OMAN

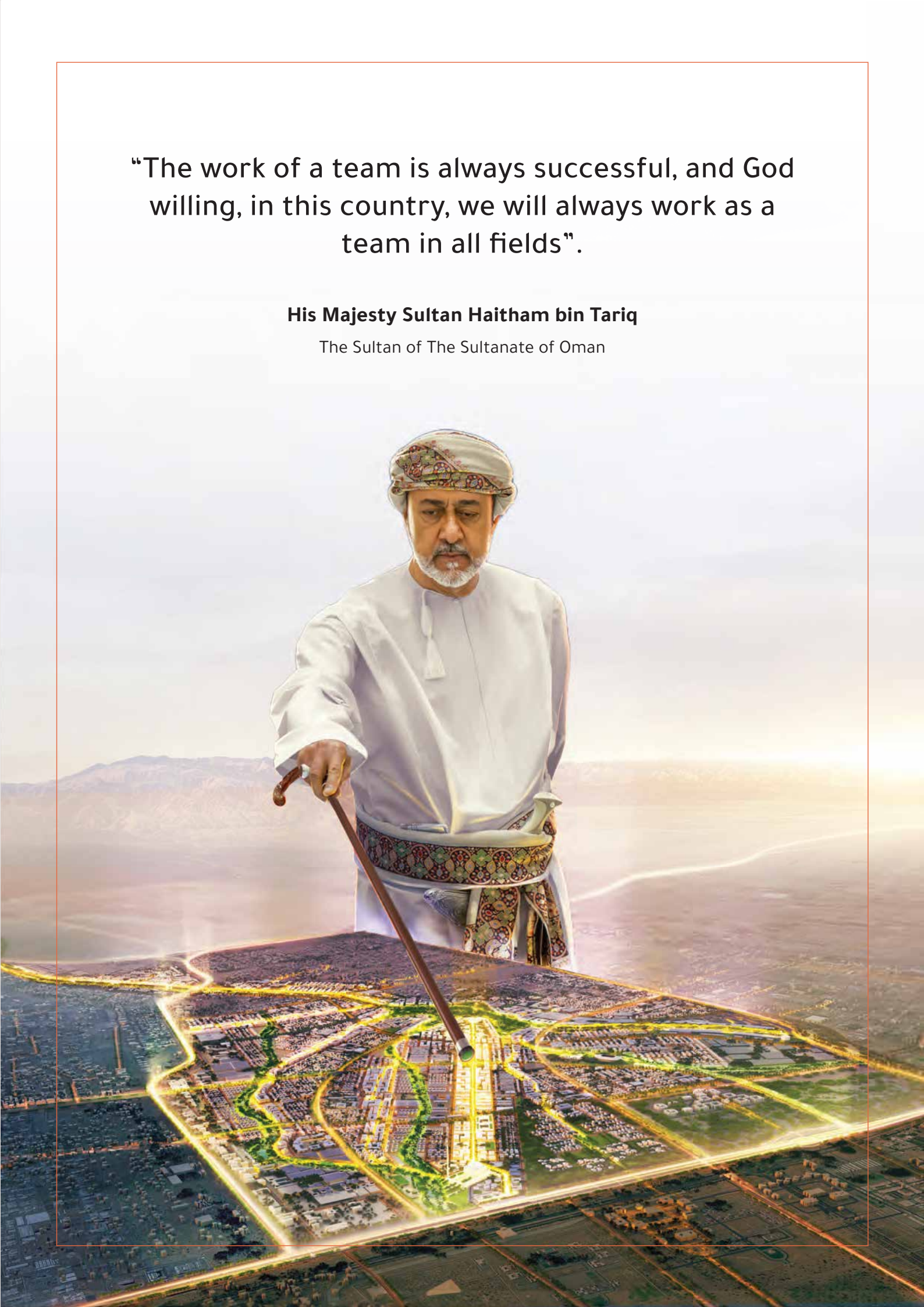
BUILDING CODE

Historical and Existing Building

“The work of a team is always successful, and God willing, in this country, we will always work as a team in all fields”.

His Majesty Sultan Haitham bin Tariq

The Sultan of The Sultanate of Oman



Under the wise and visionary leadership of His Majesty Sultan Haitham bin Tariq — May God Protect Him — the Sultanate of Oman confidently moves forward, guided by the goals of Oman Vision 2040. This vision supports the nation's progress, development, and innovation across all sectors.

The issuance of the Sultanate of Oman Building Code marks a significant milestone, establishing essential standards for safety, resilience, and sustainability in the construction sector. The code considers the Sultanate of Oman's unique geographical and environmental conditions, ensuring adaptability across all governorates while aligning with international best practices.

In line with Oman Vision 2040, the code strengthens the construction industry by promoting global safety standards, energy efficiency, and a secure built environment. It supports the Sultanate of Oman's commitment to sustainability, environmental protection, and achieving net-zero emissions.

By adopting international standards, the code enhances construction quality, encourages investment opportunities, and drives economic growth. This achievement positions the Sultanate of Oman among leading nations in sustainable development and environmental responsibility.

Appreciation is extended to all who contributed to this achievement. Their dedication reflects the nation's commitment to excellence and continuous progress. Moving forward, collaboration is key to ensuring the successful implementation of the code, benefiting present and future generations and symbolizing the Sultanate of Oman's ambition for a brighter, more prosperous future.

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by

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PREFACE

Introduction

The *Oman Existing and Historical Building Code* (OEBHC) establishes minimum requirements for existing and historical buildings using prescriptive and performance-related provisions. It is founded on broad-based principles intended to encourage the use and reuse of existing and historical buildings while requiring reasonable upgrades and improvements with special emphasis on the protection of the historical significance and fabric of qualified historical buildings and communities. The 2025 edition of the OEBHC is compatible with the other Oman Codes developed by the International Code Council® (ICC®) under contract with the Oman Ministry of Housing and Urban Planning (MoHUP), including the *Oman Building Code*®(OBC®) *Oman Energy Efficiency and Sustainability Code*® (OEESC®), *Oman Mechanical Code* (OMC), *Oman Plumbing Code* (OPC), and *Oman Private Sewage Disposal Code* (OPSDC).

The Sultanate of Oman Codes which are based on the I-Codes are used in a variety of ways in both the public and private sectors, including as the basis of laws and regulations for building design and construction. Most industry professionals are familiar with the I-Codes as the basis of laws and regulations in communities across the USA and in other countries. However, the impact of the codes extends well beyond the regulatory arena, as they are used in a variety of nonregulatory settings, including:

- Voluntary compliance programs such as those promoting sustainability, energy efficiency, resiliency, and disaster and emergency response.
- By the insurance industry, to estimate and manage risk, and as a tool in underwriting and insurance premium determination.
- In certification and credentialing of individuals involved in the fields of building design, construction and safety.
- In certification and evaluation of building and construction-related products.
- For facilities management.
- For “best practices” benchmarks for designers and builders.
- In colleges, universities and technical schools’ textbooks and curricula.

Development

The 2025 *Oman Existing and Historical Building Code* is based on the 2021 *International Existing Building Code* (IEBC®) in addition to several provisions from the 2024 *International Existing Building Code* (IEBC®) and the 2022 edition of the *California Historical Building Code*.

Maintenance

The IEBC is kept up to date through the review of proposed changes submitted by code enforcement officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate.

The ICC Code Development Process reflects principles of openness, transparency, balance, due process and consensus. The ICC process is open to anyone; there is no cost to participate, and people can participate without travel cost through the ICC's cloud-based app, cdpAccess®. A broad cross section of interests are represented in the ICC Code Development Process. The codes, which are updated regularly, include safeguards that allow for emergency action when required for health and safety reasons. The Oman Code development process includes input and feedback by public and private sector stakeholders, including government ministries and higher education institutions in collaboration with the ICC consulting team.

Coordination of the Oman Codes

The coordination of technical provisions is one of the strengths of the Oman Codes, which are based on the I-Codes. The Oman Codes can be used as a complete set of complementary documents, which will provide users with full integration and coordination of technical provisions. Individual codes can also be used in subsets or as stand-alone documents. To make sure that each individual code is as complete as possible, some technical provisions that are relevant to more than one subject area are duplicated in some of the Oman Codes.

Italicized Terms

Terms italicized in code text, other than document titles, are defined in Chapter 2. The terms selected to be italicized have definitions that the user should read carefully to better understand the code. Where italicized, the Chapter 2 definition applies. If not italicized, common-use definitions apply.

Adoption

The International Code Council and Oman Ministry of Housing and Urban Planning maintain a copyright in all of their codes and standards. Maintaining copyright of ICC Codes and Standards allows the ICC to fund its mission through sales of books, in both print and electronic formats. The ICC welcomes adoption of its codes by municipalities that recognize and acknowledge the ICC's copyright in the code, and further acknowledge the substantial shared value of the public/private partnership for code development between municipalities and the ICC.

The Oman Existing and Historical Building Code (OEHBC) is available in English and Arabic. In cases where the application or interpretation of a code provision differs in Arabic and English versions, it is intended that the English version will be referenced.

Effective Use of the Oman Existing and Historical Building Code

The OEHBC is intended to provide requirements for repair and alternative approaches for alterations, changes of occupancy and additions to existing and historical buildings. A large number of existing buildings and structures do not comply with the current building code requirements for new construction. The same can be said for historical buildings who may be no longer occupied or located in an uninhabited historical community. Although many of these buildings are potentially salvageable, rehabilitation is often cost-prohibitive because compliance with all the requirements for new construction could require extensive changes that go well beyond the value of the building or the original scope of the alteration. These processes become more challenging in historical buildings where the historical fabric, significance and in many cases the use must be preserved. A

proposed use to render the restoration economically viable may present a conflict with the historical nature of the building. The employment of archaic materials present an additional challenge and restoration to the original conditions require specialized construction skills. At the same time, it is necessary to regulate construction in existing and historical buildings that undergo additions, alterations, extensive repairs or change of occupancy. Such activity represents an opportunity to ensure that new construction complies with the current building codes and that existing conditions are maintained, at a minimum, to their current level of compliance or are improved as required to meet basic safety levels. To accomplish this objective, and to make the alteration process easier, this code allows for options for controlled departure from full compliance with the International Codes dealing with new construction, while maintaining basic levels for fire safety, structural and life safety features of the rehabilitated building.

This code provides three main options for a designer in dealing with alterations of existing buildings while historical buildings are covered in chapter 12. These are laid out in Section 301 of this code:

OPTION 1: Work for alteration, change of occupancy or addition of all existing buildings shall be done in accordance with the Prescriptive Compliance Method given in Chapter 5.

OPTION 2: Work for alteration, change of occupancy or addition of all existing buildings shall be done in accordance with the Work Area Compliance Method given in Chapters 6 through 12.

OPTION 3: Work for alteration, change of occupancy or addition of all existing buildings shall be done in accordance with the Performance Compliance Method given in Chapter 13. Under limited circumstances, a building alteration can be made to comply with the laws under which the building was originally built, as long as the accessibility requirements for the disabled are met, there has been no substantial structural damage and there will be limited structural alteration. Flood hazard provisions also must still be addressed where there is a substantial improvement.

Note that all repairs must comply with Chapter 4 and all relocated buildings are addressed by Chapter 14.

ARRANGEMENT AND FORMAT OF THE 2025 OEHBC

Before applying the requirements of the OEHBC, it is beneficial to understand its arrangement and format. The OEHBC, like other codes published by ICC, is arranged and organized to follow logical steps that generally occur during a plan review or inspection.

The following table shows how the OEHBC is divided. The ensuing chapter-by-chapter synopsis details the scope and intent of the provisions of the OEHBC.

CHAPTER TOPICS

Chapter	Subjects
1–2	Administrative Requirements and Definitions
3	Provisions for all Compliance Methods
4	Repairs
5	Prescriptive Compliance Method for Existing Buildings
6–11	Work Area Compliance Method for Existing Buildings
12	Historical Buildings
13	Performance Compliance Method for Existing Buildings
14	Relocated or moved Buildings
15	Construction Safeguards
16	Referenced Standards
Appendix A	Guidelines for Seismic Retrofit of Existing Buildings
Appendix B	Reserved
Appendix C	Reserved
Appendix D	Board of Appeals
Appendix E	Temporary Emergency Uses
Resources A–C	Resource Chapters

Chapter 1 Scope and Administration

This chapter contains provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining “due process of law” in enforcing the regulations contained in the body of the code. Only through careful observation of the administrative provisions can the building official reasonably expect to demonstrate that “equal protection under the law” has been provided.

Chapter 2 Definitions

All defined terms in the code are provided in Chapter 2. While a defined term may only be used in one chapter or another, the meaning provided in Chapter 2 is applicable throughout the code.

Where understanding of a term’s definition is especially key to or necessary for understanding of a particular code provision, the term is shown in italics wherever it appears in the code. This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Guidance regarding tense, gender and plurality of defined terms as well as guidance regarding terms not defined in this code is also provided.

Chapter 3 Provisions for All Compliance Methods

This chapter serves several purposes. The main role is to explain the three compliance options available in the code. Clarification is provided as to how provisions in other codes related to repairs, alterations, additions, relocation and changes in occupancy must also be addressed unless they conflict with the OEHBC. In that case, the OEHBC takes precedence. In addition, this chapter also lays out the methods to be used for seismic design and evaluation throughout the OEHBC. There are also several issues that are addressed globally for all methods for consistent application including storm shelters, accessibility, smoke alarms, carbon monoxide detection and exterior wall coverings.

Chapter 4 Repairs

Chapter 4 governs the repair of existing buildings. The provisions define conditions under which repairs may be made using materials and methods like those of the original construction or the extent to which repairs must comply with requirements for new buildings.

This chapter, like Chapter 14 related to relocated or moved buildings, is independent from the three methods presented by this code.

Chapter 5 Prescriptive Compliance Method

This chapter provides one of the three main options of compliance available in the OEHBC for buildings and structures undergoing alteration, addition or change of occupancy.

Chapter 6 Classification of Work

This chapter provides an overview of the Work Area Method available as an option for rehabilitation of a building. The chapter defines the different classifications of alterations and provides general requirements for alterations, change of occupancy, additions and historical buildings. Detailed requirements for all of these are given in subsequent Chapters 7 through 11.

Chapter 7 Alterations—Level 1

This chapter provides the technical requirements for those existing buildings that undergo Level 1 alterations as described in Section 503, which includes replacement or covering of existing materials, elements, equipment or fixtures using new materials for the same purpose. This chapter, similar to other chapters of this code, covers all building-related subjects, such as structural, mechanical, plumbing and electrical as well as the fire and life safety issues when the alterations are classified as Level 1. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 8 and 9 by only involving replacement of building components with new components. In contrast, Level 2 alterations involve more space reconfiguration and Level 3 alterations involve more extensive space reconfiguration, exceeding 50 percent of the building area.

Chapter 8 Alterations—Level 2

Like Chapter 7, the purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system when a building is being altered. This chapter is distinguished from Chapters 7 and 9 by involving space reconfiguration that could be up to and including 50 percent of the area of the building. In contrast, Level 1 alterations (Chapter 7) do not involve space reconfiguration, and Level 3 alterations (Chapter 9) involve extensive space reconfiguration that exceeds 50 percent of the building area. Depending on the nature of alteration work, its location within the building and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes.

Chapter 9 Alterations—Level 3

This chapter provides the technical requirements for those existing buildings that undergo Level 3 alterations. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 7 and 8 by involving alterations that cover 50 percent of the aggregate area of the building. In contrast, Level 1 alterations do not involve space reconfiguration and Level 2 alterations involve extensive space reconfiguration that does not exceed 50 percent of the building area. Depending on the nature of alteration work, its location within the building and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes. At times and under certain situations, this chapter also intends to improve the safety of certain building features beyond the work area and in other parts of the building where no alteration work might be taking place.

Chapter 10 Change of Occupancy

The purpose of this chapter is to provide regulations for the circumstances when an existing building is subject to a change of occupancy or a change of occupancy classification. A change of occupancy is not to be confused with a change of occupancy classification. The OBC defines different occupancy classifications in Chapter 3 and special occupancy requirements in Chapter 4. Within specific occupancy classifications, there can be many different types of actual activities that can take place. For instance, a Group A-3 occupancy classification deals with a wide variation of different types of activities, including bowling alleys and courtrooms, indoor tennis courts and dance halls. When a facility changes use from, for example, a bowling alley to a dance hall, the occupancy classification remains A-3, but the different uses could lead to drastically different code requirements. Therefore, this chapter deals with the special circumstances that are associated with a change in the use of a building within the same occupancy classification as well as a change of occupancy classification.

Chapter 11 Additions

Chapter 11 provides the requirements for additions, which correlate to the code requirements for new construction. There are, however, some exceptions that are specifically stated within this chapter. An "*Addition*" is defined in Chapter 2 as "an extension or increase in the floor area, number of stories or height of a building or structure." Chapter 11 contains the minimum requirements for an addition that is not separated from the existing building by a fire wall.

Chapter 12 Historical Buildings

This chapter provides some exceptions from code requirements when the building in question has historic value. The most important criterion for application of this chapter is that the building must be essentially accredited as being of historical significance by Ministry of Heritage and Tourism. Other considerations include the structural condition of the building (i.e., is the building structurally sound), its proposed use, its impact on life safety and how the intent of the code, if not the letter, will be achieved.

Chapter 13 Performance Compliance Methods

This chapter allows for existing buildings to be evaluated so as to show that alterations or a change of occupancy, while not meeting new construction requirements, will improve the current existing situation. Provisions are based on a numerical scoring system involving 21 various safety parameters and the degree of code compliance for each issue.

Chapter 14 Relocated or Moved Buildings

Chapter 14 is applicable to any building that is moved or relocated. This chapter, like the chapter on repairs, is independent from the three methods presented in this code.

Chapter 15 Construction Safeguards

The building construction process involves a number of known and unanticipated hazards. Chapter 15 establishes specific regulations in order to minimize the risk to the public and adjacent property. Some construction failures have resulted during the initial stages of grading, excavation and demolition. During these early stages, poorly designed and installed sheeting and shoring have resulted in ditch and embankment cave-ins. Also, inadequate underpinning of adjoining existing structures or careless removal of existing structures has produced construction failures.

There are also several fire safety and means of egress issues addressed by this chapter. This chapter is also consistent with Chapter 33 of the OBC.

Chapter 16 Referenced Standards

The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 16 contains a comprehensive list of all standards that are referenced in the code. The standards are part of the code to the extent of the reference to the standard. Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the building code official, contractor, designer and owner.

Chapter 16 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard. Each agency's standards are then listed in either alphabetical or numeric order based upon the standard identification. The list also contains the title of the standard; the edition (date) of the standard referenced; any addenda included as part of the code adoption; and the section or sections of this code that reference the standard.

Appendix A Guidelines for the Seismic Retrofit of Existing Buildings

Appendix A provides guidelines for upgrading the seismic resistance capacity of different types of existing buildings. It is organized into separate chapters which deal with buildings of different types, including unreinforced masonry buildings, reinforced concrete and reinforced masonry wall buildings. This appendix includes its own referenced standards.

Appendix B Reserved.

Appendix C Reserved.

Appendix D Board of Appeals

Section 112 of Chapter 1 requires the establishment of a board of appeals to hear appeals regarding determinations made by the building official. Appendix D provides qualification standards for members of the board as well as operational procedures of such board.

Appendix E Temporary Emergency Uses.

Appendix E is intended to provide guidance for designers, engineers, architects and fire and building officials on allowing temporary emergency uses of existing buildings with respect to the minimum code requirements. This appendix is a template or checklist that references the relevant code requirement of concerns.

Resources

Resource chapters are important supplementary information for users of the code to help more effective application of the code. It is recommended that resource chapters be reviewed by regulatory authorities as well as the design and construction community to be aware of other tools or additional information that might impact building design, construction and regulation.

Resource A Equivalent Standards for Select Oman Existing and Historical Building Code Referenced Standards

This resource chapter provides general information for consideration of suggested equivalency with certain European Norm Standards (EN), British Standards, ISO or other standards. The use of the listed equivalent standards is subject to the approval of the code official.

Resource B Regulations of Sultanate of Oman

This resource chapter provides a listing of various Oman ministries and authorities that have certain regulations that might impact the design, construction and regulation of buildings. Users of the code should refer to this resource and contact these entities as needed to evaluate what Omani regulations might impact their building project.

Resource C Recommended Practices for Remote Virtual Inspections (RVI)

This resource chapter about remote virtual Inspections (RVI) provides information on a method of inspection that allows the needed inspections to proceed in a timely manner by the consultant, owner or contractor located on the job site and the inspector or inspection teams performing the inspection remotely. The advantages of this methodology are so great that by reliance on more advanced technologies, it will likely become a popular and routine tool for the foreseeable future.

This RVI resource covers scheduling inspections by the contractor and inspector, expectations during RVI, training and communication about this methodology and other related matters.

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CHAPTER 1
SCOPE AND ADMINISTRATION

User note:

About this chapter: *Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—Scope and Administration (Sections 101–102) and Part 2—Administration and Enforcement (Sections 103–117). Section 101 identifies which buildings and structures come under its purview and references other codes as applicable.*

This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the building official appointed by the municipality and also establish the rights and privileges of the registered design professional, contractor and property owner.

PART 1—SCOPE AND APPLICATION

SECTION 101
SCOPE AND GENERAL REQUIREMENTS

101.1 Title. These regulations shall be known as the *Oman Existing and Historical Building Code*, hereinafter referred to as "this code."

101.2 Scope. The provisions of this code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* to and relocation of *existing* and *historical buildings*.

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted or referenced.

101.2.2 Application of Oman Fire Code. Where work regulated by this code is also regulated by the construction requirements for *existing* and *historical buildings* in the *Oman Fire Code,* where applicable*,* such work shall comply with applicable requirements in both codes.

101.3 Purpose. The intent of this code is to provide flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements to provide a reasonable level of safety, health, property protection and general welfare insofar as they are affected by the *repair*, *alteration*, *change of occupancy*, *addition* and relocation of *existing* and *historical buildings*.

101.4 Applicability. This code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* and relocation of *existing* and *historical buildings*, regardless of occupancy, subject to the criteria of Section 101.4.2.

101.4.1 Reserved.

101.4.2 Buildings previously occupied. The legal occupancy of any building existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *Oman Fire Code*, or the *Oman Building Code*, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

101.5 Safeguards during construction. Construction work covered in this code, including any related demolition, shall comply with the requirements of Chapter 15.

101.6 Reserved.

101.7 Correction of violations of other codes. *Repairs* or *alterations* mandated by the *Oman Fire Code* or other Oman regulations listed in Chapter 36 of the *Oman Building Code* shall conform only to the requirements of that regulation and shall not be required to conform to this code unless the regulations requiring such *repair* or *alteration* so provides.

SECTION 102
APPLICABILITY

102.1 General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

102.2 Other laws. The provisions of this code shall not be deemed to nullify any Royal Decrees or national law; however, they shall take precedence over provisions of local orders or governorate regulations related to building and occupant safety in the repair, alterations or reconstruction of existing buildings and structures.

102.3 Application of references. References to chapter or section numbers or to provisions not specifically identified by number shall be construed to refer to such chapter, section or provision of this code.

102.4 Referenced codes, standards and regulations. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 102.4.1 and 102.4.2. Other Oman regulations of listed ministries and authorities in Resource B, the scope of which may or may not be compatible with the scope of this code, may also be applicable.

In addition to standards referenced in this code, the *building official* may approve products, materials and building systems or components that are manufactured to the latest editions of other standards when, in the opinion of the *building official*, such products, materials, building systems or components meet or exceed the referenced standards. Such comparable standards include, but are not limited to, Oman Standards, British Standards, European Norms (EN), Standards and International Organization for Standardization (ISO) Standards.

The registered design professional shall submit written certification that the proposed comparable standard is consistent with the design and installation requirements of this code and other affected standards. In the event another standard is used, the designer shall be limited to the provisions within that standard and shall not concurrently apply provisions from any other similar standards.

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment or appliance, the conditions of the listing shall govern.

102.4.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

102.4.2 Conflicting provisions. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

102.5 Partial invalidity. In the event that any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.

PART 2—ADMINISTRATION AND ENFORCEMENT

SECTION 103
CODE COMPLIANCE AGENCY

103.1 Creation of agency. The Municipalities of Oman are hereby designated as the enforcing agency, The official in charge thereof shall be known as the *building official*. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.

103.2 Appointment. The *building official* shall be appointed by the municipality.

103.3 Deputies. In accordance with the prescribed procedures of the municipality, the *building official* shall have the authority to appoint a deputy *building official*, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the *building official*.

SECTION 104
DUTIES AND POWERS OF BUILDING OFFICIAL

104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code.

104.2 Determination of compliance. The *building official* shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies and procedures in order to clarify the application of this code's provisions. Such interpretations, policies and procedures:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be *listed* and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an *approved* listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the *building official*.

104.2.2 Technical assistance. To determine compliance with this code, the *building official* is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the municipality.

104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the *building official*. The *building official* is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

104.2.2.3 Content. The technical opinion and report shall analyze the properties of the design, operation or use of the building or premises and the *facilities* and appurtenances situated thereon to identify and propose necessary recommendations.

104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the *building official* shall have the authority to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the *building official* shall approve the testing procedures. Such tests shall be performed by a party acceptable to the *building official*.

104.2.3 Alternative materials, design and methods of construction, and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been *approved*.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *ICC Performance Code.* This exception shall not apply to alternative structural materials or to alternative structural designs.

104.2.3.1 Approval authority. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative is satisfactory and complies with Sections 104.2.3.2 through 104.2.3.7, as applicable.

104.2.3.2 Application and disposition. Where required, a request to use an alternative material, design or method of construction shall be submitted in writing to the *building official* for approval. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality.
2. Strength.
3. Effectiveness.
4. Durability.

5. Safety, other than fire safety.
6. Fire safety.

104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end-use configuration. Such tests shall be performed by a party acceptable to the *building official*.

104.2.3.5.1 Fire tests. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end-use configuration. Tests shall be performed by a party acceptable to the *building official*.

104.2.3.6 Reports. Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by ICC-ES (ICC Evaluation Service, https://icc-es.org/) or an *approved agency,* and use of the evaluation report shall require approval by the *building official* for the installation. The alternative material, design or method of construction and product evaluated shall be within the scope of the *building official's* recognition of the *approved agency.* Criteria used for the evaluation shall be identified within the report and, where required, provided to the *building official*.

104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, and laboratory or fire safety specialty organization acceptable to the *building official*. The *building official* is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

104.2.3.7 Peer review. The *building official* is authorized to require submittal of a *peer review* report in conjunction with a request to use an alternative material, design or method of construction prepared by a peer reviewer that is *approved* by the *building official*.

104.2.4 Modifications. Wherever there are practical difficulties involved in carrying out the provisions of this code, the *building official* shall have the authority to grant modifications for individual cases on application of the owner or owner's authorized representative, provided that the *building official* shall first find that special individual reason makes the strict letter of this code impractical, the modification is in compliance with the intent and purpose of this code and such modification does not lessen health, accessibility, life and fire safety, or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the *Department of Building Safety*.

104.2.4.1 Flood hazard areas. For *existing buildings* located in *flood hazard areas* for which *repairs*, *alterations* and *additions* constitute *substantial improvement*, the *building official* shall not grant modifications to provisions related to flood resistance unless a determination is made that:

1. The applicant has presented good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render compliance with the flood-resistant construction provisions inappropriate.
2. Failure to grant the modification would result in exceptional hardship.
3. The granting of the modification will not result in increased flood heights, additional threats to public safety, extraordinary public expense nor create nuisances, cause fraud on or victimization of the public, or conflict with existing laws or regulations.
4. The modification is the minimum necessary to afford relief, considering the flood hazard.
5. A written notice will be provided to the applicant and the owner stating that construction below the design flood elevation increases risks to life and property. Such notice shall also specify the difference between the design flood elevation and the elevation to which the building is to be built.

104.3 Applications and permits. The *building official* shall receive applications, review construction documents and issue permits for the *repair*, alteration, *addition*, demolition, *change of occupancy* and relocation of buildings; inspect the premises for which such permits have been issued; and enforce compliance with the provisions of this code.

104.3.1 Determination of substantially improved or substantially damaged *existing buildings* and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, *alteration*, addition or other improvement of *existing buildings* or structures located in *flood hazard areas*, the *building official* shall determine where the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*. Where the *building official* determines that the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*, and where required by this code, the *building official* shall require the building to meet the requirements of Section 1612 of the *Oman Building Code*.

104.3.2 Preliminary meeting. When requested by the permit applicant or the *building official*, the *building official* shall meet with the permit applicant prior to the application for a construction permit to discuss plans for the proposed work or *change of occupancy* in order to establish the specific applicability of the provisions of this code.

Exception: *Repairs* and Level 1 *alterations*.

104.3.2.1 Building evaluation. The *building official* is authorized to require an *existing building* to be investigated and evaluated by a registered design professional based on the circumstances agreed on at the preliminary meeting. The design professional shall notify the *building official* if any potential noncompliance with the provisions of this code is identified.

104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the *building official* has reasonable cause to believe that there exists in a structure or on any premises a condition that is contrary to or in violation of this code that makes the structure or premises *unsafe*, *dangerous* or hazardous, the *building official* is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed by this code. If such structure or premises is occupied, the *building official* shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the *building official* shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the *building official* shall have recourse to every remedy provided by law to secure entry.

104.4.1 Warrant. Where the *building official* has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent, occupant or person having charge, care or control of the structure or premises shall not fail or neglect, after a proper request is made as herein provided, to permit entry therein by the *building official* for the purposes of inspection and examination pursuant to this code.

104.5 Identification. The *building official* shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.6 Notices and orders. The *building official* shall issue necessary notices or orders to ensure compliance with this code. Notices of violations shall be in accordance with Section 113.

104.7 Official records. The *building official* shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period required in accordance with the municipality's policies.

104.7.1 Approvals. A record of approvals shall be maintained by the *building official* and shall be available for public inspection during business hours in accordance with applicable laws.

104.7.2 Inspections. The *building official* shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

104.7.3 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the *building official* for either shall be in writing and shall be retained in the official records.

104.7.4 Tests. The *building official* shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

104.7.5 Fees. The *building official* shall keep a record of fees collected and refunded in accordance with Section 108.

104.8 Liability. The *building official*, member of the board of appeals, officer or employee charged with the enforcement of this code, while acting for the municipality in good faith and without malice in the discharge of the duties required by this code or other pertinent law or regulation, shall not thereby be rendered personally liable, either civilly or criminally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or regulations implemented through the enforcement of this code shall be defended by legal representatives of the municipality until the final termination of the proceedings. The *building official* or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

104.9 Approved materials and equipment. Materials, equipment and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

104.9.1 Materials and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working condition and *approved*.

SECTION 105
PERMITS

105.1 Required. Any owner or owner's authorized agent who intends to *repair*, add to, alter, relocate, demolish or change the occupancy of a building or to *repair*, install, add, alter, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required permit. Where equipment replacements and repairs must be performed in an emergency situation, the *permit* application shall be submitted to the *building official* within the next working business day

105.1.1 Annual permit. Instead of an individual permit for each *alteration* to an already *approved* electrical, gas, mechanical, or plumbing installation, the *building official* is authorized to issue an annual permit on application therefor to any person, firm or corporation regularly employing one or more qualified trade persons in the building, structure, or on the premises owned or operated by the applicant for the permit.

105.1.2 Annual permit records. The person to whom an annual permit is issued shall keep a detailed record of *alterations* made under such annual permit. The *building official* shall have access to such records at all times, or such records shall be filed with the *building official* as designated.

105.2 Work exempt from permit. Work may be exempt from permit as identified by the municipality policy. Exemptions from permit requirement shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or regulations of the municipality.

105.2.1 Reserved.

105.2.2 Reserved.

105.2.3 Reserved.

105.3 Application for permit. To obtain a permit, the applicant shall first file an application, digitally or in writing, on a form furnished by the *Department of Building Safety* for that purpose. Such application shall:

1. Identify and describe the work in accordance with Chapter 3 to be covered by the permit for which application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by construction documents and other information as required in Section 106.3.
5. State the valuation of the proposed work.
6. Be signed by the applicant or the applicant's authorized agent.
7. Give such other data and information as required by the *building official*.

105.3.1 Action on application. The *building official* shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the construction documents do not conform to the requirements of pertinent laws, the *building official* shall reject such application in writing, stating the reasons therefor. If the *building official* is satisfied that the proposed work conforms to the requirements of this code and laws and regulations applicable thereto, the *building official* shall issue a permit therefor as soon as practicable.

105.3.2 Time limitation of application. An application for a permit for any proposed work shall be deemed to have been abandoned if updated construction documents are not submitted 14 working days after a response from the municipality. The 14-day duration may be revised by the *building official* to a longer duration based on the size and complexity of the project.

105.4 Validity of permit. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other regulation of the municipality. Permits presuming to give authority to violate or cancel the provisions of this code or other regulations of the municipality shall not be valid. The issuance of a permit based on construction documents and other data shall not prevent the *building official* from requiring the correction of errors in the construction documents and other data. The *building official* is authorized to prevent occupancy or use of a structure where in violation of this code or of any other regulations of this municipality.

105.5 Expiration. Every permit issued shall become invalid 2 years after its issuance. The *building official* is authorized to grant, in writing, one or more extensions of time, for periods not more than 24 months each after renewal fees are paid. The extension shall be requested in writing and justifiable cause demonstrated.

105.6 Suspension or revocation. The *building official* is authorized to suspend or revoke a permit issued under the provisions of this code wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any law or regulation or any of the provisions of this code.

105.7 Placement of permit. The building permit or copy shall be kept on the site of the work until the completion of the project.

SECTION 106
CONSTRUCTION DOCUMENTS

106.1 General. Submittal documents consisting of construction documents, special inspection and structural observation programs, investigation and evaluation reports, and other data shall be submitted in two or more sets, or in a digital format where allowed by the *building official,* with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the policies of the municipality in which the project is to be constructed. Where special conditions exist, the *building official* is authorized to require additional construction documents to be prepared by a registered design professional.

Exception: The *building official* is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.

106.2 Construction documents. Construction documents shall be in accordance with Sections 106.2.1 through 106.2.6.

106.2.1 Information on construction documents. Construction documents shall be dimensioned and drawn on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *building official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *building official*. The *work areas* shall be shown.

106.2.2 Fire protection system shop drawings. Shop drawings for the fire protection systems shall be submitted to indicate compliance with this code and the construction documents and shall be *approved* prior to the start of system installation. Shop drawings shall contain information as required by the referenced installation standards in Chapter 9 of the *Oman Building Code*.

106.2.3 Means of egress. The construction documents for *Alterations*—Level 2, *Alterations*—Level 3, *additions* and *changes of occupancy* shall show in sufficient detail the location, construction, size and character of all portions of the means of egress in compliance with the provisions of this code. The construction documents shall designate the number of occupants to be accommodated in every *work area* of every floor and in all affected rooms and spaces.

106.2.4 Exterior wall envelope. Construction documents for work affecting the *exterior wall envelope* shall describe the *exterior wall envelope* in sufficient detail to determine compliance with this code. The construction documents shall provide details of the *exterior wall envelope* as required, including windows, doors, flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, water-resistive barriers and details around openings.

The construction documents shall include manufacturer's installation instructions that provide supporting documentation that the proposed penetration and opening details described in the construction documents maintain the wind and weather resistance of the *exterior wall envelope*. The supporting documentation shall fully describe the exterior wall system that was tested, where applicable, as well as the test procedure used.

106.2.5 Exterior balconies and elevated walking surfaces. Where the scope of work involves balconies or other elevated walking surfaces have weather-exposed surfaces, and the structural framing is protected by an impervious moisture barrier, the construction documents shall include details for all elements of the impervious moisture barrier system. The construction documents shall include manufacturer's installation instructions.

106.2.6 Site plan. The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and *existing structures* on the site, distances from lot lines, the established street grades, and the proposed finished grades; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of *existing structures* and construction that are to remain on the site or plot. The *building official* is authorized to waive or modify the requirement for a site plan where the application for permit is for *alteration*, *repair* or *change of occupancy*.

106.3 Examination of documents. The *building official* shall examine or cause to be examined the submittal documents and shall ascertain by such examinations whether the construction or occupancy indicated and described is in accordance with the requirements of this code and other pertinent laws or regulations.

106.3.1 Approval of construction documents. Where the *building official* issues a permit, the construction documents shall be *approved* in writing or by stamp as "Approved." One set of construction documents so reviewed shall be retained by the *building official*. The other set shall be returned to the applicant, shall be kept at the site of work, and shall be open to inspection by the *building official* or a duly authorized representative.

106.3.2 Previous approval. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been issued and the construction of which has been pursued in good faith within 24 months after the effective date of this code and has not been abandoned.

106.3.3 Phased approval. The *building official* is authorized to issue a permit for the construction of foundations or any other part of a building before the construction documents for the whole building or structure have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for the foundation or other parts of a building shall proceed at the holder's own risk with the building operation and without assurance that a permit for the entire structure will be granted.

106.3.4 Deferred submittals. Deferral of any submittal items shall have the prior approval of the *building official*. The *registered design professional in responsible charge* shall list the *deferred submittals* on the construction documents for review by the *building official*.

Submittal documents for *deferred submittal* items shall be submitted to the *registered design professional in responsible charge* who shall review them and forward them to the *building official* with a notation indicating that the *deferred submittal* documents have been reviewed and that they have been found to be in general conformance to the design of the building. The *deferred submittal* items shall not be installed until their *deferred submittal* documents have been *approved* by the *building official*.

106.4 Amended construction documents. Work shall be installed in accordance with the reviewed construction documents, and any changes made during construction that are not in compliance with the *approved* construction documents shall be resubmitted for approval as an amended set of construction documents.

106.5 Retention of construction documents. One set of *approved* construction documents shall be retained by the *building official* for a period of not less than 180 days from the date of completion of the permitted work, or as required by the municipality.

106.6 Design professional in responsible charge. Where it is required that documents be prepared by a registered design professional, the *building official* shall be authorized to require the owner or the owner's authorized agent to engage and designate on the building permit application a registered design professional who shall act as the *registered design professional in responsible charge*. If the circumstances require, the owner or the owner's authorized agent shall designate a substitute *registered design professional in responsible charge* who shall perform the duties required of the original *registered design professional in responsible charge*. The *building official* shall be notified in writing by the owner or the owner's authorized agent if the *registered design professional in responsible charge* is changed or is unable to continue to perform the duties. The *registered design professional in responsible charge* shall be responsible for reviewing and coordinating submittal documents prepared by others,

including phased and *deferred submittal* items, for compatibility with the design of the building. Where structural observation is required, the inspection program shall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur.

SECTION 107
TEMPORARY USES, EQUIPMENT AND SYSTEMS

107.1 General. The *building official* is authorized to issue a permit for temporary uses, equipment and systems. Such permits shall be limited as to time of service but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

107.2 Conformance. Temporary uses shall conform to the requirements of this code as necessary to ensure the public health, safety and general welfare.

107.3 Temporary service utilities. The *building official* is authorized to grant permission to temporarily supply service utilities in accordance with Section 111.

107.4 Termination of approval. The *building official* is authorized to terminate such permit for a temporary use and to order the same to be discontinued.

SECTION 108
FEES

108.1 Payment of fees. A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a *permit* be released until the additional fee, if any, has been paid.

108.2 Schedule of permit fees. Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the municipality.

108.3 Permit valuations. The applicant for a permit shall provide an estimated value of the work for which the permit is being issued at time of application. Such estimated valuations shall include total value of work, including materials and labor for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems.

108.4 Work commencing before permit issuance. Any person who commences any work before obtaining the necessary permits shall be subject to a fee established by the *building official* that shall be in addition to the required permit fees or as prescribed by the municipality.

108.5 Related fees. The payment of the fee for the construction, *alteration*, removal or demolition of work done in connection to or concurrently with the work authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

108.6 Refunds. The *building official* is authorized to establish a refund policy.

SECTION 109
INSPECTIONS

109.1 General. Construction or work for which a permit is required shall be subject to inspection by the *building official*, and such construction or work shall remain visible and able to be accessed for inspection purposes until *approved*. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other regulations of the municipality. Inspections presuming to give authority to violate or cancel the provisions of this code or of other regulations of the municipality shall not be valid. It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Neither the *building official* nor the municipality shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

109.2 Preliminary inspection. Before issuing a permit, the *building official* is authorized to examine or cause to be examined buildings and sites for which an application has been filed.

109.3 Required inspections. The *building official*, on notification, shall make the inspections set forth in Sections 109.3.1 through 109.3.11.

109.3.1 Footing or foundation inspection. Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready-mixed in accordance with ASTM C94, the concrete need not be on the job.

109.3.2 Concrete slab or under-floor inspection. Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place but before any concrete is placed or floor sheathing installed, including the subfloor.

109.3.3 Lowest floor elevation. For *additions* and *substantial improvements* to *existing buildings* in *flood hazard areas*, on placement of the lowest floor, including basement, and prior to further vertical construction, the elevation documentation required in the *Oman Building Code* shall be submitted to the *building official*.

109.3.4 Frame inspection. Framing inspections shall be made after the roof deck or sheathing, framing, fire blocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are *approved*.

109.3.5 Lath or gypsum panel product inspection. Lath and gypsum panel inspections shall be made after lathing and gypsum panel product, interior and exterior, are in place but before any plastering is applied or before gypsum panel product joints and fasteners are taped and finished.

Exception: Gypsum panels that are not part of a fire-resistance-rated assembly or a shear assembly.

109.3.6 Weather-exposed balcony and walking surface waterproofing. Where the scope of work involves balconies or other elevated walking surfaces that have weather-exposed surfaces and the structural framing is protected by an impervious moisture barrier, all elements of the impervious moisture barrier system shall not be concealed until inspected and *approved*.

Exception: Where special inspections are provided in accordance with Section 1705.1.1, Item 3, of the *Oman Building Code*.

109.3.7 Fire- and smoke-resistant penetrations. Protection of joints and penetrations in fire-resistance-rated assemblies, smoke barriers and smoke partitions shall not be concealed from view until inspected and *approved*.

109.3.8 Other inspections. In addition to the inspections specified in Sections 109.2 through 109.3.7, the *building official* is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the *department of building safety*.

109.3.9 Special inspections. Special inspections shall be required in accordance with the *Oman Building Code*.

109.3.10 Flood hazard documentation. Where a building is located in a *flood hazard area*, documentation of the elevation of the lowest floor or the elevation of dry floodproofing, if applicable, as required in the *Oman Building Code,* shall be submitted to the *building official* prior to the final inspection.

109.3.11 Final inspection. The final inspection shall be made after work required by the building permit is completed.

109.4 Inspection agencies. The *building official* is authorized to accept reports of *approved* inspection agencies, provided that such agencies satisfy the requirements as to qualifications and reliability.

109.5 Inspection requests. It shall be the duty of the holder of the building permit or their duly authorized agent to notify the *building official* when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for any inspections of such work that are required by this code.

109.6 Approval required. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the *building official*. The *building official*, on notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed or shall notify the *permit* holder or an agent of the *permit* holder wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the *building official*.

SECTION 110
CERTIFICATE OF OCCUPANCY (COMPLETION)

110.1 Change of occupancy. A structure shall not be used or occupied in whole or in part, and a *change of occupancy* of a structure or portion thereof shall not be made until the *building official* has issued a *certificate of occupancy* therefor as provided herein. Issuance of a *certificate of occupancy* shall not be construed as an approval of a violation of the provisions of this code or of other regulations of the *municipality*. Certificates presuming to give authority to violate or cancel the provisions of this code or other regulations of the *municipality* shall not be valid.

Exception: *Certificates of occupancy* are not required for work exempt from permits in accordance with Section 105.2.

110.2 Certificate issued. After the *building official* inspects the structure and does not find violations of the provisions of this code or other laws that are enforced by the department, the *building official* shall issue a *certificate of occupancy* that contains the following:

1. The permit number.
2. The address of the structure.
3. The name and address of the owner or the owner's authorized agent.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code for the occupancy and division of occupancy and the use for which the proposed occupancy is classified.
6. The name of the *building official*.
7. The edition of the code under which the permit was issued.
8. The use and occupancy in accordance with the provisions of the *Oman Building Code*.
9. The type of construction as defined in the *Oman Building Code*.
10. The design occupant load and any impact the *alteration* has on the design occupant load of the area not within the scope of the work.
11. Where an automatic sprinkler system is provided, and whether an automatic sprinkler system is required.
12. Any special stipulations and conditions of the building permit.

110.3 Temporary occupancy. The *building official* is authorized to issue a temporary *certificate of occupancy* before the completion of the entire work covered by the *permit,* provided that such portion or portions shall be occupied safely. The *building official* shall set a time period during which the temporary certificate of occupancy is valid.

110.4 Revocation. The *building official* is authorized to suspend or revoke a *certificate of occupancy* or completion issued under the provisions of this code, in writing, wherever the certificate is issued in error or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of the provisions of this code or other regulation of the municipality.

SECTION 111
SERVICE UTILITIES

111.1 Connection of service utilities. A person shall not make connections from a utility, source of energy, fuel, power, water system or sewer system to any building or system that is regulated by this code for which a *permit* is required, until *approved* by the *building official*.

111.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, source of energy, fuel, power, water system or sewer system for the purpose of testing systems or for use under a temporary approval.

111.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 111.1 or 111.2. The *building official* shall notify the serving utility and, wherever possible, the

owner or the owner's authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the *owner*, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 112
MEANS OF APPEALS

112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building official*.

112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the municipality.

112.4 Administration. The *building official* shall take action without delay in accordance with the decision of the board.

SECTION 113
VIOLATIONS

113.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to *repair*, alter, extend, add, move, remove, demolish or change the occupancy of any building or equipment regulated by this code or cause same to be done in conflict with or in violation of any of the provisions of this code.

113.2 Notice of violation. The *building official* is authorized to serve a notice of violation or order on the person responsible for the *repair*, *alteration*, extension, *addition*, moving, removal, demolition or change in the occupancy of a building in violation of the provisions of this code or in violation of a *permit* or certificate issued under the provisions of this code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

113.3 Prosecution of violation. If the notice of violation is not complied with promptly, the *building official* is authorized to request the legal counsel of the municipality to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this code or of the order or direction made pursuant thereto.

113.4 Violation penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who *repairs* or alters or changes the occupancy of a building or structure in violation of the approved construction documents or directive of the *building official* or of a permit or certificate issued under the provisions of this code shall be subject to penalties as prescribed by the municipality.

SECTION 114
STOP WORK ORDER

114.1 Authority. Where the *building official* finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a *dangerous* or *unsafe* manner, the *building official* is authorized to issue a stop work order.

114.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

114.3 Emergencies. Where an emergency exists, the *building official* shall not be required to give a written notice prior to stopping the work.

114.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or *unsafe* condition, shall be subject to fines established by the authority having *municipality*.

SECTION 115
UNSAFE STRUCTURES AND EQUIPMENT

115.1 Unsafe conditions. Structures or existing equipment that are or hereafter become *unsafe*, insanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed an *unsafe* condition. *Unsafe* structures shall be taken down and removed or made safe as the *building official* deems necessary and as provided for in this code. A vacant structure that is not secured against unauthorized entry shall be deemed *unsafe*.

115.2 Record. The *building official* shall cause a report to be filed on an *unsafe* condition. The report shall state the occupancy of the structure and the nature of the *unsafe* condition.

115.3 Notice. If an *unsafe* condition is found, the *building official* shall serve on the owner of the structure or the owner's authorized agent a written notice that describes the condition deemed *unsafe* and specifies the required *repairs* or improvements to be made to abate the *unsafe* condition, or that requires the *unsafe* building to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the *building official* acceptance or rejection of the terms of the order.

115.4 Method of service. Such notice shall be deemed properly served where a copy thereof is served in accordance with one of the following methods:

1. A copy is delivered to the owner or the owner's authorized agent personally.
2. A copy is sent by certified or registered mail addressed to the owner at the last known address with the return receipt requested.
3. A copy is delivered in any other manner as prescribed by local law.

If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner on the owner's authorized agent shall constitute service of notice on the owner.

115.5 Restoration or abatement. The structure or equipment determined to be *unsafe* by the *building official* is permitted to be restored to a safe condition. The owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed *unsafe* by the *building official* shall abate or cause to be abated or corrected such *unsafe* conditions either by *repair*, rehabilitation, demolition or other *approved* corrective action. To the extent that *repairs*, *alterations* or *additions* are made, or a *change of occupancy* occurs during the restoration of the structure, such *repairs*, *alterations*, *additions* or *change of occupancy* shall comply with the requirements of this code.

SECTION 116
EMERGENCY MEASURES

116.1 Imminent danger. Where, in the opinion of the *building official*, there is imminent danger of failure or collapse of a building that endangers life, or where any building or part of a building has fallen and life is endangered by the occupation of the building, or where there is actual or potential danger to the building occupants or those in the proximity of any structure because of explosives, explosive fumes or vapors, or the presence of toxic fumes, gases, or materials, or operation of defective or dangerous equipment, the *building official* is hereby authorized and empowered to order and require the occupants to vacate the premises forthwith. The *building official* shall cause to be posted at each entrance to such structure a notice reading as follows: "This Structure Is Unsafe and Its Occupancy Has Been Prohibited by the Building Official." It shall be unlawful for any person to enter such structure except for the purpose of securing the structure, making the required *repairs*, removing the hazardous condition, or of demolishing the same.

116.2 Temporary safeguards. Notwithstanding other provisions of this code, whenever, in the opinion of the *building official*, there is imminent danger due to an *unsafe* condition, the *building official* shall order the necessary work to be done, including

the boarding up of openings, to render such structure temporarily safe whether or not the legal procedure herein described has been instituted; and shall cause such other action to be taken as the *building official* deems necessary to meet such emergency.

116.3 Closing streets. Where necessary for public safety, the *building official* shall temporarily close structures and close or direct the appropriate authority to close sidewalks, streets, public ways and places adjacent to *unsafe* structures, and prohibit the same from being utilized.

116.4 Emergency repairs. For the purposes of this section, the *building official* shall employ the necessary labor and materials to perform the required work as expeditiously as possible.

116.5 Costs of emergency repairs. Costs incurred in the performance of emergency work shall be paid by the municipality. The legal counsel of the municipality shall institute appropriate action against the owner of the premises or the owner's authorized agent where the *unsafe* structure is or was located for the recovery of such costs.

116.6 Hearing. Any person ordered to take emergency measures shall comply with such order forthwith. Any affected person shall thereafter, on petition directed to the appeals board, be afforded a hearing as described in this code.

SECTION 117
DEMOLITION

117.1 General. When the *building official* determines any structure is so old, dilapidated or has become so out of repair and is dangerous, unsafe, insanitary and otherwise unfit for human habitation or occupancy, the *building official* can order either of the following:

1. The *building official* is permitted to authorize the owner or owner's authorized agent to make the structure safe by repairs in order to make the structure safe and sanitary. Where there has been a cessation of construction repairs of any structure for a period of more than 2 years, the structure will be ordered demolished and removed.
2. The *building official* is permitted to order the owner or owner's authorized agent to demolish and remove any such structure.

117.2 Notices and orders. Notices and orders shall comply with Section 113.

117.3 Failure to comply. If the owner or the owner's authorized agent of a premises fails to comply with a demolition order within the time prescribed, the *building official* shall cause the structure to be demolished and removed, either through an available public agency or by contract or arrangement with private persons, and the cost of such demolition and removal shall be charged against the real estate on which the structure is located and shall be a lien on such real estate.

117.4 Salvage materials. Where any structure has been ordered demolished and removed, the governing body or other designated officer under said contract or arrangement aforesaid shall have the right to sell the salvage and valuable materials at the highest price obtainable. The net proceeds of such sale, after deducting the expenses of such demolition and removal, shall be promptly remitted with a report of such sale or transaction, including the items of expense and the amounts deducted, for the person who is entitled thereto, subject to any order of a court. If such a surplus does not remain to be turned over, the report shall so state.

CHAPTER 2
DEFINITIONS

User note:

About this chapter: *Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purpose of the code.*

SECTION 201
GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the other Oman Codes, such terms shall have the meanings ascribed to them in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this chapter, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202
GENERAL DEFINITIONS

ADDITION. An extension or increase in floor area, number of stories, or height of a building or structure.

ALTERATION. Any construction or renovation to an *existing structure* other than a *repair* or *addition*.

APPROVED. Acceptable to the *building official*.

APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been *approved* by the *building official*.

BUILDING. Any structure utilized or intended for supporting or sheltering any occupancy.

BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative. The Ministry of Heritage and Tourism designated staff shall act as the *building official* for the purposes of enforcing Chapter 12 for historical buildings.

BUILDING STANDARD. Any guideline, regulation or code that may be applied to a qualified historical building or property.

CHANGE OF OCCUPANCY. Any of the following shall be considered as a change of occupancy where the current *Oman Building Code* requires a greater degree of safety, accessibility, structural strength, fire protection, means of egress, ventilation or sanitation than is existing in the current building or structure:

1. Any change in the occupancy classification of a building or structure.
2. Any change in the purpose of, or a change in the level of activity within, a building or structure.
3. A change of use.

CHANGE OF USE. A change in the use of a building or a portion of a building, within the same group classification, for which there is a change in application of the code requirements.

CURRENT CODE. The adopted regulations that govern the design and construction or alteration of nonhistorical buildings and properties within the jurisdiction of the enforcing agency.

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under wind, rain, flood, earthquake or other environmental loads when such loads are imminent.

DEFERRED SUBMITTAL. Those portions of the design that are not submitted at the time of the application and that are to be submitted to the *code official* within a specified period.

DISPROPORTIONATE EARTHQUAKE DAMAGE. A condition of earthquake-related damage where both of the following occur:

1. The 0.3-second spectral acceleration at the building site as determined by Section 1613 of the *Oman Building Code* for the earthquake in question is less than 40 percent of the mapped acceleration parameter SS.
2. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than 10 percent from its predamage condition.

DISTINCT HAZARD. Any clear and evident condition that exists as an immediate danger to the safety of the occupants or public right-of-way. Conditions that do not meet the requirements of current regular codes and ordinances do not, of themselves, constitute a distinct hazard. Section 112, OEHBC Means of Appeals, remains applicable.

EMERGENCY ESCAPE AND RESCUE OPENING. An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

ENFORCING AUTHORITY (Historical Buildings), An entity with the responsibility for regulating, enforcing, reviewing or otherwise exerting control of or administration over the process of granting permits, approvals, decisions, variances and appeals for qualified historical buildings or properties.

EQUIPMENT OR FIXTURE. Any plumbing, heating, electrical, ventilating, air conditioning, refrigerating and fire protection equipment; and elevators, dumbwaiters, escalators, boilers, pressure vessels and other mechanical facilities; or installations that are related to building services. Equipment or fixture shall not include manufacturing, production or process equipment, but shall include connections from building service to process equipment.

EXIT LADDER DEVICE. An exit ladder device is a permanently installed, fixed, folding, retractable or hinged ladder intended for use as a means of emergency egress from areas of the second or third story. Unless *approved* specifically for a longer length, the ladder shall be limited to 7.5 m. Exit ladders are permitted where the area served by the ladder has an occupant load less than 10 persons.

EXISTING BUILDING. A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

EXISTING STRUCTURE. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments, such as cornices, soffits, facias, gutters and leaders.

EXTERIOR WALL ENVELOPE. A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space from the detrimental effects of the exterior environment.

FACILITY. All or any portion of buildings, structures, site improvements, elements and pedestrian or vehicular routes located on a site.

FIRE HAZARD. Any condition that increases or may contribute to an increase in the hazard or menace of fire to a greater degree than customarily recognized by the municipality, or any condition or act that could obstruct, delay, hinder or interfere with the operations of fire-fighting personnel or the egress of occupants in the event of fire.

FLOOD HAZARD AREA. The greater of the following two areas:

1. The area within a flood plain subject to a 1-percent or greater chance of flooding in any year.
2. The area designated as a *flood hazard area* on a community's flood hazard map, or otherwise legally designated.

HISTORICAL BUILDING. Any building or structure that is deemed of historical significance and is identified as a historical building by the Ministry of Heritage and Tourism (MHT).

HISTORICAL COMMUNITIES (HARA). Settlements that possess significant value, as determined by MHT, due to their rich historical background, cultural heritage and notable architectural landmarks. Such communities often originate from eras that date back several centuries, containing narrow streets, ancient buildings such as forts, mosques and traditional homes built from archaic materials such as mud bricks. They may be inhabited or uninhabited and untouched by modern development.

HISTORICAL FABRIC OR MATERIALS. Original and later-added historically significant construction materials, architectural finishes or elements in a particular pattern or configuration that form a qualified historical property, as determined by the MHT.

HISTORICAL SIGNIFICANCE. Importance for which a property has been evaluated and found to be historical, as determined by the MHT.

IMMINENT THREAT. Any condition within or affecting a qualified historical building or property that, in the opinion of the municipality, would qualify a building or property as dangerous to the extent that the life, health, property or safety of the public, its occupants or those performing necessary repair, stabilization or shoring work are in immediate peril due to conditions affecting the building or property. Potential hazards to persons using, or making improvements within, the right-of-way may not be construed to be "imminent threats" solely for that reason if the hazard can be mitigated by shoring, stabilization, barricades or temporary fences.

INTEGRITY. Authenticity of a building or property's historical identity, evidenced by the survival of physical characteristics that existed during the property's historical or prehistorical period of significance.

LIFE SAFETY EVALUATION. An evaluation of the life safety hazards of a qualified historical building or property based on procedures similar to those contained in NFPA 909, *Standard for the Protection of Cultural Resources,* Appendix B, Fire Risk Assessment in Heritage Premises.

LIFE SAFETY HAZARD. See *"Distinct Hazard."*

LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *buiding official* and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify *listed* equipment, products or materials include "listed," "certified," "classified" or other terms as determined appropriate by the listing organization.

LOWEST FLOOR. The lowest floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access or limited storage, provided that such enclosure is not built so as to render the structure in violation of Section 1612 of the *Oman Building Code,*

NONCOMBUSTIBLE MATERIAL. A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E136 are considered *noncombustible materials*.

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and that is equipped with a means of egress system meeting the requirements of this code.

OMAN FIRE CODE. The regulations of Civil Defense titled "Buildings Fire Prevention and Protection Requirements—Parts One through Five."

PEER REVIEW. An independent and objective technical review conducted by an *approved* third party.

PERIOD OF SIGNIFICANCE. The period of time when a qualified historical building or property was associated with important events, activities or persons, or attained the characteristics for its listing or registration.

PHOTOVOLTAIC PANEL SYSTEM. A system that incorporates discrete photovoltaic panels and that converts solar radiation into electricity, including rack support systems.

PRESERVATION. The act or process of applying measures necessary to sustain the existing form, integrity and materials of a qualified historical building or property. Work, including preliminary measures to protect and stabilize the property, generally focuses on the ongoing maintenance and repair of historical materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-related work to make properties functional is appropriate within a preservation project.

PRIMARY FUNCTION. A *primary function* is a major activity for which the *facility* is intended. Areas that contain a *primary function* include, but are not limited to, the customer services lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the *facility* are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors and restrooms are not areas containing a *primary function*.

RECONSTRUCTION. The act or process of depicting, by means of new construction, the form, features and detailing of a nonsurviving site, landscape, building, property or object for the purpose of replicating its appearance at a specific period of time.

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A registered design professional engaged by the owner or the owner's authorized agent to review and coordinate certain aspects of the project, as determined by the *building official*, for compatibility with the design of the building or structure, including submittal documents prepared by others, *deferred submittal* documents and phased submittal documents.

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE (Historical Buildings). A registered design professional engaged by the owner or the owner's authorized agent to review and coordinate certain aspects of the project, as determined by the *building official*, for compatibility with the design of the building or structure, including submittal documents prepared by others, *deferred submittal* documents and phased submittal documents. Experience and qualifications on historical buildings shall be approved by MHT.

REHABILITATION. Any work, as described by the categories of work defined herein, undertaken in an *existing building.*

REHABILITATION (HISTORICAL BUILDINGS). The act or process of making possible a compatible use for a qualified historical building or property through repair, alterations and additions while preserving those portions or features that convey its qualified historical, cultural or architectural values.

RELOCATABLE BUILDING. A partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.

RELOCATION (HISTORICAL BUILDINGS). The act or process of moving any qualified historical building or property or a portion of a qualified historical building or property to a new site or a different location on the same site.

REPAIR. The reconstruction, replacement or renewal of any part of an *existing building* for the purpose of its maintenance or to correct damage for the purpose of its continued use.

REROOFING. The process of recovering or replacing an existing roof covering. See "*Roof recover*" and "*Roof replacement*."

RESTORATION. The act or process of accurately depicting the form, features and character of a qualified building or property as it appeared at a particular period of time by the means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

RISK CATEGORY. A categorization of buildings and other structures for determination of flood, wind, ice and earthquake loads based on the risk associated with unacceptable performance, as provided in Section 1604.5 of the *Oman Building Code*.

ROOF COATING. A fluid-applied adhered coating used for roof maintenance, *roof repair* or as a component of a roof covering system or roof assembly.

ROOF RECOVER. The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering.

ROOF REPAIR. Reconstruction or renewal of any part of an existing roof for the purpose of correcting damage or restoring the predamage condition.

ROOF REPLACEMENT. The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.

STORM SHELTER. A building, structure or portions thereof, constructed in accordance with ICC 500, designated for use during hurricanes, tornadoes or other severe windstorms.

STRUCTURE. That which is built or constructed, an edifice or a building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

SEISMIC FORCES. The loads, forces and requirements prescribed herein, related to the response of the building to earthquake motions, to be used in the analysis and design of the structure and its components. Seismic forces are considered either full or reduced, as provided in Chapter 3.

SUBSTANTIAL DAMAGE. For the purpose of determining compliance with the flood provisions of this code, damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT. For the purpose of determining compliance with the flood provisions of this code, any *repair*, *alteration*, *addition* or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure, before the improvement or *repair* is started. If the structure has sustained *substantial damage*, any *repairs* are considered *substantial improvement* regardless of the actual *repair* work performed. The term does not, however, include either of the following:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the *code official* and that is the minimum necessary to ensure safe living conditions.
2. Any *alteration* of a historical structure, provided that the *alteration* will not preclude the structure's continued designation as a historical structure.

SUBSTANTIAL STRUCTURAL ALTERATION. An *alteration* in which the gravity load-carrying structural elements altered within a 5-year period support more than 30 percent of the total floor and roof area of the building or structure. The areas to be counted toward the 30 percent shall include mezzanines, penthouses, and in-filled courts and shafts tributary to the altered structural elements.

SUBSTANTIAL STRUCTURAL DAMAGE. A condition where any of the following apply:

1. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than 33 percent from its predamage condition.
2. The capacity of any vertical component carrying gravity load, or any group of such components, that has a tributary area more than 30 percent of the total area of the structure's floor(s) and roof(s) has been reduced more than 20 percent from its predamage condition, and the remaining capacity of such affected elements, with respect to all dead and live loads, is less than 75 percent of that required by the *Oman Building Code* for new buildings of similar structure, purpose and location.
3. The capacity of any structural component carrying vertical load, or any group of such components, that supports more than 30 percent of the roof area of similar construction has been reduced more than 20 percent from its predamage condition, and the remaining capacity with respect to dead and live loads is less than 75 percent of that required by the *Oman Building Code* for new buildings of similar structure, purpose and location.

For purposes of this definition, work done to implement repairs shall not be considered damage that reduces structural capacity.

TECHNICALLY INFEASIBLE. An *alteration* of a *facility* that has little likelihood of being accomplished because the existing structural conditions require the removal or *alteration* of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

TREATMENT. An act of work to carry out preservation, restoration, stabilization, rehabilitation or reconstruction.

UNSAFE. Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress *facilities*, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of *"Dangerous,"* or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed *unsafe*. A vacant structure that is not secured against entry shall be deemed *unsafe*.

WORK AREA. That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.

CHAPTER 3
PROVISIONS FOR ALL COMPLIANCE METHODS

User note:

About this chapter: *Chapter 3 explains the three compliance options for alterations and additions available in the code. In addition, this chapter also lays out the methods to be used for seismic design and evaluation throughout this code. Finally, this chapter clarifies that provisions in other Oman Building Codes related to repairs, alterations, additions, relocation and changes of occupancy must also be addressed unless they conflict with this code. In that case, this code takes precedence.*

SECTION 301
ADMINISTRATION

301.1 Applicability. The *repair*, *alteration*, *change of occupancy*, *addition* or relocation of all *existing buildings* shall comply with Section 301.2, 301.3 or 301.4. The provisions of Sections 302 through 309 shall apply to all *alterations*, *repairs*, *additions*, relocation of structures and *changes of occupancy* regardless of compliance method.

301.1.1 Bleachers, grandstands and folding and telescopic seating. Existing bleachers, grandstands and folding and telescopic seating shall comply with the *Oman Building Code* or ICC 300.

301.2 Repairs. *Repairs* shall comply with the requirements of Chapter 4.

301.3 Alteration, addition or change of occupancy. The *alteration*, *addition* or *change of occupancy* of all *existing buildings* shall comply with one of the methods listed in Section 301.3.1, 301.3.2 or 301.3.3 as selected by the applicant. Sections 301.3.1 through 301.3.3 shall not be applied in combination with each other.

Exception: Subject to the approval of the *building official*, *alterations* complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code. New structural members added as part of the *alteration* shall comply with the *Oman Building Code*. This exception shall not apply to the following:

1. *Alterations* for accessibility required by Section 306.
2. *Alterations* that constitute *substantial improvement* in *flood hazard areas*, which shall comply with Sections 503.2, 701.3 or 1301.3.3.
3. Structural provisions of Section 304, Chapter 5 or to the structural provisions of Sections 706, 805 and 906.

301.3.1 Prescriptive compliance method. *Alterations*, *additions* and *changes of occupancy* complying with Chapter 5 of this code in buildings complying with the *Oman Fire Code* shall be considered in compliance with the provisions of this code.

301.3.2 Work area compliance method. *Alterations*, *additions* and *changes of occupancy* complying with the applicable requirements of Chapters 6 through 12 of this code shall be considered in compliance with the provisions of this code.

301.3.3 Performance compliance method. *Alterations*, *additions* and *changes of occupancy* complying with Chapter 13 of this code shall be considered in compliance with the provisions of this code.

301.4 Relocated buildings. Relocated buildings shall comply with the requirements of Chapter 14.

SECTION 302
GENERAL PROVISIONS

302.1 Dangerous conditions. The *building official* shall have the authority to require the elimination of conditions deemed *dangerous*.

302.2 Additional codes. *Alterations, repairs, additions* and *changes of occupancy* to, or relocation of, *existing buildings* and structures shall comply with the provisions for *alterations, repairs, additions* and *changes of occupancy* or relocation, respectively, in this code and the *Oman Energy Efficiency and Sustainability Code*, *Oman Fire Code*, *International Fuel Gas Code*,

Oman Mechanical Code, *Oman Plumbing Code*, *Oman Private Sewage Disposal Code* and *Oman Electrical Standard.* Where provisions of the other codes conflict with provisions of this code, the provisions of this code shall take precedence.

302.2.1 Additional codes in health care. In existing Group I-2 occupancies, ambulatory health care *facilities*, outpatient clinics and hyperbaric *facilities*, *alterations*, *repairs*, *additions* and *changes of occupancy* to, or relocation of, *existing buildings* and structures shall also comply with NFPA 99.

302.3 Existing materials. Materials already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the *building official* to be *unsafe*.

302.4 New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for *repairs* and *alterations*, provided that *unsafe* conditions are not created. Hazardous materials shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

302.4.1 New structural members and connections. New structural members and connections shall comply with the detailing provisions of the *Oman Building Code* for new buildings of similar structure, purpose and location.

Exception: Where alternative design criteria are specifically permitted.

302.5 Occupancy and use. Where determining the appropriate application of the referenced sections of this code, the occupancy and use of a building shall be determined in accordance with Chapter 3 of the *Oman Building Code*.

SECTION 303
STORM SHELTERS

303.1 Storm shelters. This section applies to the design and construction of storm shelters for the purpose of providing protection during tornadoes, cyclones and other severe windstorms.

303.1.1 Construction. *Storm shelters* shall be constructed in accordance with Section 423 of the *Oman Building Code* and ICC 500 and shall be designated as cyclone shelters, tornado shelters or cyclone and tornado shelters.

Exception: *Storm shelters* added to critical emergency operations facilities or Group E occupancies are not required to comply with the travel distance in Section 423.4.2 or 423.5.2 of the *Oman Building Code*.

303.2 Reserved.

303.2.1 Design occupant capacity for Group E occupancy shelters. The required design occupant capacity of the *storm shelter* shall include all buildings on the site, and shall be the total occupant load of the classrooms, vocational rooms and offices in the Group E occupancy.

Exceptions:

1. Where an *addition* is being added on to an existing Group E site, and where the *addition* is not of sufficient size to accommodate the required occupant capacity of the *storm shelter* for all of the buildings on-site, the *storm shelter* shall at a minimum accommodate the required capacity for the *addition*.
2. Where *approved* by the *building official*, the required design occupant capacity of the shelter shall be permitted to be reduced by the design occupant capacity of any existing *storm shelters* on the site.

303.3 Occupancy classification. The occupancy classification for *storm shelters* shall be determined in accordance with Section 423.3 of the *Oman Building Code*.

SECTION 304
STRUCTURAL DESIGN LOADS AND EVALUATION AND DESIGN PROCEDURES

304.1 Live loads. Where an *addition* or *alteration* does not result in increased design live load, existing gravity load-carrying structural elements shall be permitted to be evaluated and designed for live loads *approved* prior to the *addition* or *alteration*. If the *approved* live load is less than that required by Section 1607 of the *Oman Building Code*, the area designated for the nonconforming live load shall be posted with placards of *approved* design indicating the *approved* live load. Where the *addition* or *alteration* results in increased design live load, the live load required by Section 1607 of the *Oman Building Code* shall be used.

304.2 Reserved.

304.3 Seismic evaluation and design procedures. Where required, seismic evaluation or design shall comply with the procedures and criteria in this section, regardless of which compliance method is used. The scope of the required evaluation or design shall be as indicated in applicable provisions of Chapters 4 through 12.

304.3.1 Full seismic criteria. Where required, seismic evaluation or design shall comply with the following:

Section 1613 of the *Oman Building Code*. Where the existing seismic force-resisting system is a type that can be designated as "Ordinary," values of R, Ω_0 and C_d used for analysis in accordance with Chapter 16 of the *Oman Building Code* shall be those specified for structural systems classified as "Ordinary" in accordance with Table 12.2-1 of ASCE 7, unless it can be demonstrated that the structural system will provide performance equivalent to that of a "Detailed," "Intermediate" or "Special" system.

304.3.2 Reduced seismic criteria. Where required, seismic evaluation or design shall comply with one of the following methodologies, which shall not be applied in combination with each other:

1. Section 1613 of the *Oman Building Code* using 75 percent of the prescribed forces. Values of R, Ω_0 and C_d used for analysis shall be as specified in Section 304.3.1 of this code.
2. Applicable chapters of Appendix A of this code for structures or portions of structures specified in Items 2.1 through 2.4 and subject to the limitations of the respective chapter.
    2.1. Chapter A1 or unreinforced masonry bearing wall buildings assigned to *Risk Category* I or II.
    2.2. Chapter A2 for the wall anchorage system in reinforced concrete and reinforced masonry wall buildings with flexible diaphragms assigned to *Risk Category* I or II.
    2.3. Reserved.
    2.4. Chapter A4 for soft, weak or open-front wall conditions in multiple-unit residential buildings of wood construction assigned to *Risk Category* I or II.

SECTION 305
IN-SITU LOAD TESTS

305.1 General. Where used, in-situ load tests shall be conducted in accordance with Section 1708 of the *Oman Building Code*.

SECTION 306
ACCESSIBILITY FOR EXISTING BUILDINGS

306.1 Scope. The provisions of Sections 306.1 through 306.7.16 apply to maintenance and *repair*, *change of occupancy*, *additions* and *alterations* to *existing buildings*, including those identified as *historical buildings*.

306.2 Design. Buildings and *facilities* shall be designed and constructed to be accessible in accordance with this code and the *alteration* and *existing building* provisions in ICC A117.1, as applicable.

306.3 Maintenance and repair. A *facility* that is constructed or altered to be accessible shall be maintained accessible during occupancy. Required accessible means of egress shall be maintained during construction, demolition, remodeling or *alterations* and *additions* to any occupied building.

Exception: Existing means of egress need not be maintained where *approved* temporary means of egress and accessible means of egress systems and *facilities* are provided.

306.3.1 Prohibited reduction in accessibility. An *alteration* that decreases or has the effect of decreasing accessibility of a building, *facility* or element, thereof, below the requirements for new construction at the time of the *alteration* is prohibited. The number of accessible elements need not exceed that required for new construction at the time of *alteration*.

306.4 Extent of application. An *alteration* of an existing *facility* shall not impose a requirement for greater accessibility than that which would be required for new construction.

306.5 Change of occupancy. *Existing buildings* that undergo a change of group or occupancy shall comply with Section 306.7.

Exception: Type B dwelling or sleeping units required by Section 1108 of the *Oman Building Code* are not required to be provided in *existing buildings* and *facilities* undergoing a *change of occupancy* in conjunction with *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.

306.6 Additions. Provisions for new construction shall apply to *additions*. An *addition* that affects the accessibility to, or contains an area of, a *primary function* shall comply with the requirements in Section 306.7.1.

306.7 Alterations. A *facility* that is altered shall comply with the applicable provisions in Chapter 11 of the *Oman Building Code,* ICC A117.1 and the provisions of Sections 306.7.1 through 306.7.16, unless *technically infeasible*. Where compliance with this section is *technically infeasible*, the *alteration* shall provide access to the maximum extent technically feasible.

306.7.1 Alterations affecting an area containing a primary function. Where an *alteration* affects the accessibility to, or contains an area of *primary function*, the route to the *primary function* area shall be accessible. The accessible route to the *primary function* area shall include toilet *facilities* and drinking fountains serving the area of *primary function*.

Exceptions:

1. The costs of providing the accessible route are not required to exceed 20 percent of the costs of the *alterations* affecting the area of *primary function*.
2. This provision does not apply to *alterations* limited solely to windows, hardware, operating controls, electrical outlets and signs.
3. This provision does not apply to *alterations* limited solely to mechanical systems, electrical systems, installation or *alteration* of fire protection systems and abatement of hazardous materials.
4. This provision does not apply to *alterations* undertaken for the primary purpose of increasing the accessibility of a *facility*.
5. This provision does not apply to altered areas limited to Type B dwelling and sleeping units.

306.7.2 Accessible means of egress. Accessible means of egress required by Chapter 10 of the *Oman Building Code* are not required to be added in existing *facilities*.

306.7.3 Alteration of Type A units. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.

306.7.4 Type B units. Type B dwelling or sleeping units required by Section 1108 of the *Oman Building Code* are not required to be provided in *existing buildings* and *facilities* undergoing *alterations* where the *work area* is 50 percent or less of the aggregate area of the building.

306.7.5 Entrances. Where an *alteration* includes *alterations* to an entrance that is not accessible, and the *facility* has an accessible entrance, the altered entrance is not required to be accessible unless required by Section 306.7.1. Signs complying with Section 1112 of the *Oman Building Code* shall be provided.

306.7.6 Accessible route. Exterior accessible routes, including curb ramps, shall be not less than 900 mm minimum in width.

306.7.7 Elevators. Altered elements of existing elevators shall comply with ASME A17.1. Such elements shall also be altered in elevators programmed to respond to the same hall call control as the altered elevator.

306.7.8 Platform lifts. Platform (wheelchair) lifts installed in accordance with ASME A18.1 shall be permitted as a component of an accessible route.

306.7.9 Stairways and escalators in existing buildings. Where an escalator or stairway is added where none existed previously and major structural modifications are necessary for installation, an accessible route complying with Section 1104.4 of the *Oman Building Code* is required between levels served by such escalator or stairway.

306.7.10 Determination of number of units. Where Chapter 11 of the *Oman Building Code* requires Accessible, Type A or Type B units and where such units are being altered or added, the number of Accessible, Type A and Type B units shall be determined in accordance with Sections 306.7.10.1 through 306.7.10.3.

306.7.10.1 Accessible dwelling or sleeping units. Where Group I-1, I-2, I-3, R-1, R-2 or R-4 dwelling or sleeping units are being altered or added, the requirements of Section 1108 of the *Oman Building Code* for Accessible units apply only to the quantity of spaces being altered or added.

306.7.10.2 Type A dwelling or sleeping units. Where more than 20 Group R-2 dwelling or sleeping units are being altered or added, the requirements of Section 1108 of the *Oman Building Code* for Type A units apply only to the quantity of the spaces being altered or added.

306.7.10.3 Type B dwelling or sleeping units. Where four or more Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being added, the requirements of Section 1108 of the *Oman Building Code* for Type B units apply only to the quantity of the spaces being added. Where Group I-1, I-2, R-1, R-2, R-3 or R-4 dwelling or sleeping units are being altered and where the *work area* is greater than 50 percent of the aggregate area of the building, the requirements of Section 1108 of the *Oman Building Code* for Type B units apply only to the quantity of the spaces being altered.

306.7.11 Toilet rooms. Where it is *technically infeasible* to alter existing toilet rooms to be accessible, one accessible single-user toilet room or one accessible family or assisted-use toilet room constructed in accordance with Section 1110.2.1 of the *Oman Building Code* is permitted. This toilet room shall be located on the same floor and in the same area as the existing toilet rooms. At the inaccessible toilet rooms, directional signs indicating the location of the nearest such toilet room shall be provided. These directional signs shall include the International Symbol of Accessibility, and sign characters shall meet the visual character requirements in accordance with ICC A117.1.

306.7.12 Bathing rooms. Where it is *technically infeasible* to alter existing bathing rooms to be accessible, one accessible single-user bathing room or one accessible family or assisted-use bathing room constructed in accordance with Section 1110.2.1 of the *Oman Building Code* is permitted. This accessible bathing room shall be located on the same floor and in the same area as the existing bathing rooms. At the inaccessible bathing rooms, directional signs indicating the location of the nearest such bathing room shall be provided. These directional signs shall include the International Symbol of Accessibility, and sign characters shall meet the visual character requirements in accordance with ICC A117.1.

306.7.13 Additional toilet and bathing facilities. In assembly and mercantile occupancies, where additional toilet fixtures are added, not fewer than one accessible family or assisted-use toilet room shall be provided where required by Section 1110.2.1 of the *Oman Building Code*. In recreational *facilities*, where additional bathing rooms are being added, not less than one family or assisted-use bathing room shall be provided where required by Section 1110.2.1 of the *Oman Building Code*.

306.7.14 Dressing, fitting and locker rooms. Where it is *technically infeasible* to provide accessible dressing, fitting or locker rooms at the same location as similar types of rooms, one accessible room on the same level shall be provided. Where separate-sex *facilities* are provided, accessible rooms for each sex shall be provided.

306.7.15 Amusement rides. Where the structural or operational characteristics of an amusement ride are altered to the extent that the amusement ride's performance differs from that specified by the manufacturer or the original design, the amusement ride shall comply with requirements for new construction in Section 1111.4.8 of the *Oman Building Code.*

306.7.16 Historical structures. Where compliance with the requirements for accessible routes, entrances or toilet rooms would threaten or destroy the historical significance of the historical structure, as determined by the municipality, the alternative requirements of Sections 306.7.16.1 through 306.7.16.5 for that element shall be permitted.

Exceptions:

1. Accessible means of egress required by Chapter 10 of the *Oman Building Code* are not required to be provided in historical structures.
2. The altered element or space is not required to be on an accessible route, unless required by Sections 306.7.16.1 or 306.7.16.2.

306.7.16.1 Site arrival points. Not less than one exterior accessible route, including curb ramps from a site arrival point to an accessible entrance, shall be provided and shall not be less than 900 mm minimum in width.

306.7.16.2 Multiple-level buildings and facilities. An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided.

306.7.16.3 Entrances. Where an entrance cannot be made accessible in accordance with Section 306.7.5, an accessible entrance that is unlocked while the building is occupied shall be provided; or, a locked accessible entrance with a notification system or remote monitoring shall be provided.

Signs complying with Section 1112 of the *Oman Building Code* shall be provided at the public entrances and the accessible entrance.

306.7.16.4 Toilet facilities. Where toilet rooms are provided, not less than one accessible single-user toilet room or one accessible family or assisted-use toilet room complying with Section 1110.2.1 of the *Oman Building Code* shall be provided.

306.7.16.5 Bathing facilities. Where bathing rooms are provided, not less than one accessible single-user bathing room or one accessible family or assisted-use bathing rooms complying with Section 1110.2.1 of the *Oman Building Code* shall be provided.

306.7.16.6 Type A units. The *alteration* to Type A individually owned dwelling units within a Group R-2 occupancy shall be permitted to meet the provision for a Type B dwelling unit.

306.7.16.7 Type B units. Type B dwelling or sleeping units required by Section 1108 of the *Oman Building Code* are not required to be provided in *historical buildings*.

SECTION 307
SMOKE ALARMS

307.1 Smoke alarms. Where an *alteration*, *addition*, *change of occupancy* or relocation of a building is made to an *existing building* or structure of a Group R and I-1 occupancy, the *existing building* shall be provided with smoke alarms in accordance with the *Oman Fire Code.*

Exception: Work classified as Level 1 Alterations in accordance with Chapter 7.

SECTION 308
CARBON MONOXIDE DETECTION

308.1 Carbon monoxide detection. Where an *addition*, *alteration*, *change of occupancy* or relocation of a building is made to an *existing building*, the *existing building* shall be provided with carbon monoxide detection in accordance with the *Oman Fire Code.*

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.
2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.
3. Work classified as Level 1 Alterations in accordance with Chapter 7.

SECTION 309
ADDITIONS AND REPLACEMENTS OF EXTERIOR WALL COVERINGS AND EXTERIOR WALL ENVELOPES

309.1 General. The provisions of Section 309 apply to all *alterations*, *repairs*, *additions*, relocations of structures and *changes of occupancy* regardless of compliance method.

309.2 Additions and replacements. Where an *exterior wall covering* or *exterior wall envelope* is added or replaced, the materials and methods used shall comply with the requirements for new construction in Chapter 14 and Chapter 26 of the *Oman Building Code* if the added or replaced *exterior wall covering* or *exterior wall envelope* involves two or more contiguous stories and comprises more than 15 percent of the total wall area on any side of the building.

309.2.1 Automatic sprinkler systems. Combustible exterior wall covering or combustible exterior wall envelopes shall not be added to an existing high-rise building that is not protected throughout with an automatic sprinkler system.

Exceptions:

1. Where such material is located on a single story and is less than 15 percent of the wall area on any side of the building.
2. Where water-resistive barriers are installed in accordance with Section 1402.6 of the *Oman Building Code*.

CHAPTER 4
REPAIRS

User note:

About this chapter: *Chapter 4 provides requirements for repairs of existing buildings. The provisions define conditions under which repairs may be made using materials and methods like those of the original construction or the extent to which repairs must comply with requirements for new buildings.*

SECTION 401
GENERAL

401.1 Scope. *Repairs* shall comply with the requirements of this chapter. *Repairs* to *historical buildings* need only comply with Chapter 12.

401.1.1 Bleachers, grandstands and folding and telescopic seating. *Repairs* to existing bleachers, grandstands and folding and telescopic seating shall comply with the *Oman Building Code* or ICC 300.

401.2 Compliance. The work shall not make the building less complying than it was before the *repair* was undertaken. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to requirements for alterations.

401.3 Flood hazard areas. In flood hazard areas, *repairs* that constitute *substantial improvement* shall require that the building comply with Section 1612 of the *Oman Building Code.*

SECTION 402
BUILDING ELEMENTS AND MATERIALS

402.1 Glazing in hazardous locations. Replacement glazing in hazardous locations shall comply with the safety glazing requirements of the *Oman Building Code.*

Exception: Glass block walls, louvered windows and jalousies repaired with like materials.

SECTION 403
FIRE PROTECTION

403.1 General. *Repairs* shall be done in a manner that maintains the level of fire protection provided.

SECTION 404
MEANS OF EGRESS

404.1 General. *Repairs* shall be done in a manner that maintains the level of protection provided for the means of egress.

SECTION 405
STRUCTURAL

405.1 General. Structural damage shall be repaired in compliance with this section and Section 401.2.

405.1.1 Structural concrete. *Repair* of structural concrete shall be permitted to comply with ACI 562 Section 1.7, except where Section 405.2.2, 405.2.3 or 405.2.4.1 requires compliance with Section 304.

405.2 Repairs to damaged buildings. *Repairs* to damaged buildings shall comply with this section.

405.2.1 Repairs for less than substantial structural damage. Unless otherwise required by this section, for damage less than *substantial structural damage*, the damaged elements shall be permitted to be restored to their predamage condition.

405.2.1.1 Reserved.

405.2.2 Disproportionate earthquake damage. A building assigned to Seismic Design Category D that has sustained *disproportionate earthquake damage* shall be subject to the requirements for buildings with substantial structural damage to vertical elements of the lateral force-resisting system.

405.2.3 Substantial structural damage to vertical elements of the lateral force-resisting system. A building that has sustained *substantial structural damage* to the vertical elements of its lateral force-resisting system shall be evaluated in accordance with Section 405.2.3.1, and either repaired in accordance with Section 405.2.3.2 or repaired and retrofitted in accordance with Section 405.2.3.3, depending on the results of the evaluation.

Exceptions:

1. Buildings assigned to Seismic Design Category A, B or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or retrofitted for load combinations that include earthquake effects.
2. One- and two-family dwellings need not be evaluated or retrofitted for load combinations that include earthquake effects.

405.2.3.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the *building official*. The evaluation shall establish whether the lateral force-resisting system of the damaged building, including the foundation, if repaired to its predamage state, would comply with the provisions of the *Oman Building Code* for load combinations that include wind and with Section 304.3.2 of this code.

405.2.3.2 Extent of repair for compliant buildings. If the evaluation establishes that the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the damaged elements shall be permitted to be restored to their predamage condition.

405.2.3.3 Extent of repair for noncompliant buildings. If the evaluation does not establish that the lateral force-resisting system of the building in its predamage condition complies with the provisions of Section 405.2.3.1, then the lateral force-resisting system and its foundation shall be retrofitted to comply with the provisions of this section. The wind loads for the *repair* and *retrofit* shall be those required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be in accordance with the *Oman Building Code*. The seismic retrofit shall comply with Section 304.3.2 of this code, but the earthquake loads shall not be less than those required by the building code in effect at the time of original construction.

405.2.4 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained *substantial structural damage* shall be retrofitted to comply with the applicable provisions for dead and live loads in the *Oman Building Code*. Undamaged gravity load-carrying components, including undamaged foundation components that receive dead or live loads from retrofitted components, shall also be retrofitted if required to comply with these design loads.

405.2.4.1 Lateral force-resisting elements. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if *substantial structural damage* to gravity load-carrying components was caused primarily by wind or seismic effects, then the building shall be evaluated in accordance with Section 405.2.3.1 and, if noncompliant, retrofitted in accordance with Section 405.2.3.3.

Exceptions:

1. Buildings assigned to Seismic Design Category A, B or C whose *substantial structural damage* was not caused by earthquake need not be evaluated or retrofitted for load combinations that include earthquake effects.
2. One- and two-family dwellings need not be evaluated or retrofitted for load combinations that include earthquake effects.

405.2.5 Reserved.

405.2.6 Flood hazard areas. In *flood hazard* areas, buildings that have sustained *substantial damage* shall be brought into compliance with Section 1612 of the *Oman Building Code.*

SECTION 406
ELECTRICAL

406.1 Material. Existing electrical wiring and equipment undergoing *repair* shall be allowed to be repaired or replaced with like material.

406.1.1 Receptacles. Replacement of electrical receptacles shall comply with the applicable requirements of the *Oman Electrical Standard.*

406.1.2 Plug fuses. Plug fuses of the Edison-base type shall be used for replacements only where there is no evidence of over fusing or tampering per applicable requirements of the *Oman Electrical Standard.*

406.1.3 Nongrounding-type receptacles. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system or to any accessible point on the grounding electrode conductor in accordance with the *Oman Electrical Standard.*

406.1.4 Health care facilities. Portions of electrical systems being repaired in Group I-2, ambulatory care *facilities* and outpatient clinics shall comply with NFPA 99.

406.1.5 Grounding of appliances. Frames of electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers and outlet or junction boxes that are part of the existing branch circuit for these appliances shall be permitted to be grounded to the grounded circuit conductor in accordance with the *Oman Electrical Standard.*

SECTION 407
MECHANICAL

407.1 General. Existing mechanical systems undergoing *repair* shall not make the building less complying than it was before the damaged occurred.

407.2 Mechanical draft systems for manually fired appliances and fireplaces. A mechanical draft system shall be permitted to be used with manually fired appliances and fireplaces where such a system complies with all of the following requirements:

1. The mechanical draft device shall be listed and installed in accordance with the manufacturer's installation instructions.
2. A device shall be installed that produces visible and audible warning upon failure of the mechanical draft device or loss of electrical power at any time that the mechanical draft device is turned on. This device shall be equipped with a battery backup if it receives power from the building wiring.
3. A smoke detector shall be installed in the room with the appliance or fireplace. This device shall be equipped with a battery backup if it receives power from the building wiring.

SECTION 408
PLUMBING

408.1 Materials. Plumbing materials and supplies shall not be used for *repairs* that are prohibited in the *Oman Plumbing Code*.

408.2 Water closet replacement. The maximum water consumption flow rates and quantities for all replaced water closets shall be 6 L per flushing cycle.

Exception: Blowout-design water closets 13 L per flushing cycle.

408.3 Health care facilities. Portions of medical gas systems being repaired in Group I-2, ambulatory care *facilities* and outpatient clinics shall comply with NFPA 99 requirements for *repairs*.

CHAPTER 5
PRESCRIPTIVE COMPLIANCE METHOD

User note:

About this chapter: *Chapter 5 provides details for the prescriptive compliance method—one of the three main options of compliance available in this code for buildings and structures undergoing alteration, addition or change of occupancy.*

SECTION 501
GENERAL

501.1 Scope. The provisions of this chapter shall control the *alteration, addition* and *change of occupancy* of *existing buildings* and structures, including *historical buildings* and structures as referenced in Section 301.3.1.

501.1.1 Compliance with other methods. *Alterations*, *additions* and *changes of occupancy* to *existing buildings* and structures shall comply with the provisions of this chapter or with one of the methods provided in Section 301.3.

501.2 Fire-resistance ratings. Where *approved* by the *building official*, in buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the *Oman Building Code* has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable requirements of the *Oman Building Code*.

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the *building official* to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, *approved* modifications or *approved* alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

501.3 Health care facilities. In Group I-2 *facilities*, ambulatory care *facilities* and outpatient clinics, any altered or added portion of an existing electrical or medical gas systems shall be required to meet installation and equipment requirements in NFPA 99.

SECTION 502
ADDITIONS

502.1 General. *Additions* to any building or structure shall comply with the requirements of the *Oman Building Code* for new construction. *Alterations* to the *existing building* or structure shall be made to ensure that the *existing building* or structure together with the *addition* are not less complying with the provisions of the *Oman Building Code* than the *existing building* or structure was prior to the *addition* except that the structural elements need comply only with Sections 502.2 and 502.3. An *existing building* together with its *additions* shall comply with the height and area provisions of Chapter 5 of the *Oman Building Code*. Where a new *occupiable roof* is added to a building or structure, the *occupiable roof* shall comply with the provisions of the *Oman Building Code.*

Exception: In-filling of floor openings and nonoccupiable appendages such as elevator and exit stairway shafts shall be permitted beyond that permitted by the *Oman Building Code.*

502.1.1 Risk category assignment. Where the *addition* and the *existing building* have different occupancies, the *risk category* of each existing and added occupancy shall be determined in accordance with Section 1604.5.1 of the *Oman Building Code*. Where application of that section results in a higher *risk category* for the *existing building* compared with the *risk category* for the *existing building* before the *addition*, such a change shall be considered a *change of occupancy* and shall comply with Section 506 of this code. Where application of that section results in a higher *risk category* for the *addition* compared with the *risk category* for the *addition* by itself, the *addition* and any systems in the *existing building* required to serve the *addition* shall comply with the requirements of the *Oman Building Code* for new construction for the higher *risk category*.

502.1.2 Creation or extension of nonconformity. An *addition* shall not create or extend any nonconformity in the *existing building* to which the *addition* is being made with regard to accessibility, structural strength, supports and attachments for nonstructural components, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

Exception: Nonconforming supports and attachments for nonstructural components that serve the *addition* from within the *existing building* need not be altered to comply with *Oman Building Code* Section 1613 unless the components are part of the *addition*'s life safety system or are required to serve an *addition* assigned to *Risk Category* IV.

502.2 Flood hazard areas. For buildings and structures in *flood hazard* areas established in Section 1612.3 of the *Oman Building Code*, any *addition* that constitutes *substantial improvement* of the *existing structure* shall comply with the flood design requirements for new construction, and all aspects of the *existing structure* shall be brought into compliance with the requirements for new construction for flood design. For new foundations, foundations raised or extended upward, and replacement foundations, the foundations shall be in compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *Oman Building Code*, any *additions* that do not constitute *substantial improvement* of the *existing structure* are not required to comply with the flood design requirements for new construction, provided that both of the following apply:

1. The *addition* shall not create or extend a nonconformity of the *existing building* or structure with the flood-resistant construction requirements.
2. The *lowest floor* of the *addition* shall be at or above the lower of the *lowest floor* of the *existing building* or structure or the *lowest floor* elevation required in Section 1612 of the *Oman Building Code*

502.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead, live, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *Oman Building Code* for new structures. Any existing gravity load-carrying structural element whose vertical load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 503.3. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 502.5.

Exception: Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *Oman Building Code.*

502.4 Existing structural elements carrying lateral load. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the lateral force-resisting system of the *existing structure* and its *addition* acting together as a single structure shall comply with Section 1609 of the *Oman Building Code* and with Section 304.3.1 of this code.

Exception: Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *Oman Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 1609 of the *Oman Building Code* or the code wind forces in effect at the time. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 304.3.1 or the full seismic forces in effect at the time.

502.5 Smoke barriers in Group I-1, Condition 2. Where an *addition* to an existing Group I-1, Condition 2 building adds sleeping areas that result in more than 50 care recipients on a story, smoke barriers shall be provided to subdivide such story into not fewer than two smoke compartments in accordance with Section 420.6 of the *Oman Building Code*.

Exception: Where the *existing building* is divided into smoke compartments and the *addition* does not result in any individual smoke compartment exceeding the size and travel distance requirements in Section 420.6 of the *Oman Building Code*, additional smoke barriers are not required.

502.6 Enhanced classroom acoustics. In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms in the *addition* with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

SECTION 503
ALTERATIONS

503.1 General. *Alterations* to any building or structure shall comply with the requirements of the *Oman Building Code* for new construction. *Alterations* shall be such that the *existing building* or structure is not less complying with the provisions of the *Oman Building Code* than the *existing building* or structure was prior to the *alteration*, except that the structural elements need comply only with Sections 503.2 through 503.12.

Exceptions:

1. An existing stairway shall not be required to comply with the requirements of Section 1011 of the *Oman Building Code* where the existing space and construction does not allow a reduction in pitch or slope.
2. Handrails otherwise required to comply with Section 1011.11 of the *Oman Building Code* shall not be required to comply with the requirements of Section 1014.6 of the *Oman Building Code* regarding full extension of the handrails where such extensions would be hazardous because of plan configuration.
3. Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 800 mm.

503.2 Flood hazard areas. For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *Oman Building Code*, any *alteration* that constitutes *substantial improvement* of the *existing structure* shall comply with the flood design requirements for new construction, and all aspects of the *existing structure* shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *Oman Building Code*, any *alterations* that do not constitute *substantial improvement* of the *existing structure* are not required to comply with the flood design requirements for new construction.

503.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead or live load of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *Oman Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead and live loads required by the *Oman Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *Oman Building Code.*
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 0.144 kN/m^2 or less over an existing single layer of roof covering.

503.4 Existing structural elements carrying lateral load. Except as permitted by Section 503.13, where the *alteration* increases design lateral loads, results in a prohibited structural irregularity as defined in ASCE 7, or decreases the capacity of any existing lateral load-carrying structural element, the lateral force-resisting system of the altered building or structure shall meet the requirements of Section 1609 of the *Oman Building Code*. Reduced seismic forces shall be permitted.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is not more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section 1609 of the *Oman Building Code* and Section 304.3.1 or 304.3.2 of this code. The same methodology shall be used for altered and unaltered structures. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction. When calculating

demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 1609 of the *Oman Building Code* or the code wind forces in effect at the time. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 304.3.1 or Section 304.3.2, Item 1 or 3, or the full or reduced seismic forces in effect at the time.

2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 180 kg and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, "roof" shall mean the roof level above a particular story.
3. Increases in the demand-capacity ratio due to lateral loads from seismic forces need not be evaluated for the installation of rooftop *photovoltaic panel systems* where the additional roof dead load due to the system, including ballast where applicable, does not exceed 0.24 kN/m^2 and does not exceed 10 percent of the dead load of the existing roof.

503.5 Reserved.

503.6 Bracing for unreinforced masonry parapets on reroofing. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 25 percent of the roof area of a building assigned to Seismic Design Category D that has parapets constructed of unreinforced masonry, the work shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of parapet bracing to resist out-of-plane seismic forces.

503.7 Anchorage for concrete and reinforced masonry walls. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C or D, and the building's structural system includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of wall anchors at the roof line.

503.8 Anchorage for unreinforced masonry walls in major alterations. Where the *work area* exceeds 50 percent of the building area, the building is assigned to Seismic Design Category C or D, and the building's structural system includes unreinforced masonry bearing walls, the *alteration* shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of wall anchors at the floor and roof lines.

503.9 Bracing for unreinforced masonry parapets in major alterations. Where the *work area* exceeds 50 percent of the building area, and where the building is assigned to Seismic Design Category C or D, and the building has parapets constructed of unreinforced masonry, the *alteration* shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of parapet bracing to resist out-of-plane seismic forces.

503.10 Anchorage of unreinforced masonry partitions in major alterations. Where the *work area* exceeds 50 percent of the building area, or where the building is assigned to Seismic Design Category C or D, and the building has unreinforced masonry partitions and nonstructural walls, the *alteration* work shall include evaluation of the existing condition or removal, anchoring or alteration of any such partitions or walls within the *work area* and adjacent to egress paths from the *work area* to comply with Section 304.3.2.

503.11 Substantial structural alteration. Where the *work area* exceeds 50 percent of the building area and where work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall satisfy the requirements of Section 1609 of the *Oman Building Code* and Section 304.3.2 of this code. Where the building is assigned to Seismic Design Category D, supports and attachments for nonstructural components required to serve any portion of the building with a use included in *Risk Category* IV shall comply with Section 1613 of the *Oman Building Code*.

Exception: Where the intended *alteration* involves structural components of the lowest story of a building, the lateral load-resisting system above that story need not comply with this section.

503.12 Roof diaphragms resisting wind loads in high-wind regions. Where the intended *alteration* requires a permit for reroofing and involves removal of roofing materials from more than 50 percent of the roof diaphragm of a building or section of a building located where the basic wind speed is greater than 58 m/s in accordance with Section 1609 of the *Oman Building Code*, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in Section 1609 of the *Oman Building Code*, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in Section 1609 of the *Oman Building Code*.

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7-88 or later editions.

503.13 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be subject to the structural requirements of Section 503, provided that all of the following apply:

1. With the *alteration* complete, the capacity of existing structural systems to resist forces is not reduced.
2. New structural elements are detailed and connected to existing or new structural elements as required by the selected design criteria.

   Exception: New lateral force-resisting systems designed in accordance with the *Oman Building Code* are permitted to be of a type designated as "Ordinary" or "Intermediate" where ASCE 7 Table 12.2-1 states these types of systems are not permitted.
3. Supports and attachments for nonstructural elements removed and reinstalled to facilitate the work comply with the *Oman Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

   Exception: Condition 4 need not be satisfied where the work complies with Section 304.3.2, Item 3.

503.14 Smoke compartments. In Group I-2 occupancies where the *alteration* is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 407.5 of the *Oman Building Code* as required for new construction.

503.15 Refuge areas. Where *alterations* affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the *Oman Building Code*.

Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and Group B ambulatory care *facilities* shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the *Oman Building Code,* as applicable.

503.16 Enhanced classroom acoustics. In Group E occupancies, where the *work area* exceeds 50 percent of the building area, enhanced classroom acoustics shall be provided in all classrooms with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

503.17 Locking arrangements in educational occupancies. In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8 of the *Oman Building Code*.

503.18 Two-way communications systems. Where the *work area* for *alterations* exceeds 50 percent of the building area and the building has elevator service, a two-way communication systems shall be provided where required by Section 1009.8 of the *Oman Building Code*.

SECTION 504
FIRE ESCAPES

504.1 Where permitted. Fire escapes shall be permitted only as provided for in Sections 504.1.1 through 504.1.4.

504.1.1 New buildings. Fire escapes shall not constitute any part of the required means of egress in new buildings.

504.1.2 Existing fire escapes. Existing fire escapes shall continue to be accepted as a component in the means of egress in *existing buildings* only.

504.1.3 New fire escapes. New fire escapes for *existing buildings* shall be permitted only where exterior stairways cannot be utilized because of lot lines limiting stairway size or because of sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

504.1.4 Limitations. Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

504.2 Location. Where located on the front of the building and where projecting beyond the building line, the lowest landing shall be not less than 2.1 m or more than 3.6 m above grade, and shall be equipped with a counterbalanced stairway to the street. In alleyways and thoroughfares less than 9 m wide, the clearance under the lowest landing shall be not less than 3.6 m.

504.3 Construction. The fire escape shall be designed to support a live load of 4.8 kPa and shall be constructed of steel or other *approved noncombustible materials*. Fire escapes constructed of wood not less than nominal 50 mm thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Type III and IV construction are permitted to be of wood not less than nominal 50 mm thick.

504.4 Dimensions. Stairways shall be not less than 550 mm wide with risers not more than, and treads not less than, 200 mm and landings at the foot of stairways not less than 1 m wide by 900 mm long, located not more than 200 mm below the door.

504.5 Opening protectives. Doors and windows within 3 m of fire escape stairways shall be protected with $^{3}/_{4}$-hour opening protectives.

Exception: Opening protection shall not be required in buildings equipped throughout with an *approved* automatic sprinkler system.

SECTION 505
WINDOWS AND EMERGENCY ESCAPE OPENINGS

505.1 Replacement windows. The installation or replacement of windows shall be as required for new installations.

505.2 Fall prevention devices on replacement windows. In Group R-2 or R-3 buildings containing dwelling units, and one- and two-family dwellings, window opening control devices or other window fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
    2.1. The window replacement includes replacement of the sash and frame.
    2.2. The window replacement includes the sash only where the existing frame remains.
3. One of the following applies:
    3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 900 mm above the finished floor.
    3.2. In one- and two-family dwellings and townhouses, the bottom of the clear opening of the window opening is at a height less than 600 mm above the finished floor.
4. The window will permit openings that will allow passage of a 100 mm sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 1.8 m.

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 23 m above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

505.3 Replacement window emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses, replacement windows shall be exempt from the requirements of Section 1031.3 of the *Oman Building Code,* provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement of the window is part of a *change of occupancy,* it shall comply with Section 1011.5.6.

505.3.1 Control devices. Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide *emergency escape and rescue openings*. After operation to release the control device allowing the window to fully open, the control device shall not reduce the net clear opening area of the window unit. *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys or tools.

505.4 Bars, grilles, covers or screens. Bars, grilles, covers, screens or similar devices are permitted to be placed over *emergency escape and rescue openings*, bulkhead enclosure or window wells that serve such openings, provided all of the following conditions are met:

1. The minimum net clear opening size complies with the code that was in effect at the time of construction.
2. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.
3. Where such devices are installed, they shall not reduce the net clear opening of the emergency escape and rescue openings.
4. Smoke alarms shall be installed in accordance with Section 907.2.11 of the *Oman Building Code*.

SECTION 506
CHANGE OF OCCUPANCY

506.1 Compliance. A *change of occupancy* shall not be made in any building unless that building is made to comply with the requirements of the *Oman Building Code* for the proposed use or occupancy. Changes of occupancy in a building or portion thereof shall be such that the *existing building* is not less complying with the provisions of this code than the *existing building* or structure was prior to the change. Subject to the approval of the *building official*, changes of occupancy shall be permitted without complying with all of the requirements of this code for the new occupancy, provided that the new occupancy is less hazardous, based on life and fire risk, than the existing occupancy.

Exception: The building need not be made to comply with Chapter 16 of the *Oman Building Code* unless required by Section 506.5.

506.1.1 Change in the character of use. A change of occupancy with no *change of occupancy* classification shall not be made to any structure that will subject the structure to any special provisions of the applicable *Oman* Codes, without approval of the *building official*. Compliance shall be only as necessary to meet the specific provisions and is not intended to require the entire building be brought into compliance.

506.2 Certificate of occupancy (Completion). A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

506.3 Stairways. An existing stairway shall not be required to comply with the requirements of Section 1011 of the *Oman Building Code* where the existing space and construction does not allow a reduction in pitch or slope.

506.4 Existing emergency escape and rescue openings. Where a *change of occupancy* would require an *emergency escape and rescue opening* in accordance with Section 1031.1 of the *Oman Building Code*, operable windows serving as the *emergency escape and rescue opening* shall comply with the following

1. An existing operable window shall provide a minimum net clear opening of 0.38 m^2 with a minimum net clear opening height of 550 mm and a minimum net clear opening width of 500 mm.
2. A replacement window where such window complies with both of the following:
    2.1. The replacement window meets the size requirements in Item 1.

2.2. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

506.5 Structural. Any building undergoing a *change of occupancy* shall satisfy the requirements of this section.

506.5.1 Live loads. Structural elements carrying tributary live loads from an area with a *change of occupancy* shall satisfy the requirements of Section 1607 of the *Oman Building Code*. Design live loads for areas of new occupancy shall be based on Section 1607 of the *Oman Building Code*. Design live loads for other areas shall be permitted to use previously *approved* design live loads.

Exception: Structural elements whose demand-capacity ratio considering the *change of occupancy* is not more than 5 percent greater than the demand-capacity ratio based on previously *approved* live loads need not comply with this section.

506.5.2 Wind loads. Where a *change of occupancy* results in a structure being assigned to a higher *risk category*, the structure shall satisfy the requirements of Section 1609 of the *Oman Building Code* for the new *risk category*.

Exception: Where the area of the new occupancy is less than 10 percent of the building area, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.

506.5.3 Seismic loads (seismic force-resisting system). Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the lateral force-resisting system of the building shall comply with Section 304.3.1 for the new *risk category*. Where a *change of occupancy* results in a building being assigned to *Risk Category* IV and Seismic Design Category D, nonstructural components serving any portion of the building changed to *Risk Category* IV shall comply with the requirements of Section 1613 of the *Oman Building Code*.

Exceptions:

1. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
2. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to Risk Category III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B, shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of risk category, use of reduced seismic forces shall be permitted.

506.5.4 Access to Risk Category IV. Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a *change of occupancy* shall itself comply with Section 1609 of the *Oman Building Code* and Section 304.3.1 of this code. For compliance with Section 1613, *Oman Building Code*-level seismic forces shall be used. Where operational access to the *Risk Category* IV structure is less than 3 m from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

506.6 Enhanced classroom acoustics. In Group E occupancies, where the *work area* exceeds 50 percent of the building area, enhanced classroom acoustics shall be provided in all classrooms with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

SECTION 507
HISTORICAL BUILDINGS

507.1 Historical buildings. For historical buildings provisions, see Chapter 12.

CHAPTER 6
CLASSIFICATION OF WORK

User note:

About this chapter: *Chapter 6 provides an overview of the Work Area Method available as an option for rehabilitation of a building. The chapter defines the different classifications of alterations and provides general requirements for alterations, change of occupancy, additions and historical buildings. Detailed requirements for all of these are given in Chapters 7 through 12.*

SECTION 601
GENERAL

601.1 Scope. The provisions of this chapter shall be used in conjunction with Chapters 7 through 12 and shall apply to the *alteration*, *addition* and *change of occupancy* of *existing structures*, including historical structures, as referenced in Section 301.3.2. The work performed on an *existing building* shall be classified in accordance with this chapter.

601.1.1 Compliance with other alternatives. *Alterations*, *additions* and *changes of occupancy* to *existing structures* shall comply with the provisions of Chapters 7 through 12 or with one of the alternatives provided in Section 301.3.

601.2 Work area. The *work area*, as defined in Chapter 2, shall be identified on the construction documents.

SECTION 602
ALTERATION—LEVEL 1

602.1 Scope. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, *equipment* or *fixtures* using new materials, elements, *equipment* or *fixtures* that serve the same purpose.

602.2 Application. Level 1 *alterations* shall comply with the provisions of Chapter 7.

SECTION 603
ALTERATION—LEVEL 2

603.1 Scope. Level 2 *alterations* include the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment, and shall apply where the w*ork area* is equal to or less than 50 percent of the building area.

Exception: The movement or addition of nonfixed and movable fixtures, cases, racks, counters and partitions not over 1.8 m in height shall not be considered a Level 2 *alteration*.

603.2 Application. Level 2 *alterations* shall comply with the provisions of Chapter 7 for Level 1 *alterations* as well as the provisions of Chapter 8.

SECTION 604
ALTERATION—LEVEL 3

604.1 Scope. Level 3 *alterations* apply where the *work area* exceeds 50 percent of the *building area*.

604.2 Application. Level 3 *alterations* shall comply with the provisions of Chapters 7 and 8 for Level 1 and 2 *alterations*, respectively, as well as the provisions of Chapter 9.

SECTION 605
CHANGE OF OCCUPANCY

605.1 Scope. *Change of occupancy* provisions apply where the activity is classified as a *change of occupancy* as defined in Chapter 2.

605.2 Application. *Changes of occupancy* shall comply with the provisions of Chapter 10.

SECTION 606
ADDITIONS

606.1 Scope. Provisions for *additions* shall apply where work is classified as an *addition* as defined in Chapter 2.

606.2 Application. *Additions* to *existing buildings* shall comply with the provisions of Chapter 11.

SECTION 607
HISTORICAL BUILDINGS

607.1 Scope. *Historical building* provisions shall apply to buildings classified as historical as defined in Chapter 2.

607.2 Application. Except as specifically provided for in Chapter 12, *historical buildings* shall comply with applicable provisions of this code for the type of work being performed.

CHAPTER 7
ALTERATIONS—LEVEL 1

User note:

About this chapter: *Chapter 7 provides the technical requirements for those existing buildings that undergo Level 1 alterations as described in Section 603, which includes replacement or covering of existing materials, elements, equipment or fixtures using new materials for the same purpose. This chapter, similar to other chapters of this code, covers all building-related subjects, such as structural, mechanical, plumbing, electrical and accessibility as well as the fire and life safety issues when the alterations are classified as Level 1. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 8 and 9 by involving only replacement of building components with new components. In contrast, Level 2 alterations involve more space reconfiguration, and Level 3 alterations involve more extensive space reconfiguration, exceeding 50 percent of the building area.*

SECTION 701
GENERAL

701.1 Scope. Level 1 *alterations* as described in Section 602 shall comply with the requirements of this chapter. Level 1 *alterations* to *historical buildings* shall comply with this chapter, except as modified in Chapter 12.

701.2 Conformance. An *existing building* or portion thereof shall not be altered such that the building becomes less safe than its existing condition.

Exception: Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the *Oman Building Code*.

701.3 Flood hazard areas. In *flood hazard areas*, *alterations* that constitute *substantial improvement* shall require that the building comply with Section 1612 of the *Oman Building Code*.

SECTION 702
BUILDING ELEMENTS AND MATERIALS

702.1 Interior finishes. Newly installed interior wall and ceiling finishes shall comply with Chapter 8 of the *Oman Building Code*.

702.2 Interior floor finish. New interior floor finish, including new carpeting used as an interior floor finish material, shall comply with Section 804 of the *Oman Building Code*.

702.3 Interior trim. Newly installed interior trim materials shall comply with Section 806 of the *Oman Building Code*.

702.4 Window fall prevention. In Group R-2 or R-3 buildings containing dwelling units, window opening control devices or other window fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
    2.1. The window replacement includes replacement of the sash and frame.
    2.2. The window replacement includes the sash only where the existing frame remains.
3. One of the following applies:
    3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 900 mm above the finished floor.
    3.2. In one- and two-family dwellings and townhouses, the bottom of the clear opening of the window opening is at a height less than 600 mm above the finished floor.

4. The window will permit openings that will allow passage of a 100 mm sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 1.8 m.

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 23 m above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

702.5 Replacement window for emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies and one- and two-family dwellings and townhouses, replacement windows shall be exempt from the requirements of Section 1031.3 of the *Oman Building Code*, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is part of a *change of occupancy* it shall comply with Section 1011.5.6.

702.5.1 Control devices. Window opening control devices or fall prevention devices complying with ASTM F2090 shall be permitted for use on windows required to provide *emergency escape and rescue openings.* After operation to release the control device allowing the window to fully open, the control device shall not reduce the net clear opening area of the window unit. *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys or tools.

702.6 Bars, grilles, covers or screens. Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosure or window wells that serve such openings, provided all of the following conditions are met:

1. The minimum net clear opening size complies with the code that was in effect at the time of construction.
2. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.
3. Where such devices are installed, they shall not reduce the net clear opening of the emergency escape and rescue openings.
4. Smoke alarms shall be installed in accordance with Section 907.2.11 of the *Oman Building Code*.

702.7 Materials and methods. New work shall comply with the materials and methods requirements in the *Oman Building Code*, *Oman Energy Efficiency and Sustainability Code*, *Oman Mechanical Code* and *Oman Plumbing Code*, as applicable that specify material standards, detail of installation and connection, joints, penetrations and continuity of any element, component or system in the building.

702.7.1 Reserved.

SECTION 703
FIRE PROTECTION

703.1 General. *Alterations* shall be done in a manner that maintains the level of fire protection provided.

SECTION 704
MEANS OF EGRESS

704.1 General. *Alterations* shall be done in a manner that maintains the level of protection provided for the means of egress.

704.1.1 Projections in nursing home corridors. In Group I-2, Condition 1 occupancies, where the corridor is at least 2.4 m wide, projections into the corridor width are permitted in accordance with Section 407.4.3 of the *Oman Building Code*.

704.2 Casework. Addition, alteration or reconfiguration of nonfixed and movable cases, counters and partitions not over 1.8 m in height shall maintain the required means of egress path.

704.3 Locking arrangements in educational occupancies. In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8 of the *Oman Building Code*.

SECTION 705
REROOFING

705.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the *Oman Building Code*.

Exceptions:

1. *Roof replacement* or roof recover of existing low-slope roof coverings shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the *Oman Building Code* for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the *Oman Building Code* for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the *Oman Building Code*.

705.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of roof coverings down to the roof deck.

Exceptions:

1. Reserved.
2. Where the existing roof includes a self-adhered underlayment and the existing sheathing is not water-soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered underlayment shall be permitted to remain in place and covered with an underlayment complying with Tables 1507.1.1(1), 1507.1.1(2) and 1507.1.1(3) of the *Oman Building Code*.
3. Where the existing roof includes one layer of self-adhered underlayment and the existing layer cannot be removed without damaging the roof deck, a second layer of self-adhered underlayment is permitted to be installed over the existing self-adhered underlayment, provided that all of the following conditions are met:
    3.1. It is permitted by the roof-covering manufacturer and self-adhered underlayment manufacturer.
    3.2. The existing sheathing is not water-soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
    3.3. The second layer of self-adhered underlayment is installed such that buildup of material at walls, valleys, roof edges, end laps and side laps does not exceed two layers.

705.2.1 Roof recover. The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. The new roof covering is installed in accordance with the roof covering manufacturer's *approved* instructions.
2. Complete and separate roofing systems, such as standing-seam metal roof panel systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 705.3.
4. The application of a new protective roof coating over an existing protective roof coating, a metal roof panel, built-up roof, spray polyurethane foam roofing system, metal roof shingles, mineral-surfaced roll roofing, modified bitumen roofing or thermoset and thermoplastic single-ply roofing shall be permitted without tear off of existing roof coverings.

705.2.1.1 Exceptions. A roof recover shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

705.3 Roof recovering. Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other *approved* materials securely fastened in place.

705.4 Reinstallation of materials. Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counterflashings shall not be reinstalled where rusted, damaged or deteriorated. Existing ballast that is damaged, cracked or broken shall not be reinstalled. Existing aggregate surfacing materials from built-up roofs shall not be reinstalled.

705.5 Flashings. Flashings shall be reconstructed in accordance with *approved* manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.

SECTION 706
STRUCTURAL

706.1 General. Where *alteration* work includes replacement of equipment that is supported by the building or where a reroofing permit is required, the provisions of this section shall apply.

706.2 Addition or replacement of roofing or replacement of equipment. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead or live load of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *Oman Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *Oman Building Code*.
2. Buildings in which the increased dead load is due entirely to the addition of a second layer of roof covering weighing 0.144 kN/m^2 or less over an existing single layer of roof covering.

706.3 Additional requirements for reroof permits. The requirements of this section shall apply to *alteration* work requiring reroof permits.

706.3.1 Bracing for unreinforced masonry bearing wall parapets. Where a permit is issued for reroofing for more than 25 percent of the roof area of a building assigned to Seismic Design Category D that has parapets constructed of unreinforced masonry, the work shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of parapet bracing.

706.3.2 Roof diaphragms resisting wind loads in high-wind regions. Where roofing materials are removed from more than 50 percent of the roof diaphragm or section of a building located where the ultimate design wind speed, V_{ult}, determined in accordance with Section 1609 of the *Oman Building Code,* is greater than 58 m/s, roof diaphragms, connections of the roof diaphragm to roof framing members, and roof-to-wall connections shall be evaluated for the wind loads specified in the *Oman Building Code*, including wind uplift. If the diaphragms and connections in their current condition are not capable of resisting 75 percent of those wind loads, they shall be replaced or strengthened in accordance with the loads specified in the *Oman Building Code.*

Exception: Buildings that have been demonstrated to comply with the wind load provisions in ASCE 7-88 or later editions.

SECTION 707
ELECTRICAL

707.1 Health care facilities. In Group I-2 facilities, ambulatory care facilities and outpatient clinics, any altered portion of an existing electrical systems shall be required to meet installation and equipment requirements in OES-4.

SECTION 708
ENERGY CONSERVATION

708.1 Minimum requirements. Level 1 *alterations* to *existing buildings* or structures do not require the entire building or structure to comply with the energy requirements of the *Oman Energy Efficiency and Sustainability Code*. The *alterations* shall conform to the energy requirements of the *Oman Energy Efficiency and Sustainability Code* as they relate to new construction only.

CHAPTER 8
ALTERATIONS—LEVEL 2

User note:

About this chapter: *Like Chapter 7, the purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system when a building is being altered. This chapter is distinguished from Chapters 7 and 9 by involving space reconfiguration that could be up to and including 50 percent of the area of the building. In contrast, Level 1 alterations (Chapter 7) do not involve space reconfiguration, and Level 3 alterations (Chapter 9) involve extensive space reconfiguration that exceeds 50 percent of the building area. Depending on the nature of alteration work, its location within the building, and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes.*

SECTION 801
GENERAL

801.1 Scope. Level 2 *alterations* as described in Section 603 shall comply with the requirements of this chapter.

Exception: Buildings in which the reconfiguration is exclusively the result of compliance with the accessibility requirements of Section 306.7.1 shall be permitted to comply with Chapter 7.

801.2 Alteration Level 1 compliance. In addition to the requirements of this chapter, all work shall comply with the requirements of Chapter 7.

801.3 System installations. Requirements related to *work area* are not applicable where the Level 2 *alterations* are limited solely to one or more of the following:

1. Mechanical systems, electrical systems, fire protection systems and abatement of hazardous materials.
2. Windows, hardware, operating controls, electrical outlets and signs.
3. Alterations undertaken for the primary purpose of increasing the accessibility of a facility.

801.4 Compliance. New construction elements, components, systems and spaces shall comply with the requirements of the *Oman Building Code*.

Exceptions:

1. Where windows are added they are not required to comply with the light and ventilation requirements of the *Oman Building Code*.
2. Newly installed electrical equipment shall comply with the requirements of Section 806.
3. The length of dead-end corridors in newly constructed spaces shall only be required to comply with the provisions of Section 804.7.
4. The minimum ceiling height of the newly created habitable and occupiable spaces and corridors shall be 2.25 m.
5. Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 800 mm.
6. New structural members and connections shall be permitted to comply with alternative design criteria in accordance with Section 302.

SECTION 802
BUILDING ELEMENTS AND MATERIALS

802.1 Scope. The requirements of this section are limited to *work areas* in which Level 2 *alterations* are being performed and shall apply beyond the *work area* where specified.

802.2 Vertical openings. Existing vertical openings shall comply with the provisions of Sections 802.2.1, 802.2.2 and 802.2.3.

802.2.1 Existing vertical openings. Existing interior vertical openings connecting two or more floors shall be enclosed with *approved* assemblies having a fire-resistance rating of not less than 1 hour with *approved* opening protectives.

Exceptions:

1. Where vertical opening enclosure is not required by the *Oman Building Code* or the *Oman Fire Code*.
2. Interior vertical openings other than stairways may be blocked at the floor and ceiling of the *work area* by installation of not less than 50 mm of solid wood or equivalent construction.
3. The enclosure shall not be required where:
    3.1. Connecting the main floor and mezzanines; or
    3.2. All of the following conditions are met:
        3.2.1. The communicating area has a low-hazard occupancy or has a moderate-hazard occupancy that is protected throughout by an automatic sprinkler system.
        3.2.2. The lowest or next-to-the-lowest level is a street floor.
        3.2.3. The entire area is open and unobstructed in a manner such that it is reasonable to assume that a fire in any part of the interconnected spaces will be readily obvious to all of the occupants.
        3.2.4. Exit capacity is sufficient to provide egress simultaneously for all occupants of all levels by considering all areas to be a single floor area for the determination of required exit capacity.
        3.2.5. Each floor level, considered separately, has not less than one-half of its individual required exit capacity provided by an exit or exits leading directly out of that level without having to traverse another communicating floor level or be exposed to the smoke or fire spreading from another communicating floor level.
4. In Group A occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories.
5. In Group B occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:
    5.1. Buildings not exceeding 280 m^2 per floor.
    5.2. Buildings protected throughout by an *approved* automatic fire sprinkler system.
6. In Group E occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where the building is protected throughout by an *approved* automatic fire sprinkler system.
7. In Group F occupancies, the enclosure shall not be required in the following locations:
    7.1. Vertical openings not exceeding three stories.
    7.2. Special-purpose occupancies where necessary for manufacturing operations and direct access is provided to not fewer than one protected stairway.
    7.3. Buildings protected throughout by an *approved* automatic sprinkler system.
8. In Group H occupancies, the enclosure shall not be required for vertical openings not exceeding three stories where necessary for manufacturing operations and every floor level has direct access to not fewer than two remote enclosed stairways or other *approved* exits.
9. In Group M occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:
    9.1. Openings connecting only two floor levels.
    9.2. Occupancies protected throughout by an *approved* automatic sprinkler system.
10. In Group R-1 occupancies, the enclosure shall not be required for vertical openings not exceeding three stories in the following locations:
    10.1. Buildings protected throughout by an *approved* automatic sprinkler system.

10.2. Buildings with less than 25 dwelling units or sleeping units where every sleeping room above the second floor is provided with direct access to a fire escape or other *approved* second exit by means of an *approved* exterior door or window having a sill height of not greater than 1.1 m and where both of the following conditions are met:

10.2.1. Any exit access corridor exceeding 2.5 m in length that serves two means of egress, one of which is an unprotected vertical opening, shall have not less than one of the means of egress separated from the vertical opening by a 1-hour fire barrier.

10.2.2. The building is protected throughout by an automatic fire alarm system, installed and supervised in accordance with the *Oman Building Code*.

11. In Group R-2 occupancies, a minimum 30-minute enclosure shall be provided to protect all vertical openings not exceeding three stories. This enclosure, or the enclosure specified in Section 802.2.1, shall not be required in the following locations:

11.1. Vertical openings not exceeding two stories with not more than four dwelling units per floor.

11.2. Buildings protected throughout by an *approved* automatic sprinkler system.

11.3. Buildings with not more than four dwelling units per floor where every sleeping room above the second floor is provided with direct access to a fire escape or other *approved* second exit by means of an *approved* exterior door or window having a sill height of not greater than 1.1 m and the building is protected throughout by an automatic fire alarm system complying with Section 803.4.

12. One- and two-family dwellings.

13. Group S occupancies where connecting not more than two floor levels or where connecting not more than three floor levels and the structure is equipped throughout with an *approved* automatic sprinkler system.

14. Group S occupancies where vertical opening protection is not required for open parking garages and ramps.

802.2.2 Supplemental shaft and floor opening enclosure requirements. Where the *work area* on any floor exceeds 50 percent of that floor area, the enclosure requirements of Section 802.2 shall apply to vertical openings other than stairways throughout the floor.

Exception: Vertical openings located in tenant spaces that are entirely outside the *work area*.

802.2.3 Supplemental stairway enclosure requirements. Where the *work area* on any floor exceeds 50 percent of that floor area, stairways that are part of the means of egress serving the *work area* shall, at a minimum, be enclosed with smoketight construction on the highest *work area* floor and all floors below.

Exception: Where stairway enclosure is not required by the *Oman Building Code* or the *Oman Fire Code*.

802.3 Smoke compartments. In Group I-2 occupancies where the *work area* is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not less than two compartments by smoke barrier walls in accordance with Section 407.5 of the *Oman Building Code* as required for new construction.

802.4 Interior finish. The interior finish and trim of walls and ceilings in exits and corridors in any *work area* shall comply with the requirements of the *Oman Building Code*.

Exception: Existing materials that do not comply with the requirements of the *Oman Building Code* shall be permitted to be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to achieve the required classification. Compliance with this section shall be demonstrated by testing the fire-retardant coating on the same material and achieving the required performance. Where the same material is not available, testing on a similar material shall be permitted.

802.4.1 Supplemental interior finish requirements. Where the *work area* on any floor exceeds 50 percent of the floor area, Section 802.4 shall apply to the interior finish and trim in exits and corridors serving the *work area* throughout the floor.

Exception: Interior finish within tenant spaces that are entirely outside the *work area*.

802.5 Guards. The requirements of Sections 802.5.1 and 802.5.2 shall apply in all *work areas*.

802.5.1 Minimum requirement. Every portion of a floor, such as a balcony or a loading dock, that is more than 750 mm above the floor or grade below and is not provided with guards, or those in which the existing guards are judged to be in danger of collapsing, shall be provided with guards.

802.5.2 Design. Where there are no guards or where existing guards must be replaced, the guards shall be designed and installed in accordance with the *Oman Building Code*.

802.6 Fire-resistance ratings. Where *approved* by the *building official*, buildings where an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 of the *Oman Building Code* has been added, and the building is now sprinklered throughout, the required fire-resistance ratings of building elements and materials shall be permitted to meet the requirements of the current building code. The building is required to meet the other applicable requirements of the *Oman Building Code*.

Plans, investigation and evaluation reports, and other data shall be submitted indicating which building elements and materials the applicant is requesting the *building official* to review and approve for determination of applying the current building code fire-resistance ratings. Any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means-of-egress conditions, fire code deficiencies, *approved* modifications or *approved* alternative materials, design and methods of construction, and equipment applying to the building that impact required fire-resistance ratings shall be identified in the evaluation reports submitted.

SECTION 803
FIRE PROTECTION

803.1 Scope. The requirements of this section shall be limited to *work areas* in which Level 2 *alterations* are being performed, and where specified they shall apply throughout the floor on which the *work areas* are located or otherwise beyond the *work area*.

803.1.1 Corridor ratings. Where an *approved* automatic sprinkler system is installed throughout the story, the required fire-resistance rating for any corridor located on the story shall be permitted to be reduced in accordance with the *Oman Building Code*. In order to be considered for a corridor rating reduction, such system shall provide coverage for the stairway landings serving the floor and the intermediate landings immediately below.

803.2 Automatic sprinkler systems. Automatic sprinkler systems shall be provided in accordance with the requirements of Sections 803.2.1 through 803.2.6. Installation requirements shall be in accordance with the *Oman Building Code*.

803.2.1 High-rise buildings. In high-rise buildings, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection in the entire *work area* where the *work area* is located on a floor that has a sufficient sprinkler water supply system from an existing standpipe or a sprinkler riser serving that floor.

803.2.1.1 Supplemental automatic sprinkler system requirements. Where the *work area* on any floor exceeds 50 percent of that floor area, Section 803.2.1 shall apply to the entire floor on which the *work area* is located.

Exception: Occupied tenant spaces that are entirely outside the *work area*.

803.2.2 Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2. In buildings with occupancies in Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where both of the following conditions occur:

1. The *work area* is required to be provided with automatic sprinkler protection in accordance with the *Oman Building Code* as applicable to new construction.
2. The *work area* exceeds 50 percent of the floor area.

Exception: If the building does not have an existing municipal water supply available at the floor of the proposed *work area* with sufficient pressure and flow for the design of a fire sprinkler system available to the floor and without installation of a new fire pump, the *work areas* shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4, 907.5 and 907.6 of the *Oman Building Code*.

803.2.2.1 Mixed uses. In *work areas* containing mixed uses, one or more of which requires automatic sprinkler protection in accordance with Section 803.2.2, such protection shall not be required throughout the *work area* provided that the uses requiring such protection are separated from those not requiring protection by fire-resistance-rated construction having a minimum 2-hour rating for Group H and a minimum 1-hour rating for all other occupancy groups.

803.2.3 Group I-2. In Group I-2 occupancies, an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the *Oman Fire Code* shall be provided in the following

1. In Group I-2, Condition 1, throughout the work area.
2. In Group I-2, Condition 2, throughout the work area where the work area is 50 percent or less of the smoke compartment.z
3. In Group I-2, Condition 2, throughout the smoke compartment in which the work occurs where the work area exceeds 50 percent of the smoke compartment.

803.2.4 Windowless stories. Work located in a windowless story, as determined in accordance with the *Oman Building Code*, shall be sprinklered where the *work area* is required to be sprinklered under the provisions of the *Oman Building Code* for newly constructed buildings and the building has a sufficient municipal water supply without installation of a new fire pump.

803.2.5 Other required automatic sprinkler systems. In buildings and areas listed in Table 903.2.11.6 of the *Oman Building Code*, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions

1. The work area is required to be provided with an automatic sprinkler system in accordance with the *Oman Building Code* applicable to new construction; and
2. The building has an existing municipal water supply available at the floor of the proposed *work area* with sufficient pressure and flow for the design of an automatic sprinkler system available to the floor without installation of a new fire pump.

803.2.6 Supervision. Automatic fire sprinkler systems required by this section shall be provided with supervision and alarms in accordance with Section 903.4 of the *Oman Building Code*.

803.3 Standpipes. Where the *work area* includes exits or corridors shared by more than one tenant and is located more than 15.25 m above or below the lowest level of Civil Defense access, a standpipe system shall be provided. Standpipes shall have an *approved* Civil Defense connection with hose connections at each floor level above or below the lowest level of Civil Defense access. Standpipe systems shall be installed in accordance with the *Oman Building Code*.

Exceptions:

1. A pump shall not be required provided that the standpipes are capable of accepting delivery by Civil Defense apparatus of not less than 950 L/m at 450 kPa to the topmost floor in buildings equipped throughout with an automatic sprinkler system or not less than 1900 L/m at 450 kPa to the topmost floor in all other buildings. Where the standpipe terminates below the topmost floor, the standpipe shall be designed to meet L/m/kPa requirements of this exception for possible future extension of the standpipe.
2. The interconnection of multiple standpipe risers shall not be required.

803.4 Fire alarm and detection. An *approved* fire alarm system shall be installed in accordance with Sections 803.4.1 through 803.4.3. Where automatic sprinkler protection is provided in accordance with Section 803.2 and is connected to the building fire alarm system, automatic heat detection shall not be required.

An *approved* automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA 72. Devices, combinations of devices, appliances, and equipment shall be *approved*. The automatic fire detectors shall be smoke detectors, except that an *approved* alternative type of detector shall be installed in spaces such as boiler rooms, where products of combustion are present during normal operation in sufficient quantity to actuate a smoke detector.

803.4.1 Occupancy requirements. A fire alarm system shall be installed in accordance with Sections 803.4.1.1 through 803.4.1.6. Existing alarm-notification appliances shall be automatically activated throughout the building. Where the building

is not equipped with a fire alarm system, alarm-notification appliances within the *work area* shall be provided and automatically activated.

Exceptions:

1. Occupancies with an existing, previously *approved* fire alarm system.
2. Where selective notification is permitted, alarm-notification appliances shall be automatically activated in the areas selected.

803.4.1.1 Group E. A fire alarm system shall be installed in *work areas* of Group E occupancies as required by the *Oman Fire Code* for existing Group E occupancies.

803.4.1.2 Group I-1. An automatic fire alarm system shall be installed in *work areas* of Group I-1 *facilities* as required by the *Oman Fire Code* for existing Group I-1 occupancies.

803.4.1.3 Group I-2. An automatic fire alarm system shall be installed throughout Group I-2 occupancies as required by the *Oman Fire Code*.

803.4.1.4 Group I-3. A fire alarm system shall be installed in *work areas* of Group I-3 occupancies as required by the *Oman Fire Code*.

803.4.1.5 Group R-1. A fire alarm system shall be installed in Group R-1 occupancies as required by the *Oman Fire Code* for existing Group R-1 occupancies.

803.4.1.6 Group R-2. A fire alarm system shall be installed in *work areas* of Group R-2 apartment buildings as required by the *Oman Fire Code* for existing Group R-2 occupancies.

803.4.2 Supplemental fire alarm system requirements. Where the *work area* on any floor exceeds 50 percent of that floor area, Section 803.4.1 shall apply throughout the floor.

Exception: Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the *work area*.

803.4.3 Installation. Where a fire alarm system is required to be installed in accordance with Sections 803.4.1 or 803.4.2, the fire alarm system shall be installed in accordance with the provisions of this code, Section 907 of the *Oman Building Code* and NFPA 72.

SECTION 804
MEANS OF EGRESS

804.1 Scope. The requirements of this section shall be limited to *work areas* that include exits or corridors shared by more than one tenant within the *work area* in which Level 2 *alterations* are being performed, and where specified they shall apply throughout the floor on which the *work areas* are located or otherwise beyond the *work area*.

804.2 General. The means of egress shall comply with the requirements of this section.

Exceptions:

1. Where the *work area* and the means of egress serving it complies with NFPA 101.
2. Means of egress complying with the requirements of the building code under which the building was constructed shall be considered to be compliant means of egress if, in the opinion of the *building official*, they do not constitute a distinct hazard to life.

804.3 Group I-2. In Group I-2 occupancies, in areas where corridors are used for movement of care recipients in beds, the clear width of ramps and corridors shall be not less than 1.2 m.

804.4 Refuge areas. Where *alterations* affect the configuration of an area utilized as a refuge area, the capacity of the refuge area shall not be reduced below the required capacity of the refuge area for horizontal exits in accordance with Section 1026.4 of the *Oman Building Code*. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and ambulatory care *facilities* shall not be reduced below that required in Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the *Oman Building Code*, as applicable

804.5 Number of exits. The number of exits or access to exits shall be in accordance with Sections 804.5.1 through 804.5.3.

804.5.1 Minimum number. Every story utilized for human occupancy on which there is a *work area* that includes exits or corridors shared by more than one tenant within the *work area* shall be provided with the minimum number of exits based on the occupancy and the occupant load in accordance with the *Oman Building Code*. In addition, the exits shall comply with Sections 804.5.1.1 and 804.5.1.2.

804.5.1.1 Single-exit buildings. A single exit or access to a single exit shall be permitted from spaces, any story or any occupiable roof where one of the following conditions exists:

1. The occupant load, number of dwelling units and exit access travel distance do not exceed the values in Table 804.5.1.1(1) or Table 804.5.1.1(2).
2. In Group R-1 or R-2, buildings without an *approved* automatic sprinkler system, individual single-story or multiple-story dwelling or sleeping units shall be permitted to have a single exit or access to a single exit from the dwelling or sleeping unit provided one of the following criteria are met:
    2.1. The occupant load is not greater than 10 and the exit access travel distance within the unit does not exceed 23 m.
    2.2. The building is not more than three stories in height; all third-story space is part of dwelling with an exit access doorway on the second story; and the portion of the exit access travel distance from the door to any habitable room within any such unit to the unit entrance doors does not exceed 15.25 m.
3. In buildings of Group R-2 occupancy of any number of stories with not more than four dwelling units per floor served by an interior exit stairway; with a smokeproof enclosure in accordance with Sections 909.20 and 1023.12 of the *Oman Building Code* or an exterior stairway as an exit; and where the portion of the exit access travel distance from the dwelling unit entrance door to the exit is not greater than 6 m.

TABLE 804.5.1.1(1)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (m)
Basement, first, second or third story above grade plane and occupiable roofs over the first or second floor above grade plane	R-2[a, b, c]	4 dwelling units	38 m
Fourth story above grade plane and higher	NP	NA	NA

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2, provided with emergency escape and rescue openings in accordance with Section 1031 of the *Oman Building Code*.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2) of the *Oman Building Code*.

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 804.5.1.1(2).

TABLE 804.5.1.1(2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (m)
First story above or below grade plane or occupiable roofs over the first story above grade plane	B,[b] F-2[b] S-2[a]	49 35	23 23
Second story above grade plane	B, F-2, S-2[a]	35	23
Third story above grade plane and higher	NP	NA	NA

NP = Not Permitted.
NA = Not Applicable.
a. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 30 m.
b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.2 of the *Oman Building Code* or on the roof of such buildings shall have a maximum exit access travel distance of 50 m.

804.5.1.2 Fire escapes required. For other than Group I-2, where more than one exit is required, an existing or newly constructed fire escape complying with Section 804.5.1.2.1 shall be accepted as providing one of the required means of egress.

804.5.1.2.1 Fire escape access and details. Fire escapes shall comply with all of the following requirements:

1. Occupants shall have unobstructed access to the fire escape without having to pass through a room subject to locking.
2. Access to a new fire escape shall be through a door, except that windows shall be permitted to provide access from single dwelling units or sleeping units in Group R-1, R-2 and I-1 occupancies or to provide access from spaces having a maximum occupant load of 10 in other occupancy classifications.
    2.1. The window shall have a minimum net clear opening of 0.53 m^2 or 0.46 m^2 where located at grade.
    2.2. The minimum net clear opening height shall be 600 mm and net clear opening width shall be 500 mm.
    2.3. The bottom of the clear opening shall not be greater than 1.1 m above the floor.
    2.4. The operation of the window shall comply with the operational constraints of the *Oman Building Code*.
3. Newly constructed fire escapes shall be permitted only where exterior stairways cannot be utilized because of lot lines limiting the stairway size or because of the sidewalks, alleys, or roads at grade level.
4. Openings within 3 m of fire escape stairways shall be protected by fire assemblies having minimum $^3/_4$-hour fire-resistance ratings.

    Exception: Opening protection shall not be required in buildings equipped throughout with an *approved* automatic sprinkler system.

5. In all buildings of Group E occupancy, up to and including the 12th grade, buildings of Group I occupancy, rooming houses and childcare centers, ladders of any type are prohibited on fire escapes used as a required means of egress.

804.5.1.2.2 Construction. The fire escape shall be designed to support a live load of 4.8 kPa and shall be constructed of steel or other *approved noncombustible materials*. Fire escapes constructed of wood not less than nominal 50 mm thick are permitted on buildings of Type V construction. Walkways and railings located over or supported by combustible roofs in buildings of Types III and IV construction are permitted to be of wood not less than nominal 50 mm thick.

804.5.1.2.3 Dimensions. Stairways shall be not less than 550 mm wide with risers not more than, and treads not less than, 200 mm. Landings at the foot of stairways shall be not less than 1 m wide by 900 mm long and located not more than 200 mm below the door.

804.5.2 Mezzanines. Mezzanines in the *work area* and with an occupant load of more than 50 or in which the travel distance to an exit exceeds 23 m shall have access to not fewer than two independent means of egress.

Exception: Two independent means of egress are not required where the travel distance to an exit does not exceed 30 m and the building is protected throughout with an automatic sprinkler system.

804.5.3 Main entrance—Group A. Buildings of Group A with an occupant load of 300 or more shall be provided with a main entrance capable of serving as the main exit with an egress capacity of not less than one-half of the total occupant load. The remaining exits shall be capable of providing one-half of the total required exit capacity.

Exception: Where a main exit is not well defined or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total width of egress is not less than 100 percent of the required width.

804.6 Egress doorways. Egress doorways in any *work area* shall comply with Sections 804.6.1 through 804.6.5.

804.6.1 Two egress doorways required. Work areas shall be provided with two egress doorways in accordance with the requirements of Sections 804.6.1.1 and 804.6.1.2.

804.6.1.1 Occupant load and travel distance. In any *work area*, all rooms and spaces having an occupant load greater than 50 or in which the travel distance to an exit exceeds 23 m shall have not fewer than two egress doorways.

Exceptions:

1. Storage rooms having a maximum occupant load of 10.
2. Where the *work area* is served by a single exit in accordance with Section 804.5.1.1.

804.6.1.2 Group I-2. In Group I-2, Condition 2 *work areas* that include altered care suites shall comply with Sections 407.4.4 through 407.4.4.6.2 of the *Oman Building Code*.

804.6.2 Door swing. In the *work area* and in the egress path from any *work area* to the exit discharge, all egress doors serving an occupant load greater than 50 shall swing in the direction of exit travel.

804.6.2.1 Supplemental requirements for door swing. Where the *work area* exceeds 50 percent of the floor area, door swing shall comply with Section 804.6.2 throughout the floor.

Exception: Means of egress within or serving only a tenant space that is entirely outside the *work area*.

804.6.3 Door closing. In any *work area*, all doors opening onto an exit passageway at grade or an exit stairway shall be self-closing or automatic-closing by listed closing devices.

Exceptions:

1. Where exit enclosure is not required by the *Oman Building Code*.
2. Means of egress within or serving only a tenant space that is entirely outside the *work area*.

804.6.3.1 Supplemental requirements for door closing. Where the *work area* exceeds 50 percent of the floor area, doors shall comply with Section 804.65.3 throughout the exit stairway from the *work area* to, and including, the level of exit discharge.

804.6.4 Panic and fire exit hardware. In any *work area*, and in the egress path from any *work area* to the exit discharge, in buildings or portions thereof of Group A assembly occupancies with an occupant load greater than 100, all required exit doors equipped with latching devices shall be equipped with *approved* panic or fire exit hardware in accordance with Section 1010.2.9 of the *Oman Building Code*.

804.6.4.1 Supplemental requirements for panic hardware. Where the *work area* exceeds 50 percent of the floor area, panic hardware shall comply with Section 804.6.4 throughout the floor.

Exception: Means of egress within a tenant space that is entirely outside the *work area*.

804.6.5 Emergency power source in Group I-3. Power-operated sliding doors or power-operated locks for swinging doors shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks in accordance with Section 2702 of the *Oman Building Code*.

Exceptions:

1. Emergency power is not required in *facilities* with 10 or fewer locks complying with the exception to Section 408.4.1 of the *Oman Building Code*.
2. Emergency power is not required where remote mechanical operating releases are provided.

804.7 Openings in corridor walls. Openings in corridor walls in any *work area* shall comply with Sections 804.7.1 through 804.7.4.

Exception: Openings in corridors where such corridors are not required to be rated in accordance with the *Oman Building Code*.

804.7.1 Corridor doors. Corridor doors in the *work area* shall not be constructed of hollow core wood and shall not contain louvers. Dwelling unit or sleeping unit corridor doors in *work areas* in buildings of Groups R-1, R-2 and I-1 shall be not less than 35 mm solid core wood or *approved* equivalent and shall not have any glass panels, other than *approved* wired glass or other *approved* glazing material in metal frames. Dwelling unit or sleeping unit corridor doors in *work areas* in buildings of Groups R-1, R-2 and I-1 shall be equipped with *approved* door closers. Replacement doors shall be 45 mm solid bonded wood core or *approved* equivalent, unless the existing frame will accommodate only a 35 mm door.

Exceptions:

1. Corridor doors within a dwelling unit or sleeping unit.
2. Reserved.
3. Existing doors in buildings protected throughout with an *approved* automatic sprinkler system shall be required only to resist smoke, be reasonably tight fitting and shall not contain louvers.
4. In group homes with not more than 15 occupants and that are protected with an *approved* automatic detection system, closing devices are not required.
5. Door assemblies having a fire protection rating of not less than 20 minutes.

804.7.2 Transoms. In all buildings of Group I-1, I-2, R-1 and R-2 occupancies, all transoms in corridor walls in *work areas* shall be either glazed with 6.5 mm wired glass set in metal frames or other glazing assemblies having a fire protection rating as required for the door and permanently secured in the closed position or sealed with materials consistent with the corridor construction.

804.7.3 Other corridor openings. In any *work area*, unless protected in accordance with Section 716 of the *Oman Building Code*, any other sash, grille or opening in a corridor, and any window in a corridor not opening to the outside air, shall be sealed with materials consistent with the corridor construction.

804.7.3.1 Supplemental requirements for other corridor opening. Where the *work area* exceeds 50 percent of the floor area, Section 804.7.3 shall be applicable to all corridor windows, grills, sashes and other openings on the floor.

Exception: Means of egress within or serving only a tenant space that is entirely outside the *work area*.

804.7.4 Supplemental requirements for corridor openings. Where the *work area* on any floor exceeds 50 percent of the floor area, the requirements of Sections 804.7.1 through 804.7.3 shall apply throughout the floor.

804.8 Dead-end corridors. Dead-end corridors in any *work area* shall not exceed 10.7 m. In Group I-2 occupancies, dead-end corridors shall not exceed 9 m.

Exceptions:

1. Where dead-end corridors of greater length are permitted by the *Oman Building Code*.
2. In other than Group A, I-2 and H occupancies, the maximum length of an existing dead-end corridor shall be 15.25 m in buildings equipped throughout with an automatic fire alarm system installed in accordance with the *Oman Building Code*.
3. In other than Group A, I-2 and H occupancies, the maximum length of an existing dead-end corridor shall be 21 m in buildings equipped throughout with an automatic sprinkler system installed in accordance with the *Oman Building Code*.
4. In other than Group A, I-2 and H occupancies, the maximum length of an existing, newly constructed, or extended dead-end corridor shall not exceed 15.25 m on floors equipped with an automatic sprinkler system installed in accordance with the *Oman Building Code*.

804.9 Means-of-egress lighting. Means-of-egress lighting shall be in accordance with this section, as applicable.

804.9.1 Artificial lighting required. Means of egress in all *work areas* shall be provided with artificial lighting in accordance with the requirements of the *Oman Building Code.*

804.9.2 Supplemental requirements for means-of-egress lighting. Where the *work area* on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 804.9.1.

Exception: Means of egress within or serving only a tenant space that is entirely outside the *work area*.

804.10 Exit signs. Exit signs shall be in accordance with this section, as applicable.

804.10.1 Work areas. Means of egress in all *work areas* shall be provided with exit signs in accordance with the requirements of the *Oman Building Code*.

804.10.2 Supplemental requirements for exit signs. Where the *work area* on any floor exceeds 50 percent of that floor area, means of egress throughout the floor shall comply with Section 804.10.1.

Exception: Means of egress within a tenant space that is entirely outside the *work area*.

804.11 Stairways. An existing stairway shall not be required to comply with the requirements of Section 1011 of the *Oman Building Code* where the existing space and construction does not allow a reduction in pitch or slope.

804.12 Escalators. Where provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 800 mm.

804.13 Handrails. The requirements of Sections 804.13.1 and 804.13.2 shall apply to handrails from the *work area* floor to, and including, the level of exit discharge.

804.13.1 Minimum requirement. Every required exit stairway that is part of the means of egress for any *work area* and that has three or more risers and is not provided with not fewer than one handrail, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails for the full length of the stairway on not fewer than one side. Exit stairways with a required egress width of more than 1.65 m shall have handrails on both sides.

804.13.2 Design. Handrails required in accordance with Section 804.13.1 shall be designed and installed in accordance with the provisions of the *Oman Building Code*.

804.14 Guards. The requirements of Sections 804.14.1 and 804.14.2 shall apply to guards from the *work area* floor to, and including, the level of exit discharge but shall be confined to the egress path of any *work area*.

804.14.1 Minimum requirement. Every open portion of a stairway, landing, or balcony that is more than 750 mm above the floor or grade below and is not provided with guards, or those portions in which existing guards are judged to be in danger of collapsing, shall be provided with guards.

804.14.2 Design. Guards required in accordance with Section 804.14.1 shall be designed and installed in accordance with the *Oman Building Code*.

Exceptions: In Group I-1 and I-2 facilities, required guards enclosing the *occupiable roof* areas shall be permitted to be greater than 1.2 m above the surface of the *occupiable roof* where the occupants, because of clinical needs, require restraint or containment as part of a function of a psychiatric or cognitive treatment area.

SECTION 805
STRUCTURAL

805.1 General. Structural elements and systems within buildings undergoing Level 2 *alterations* shall comply with this section.

805.2 Existing structural elements carrying gravity loads. Any existing gravity load-carrying structural element for which an *alteration* causes an increase in design dead or live load of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *Oman Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *alteration* shall be shown to have the capacity to resist the applicable design dead and live loads required by the *Oman Building Code* for new structures.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the altered building complies with the conventional light-frame construction methods of the *Oman Building Code*.
2. Buildings in which the increased dead load is attributable to the addition of a second layer of roof covering weighing 0.144 kN/m^2 or less over an existing single layer of roof covering.

805.3 Existing structural elements resisting lateral loads. Except as permitted by Section 805.4, where the *alteration* increases design lateral loads, or where the alteration results in prohibited structural irregularity as defined in ASCE 7, or where the *alteration* decreases the capacity of any existing lateral load-carrying structural element, the lateral force-resisting system of the altered building or structure shall meet the requirements of Section 1609 of the *Oman Building Code* and Section 304.3.2 of this code.

Exceptions:

1. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *alteration* considered is not more than 10 percent greater than its demand-capacity ratio with the *alteration* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Section 1609 of the *Oman Building Code* and Section 304.3.1 or 304.3.2 of this code. The same methodology shall be used for the altered and unaltered structures. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction. When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 1609 of the *Oman Building Code* or the code wind forces in effect at the time. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition*, *alteration* or *repair* in compliance with Section 304.3.1 or 304.3.2, Item 1 or 3, or the full or reduced seismic forces in effect at the time.
2. Buildings in which the increase in the demand-capacity ratio is due entirely to the addition of rooftop-supported mechanical equipment individually having an operating weight less than 181.5 kg and where the total additional weight of all rooftop equipment placed after initial construction of the building is less than 10 percent of the roof dead load. For purposes of this exception, “roof” shall mean the roof level above a particular story.
3. Increases in the demand-capacity ratio due to lateral loads from seismic forces need not be evaluated for the installation of rooftop *photovoltaic panel systems* where the additional roof dead load due to the system, including ballast where applicable, does not exceed 0.24 kN/m^2 and does not exceed 10 percent of the dead load of the existing roof.

805.4 Voluntary lateral force-resisting system alterations. Structural *alterations* that are intended exclusively to improve the lateral force-resisting system and are not required by other sections of this code shall not be subject to the structural requirements of this chapter or Chapter 7, provided that the following conditions are met:

1. The capacity of existing structural systems to resist forces is not reduced once the *alteration* is completed.
2. New structural elements are detailed and connected to existing or new structural elements as required by the selected design criteria.

   Exception: New lateral force-resisting systems designed in accordance with the *Oman Building Code* are permitted to be of a type designated as "Ordinary" or "Intermediate" where ASCE 7 Table 12.2-1 states these types of systems are not permitted.
3. Supports and attachments for nonstructural elements removed and reinstalled to facilitate the work comply with the *Oman Building Code* for new construction.
4. The *alterations* do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

   Exception: Condition 4 need not be satisfied where the work complies with Section 304.3.2 Item 3.

SECTION 806
ELECTRICAL

806.1 New installations. Newly installed electrical equipment and wiring relating to work done in any *work area* shall comply with all applicable requirements of the *Oman Electrical Standard* except as provided for in Section 806.4.

806.2 Existing installations. Existing wiring in all *work areas* in Group A-1, A-2, A-5, H and I occupancies shall be upgraded to meet the materials and methods requirements of Chapter 7.

806.3 Health care facilities. In Group I-2 *facilities*, ambulatory care *facilities* and outpatient clinics, any added portion of an existing electrical system shall be required to meet installation and equipment requirements in NFPA 99.

806.4 Residential occupancies. In Group R-2, R-3 and R-4 occupancies, the requirements of Sections 806.4.1 through 806.4.7 shall be applicable only to *work areas* located within a dwelling unit.

806.4.1 Enclosed areas. Enclosed areas, other than closets, kitchens, basements, garages, hallways, laundry areas, utility areas, storage areas and bathrooms shall have not fewer than two duplex receptacle outlets or one duplex receptacle outlet and one ceiling or wall-type lighting outlet.

806.4.2 Kitchens. Kitchen areas shall have not fewer than two duplex receptacle outlets.

806.4.3 Laundry areas. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

806.4.4 Ground fault circuit interruption. Newly installed receptacle outlets shall be provided with ground fault circuit interruption as required by the *Oman Electrical Standrad*.

806.4.5 Minimum lighting outlets. Not less than one lighting outlet shall be provided in every bathroom, hallway, stairway, attached garage and detached garage with electric power, and to illuminate outdoor entrances and exits.

806.4.6 Utility rooms and basements. Not less than one lighting outlet shall be provided in utility rooms and basements where such spaces are used for storage or contain equipment requiring service.

806.4.7 Clearance for equipment. Clearance for electrical service equipment shall be provided in accordance with the *Oman Electrical Standard.*

SECTION 807
MECHANICAL

807.1 Reconfigured or converted spaces. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any *work area* shall be provided with natural or mechanical ventilation in accordance with the *Oman Mechanical Code*.

Exception: Existing mechanical ventilation systems shall comply with the requirements of Section 807.2.

807.2 Altered existing systems. In mechanically ventilated spaces, existing mechanical ventilation systems that are altered, reconfigured or extended shall provide not less than 0.0024 m^3/s per person of outdoor air and not less than 0.0071 m^3/s of ventilation air per person, or not less than the amount of ventilation air determined by the Indoor Air Quality Procedure of ASHRAE 62.1.

807.3 Local exhaust. Newly introduced devices, equipment or operations that produce airborne particulate matter, odors, fumes, vapor, combustion products, gaseous contaminants, pathogenic and allergenic organisms, and microbial contaminants in such quantities as to affect adversely or impair health or cause discomfort to occupants shall be provided with local exhaust.

SECTION 808
PLUMBING

808.1 Health care facilities. In Group I-2 *facilities*, ambulatory care *facilities* and outpatient clinics, any added portion of an existing medical gas system shall be required to meet installation and equipment requirements in NFPA 99.

SECTION 809
ENERGY CONSERVATION

809.1 Minimum requirements. Level 2 *alterations* to *existing buildings* or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the *Oman Energy Efficiency and Sustainability Code*. The *alterations* shall conform to the energy requirements of the *Oman Energy Efficiency and Sustainability Code* as they relate to new construction only.

CHAPTER 9
ALTERATIONS—LEVEL 3

User note:

***About this chapter**: Chapter 9 provides the technical requirements for those existing buildings that undergo Level 3 alterations. The purpose of this chapter is to provide detailed requirements and provisions to identify the required improvements in the existing building elements, building spaces and building structural system. This chapter is distinguished from Chapters 7 and 8 by involving alterations that cover 50 percent or more of the aggregate area of the building. In contrast, Level 1 alterations do not involve space reconfiguration, and Level 2 alterations involve extensive space reconfiguration that does not exceed 50 percent of the building area. Depending on the nature of alteration work, its location within the building, and whether it encompasses one or more tenants, improvements and upgrades could be required for the open floor penetrations, sprinkler system or the installation of additional means of egress such as stairs or fire escapes. At times and under certain situations, this chapter also is intended to improve the safety of certain building features beyond the work area and in other parts of the building where no alteration work might be taking place.*

SECTION 901
GENERAL

901.1 Scope. Level 3 *alterations* as described in Section 604 shall comply with the requirements of this chapter.

901.2 Compliance. In addition to the provisions of this chapter, work shall comply with all of the requirements of Chapters 7 and 8. The requirements of Sections 802, 803, 804 and 805 shall apply within all *work areas* whether or not they include exits and corridors shared by more than one tenant and regardless of the occupant load.

Exception: Buildings in which the reconfiguration of space affecting exits or shared egress access is exclusively the result of compliance with the accessibility requirements of Section 306.7.1 shall not be required to comply with this chapter.

SECTION 902
SPECIAL USE AND OCCUPANCY

902.1 High-rise buildings. Any building having occupied floors or an *occupiable roof* more than 23 m above the lowest level of Civil Defense vehicle access shall comply with the requirements of Sections 902.1.1 and 902.1.2.

902.1.1 Recirculating air or exhaust systems. Where a floor is served by a recirculating air or exhaust system with a capacity greater than 700 m^3/s, that system shall be equipped with *approved* smoke and heat detection devices installed in accordance with the *Oman Mechanical Code*.

902.1.2 Elevators. Where there is an elevator or elevators for public use, not less than one elevator serving the *work area* shall comply with this section. Existing elevators with a travel distance of 7.5 m or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1/CSA B44.1.

902.2 Boiler and furnace equipment rooms. Boiler and furnace equipment rooms adjacent to or within Group I-1, I-2, I-4, R-1, R-2 and R-4 occupancies shall be enclosed by 1-hour fire-resistance-rated construction.

Exceptions:

1. Steam boiler equipment operating at pressures of 103 kPa or less is not required to be enclosed.
2. Hot water boilers operating at pressures of 1170 kPa or less are not required to be enclosed.
3. Furnace and boiler equipment with 4.22×108 J per hour input rating or less is not required to be enclosed.
4. Furnace rooms protected with an automatic sprinkler system are not required to be enclosed.

902.3 Conditions for I-1 occupancies. Group I-1 occupancies shall be classified as Condition 1 or Condition 2 in accordance with Section 308.2 of the *Oman Building Code*.

902.3.1 Smoke barriers in Group I-1, Condition 2. In Group I-1, Condition 2 occupancies where the *work area* is on a story used for sleeping rooms for more than 30 care recipients, the story shall be divided into not fewer than two compartments by smoke barrier walls in accordance with Section 420.6 of the *Oman Building Code*.

902.4 Ambulatory care facilities. Where a Level 3 *work area* includes an existing *ambulatory care facility*, the following shall be provided:

1. A smoke compartment in accordance with Section 422.3 of the *Oman Building Code*, where the *alteration* results in an *ambulatory care facility* greater than 930 m^2 on one story.
2. Separation from adjacent spaces in accordance with Section 422.2 of the *Oman Building Code*, where any such facility has the potential for four or more care recipients incapable of self-preservation at any time.

SECTION 903
BUILDING ELEMENTS AND MATERIALS

903.1 Existing shafts and vertical openings. Existing stairways that are part of the means of egress shall be enclosed in accordance with Section 802.2.1 from the highest *work area* floor to, and including, the level of exit discharge and all floors below.

903.2 Fire partitions in Group R-3. Fire separation in Group R-3 occupancies shall be in accordance with Section 903.2.1.

903.2.1 Separation required. Where the *work area* is in any attached dwelling unit in Group R-3 or any multiple single-family dwelling (townhouse), walls separating the dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Work shall be performed on the side of the dwelling unit wall that is part of the *work area*.

Exception: Where *alterations* or *repairs* do not result in the removal of wall or ceiling finishes exposing the structure, walls are not required to be continuous through concealed floor spaces.

903.3 Interior finish. Interior finish in exits serving the *work area* shall comply with Section 802.4 between the highest floor on which there is a *work area* to the floor of exit discharge.

903.4 Enhanced classroom acoustics. In Group E occupancies, where the *work area* is a Level 3 alteration, enhanced classroom acoustics shall be provided in all classrooms with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

SECTION 904
FIRE PROTECTION

904.1 Automatic sprinkler systems. An automatic sprinkler system shall be provided in a *work area* where required by Section 803.2 or this section.

904.1.1 High-rise buildings. An automatic sprinkler system shall be provided in *work areas* where the high-rise building has a sufficient municipal water supply for the design and installation of an automatic sprinkler system at the site.

904.1.2 Rubbish and linen chutes. Rubbish and linen chutes located in the *work area* shall be provided with automatic sprinkler system protection or an *approved* automatic fire-extinguishing system where protection of the rubbish and linen chute would be required under the provisions of the *Oman Building Code* for new construction.

904.1.3 Upholstered furniture or mattresses. *Work areas* shall be provided with an automatic sprinkler system in accordance with the *Oman Building Code* where any of the following conditions exist:

1. A Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses exceeds 230 m^2.
2. A Group M occupancy used for the display and sale of upholstered furniture or mattresses exceeds 460 m^2.
3. A Group S-1 occupancy used for the storage of upholstered furniture or mattresses exceeds 230 m^2.

904.1.4 Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2. In buildings with occupancies in Groups A, B, E, F-1, H, I-1, I-3, I-4, M, R-1, R-2, R-4, S-1 and S-2 work areas shall be provided with automatic sprinkler protection where all of the following conditions occur:

1. The work area is required to be provided with automatic sprinkler protection in accordance with the *Oman Building Code* as applicable to new construction.
2. The building site has sufficient municipal water supply for design and installation of an automatic sprinkler system.

Exception: If the building site does not have sufficient municipal water supply for design of an automatic sprinkler system, work areas shall be protected by an automatic smoke detection system throughout all occupiable spaces other than sleeping units or individual dwelling units that activates the occupant notification system in accordance with Sections 907.4 , 907.5 and 907.6 of the *Oman Building Code*.

904.1.5 Group I-2. In Group I-2 occupancies, an automatic sprinkler system installed in accordance with *Oman Building Code* shall be provided in the following:

1. In Group I-2, Condition 1, throughout the work area.
2. In Group I-2, Condition 2, throughout the work area where the work area is 50 percent or less of the smoke compartment.
3. In Group I-2, Condition 2, throughout the smoke compartment in which the work occurs where the work area exceeds 50 percent of the smoke compartment.

904.1.6 Windowless stories. Work located in a windowless story, as determined in accordance with the *Oman Building Code*, shall be sprinklered where the *work area* is required to be sprinklered under the provisions of the *Oman Building Code* for newly constructed buildings and the building site has a sufficient municipal water supply for the design and installation of an automatic sprinkler system.

904.1.7 Other required automatic sprinkler systems. In buildings and areas listed in Table 903.2.11.6 of the *Oman Building Code*, *work areas* shall be provided with an automatic sprinkler system under the following conditions:

1. The *work area* is required to be provided with an automatic sprinkler system in accordance with the *Oman Building Code* applicable to new construction.
2. The building site has sufficient municipal water supply for design and installation of an automatic sprinkler system.

904.2 Fire alarm and detection systems. Fire alarm and detection shall be provided in accordance with Section 907 of the *Oman Building Code* as required for new construction.

904.2.1 Manual fire alarm systems. Where required by the *Oman Building Code*, a manual fire alarm system shall be provided throughout the *work area*. Alarm notification appliances shall be provided on such floors and shall be automatically activated as required by the *Oman Building Code*.

Exceptions:

1. Alarm-initiating and notification appliances shall not be required to be installed in tenant spaces outside of the *work area*.
2. Visual alarm notification appliances are not required, except where an existing alarm system is upgraded or replaced or where a new fire alarm system is installed.

904.2.2 Automatic fire detection. Where required by the *Oman Building Code* for new buildings, automatic fire detection systems shall be provided throughout the *work area*.

SECTION 905
MEANS OF EGRESS

905.1 General. The means of egress shall comply with the requirements of Section 804 except as specifically required in Sections 905.2 and 905.3.

905.2 Means-of-egress lighting. Means of egress from the highest *work area* floor to the floor of exit discharge shall be provided with artificial lighting within the exit enclosure in accordance with the requirements of the *Oman Building Code*.

905.3 Exit signs. Means of egress from the highest *work area* floor to the floor of exit discharge shall be provided with exit signs in accordance with the requirements of the *Oman Building Code*.

905.4 Two-way communications systems. In buildings with elevator service, a two-way communication system shall be provided where required by Section 1009.8 of the *Oman Building Code*.

SECTION 906
STRUCTURAL

906.1 General. Where buildings are undergoing Level 3 *alterations*, the provisions of this section shall apply.

906.2 Existing structural elements resisting lateral loads. Where work involves a *substantial structural alteration*, the lateral load-resisting system of the altered building shall be shown to satisfy the requirements of Section 1609 of the *Oman Building Code* and Section 304.3.2 of this code. Where the building is assigned to Seismic Design Category D, supports and attachments for nonstructural components required to serve any portion of the building with a use included in *Risk Category* IV shall comply with Section 1613 of the *Oman Building Code*.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes that are altered based on the conventional light-frame construction methods of the *Oman Building Code.*
2. Where the intended alteration involves only the lowest story of a building, structural components of the lateral load-resisting system above that story need not comply with this section.

906.3 Reserved.

906.4 Anchorage for concrete and masonry buildings. For any building assigned to Seismic Design Category D, ith a structural system that includes concrete or reinforced masonry walls with a flexible roof diaphragm, the *alteration* shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of wall anchors at the roof line of all subject buildings and at the floor lines of unreinforced masonry.

906.5 Anchorage for unreinforced masonry walls. For any building assigned to Seismic Design Category C or D, with a structural system that includes unreinforced masonry bearing walls, the *alteration* shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of wall anchors at the roof line.

906.6 Bracing for unreinforced masonry parapets. Parapets constructed of unreinforced masonry in buildings assigned to Seismic Design Category C or D shall comply with Section 304.3.2 by evaluation of the existing condition or by installation of parapet bracing.

906.7 Anchorage of unreinforced masonry partitions. Where the building is assigned to Seismic Design Category C or D, unreinforced masonry partitions and nonstructural walls within the *work area* and adjacent to egress paths from the *work area* shall have their existing conditions evaluated or shall be anchored, removed or altered to resist out-of-plane seismic forces to comply with Section 304.3.2.

SECTION 907
ENERGY CONSERVATION

907.1 Minimum requirements. Level 3 *alterations* to *existing buildings* or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the *Oman Energy Efficiency and Sustainability Code*. The *alterations* shall conform to the energy requirements of the *Oman Energy Efficiency and Sustainability Code* or as it relates to new construction only.

CHAPTER 10
CHANGE OF OCCUPANCY

User note:

***About this chapter**: The purpose of this chapter is to provide regulations for the circumstances where an existing building is subject to a change of occupancy or a change of occupancy classification. A change of occupancy is not to be confused with a change of occupancy classification. The* Oman Building Code *defines different occupancy classifications in Chapter 3 and special occupancy requirements in Chapter 4. Within specific occupancy classifications there can be many different types of actual activities that can take place. For instance, a Group A-3 occupancy classification deals with a wide variation of different types of activities, including bowling alleys and courtrooms, indoor tennis courts and dance halls. When a facility changes use from, for example, a bowling alley to a dance hall, the occupancy classification remains A-3, but the different uses could lead to drastically different code requirements. Therefore, this chapter deals with the special circumstances that are associated with a change in the use of a building within the same occupancy classification as well as a change of occupancy classification.*

SECTION 1001
GENERAL

1001.1 Scope. The provisions of this chapter shall apply where a *change of occupancy* occurs, as defined in Section 202.

1001.2 Certificate of occupancy (completion). A *change of occupancy* or a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the *Oman Building Code* than exists in the current building or space shall not be made to any structure without the approval of the *building official*. A certificate of occupancy shall be issued where it has been determined that the requirements for the *change of occupancy* have been met.

1001.2.1 Change of use. Any work undertaken in connection with a change in use that does not involve a *change of occupancy* classification or a change to another group within an occupancy classification shall conform to the applicable requirements for the work as classified in Chapter 6 and to the requirements of Sections 1002 through 1010.

Exception: As modified in Section 1204 for *historical buildings*.

1001.2.2 Change of occupancy classification or group. Where a building undergoes a *change of occupancy* classification, the provisions of Sections 1002 through 1011 shall apply.

1001.2.2.1 Partial change of occupancy. Where a portion of an *existing building* undergoes a *change of occupancy* classification, Section 1011 shall apply.

1001.3 Certificate of occupancy (completion) required. A certificate of occupancy (completion) shall be issued where a *change of occupancy* occurs that results in a different occupancy classification as determined by the *Oman Building Code*.

SECTION 1002
SPECIAL USE AND OCCUPANCY

1002.1 Compliance with the building code. Where an *existing building* or part of an *existing building* undergoes a *change of occupancy* to one of the special use or occupancy categories as described in Chapter 4 in the *Oman Building Code*, the building shall comply with all of the requirements of Chapter 4 of the *Oman Building Code* applicable to the special use or occupancy.

1002.2 Incidental uses. Where a portion of a building undergoes a *change of occupancy* to one of the incidental uses listed in Table 509.1 of the *Oman Building Code*, the incidental use shall comply with Section 509 of the *Oman Building Code* applicable to the incidental use.

1002.3 Change of occupancy in health care. Where a *change of occupancy* occurs to a Group I-2 or I-1 *facility*, the *work area* with the *change of occupancy* shall comply with the *Oman Building Code*.

Exceptions:

1. A *change in use* or occupancy in the following cases shall not be required to meet the *Oman Building Code*:
   1.1. Group I-2, Condition 2 to Group I-2, Condition 1.

   1.2. Group I-2 to ambulatory health care.

1.3. Group I-2 to Group I-1.

1.4. Group I-1, Condition 2 to Group I-1, Condition 1.

2. In a Group I-1 occupancy, where a *change of use* is not in conjunction with a Level 3 *alteration*, a smoke barrier in accordance with Section 420.6 of the *Oman Building Code* is not required to be added.

1002.4 Storage. In Group I-2 occupancies, equipped throughout with an automatic sprinkler in accordance with Section 903.3.1.1 of the *Oman Building Code*, where a room 23 m^2 or less undergoes a change in occupancy to a storage room, the room shall be separated from the remainder of the building by construction capable of resisting the passage of smoke in accordance with Section 509.4.2 of the *Oman Building Code*.

SECTION 1003
BUILDING ELEMENTS AND MATERIALS

1003.1 General. Building elements and materials in portions of buildings undergoing a change of occupancy classification shall comply with Section 1011.

SECTION 1004
FIRE PROTECTION

1004.1 General. Fire protection requirements in Section 1011 shall apply where either of the following occur:

1. A building or portions thereof undergo a *change of occupancy*.
2. A building or portions thereof undergo a *change of occupancy* and there is a different fire protection system threshold requirement in Chapter 9 of the *Oman Building Code*.

SECTION 1005
MEANS OF EGRESS

1005.1 General. Means of egress in portions of buildings undergoing a change of occupancy classification shall comply with Section 1011.

SECTION 1006
STRUCTURAL

1006.1 Live loads. Structural elements carrying tributary live loads from an area with a *change of occupancy* shall satisfy the requirements of Section 1607 of the *Oman Building Code*. Design live loads for areas of new occupancy shall be based on Section 1607 of the *Oman Building Code*. Design live loads for other areas shall be permitted to use previously *approved* design live loads.

Exception: Structural elements whose demand-capacity ratio considering the *change of occupancy* is not more than 5 percent greater than the demand-capacity ratio based on previously *approved* live loads.

1006.2 Wind loads. Where a *change of occupancy* results in a structure being assigned to a higher *risk category*, the structure shall satisfy the requirements of Section 1609 of the *Oman Building Code* for the new risk category.

Exception: Where the area of the new occupancy is less than 10 percent of the building area. The cumulative effect of occupancy changes over time shall be considered.

1006.3 Seismic loads. Where a *change of occupancy* results in a building being assigned to a higher *risk category*, or where the change is from a Group S or Group U occupancy to any occupancy other than Group S or Group U, the lateral force-resisting system of the building shall comply with Section 304.3.1 for the new *risk category*. Where a *change of occupancy* results in a

building being assigned to *Risk Category* IV and Seismic Design Category D, nonstructural components serving any portion of the building changed to *Risk Category* IV shall comply with the requirements of Section 1613 of the *Oman Building Code*.

Exceptions:

1. Where a *change of use* results in a building being reclassified from *Risk Category* I or II to *Risk Category* III and the seismic coefficient, S_{DS}, is less than 0.33, compliance with this section is not required.
2. Where the area of the new occupancy is less than 10 percent of the building area, the occupancy is not changing from a Group S or Group U occupancy, and the new occupancy is not assigned to *Risk Category* IV, compliance with this section is not required. The cumulative effect of occupancy changes over time shall be considered.
3. Unreinforced masonry bearing wall buildings assigned to *Risk Category* III and to Seismic Design Category A or B shall be permitted to use Appendix Chapter A1 of this code.
4. Where the change is from a Group S or Group U occupancy and there is no change of *risk category*, compliance with Section 304.3.2 shall be permitted.

1006.4 Access to Risk Category IV. Any structure that provides operational access to an adjacent structure assigned to *Risk Category* IV as the result of a *change of occupancy* shall itself comply with the requirements of Section 1609 of the *Oman Building Code* and Section 304.3.1 of this code. Where operational access to *Risk Category* IV is less than 3 m from either an interior lot line or from another structure, access protection from potential falling debris shall be provided.

SECTION 1007
ELECTRICAL

1007.1 Special occupancies. Where the occupancy of an *existing building* or part of an *existing building* is changed to one of the following special occupancies as described in the *Oman Electrical Standard,* the electrical wiring and equipment of the building or portion thereof that contains the proposed occupancy shall comply with the applicable requirements of the *Oman Electrical Standard.* Health care *facilities*, including Group I-2, ambulatory health care *facilities* and outpatient clinics, shall also comply with the applicable requirements of NFPA 99:

1. Hazardous locations.
2. Commercial garages, repair and storage.
3. Aircraft hangars.
4. Gasoline dispensing and service stations.
5. Bulk storage plants.
6. Spray application, dipping and coating processes.
7. Health care *facilities*, including Group I-2, ambulatory health care *facilities* and outpatient clinics.
8. Places of assembly.
9. Theaters, audience areas of motion picture and television studios, and similar locations.
10. Motion picture and television studios and similar locations.
11. Motion picture projectors.
12. Agricultural buildings.

1007.2 Unsafe conditions. Where the occupancy of an *existing building* or part of an *existing building* is changed, all *unsafe* conditions shall be corrected without requiring that all parts of the electrical system comply with the *Oman Electrical Standard.*

1007.3 Service upgrade. Where the occupancy of an *existing building* or part of an *existing building* is changed, electrical service shall be upgraded to meet the requirements of the *Oman Electrical Standard* for the new occupancy.

1007.4 Number of electrical outlets. Where the occupancy of an *existing building* or part of an *existing building* is changed, the number of electrical outlets shall comply with the *Oman Electrical Standard* for the new occupancy.

SECTION 1008
MECHANICAL

1008.1 Mechanical requirements. Where the occupancy of an *existing building* or part of an *existing building* is changed such that the new occupancy is subject to different kitchen exhaust requirements or to increased mechanical ventilation requirements in accordance with the *Oman Mechanical Code*, the new occupancy shall comply with the respective *Oman Mechanical Code* provisions.

SECTION 1009
PLUMBING

1009.1 Increased demand. Where the occupancy of an *existing building* or part of an *existing building* is changed such that the new occupancy is subject to increased or different plumbing fixture requirements or to increased water supply requirements in accordance with the *Oman Plumbing Code*, the new occupancy shall comply with the intent of the respective *Oman Plumbing Code* provisions.

Exception: Only where the occupant load of the story is increased by more than 20 percent, plumbing fixtures for the story shall be provided in quantities specified in the *Oman Plumbing Code* based on the increased occupant load.

1009.2 Food-handling occupancies. If the new occupancy is a food-handling establishment, all existing sanitary waste lines above the food or drink preparation or storage areas shall be panned or otherwise protected to prevent leaking pipes or condensation on pipes from contaminating food or drink. New drainage lines shall not be installed above such areas and shall be protected in accordance with the *Oman Plumbing Code*.

1009.3 Interceptor required. If the new occupancy will produce grease or oil-laden wastes, interceptors shall be provided as required in the *Oman Plumbing Code*.

1009.4 Chemical wastes. If the new occupancy will produce chemical wastes, the following shall apply:

1. If the existing piping is not compatible with the chemical waste, the waste shall be neutralized prior to entering the drainage system or the piping shall be changed to a compatible material.
2. Chemical waste shall not discharge to a public sewer system without the approval of the sewage authority.

1009.5 Group I-2. If the occupancy group is changed to Group I-2, the plumbing system and medical gas system shall comply with the applicable requirements of the *Oman Plumbing Code*.

SECTION 1010
OTHER REQUIREMENTS

1010.1 Light and ventilation. Light and ventilation shall comply with the requirements of the *Oman Building Code* for the new occupancy.

SECTION 1011
CHANGE OF OCCUPANCY CLASSIFICATION

1011.1 General. The provisions of this section shall apply to buildings or portions thereof undergoing a change of occupancy classification. This includes a change of occupancy classification within a group as well as a change of occupancy classification from one group to a different group. The provisions of this section shall also apply where there is a *change of occupancy* within a building or portion thereof and there is a different fire protection system threshold requirement in Chapter 9 of the *Oman Building Code* than exists in the current building or space. Such buildings shall also comply with Sections 1002 through 1010 of this code.

1011.2 Fire protection systems. Fire protection systems shall be provided in accordance with Sections 1011.2.1 and 1011.2.2.

1011.2.1 Automatic sprinkler system. The installation of an automatic sprinkler system shall be required where there is a *change of occupancy* classification and Chapter 9 of the current *Oman Building Code* requires an automatic sprinkler system based on the new occupancy or where there is a *change of occupancy* within the space where there is a different fire protection system threshold requirement in Chapter 9 of the current *Oman Building Code* than exists in the current building

or space. The installation of the automatic sprinkler system shall be required within the area of the *change of occupancy* and areas of the building not separated horizontally and vertically from the *change of occupancy* by a nonrated permanent partition and horizontal assemblies, fire partition, smoke partition, smoke barrier, fire barrier or fire wall.

Exceptions:

1. An automatic sprinkler system shall not be required in a one- or two-family dwelling constructed in accordance with the *Oman Building Code*.
2. Automatic sprinkler system shall not be required in a townhouse constructed in accordance with the *Oman Building Code*.
3. The townhouse shall be separated from adjoining units in accordance with Section 705.5 and 705.8 of the *Oman Building Code*.

1011.2.1.1 Nonrequired automatic sprinkler systems. The *building official* is authorized to permit the removal of an existing automatic sprinkler system where all of the following conditions exist:

1. The system is not required for new construction.
2. Portions of the system that are exposed to the public are removed.
3. The system was not installed as part of any special construction features, including fire-resistance-rated assemblies and smoke-resistive assemblies, conditions of occupancy, means of egress conditions, fire code deficiencies, *approved* modifications or *approved* alternative materials, design and methods of construction, and equipment applying to the building.

1011.2.1.1.1 Approval. Plans, investigation and evaluation reports, and other data shall be submitted documenting compliance with Section 1011.2.1.1 for review and approval in support of a determination authorizing the removal of the automatic sprinkler system by the *building official*.

1011.2.2 Fire alarm and detection system. Where a change in occupancy classification occurs or where there is a *change of occupancy* within a space where there is a different fire protection system threshold requirement in Chapter 9 of the current *Oman Building Code* than exists in the current building or space that requires a fire alarm and detection system to be provided based on the new occupancy in accordance with Chapter 9 of the *Oman Building Code*, such system shall be provided throughout the area where the *change of occupancy* occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the *change of occupancy* occurs in accordance with Section 907 of the *Oman Building Code* as required for new construction.

1011.3 Interior finish. In areas of the building undergoing the *change of occupancy* classification, the interior finish of walls and ceilings shall comply with the requirements of the *Oman Building Code* for the new occupancy classification.

1011.4 Enhanced classroom acoustics. In Group E occupancies, where the *work area* is a Level 3 *alteration*, enhanced classroom acoustics shall be provided in all classrooms with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

1011.5 Means of egress, general. Hazard categories in regard to life safety and means of egress shall be in accordance with Table 1011.5.

TABLE 1011.5
MEANS OF EGRESS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	I-2; I-3; I-4
3	A; E; I-1; M; R-1; R-2; R-4, Condition 2
4	B; F-1; R-3; R-4, Condition 1; S-1
5 (Lowest Hazard)	F-2; S-2; U

1011.5.1 Means of egress for change to a higher-hazard category. Where a change of occupancy classification is made to a higher-hazard category (lower number) as shown in Table 1011.5, the means of egress shall comply with the requirements of Chapter 10 of the *Oman Building Code*.

Exceptions:

1. Stairways shall be enclosed in compliance with the applicable provisions of Section 903.1.
2. Existing stairways including handrails and guards complying with the requirements of Chapter 9 shall be permitted for continued use subject to approval of the *building official*.
3. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
4. Existing corridor walls constructed on both sides of wood lath and plaster in good condition or 13 mm gypsum wallboard shall be permitted. Such walls shall either terminate at the underside of a ceiling of equivalent construction or extend to the underside of the floor or roof next above.
5. Existing corridor doorways, transoms and other corridor openings shall comply with the requirements in Sections 804.6.1, 804.6.2 and 804.6.3.
6. Existing dead-end corridors shall comply with the requirements in Section 804.7.
7. An operable window complying with Section 1011.5.6 shall be accepted as an *emergency escape and rescue opening*.

1011.5.2 Means of egress for change of use to an equal or lower-hazard category. Where a change of occupancy classification is made to an equal or lesser-hazard category (higher number) as shown in Table 1011.5, existing elements of the means of egress shall comply with the requirements of Section 905 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the requirements of Chapter 10 of the *Oman Building Code*.

Exceptions:

1. Any stairway replacing an existing stairway within a space where the pitch or slope cannot be reduced because of existing construction shall not be required to comply with the maximum riser height and minimum tread depth requirements.
2. In Group I-1 and I-2 facilities, required guards enclosing the occupiable roof areas shall be permitted to be greater than 1.2 m above the surface of the occupiable roof where the occupants, because of clinical needs, require restraint or containment as part of a function of a psychiatric or cognitive treatment area.

1011.5.3 Egress capacity. Egress capacity shall meet or exceed the occupant load as specified in the *Oman Building Code* for the new occupancy.

1011.5.4 Handrails. Existing stairways shall comply with the handrail requirements of Section 804.13 in the area of the *change of occupancy* classification.

1011.5.5 Guards. Existing guards shall comply with the requirements in Section 804.12 in the area of the *change of occupancy* classification.

1011.5.6 Existing emergency escape and rescue openings. Where a *change of occupancy* would require an *emergency escape and rescue opening* in accordance with Section 1031 of the *Oman Building Code*, operable windows serving as the *emergency escape and rescue opening* shall comply with the following:

1. An existing operable window shall provide a minimum net clear opening of 0.38 m^2 with a minimum net clear opening height of 550 mm and a minimum net clear opening width of 500 mm.
2. A replacement window where such window complies with both of the following:
    2.1. The replacement window meets the size requirements in Item 1.
    2.2. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

1011.6 Heights and areas. Hazard categories in regard to height and area shall be in accordance with Table 1011.6.

TABLE 1011.6
HEIGHTS AND AREAS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATIONS
1 (Highest Hazard)	H
2	A-1; A-2; A-3; A-4; I; R-1; R-2; R-4, Condition 2
3	E; F-1; S-1; M
4 (Lowest Hazard)	B; F-2; S-2; A-5; R-3; R-4, Condition 1; U

1011.6.1 Height and area for change to a higher-hazard category. Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.6, heights and areas of buildings and structures shall comply with the requirements of Chapter 5 of the *Oman Building Code* for the new occupancy classification.

Exceptions:

1. For high-rise buildings constructed in compliance with a previously issued permit, the type of construction reduction specified in Section 403.2.1 of the *Oman Building Code* is permitted. This shall include the reduction for columns. The high-rise building is required to be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *Oman Building Code*.
2. Buildings that were constructed in compliance with a previously issued permit that have floor assemblies with a 1.5-hour fire-resistance rating shall not be required to comply with Chapter 5 of the *Oman Building Code* where all of the following apply:
   2.1. Chapter 5 of the *Oman Building Code* requires Type IB construction.
   2.2. The building does not include Group H occupancies.
   2.3. The building is protected throughout with an automatic sprinkler system in accordance Section 903.3.1.1 of the *Oman Building Code*.

1011.6.1.1 Fire wall alternative. In other than Groups H, F-1 and S-1, fire barriers and horizontal assemblies constructed in accordance with Sections 707 and 711, respectively, of the *Oman Building Code* shall be permitted to be used in lieu of fire walls to subdivide the building into separate buildings for the purpose of complying with the area limitations required for the new occupancy where all of the following conditions are met:

1. The buildings are protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the *Oman Building Code*.
2. The maximum allowable area between fire barriers, horizontal assemblies or any combination thereof shall not exceed the maximum allowable area determined in accordance with Chapter 5 of the *Oman Building Code* without an increase allowed for an automatic sprinkler system in accordance with Section 506 of the *Oman Building Code*.
3. The fire-resistance rating of the fire barriers and horizontal assemblies shall be not less than that specified for fire walls in Table 706.4 of the *Oman Building Code*.

Exception: Where horizontal assemblies are used to limit the maximum allowable area, the required fire-resistance rating of the horizontal assemblies shall be permitted to be reduced by 1 hour provided that the height and number of stories increases allowed for an automatic sprinkler system by Section 504 of the *Oman Building Code* are not used for the buildings.

1011.6.2 Height and area for change to an equal or lesser-hazard category. Where a change of occupancy classification is made to an equal or lesser-hazard category as shown in Table 1011.6, the height and area of the *existing building* shall be deemed acceptable.

1011.6.3 Fire barriers. Where a *change of occupancy* classification is made to a higher-hazard category as shown in Table 1011.6, fire barriers in separated mixed use buildings shall comply with the fire-resistance requirements of the *Oman Building Code*.

Exception: Where the fire barriers are required to have a 1-hour fire-resistance rating, existing wood lath and plaster in good condition or existing 13 mm gypsum wallboard shall be permitted.

1011.7 Exterior wall fire-resistance ratings. Hazard categories in regard to fire-resistance ratings of exterior walls shall be in accordance with Table 1011.7.

TABLE 1011.7
EXPOSURE OF EXTERIOR WALLS HAZARD CATEGORIES

RELATIVE HAZARD	OCCUPANCY CLASSIFICATION
1 (Highest Hazard)	H
2	F-1; M; S-1
3	A; B; E; I; R
4 (Lowest Hazard)	F-2; S-2; U

1011.7.1 Exterior wall rating for change of occupancy classification to a higher-hazard category. Where a change of occupancy classification is made to a higher hazard category as shown in Table 1011.7, exterior walls shall have fire resistance and exterior areas and opening protectives as required by the *Oman Building Code*.

Exception: A 2-hour fire-resistance rating shall be allowed where the building does not exceed three stories in height and is classified as one of the following groups: A-2 and A-3 with an occupant load of less than 300, B, F, M or S.

1011.7.2 Exterior wall rating for change of occupancy classification to an equal or lesser-hazard category. Where a change of occupancy classification is made to an equal or lesser-hazard category as shown in Table 1011.7, existing exterior walls, including openings, shall be accepted.

1011.7.3 Opening protectives. Openings in exterior walls shall be protected as required by the *Oman Building Code*. Where openings in the exterior walls are required to be protected because of their distance from the lot line, the sum of the area of such openings shall not exceed 50 percent of the total area of the wall in each story.

Exceptions:

1. Where the *Oman Building Code* permits openings in excess of 50 percent.
2. Protected openings shall not be required in buildings of Group R occupancy that do not exceed three stories in height and that are located not less than 910 mm from the lot line.
3. Exterior opening protectives are not required where an automatic sprinkler system has been installed throughout.
4. Exterior opening protectives are not required where the *change of occupancy* group is to an equal or lower hazard classification in accordance with Table 1011.7.

1011.8 Enclosure of vertical shafts. Enclosure of vertical shafts shall be in accordance with Sections 1011.8.1 through 1011.8.4.

1011.8.1 Minimum requirements. Vertical shafts shall be designed to meet the *Oman Building Code* requirements for atriums or the requirements of this section.

1011.8.2 Stairways. Where a change of occupancy classification is made to a higher-hazard category as shown in Table 1011.5, interior stairways shall be enclosed as required by the *Oman Building Code*.

Exceptions:

1. In other than Group I occupancies, an enclosure shall not be required for openings serving only one adjacent floor and that are not connected with corridors or stairways serving other floors.
2. Unenclosed existing stairways need not be enclosed in a continuous vertical shaft if each story is separated from other stories by 1-hour fire-resistance-rated construction or *approved* wired glass set in steel frames and all exit

corridors are sprinklered in accordance with the *Oman Building Code*. The openings between the corridor and the tenant space shall have not less than one sprinkler head above the openings on the tenant side. The sprinkler system shall be permitted to be supplied from the domestic water-supply systems, provided that the system is of adequate pressure, capacity and sizing for the combined domestic and sprinkler requirements.

3. Existing penetrations of stairway enclosures shall be accepted if they are protected in accordance with the *Oman Building Code*.

1011.8.3 Other vertical shafts. Interior vertical shafts other than stairways, including but not limited to elevator hoistways and service and utility shafts, shall be enclosed as required by the *Oman Building Code* where there is a *change of use* to a higher-hazard category as specified in Table 1011.5.

Exceptions:

1. Existing 1-hour interior shaft enclosures shall be accepted where a higher rating is required.
2. Vertical openings, other than stairways, in buildings of other than Group I occupancy and connecting less than six stories shall not be required to be enclosed if the entire building is provided with an *approved* automatic sprinkler system.

1011.8.4 Openings. Openings into existing vertical shaft enclosures shall be protected by fire assemblies having a fire protection rating of not less than 1 hour and shall be maintained self-closing or shall be automatic-closing by actuation of a smoke detector. Other openings shall be fire protected in an *approved* manner. Existing fusible link-type automatic door-closing devices shall be permitted in all shafts except stairways if the fusible link rating does not exceed 57°C.

CHAPTER 11
ADDITIONS

User note:

About this chapter: *Chapter 11 provides the requirements for additions, which correlate to the code requirements for new construction. There are, however, some exceptions that are specifically stated within this chapter. An "Addition" is defined in Chapter 2 as "an extension or increase in the floor area, number of stories or height of a building or structure." Chapter 11 contains the minimum requirements for an addition that is not separated from the existing building by a fire wall.*

SECTION 1101
GENERAL

1101.1 Scope. An *addition* to a building or structure shall comply with the Oman Codes for new construction without requiring the *existing building* or structure to comply with any requirements of those codes or of these provisions, except as required by this chapter. Where an *addition* impacts the *existing building* or structure, that portion shall comply with this code.

1101.2 Creation or extension of nonconformity. An *addition* shall not create or extend any nonconformity in the *existing building* to which the *addition* is being made with regard to accessibility, structural strength, supports and attachments for non-structural components, fire safety, means of egress or the capacity of mechanical, plumbing or electrical systems.

Exception: Nonconforming supports and attachments for nonstructural components that serve the *addition* from within the *existing building* need not be altered to comply with *Oman Building Code* Section 1613 unless the components are part of the *addition*'s life safety system or are required to serve an *addition* assigned to *Risk Category* IV.

1101.3 Risk category assignment. Where the *addition* and the *existing building* have different occupancies, the *risk category* of each existing and added occupancy shall be determined in accordance with Section 1604.5.1 of the *Oman Building Code*. Where application of that section results in a higher risk category for the *existing building* compared with the *risk category* for the *existing building* before the *addition*, such a change shall be considered a *change of occupancy* and shall comply with Chapter 10 of this code. Where application of that section results in a higher *risk category* for the *addition* compared with the *risk category* for the *addition* by itself, the *addition* and any systems in the *existing building* required to serve the *addition* shall comply with the requirements of the *Oman Building Code* for new construction for the higher *risk category.*

1101.4 Other work. Any *repair* or *alteration* work within an *existing building* to which an *addition* is being made shall comply with the applicable requirements for the work as classified in Chapter 6.

1101.5 Smoke barriers in Group I-1, Condition 2. Where an *addition* to an existing Group I-1, Condition 2 building adds sleeping areas that result in more than 50 care recipients on a story, smoke barriers shall be provided to subdivide such story into not fewer than two smoke compartments in accordance with Section 420.6 of the *Oman Building Code*.

Exception: Where the e*xisting building* is divided into smoke compartments and the *addition* does not result in any individual smoke compartment exceeding the size and travel distance requirements in Section 420.6 of the *Oman Building Code*, additional smoke barriers are not required.

1101.6 Enhanced classroom acoustics. In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms in the *addition* with a volume of 565 m^3 or less. Enhanced classroom acoustics shall comply with the reverberation time in Section 808 of ICC A117.1.

1101.7 Occupiable roofs. Where a new *occupiable roof* is added to a building or structure, the *occupiable roof* shall comply with the provisions of the *Oman Building Code*.

SECTION 1102
HEIGHTS AND AREAS

1102.1 Height limitations. An *addition* shall not increase the height of an *existing building* beyond that permitted under the applicable provisions of Chapter 5 of the *Oman Building Code* for new buildings.

1102.2 Area limitations. An *addition* shall not increase the area of an *existing building* beyond that permitted under the applicable provisions of Chapter 5 of the *Oman Building Code* for new buildings unless fire separation as required by the *Oman Building Code* is provided.

Exception: In-filling of floor openings and nonoccupiable appendages such as elevator and exit stairway shafts shall be permitted beyond that permitted by the *Oman Building Code.*

1102.3 Fire protection systems. Existing fire areas increased by the *addition* shall comply with Chapter 9 of the *Oman Building Code*.

Exception: Nonoccupiable appendages, such as elevator and exit stairway shafts, shall be permitted beyond that permitted by the *Oman Building Code*.

SECTION 1103
STRUCTURAL

1103.1 Additional gravity loads. Any existing gravity load-carrying structural element for which an *addition* and its related *alterations* cause an increase in design dead or live load, as specified in Section 1605 of the *Oman Building Code*, of more than 5 percent shall be replaced or altered as needed to carry the gravity loads required by the *Oman Building Code* for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the *addition* and its related *alterations* shall be considered to be an altered element subject to the requirements of Section 805.2. Any existing element that will form part of the lateral load path for any part of the *addition* shall be considered to be an existing lateral load-carrying structural element subject to the requirements of Section 1103.2.

Exception: Buildings of Group R occupancy with not more than five dwelling units or sleeping units used solely for residential purposes where the *existing building* and the *addition* together comply with the conventional light-frame construction methods of the *Oman Building Code.*

1103.2 Lateral force-resisting system. Where the *addition* is structurally independent of the *existing structure*, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the *addition* is not structurally independent of the *existing structure*, the lateral force-resisting system of the *existing structure* and its *addition* acting together as a single structure shall comply with Section 1609 of the *Oman Building Code* and Section 304.3.1 of this code.

Exceptions:

1. Buildings of Group R occupancy with not more than five dwelling or sleeping units used solely for residential purposes where the *existing building* and the *addition* comply with the conventional light-frame construction methods of the *Oman Building Code.*
2. Any existing lateral load-carrying structural element whose demand-capacity ratio with the *addition* considered is not more than 10 percent greater than its demand-capacity ratio with the *addition* ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609 and 1613 of the *Oman Building Code*. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of *additions* and *alterations* since original construction.

   When calculating demand-capacity ratios for wind, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition, alteration* or repair in compliance with Section 1609 of the *Oman Building Code* or the code wind forces in effect at the time. When calculating demand-capacity ratios for earthquake, the date of original construction shall be permitted to be taken as the date of completion of a prior *addition, alteration* or repair in compliance with Section 304.3.1 or the full seismic forces in effect at the time.

1103.3 Flood hazard areas. *Additions* and *foundations* in *flood hazard areas* shall comply with the following requirements:

1. For horizontal *additions* that are structurally interconnected to the *existing building*:
   1.1. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *Oman Building Code.*
   1.2. If the *addition* constitutes *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *Oman Building Code.*

1.3. If the *addition* does not constitute substantial improvement, the *addition* is not required to comply with the flood design requirements for new construction, provided that both of the following apply:

1.3.1. The *addition* shall not create or extend any nonconformity of the existing building with the flood-resistant construction requirements.

1.3.2. The lowest floor of the *addition* shall be at or above the lower of the lowest floor of the existing building or the lowest floor elevation required in Section 1612 of the *Oman Building Code.*

2. For horizontal *additions* that are not structurally interconnected to the *existing building*:

2.1. The *addition* shall comply with Section 1612 of the *Oman Building Code.*

2.2. If the *addition* and all other proposed work, when combined, constitute *substantial improvement*, the *existing building* and the *addition* shall comply with Section 1612 of the *Oman Building Code.*

3. For vertical *additions* and all other proposed work that, when combined, constitute *substantial improvement*, the *existing building* shall comply with Section 1612 of the *Oman Building Code.*

4. For a new foundation or replacement foundation or a foundation raised or extended upward, the foundation shall comply with Section 1612 of the *Oman Building Code.*

SECTION 1104
ENERGY CONSERVATION

1104.1 Minimum requirements. *Additions* to *existing buildings* shall conform to the energy requirements of the *Oman Energy Efficiency and Sustainability Code* relating to new construction.

CHAPTER 12
HISTORICAL BUILDINGS

User note:

***About this chapter**: Chapter 12 provides some exceptions from code requirements when the building in question has historical value. The most important criterion for application of this chapter is that the building must be essentially accredited as being of historical significance by the Ministry of Heritage. Other considerations include the structural condition of the building (i.e., is the building structurally sound), its proposed use, its impact on life safety and how the intent of the code, if not the letter, will be achieved. This chapter was based on the 2021 and 2024 IEBC as well as the 2022 California Historical Building Code.*

SECTION 1201
GENERAL

1201.1 Scope. This chapter is intended to provide means for the preservation of *historical buildings*. *Historical buildings* shall comply with the provisions of this chapter relating to their *repair*, *alteration*, relocation and *change of occupancy*. The purpose of this chapter is to provide regulations for the preservation, restoration, rehabilitation, relocation or reconstruction of buildings or properties designated as qualified *historical buildings,* properties and communities (Chapter 2). This chapter is intended to provide solutions for the preservation of qualified *historical buildings* or properties, to promote sustainability, to provide access for persons with disabilities, to provide a cost-effective approach to preservation, and to provide for the reasonable safety of the occupants or users. This section requires enforcing agencies to accept solutions that are reasonably equivalent to the *current code* as defined in Chapter 2 when dealing with qualified *historical buildings,* properties and communities.

1201.1.1 Intent. This chapter is intended to facilitate the preservation and continuing use of qualified *historical buildings* or properties while providing reasonable safety for the building occupants and access for persons with disabilities.

1201.1.2 Enforcement. The Ministry of Heritage and Tourism (MHT) designated staff shall be responsible for the enforcement of Chapter 12 of this code as to the historical provisions.

1201.1.3 Appeals. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, appeals may be filed in accordance Section 113 of the *Oman Building Code.* The board of appeals shall consult with the MHT designated staff. The board shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building official* and the MHT.

1201.2 Report. A *historical building* undergoing alteration or change of occupancy shall be investigated, assessed or evaluated, and a written report, where required by the *building official,* shall be prepared and filed with the *building official* by a registered design professional. The report shall identify all unsafe conditions as defined in Section 115. For buildings assigned to Seismic Design Category D, a description of the vertical and horizontal elements of the lateral force-resisting system and strengths or weaknesses therein shall be included. Additionally, the report shall describe the components of the building that provide a level of safety substantially below that required of existing nonhistorical buildings.

Exception: An investigation, evaluation and report shall not be required where the alteration is scoped by Section 602 as a Level 1 *alteration* and does not make the building or structure less compliant with the provisions of the *Oman Building Code*.

1201.3 Special occupancy exceptions—museums. Where a building in Group R-3 is used for Group A, B or M purposes such as museum tours, exhibits and other public assembly activities, or for museums less than 300 m^2 per floor and a maximum of three stories, the occupancy shall be classified as Group B where life safety conditions are *approved* by the *building official* in accordance with Section 1201.2. Adequate means of egress in such buildings, including, but not limited to, a means of maintaining doors in an open position to permit egress, a limit on building occupancy to an occupant load permitted by the means of egress capacity, a limit on occupancy of certain areas or floors, or supervision by a person knowledgeable in the emergency exiting procedures, shall be provided.

1201.4 Flood hazard areas. In *flood hazard areas*, if all proposed work, including *repairs*, work required because of a *change of occupancy*, and *alterations*, constitutes *substantial improvement*, then the *existing building* shall comply with Section 1612 of the *Oman Building Code*.

Exception: If a *historical building* will continue to be a *historical building* after the proposed work is completed, then the proposed work is not considered a *substantial improvement*.

1201.5 Unsafe conditions. Conditions determined by the *building official* to be *unsafe* shall be remedied. Work shall not be required beyond what is required to remedy the *unsafe* conditions.

SECTION 1202
REPAIRS

1202.1 General. Repairs to any portion of a *historical building* or structure shall be permitted with original or like materials and original methods of construction, subject to the provisions of this chapter. Hazardous materials, such as asbestos and lead-based paint, shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

1202.2 Replacement. Replacement of existing or missing features using original materials for *repairs* that match the original in configuration, height and size shall be permitted where approved by the *building official.*

Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Chapter 24 of the *Oman Building Code*.

Exception: Glass block walls, louvered windows and jalousies repaired with like materials.

SECTION 1203
FIRE SAFETY

1203.1 Scope. *Historical buildings* undergoing *alterations*, *changes of occupancy* or that are moved shall comply with Section 1203.

1203.2 General. Every *historical building* that does not conform to the construction requirements specified in this code for the occupancy or use and that constitutes a distinct fire hazard as defined herein shall be provided with an *approved* automatic sprinkler system as determined appropriate by the *building official*. However, an automatic sprinkler system shall not be used to substitute for, or act as an alternative to, the required number of exits from any *facility*.

1203.3 Means of egress. Where, in the opinion of the *building official*, there is sufficient width and height for a person to pass through the opening or traverse the means of egress, existing door openings and corridor and stairway widths are not required to meet the widths required by the *Oman Building Code* or this code. Where *approved* by the *building official*, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other *approved* means of egress having sufficient capacity to serve the total occupant load are provided.

1203.3.1 Existing fire escapes. Existing previously approved fire escapes and fire escape ladders shall be acceptable as one of the required means of egress, provided they extend to the ground and are easily negotiated, adequately signed and in good working order. Access shall be by an opening having a minimum width of 800 mm when open with a sill not more than 800 mm above the adjacent floor, landing or approved step.

1203.3.2 New fire escapes and fire escape ladders. New fire escapes and fire escape ladders that comply with this section shall be acceptable as one of the required means of egress. New fire escapes and new fire escape ladders shall comply with the following:

1. Access from a corridor shall not be through an intervening room.
2. All openings within 3 m shall be protected by 3/4-hour fire assemblies. Where located within a recess or vestibule, adjacent enclosure walls shall be of not less than 1-hour fire-resistive construction.
3. Egress from the building shall be by a clear opening having a minimum dimension of not less than 740 mm. Such openings shall be openable from the inside without the use of a key or special knowledge or effort. The sill of an opening giving access shall not be more than 750 mm above the floor, step or landing of the building or balcony.
4. Fire escape stairways and balconies shall support the dead load plus a live load of not less than 4.80 kN/m^2 and shall be provided with a top and intermediate handrail on each side. The pitch of the stairway shall not exceed 72 degrees with a minimum width of 450 mm. Treads shall be not less than 100 mm in width, and the rise between treads shall not exceed 250 mm. All stair and balcony railings shall support a horizontal force of not less than 729.5 N/m of railing.

5. Balconies shall be not less than 1.1 m in width with no floor opening other than the stairway opening greater than 16 mm in width. Stairway openings in such balconies shall be not less than 600 mm by 1.1 m. The balustrade of each balcony shall be not less than 900 mm high with not more than 225 mm between balusters.
6. Fire escapes shall extend to the roof or provide an approved gooseneck ladder between the top floor landing and the roof when serving buildings four or more stories in height having roofs with less than 33.3 percent slope. Fire escape ladders shall be designed and connected to the building to withstand a horizontal force of 445 N placed anywhere on the rung. All ladders shall be at least 380 mm wide, located within 300 mm of the building. Ladder rungs shall be 20 mm in diameter and shall be located 300 mm on center. Openings for roof access ladders through cornices and similar projections shall have minimum dimensions of 760 mm by 840 mm.

   The length of fire escapes and exit ladder devices shall be limited to that approved by the *building official* based on products listed by a recognized testing laboratory.
7. The lowest balcony shall be not more than 5.5 m from the ground. Fire escapes shall extend to the ground or be provided with counterbalanced stairs reaching to the ground.
8. Fire escapes shall not take the place of stairways required by the codes under which the building was constructed.
9. Fire escapes shall be kept clear and unobstructed at all times and maintained in good working order.

1203.3.3 Escape or rescue windows and doors. Basements in dwelling units and every sleeping room below the fourth floor shall have at least one openable window or door approved for emergency escape that shall open directly into a public street, public way, yard or exit court. Escape or rescue windows or doors shall have a minimum clear area of 0.50 m^2 and a minimum width or height dimension of 500 mm and be operable from the inside to provide a full, clear opening without the use of special tools.

Exception: Where windows are not provided on the ground floor, and in the opinion of the *building official*, the addition of windows will impair the historical nature of the building, the requirement will not apply to the ground floor.

1203.4 Transoms. In buildings with automatic sprinkler systems of Group R-1, R-2 or R-3, existing transoms in corridors and other fire-resistance-rated walls may be maintained if fixed in the closed position. A sprinkler shall be installed on each side of the transom.

1203.5 Wall construction.

1203.5.1 Interior wall finishes. The existing interior finishes shall be accepted where it is demonstrated that they are the historical finishes. New nonhistorical interior wall and ceiling finishes shall conform to the provisions of the *Oman Building Code*. Existing nonconforming materials used in interior walls and finishes may be surfaced with an approved fire retardant to increase the rating of the natural finish to within reasonable proximity of the required rating.

1203.5.2 Exterior wall construction. The fire-resistance requirement for existing exterior walls and existing opening protection may be satisfied when an automatic sprinkler system designed for exposure protection is installed per the *Oman Building Code*. The automatic sprinklers may be installed on the exterior with at least one sprinkler located over each opening required to be protected. Additional sprinklers shall also be distributed along combustible walls under the roof lines that do not meet the fire-resistive requirement due to their relationship to property lines as required by the *Oman Building Code*. Such sprinkler systems may be connected to the domestic water supply on the supply-main side of the building shutoff valve. A shutoff valve may be installed for the sprinkler system, provided it is locked in an open position.

1203.6 Stairway enclosure. In buildings of three stories or less, exit enclosure construction shall limit the spread of smoke by the use of tight-fitting doors and solid elements. Such elements are not required to have a fire-resistance rating.

1203.7 One-hour fire-resistant assemblies. Upgrading an existing qualified *historical building* or property to 1-hour fire-resistive construction and 1-hour fire-resistive corridors shall not be required regardless of construction or occupancy where one of the following is provided:

1. An automatic sprinkler system throughout. See Section 1203.12 for automatic sprinkler systems.
2. An approved life safety evaluation.
3. Other alternative measures as approved by the enforcing authority.

1203.8 Glazing in fire-resistance-rated systems. Historical glazing materials are permitted in interior walls required to have a 1-hour fire-resistance rating where the opening is provided with *approved* smoke seals and the area affected is provided with an automatic sprinkler system.

1203.9 Stairway railings. Grand stairways shall be accepted without complying with the handrail and guard requirements. Existing handrails and guards at all stairways shall be permitted to remain, provided they are not structurally *dangerous*.

1203.10 Guards. Guards shall comply with Sections 1203.10.1 and 1203.10.2.

1203.10.1 Height. Existing guards shall comply with the requirements of Section 404.

1203.10.2 Guard openings. The spacing between existing intermediate railings or openings in existing ornamental patterns shall be accepted unless a distinct hazard has been identified or created by a change in use or occupancy. Missing elements or members of a guard may be replaced in a manner that will preserve the historical appearance of the building or structure.

1203.11 Exit signs. Where exit sign or egress path marking location would damage the historical character of the building, alternative exit signs are permitted with approval of the *building official*. Alternative signs shall identify the exits and egress path.

1203.12 Automatic sprinkler systems. Every *historical building* that cannot be made to conform to the construction requirements specified in the *Oman Building Code* for the occupancy or use and that constitutes a distinct fire hazard shall be deemed to be in compliance if provided with an *approved* automatic sprinkler system.

Exception: Where the *building official* approves an alternative life safety system.

1203.13 Fire alarm systems. Every qualified *historical building* or property shall be provided with fire alarm systems as required for the use or occupancy by the *Oman Building Code* or other approved alternative.

1203.14 Roof covering. Existing or original roofing materials may be repaired or reconstructed provided that the original or historical roofing system shall be detailed or modified as necessary in order to be capable of providing shelter while preserving the historical materials and appearance of the roof.

SECTION 1204
CHANGE OF OCCUPANCY

1204.1 Scope. Every qualified *historical building* or property for which a permit or approval has been requested shall be classified prior to permit issuance according to its use or the character of its occupancy in accordance with the *current code* and applicable provisions of this chapter.

1204.1.1 General. *Historical buildings* undergoing a *change of occupancy* shall comply with the applicable provisions of Chapter 10, except as specifically permitted in this chapter. Where Chapter 10 requires compliance with specific requirements of Chapter 7, Chapter 8 or Chapter 9 and where those requirements are subject to the exceptions in Section 1202, the same exceptions shall apply to this section

1204.1.2 Existing use. The use or character of occupancy of a qualified *historical building* or property, or portion thereof, shall be permitted to continue in use regardless of any period of time in which it may have remained unoccupied or in other uses, provided such building or property otherwise conforms to all applicable requirements of this code.

1204.2 Building height and area. The allowable floor area for *historical buildings* undergoing a *change of occupancy* shall be permitted to exceed by 20 percent the allowable areas specified in Chapter 5 of the *Oman Building Code*. The maximum height and number of stories of a qualified *historical building* or property shall not be limited because of construction type, provided such height or number of stories does not exceed that of its historical design.

1204.3 Location on property. Historical structures undergoing a *change of use* to a higher-hazard category in accordance with Section 1011.7 may use alternative methods to comply with the fire-resistance and exterior opening protective requirements. Such alternatives shall comply with Section 1201.2.

1204.4 Occupancy separation. Required occupancy separations of 1 hour may be omitted where the building is provided with an *approved* automatic sprinkler system throughout.

1204.5 Roof covering. Regardless of occupancy or use group, roof-covering materials not less than Class C, where tested in accordance with ASTM E108 or UL 790, shall be permitted where a fire-retardant roof covering is required.

1204.6 Means of egress. Existing door openings and corridor and stairway widths less than those that would be acceptable for nonhistorical buildings under these provisions shall be *approved*, provided that, in the opinion of the *building official*, there is sufficient width and height for a person to pass through the opening or traverse the exit and that the capacity of the exit system is adequate for the occupant load, or where other operational controls to limit occupancy are *approved* by the *building official*.

1204.7 Door swing. Where *approved* by the *building official*, existing front doors need not swing in the direction of exit travel, provided that other *approved* exits having sufficient capacity to serve the total occupant load are provided.

1204.8 Transoms. In corridor walls required by these provisions to be fire-resistance rated, existing transoms may be maintained if fixed in the closed position, and fixed wired glass set in a steel frame or other *approved* glazing shall be installed on one side of the transom.

Exception: Transoms conforming to Section 1203.4 shall be accepted.

1204.9 Interior finishes. Where interior finish materials are required to comply with the fire test requirements of Section 803.1 of the *Oman Building Code*, existing nonconforming materials shall be permitted to be surfaced with an *approved* fire-retardant coating to achieve the required classification. Compliance with this section shall be demonstrated by testing the fire-retardant coating on the same material and achieving the required fire classification. Where the same material is not available, it shall be permitted to test on a similar material.

Exception: Existing nonconforming materials need not be surfaced with an *approved* fire-retardant coating where the building is equipped throughout with an automatic sprinkler system installed in accordance with the *Oman Building Code* and the nonconforming materials can be substantiated as being historical in character.

1204.10 One-hour fire-resistant assemblies. Where 1-hour fire-resistance-rated construction is required by these provisions, it need not be provided, regardless of construction or occupancy, where the existing wall and ceiling finish is wood lath and plaster.

1204.11 Stairways and guards. Existing stairways shall comply with the requirements of these provisions. The *building official* shall grant alternatives for stairways and guards if alternative stairways are found to be acceptable or are judged to meet the intent of these provisions. Existing stairways shall comply with Section 1203.

Exception: For buildings less than 279 m^2, existing conditions are permitted to remain at all stairways and guards.

1204.12 Exit signs. The *building official* may accept alternative exit sign locations where the location of such signs would damage the historical character of the building or structure. Such signs shall identify the exits and exit path.

1204.13 Exit stair live load. Existing historical stairways in buildings changed to a Group R-1 or R-2 occupancy shall be accepted where it can be shown that the stairway can support a 366 kg/m^2 live load.

1204.14 Natural light and ventilation. Other than Residential Occupancies and where it is determined by the *building official* that compliance with the natural light and ventilation requirements of Section 1010.1 will lead to loss of historical character or historical materials in the building, the existing level of natural light and ventilation shall be considered to be acceptable.

1204.15 Residential occupancies. The provisions of this section shall apply to all qualified *historical buildings* used for human habitation. Those dwelling units intended only for display, or public use with no residential use involved, need not comply with the requirements of this section.

1204.15.1 Fire escapes. See Section 504.

1204.15.2 Room dimensions. Rooms used for sleeping purposes may contain a minimum of 5 m^2 floor area, provided an average ceiling height of 2.5 m is maintained. Other habitable rooms need only be of adequate size to be functional for the purpose intended.

1204.15.3 Alteration and repair. The alteration and repair of qualified *historical buildings* or properties may permit the replacement, retention and extension of original materials and the continued use of original methods of construction, provided a life safety hazard is not created or continued. Alterations and repairs shall be consistent with this code and subject to the *building official's* approval.

The amount of alterations and repairs is not limited, provided there is no nonhistorical increase in floor area, volume or size of the building or property.

SECTION 1205
STRUCTURAL

1205.1 General. *Historical buildings* shall comply with the applicable structural provisions for the work as classified in Chapter 6.

Exceptions:

1. The *building official* shall be authorized to accept existing floor and previously *approved* live loads and roof live loads and to approve operational controls that limit the live load or roof live load.
2. Regardless of the level of damage, structural *repairs* shall be permitted to return the building to its predamage condition without additional work.

1205.2 Dangerous conditions. Conditions determined by the *building official* to be *dangerous* shall be remedied. Work shall not be required beyond what is required to remedy the *dangerous* condition.

SECTION 1206
RELOCATED BUILDINGS

1206.1 Relocated buildings. Foundations of relocated *historical buildings* and structures shall comply with the *Oman Building Code*. Relocated *historical buildings* shall otherwise be considered a *historical building* for the purposes of this code. Relocated *historical buildings* and structures shall be sited so that exterior wall and opening requirements comply with the *Oman Building Code* or with the compliance alternatives of this code.

SECTION 1207
ARCHAIC MATERIALS AND METHODS OF CONSTRUCTION

1207.1 Purpose. The purpose of this code is to provide regulations for the use of historical methods and materials of construction that are at variance with *current code* requirements, or are not otherwise codified, in buildings or structures designated as qualified *historical buildings* or properties. This code requires the enforcing authority to accept any reasonably equivalent alternatives to the *current code* when dealing with qualified *historical buildings* or properties.

TABLE 1207.1
STRENGTH VALUES FOR EXISTING MATERIALS

EXISTING MATERIALS OR CONFIGURATIONS OF MATERIALS[a]	STRENGTH LEVEL CAPACITY
1. Horizontal diaphragms.[b]	
1.1. Roofs with straight sheathing and roofing applied directly to the sheathing.	4.38 kN/m for seismic shear
1.2. Roofs with diagonal sheathing and roofing applied directly to the sheathing.	10.96 kN/m for seismic shear
1.3. Floors with straight tongue-and-groove sheathing.	4.38 kN/m for seismic shear
1.4. Floors with straight sheathing and finished wood flooring with board edges offset or perpendicular.	21.9 kN/m for seismic shear
1.5. Floors with finished diagonal sheathing.	26.27 kN/m for seismic shear
2. Crosswalls.[b, c]	Per side:
2.1. Plaster on wood or metal lath.	8.76 kN/m for seismic shear
2.2. Plaster on gypsum lath.	8 kN/m for seismic shear
2.3. Gypsum wallboard, unblocked edges.	2.92 kN/m for seismic shear
2.4. Gypsum wallboard, blocked edges.	5.84 kN/m for seismic shear
3. Existing footings, wood framing, structural steel and reinforcing steel.	
3.1. Plain concrete footings.	f'_c = 10.34 MPa unless otherwise shown by tests[c]
3.2. Douglas fir wood.	Allowable stress same as D.F. No. 1[c]
3.3. Reinforcing steel.	f_t = 124.1 N/mm^2 maximum
3.4. Structural steel.	f_t = 137.9 N/mm^2 maximum

a. Material must be sound and in good condition.
b. Shear values of these materials may be combined, except the total combined value shall not exceed 13.14 kN/m.
c. Stresses given may be increased for combinations of loads as specified in the current code.

1207.2 Intent. This code is intended to provide for the use of historical methods and materials of construction that are at variance with specific code requirements or are not otherwise codified.

TABLE 1207.2
STRENGTH VALUES OF NEW MATERIALS USED IN CONNECTION WITH EXISTING CONSTRUCTION

NEW MATERIALS OR CONFIGURATIONS OF MATERIALS	STRENGTH LEVEL CAPACITY[a]
1. Horizontal diaphragms.[b]	
1.1. 12 mm minimum plywood sheathing fastened directly over existing straight sheathing with edges of plywood located on center of individual sheathing boards and fastened with minimum #8 x 32 mm wood screws or nails with helical threads 3.5 mm minimum diameter and 32 mm minimum length at 100 mm tall panel edges and 300 mm centers each way in field.	21.9 kN/m
1.2. Same plywood and attachments as Item 1.1 fastened directly over existing diagonal sheathing.	26.27 kN/m
1.3. 10 mm plywood sheathing fastened directly over existing straight or diagonal sheathing with ends and edges on centers of individual sheathing boards and fastened with #6 wood screws or nails with helical threads 3.5 mm minimum diameter and 32 mm minimum length at 150 mm tall panel edges and 300 mm centers each way in field.	13.14 kN/m
2. Shear walls.	
2.1. Plywood sheathing applied directly over wood studs. No value shall be given to plywood applied over existing plaster or wood sheathing.	100 percent of the value specified in the current code for shear walls
3. Crosswalls (special procedure only).	
3.1. Plywood sheathing applied directly over wood studs. No value shall be given to plywood applied over existing plaster or wood sheathing.	133 percent of the value specified in the current code for shear walls
3.2. Drywall or plaster applied directly over wood studs.	100 percent of the values in the current code
3.3. Drywall or plaster applied to sheathing over existing wood studs.	50 percent of the values specified in the current code
4. Tension bolts.	
4.1. Bolts extending entirely through unreinforced masonry walls secured with bearing plates on far side of a three-wythe-minimum wall with at least 0.019 m^2 of area.[d, e]	24 N per bolt[f] 12 N per bolt for two-wythe walls[f]
4.2. All thread rod extending to the exterior face of the wall installed in adhesive.[i]	16 N per bolt
5. Shear bolts.	
5.1. Bolts embedded a minimum of 200 mm into unreinforced masonry walls and centered in 65 mm hole filled with dry-pack or nonshrink grout. Through bolts with first 200 mm embedded all-thread rod as noted in Item 4.2.[e, g, i]	13 mm diameter = 4.7 N[f] 16 mm diameter = 6.67 N[f] 19 mm diameter = 10 N[f]
6. Infilled walls.	
6.1. Reinforced masonry infilled openings in existing unreinforced masonry walls. Provide keys or dowels to match reinforcing.	Same as values specified for unreinforced masonry walls
7. Reinforced masonry.	
7.1. Masonry piers and walls reinforced per the current code.	Same as values specified in the current code[h]
8. Reinforced concrete.	
8.1. Concrete footings, walls and piers reinforced as specified in the current code and designed for tributary loads.	Same as values specified in the current code[h]

a. Values are for strength level loads as defined in current code standards.
b. Values may be adjusted for other fasteners when approved by the enforcing authority.
c. In addition to existing sheathing value.
d. Bolts to be 13 mm minimum diameter.
e. Other bolt sizes, values and installation methods may be used, provided a testing program is conducted in accordance with current code standards. Bolt spacing shall not exceed 1.8 m on center and shall be not less than 300 mm on center.
f. Other masonry based on tests or other substantiated data.
g. Embedded bolts to be tested as specified in current code standards.
h. Stresses given may be increased for combinations of loads as specified in the current code.
i. Adhesives shall be approved by the enforcing agency and installed in accordance with the manufacturer's recommendations. All drilling dust shall be removed from drilled holes prior to installation.

1207.3 Scope. Any construction type or material that is, or was, part of the historical fabric of a structure is covered by this chapter. Archaic materials and methods of construction present in a historical structure may remain or be reinstalled or be installed with new materials of the same class to match existing conditions.

1207.4 General engineering approaches. Strength values for archaic materials shall be assigned based on similar conventional codified materials or on tests as hereinafter indicated. The archaic materials and methods of construction shall be thoroughly investigated for their details of construction in accordance with Section 1205. Testing shall be performed when applicable to evaluate existing conditions. The architect or structural engineer in responsible charge of the project shall assign allowable stresses or strength levels to archaic materials. Such assigned strength values shall not be greater than those provided for in Sections 1207.5 and 1207.6 without adequate testing, and shall be subject to the concurrence of the enforcing authority.

1207.5 Nonstructural archaic materials. Where nonstructural historical materials exist in uses that do not meet the requirements of the *current code*, their continued use is allowed by this code, provided that any public health and life safety hazards are mitigated subject to the concurrence of the enforcing authority.

1207.6 Allowable conditions for specific materials. Archaic materials that exist and are to remain in qualified *historical buildings* or structures shall be evaluated for their condition and for loads required by this code. The structural survey required in Section 1201.2 shall document existing conditions, reinforcement, anchorage, deterioration and other factors pertinent to establishing allowable stresses, strength levels and adequacy of the archaic material. The remaining portion of this chapter provides additional specific requirements for commonly encountered archaic materials.

1207.6.1 Masonry.

1207.6.1.1 Existing solid masonry. Existing solid masonry walls of any type, except adobe, may be allowed, without testing, a maximum ultimate strength of 62 kPa in shear where there is a qualifying statement by the architect or engineer that an inspection has been made, that mortar joints are filled, and that both brick and mortar are reasonably good. The shear stress above applies to unreinforced masonry, except adobe, where the maximum ratio of unsupported height or length to thickness does not exceed 13, and where minimum quality mortar is used or exists. Wall height or length is measured to supporting or resisting elements that are at least twice as stiff as the tributary wall. Stiffness is based on the gross section. Shear stress may be increased by the addition of 10 percent of the axial direct stress due to the weight of the wall directly above. Higher-quality mortar may provide a greater shear value and shall be tested in accordance with Appendix A, Chapter A1.

1207.6.1.2 Stone masonry.

1207.6.1.2.1 Solid-backed stone masonry. Stone masonry solidly backed with brick masonry shall be treated as solid brick masonry as described in Section 1207.6.1.1 and in this code, provided representative testing and inspection verifies solid collar joints between stone and brick and that a reasonable number of stones lap with the brick wythes as headers or that steel anchors are present. Solid stone masonry where the wythes of stone effectively overlap to provide the equivalent header courses may also be treated as solid brick masonry.

1207.6.1.2.2 Independent wythe stone masonry. Stone masonry with independent face wythes may be treated as solid brick masonry as described in Section 1207.6.1.1 and this code, provided representative testing and inspection verify that the core is essentially solid in the masonry wall and that steel ties are epoxied in drilled holes between outer stone wythes at floors and roof, and not to exceed 1.2 m on center in each direction between floors and roof. A reinforcing element shall exist or be provided at or near the top of all stone masonry walls.

1207.6.1.2.3 Testing of stone masonry. Testing of stone masonry shall be similar to this code's requirements for brick masonry, except that representative stones that are not interlocked shall be pulled outward from the wall and shear area appropriately calculated after the test.

1207.6.2 Adobe.

1207.6.2.1 General. Unburned clay masonry may be constructed, reconstructed, stabilized or rehabilitated subject to this chapter. Alternative approaches that provide an equivalent or greater level of safety may be used, subject to the concurrence of the enforcing authority.

1207.6.2.2 Moisture protection. Provisions shall be in place to protect adobe structures from deterioration due to moisture penetration. Adobe shall be maintained in reasonably good condition. Particular attention shall be given to moisture content of adobe walls. Unmaintained walls or ruins shall be evaluated for safety based on their condition and stability. Additional protection measures may be appropriate subject to the concurrence of the enforcing authority.

1207.6.2.3 Height to thickness ratio. Unreinforced new or existing adobe walls meeting these criteria need not be evaluated for out-of-plane failure. Where existing dimensions do not meet these conditions, additional strengthening measures, such as a bond beam, may be appropriate. Existing sod or rammed earth walls shall be considered similar to the extent these provisions apply.

1. One-story adobe load-bearing walls shall not exceed a height-to-thickness ratio of 6.
2. Two-story adobe buildings or structures' height-to-thickness wall ratio shall not exceed 6 at the ground floor and 5 at the second floor, and shall be measured at floor-to-floor height when the second floor and attic ceiling/roof are connected to the wall as described in Sections 1207.6.2.4 through 1207.6.2.8.

1207.6.2.4 Nonload-bearing adobe. Nonload-bearing adobe partitions and gable end walls shall be evaluated for stability and anchored against out-of-plane failure if necessary.

1207.6.2.5 Bond beam. Where provided, a bond beam or equivalent structural element shall be located at the top of all adobe walls and at the second floor for two-story buildings or structures. The size and configuration of the structural element shall be sufficient to provide an effective brace for the wall to tie the building together and to connect the wall to the floor or roof.

1207.6.2.6 Repair or reconstruction. Repair or reconstruction of wall areas may utilize unstabilized brick or adobe masonry designed to be compatible with the constituents of the existing adobe materials.

1207.6.2.7 Shear values. Existing adobe may be allowed a maximum strength level of 83 kPa for shear.

1207.6.2.8 Mortar. Mortar may be of the same soil composition as that used in the existing wall or in new walls as necessary to be compatible with the adobe brick.

1207.6.3 Wood.

1207.6.3.1 Existing wood diaphragms or walls. Existing wood diaphragms or walls of straight or diagonal sheathing shall be assigned shear resistance values appropriate with the fasteners and materials functioning in conjunction with the sheathing. The structural survey shall determine fastener details and spacings and verify a load path through floor construction in accordance with Tables 1207.1 and 1207.2.

1207.6.3.2 Wood lath and plaster. Wood lath and plaster walls and ceilings may be utilized using the shear values referenced in Section 1207.6.3.1.

1207.6.3.3 Existing wood framing. Existing wood framing members may be assigned allowable stresses consistent with codes in effect at the time of construction. Existing or new replacement wood framing may be of archaic types originally used if properly researched, such as balloon and single wall. Wood joints such as dovetail and mortise and tenon types may be used structurally, provided they are well made. Lumber selected for use and type need not bear grade marks, and greater or lesser species such as low-level pine and fir, boxwood and indigenous hardwoods and other variations may be used for specific conditions where they were or would have been used.

Wood fasteners such as square or cut nails may be used with a maximum increase of 50 percent over wire nails for shear.

1207.6.4 Concrete.

1207.6.4.1 Materials. Natural cement concrete, unreinforced rubble concrete and similar materials may be utilized wherever that material is used historically. Concrete of low strength and with less reinforcement than required by the *current code* may remain in place. The architect or engineer shall assign appropriate values of strength based on testing of samples of the materials. Bond and development lengths shall be determined based on historical information or tests.

1207.6.4.2 Detailing. The architect or engineer shall carefully evaluate all detailing provisions of the *current code* that are not met and shall consider the implications of these variations on the ultimate performance of the structure, giving due consideration to ductility and reserve strength.

1207.6.5 Steel and iron. The hand-built, untested use of wrought or black iron, the use of cast iron or grey iron, and the myriad of joining methods that are not specifically allowed by the current code may be used wherever applicable and wherever they have proven their worth under the considerable span of years involved with most qualified *historical buildings* or structures. Uplift capacity should be evaluated and strengthened where necessary. Fixed conditions or midheight lateral loads on cast iron columns that could cause failure should be taken into account. Existing structural wrought, forged steel or grey iron may be assigned the maximum working stress prevalent at the time of original construction.

1207.6.6 Hollow clay tile. The historical performance of hollow clay tile in past earthquakes shall be carefully considered in evaluating walls of hollow clay tile construction. Hollow clay tile bearing walls shall be evaluated and strengthened as appropriate for lateral loads and their ability to maintain support of gravity loads. Suitable protective measures shall be provided to prevent blockage of exit stairways, stairway enclosures, exit ways and public ways as a result of an earthquake.

1207.6.7 Veneers.

1207.6.7.1 Terra cotta and stone. Terra cotta, cast stone and natural stone veneers shall be investigated for the presence of suitable anchorage. Steel anchors shall be investigated for deterioration or corrosion. New or supplemental anchorage shall be provided as appropriate.

1207.6.7.2 Anchorage. Brick veneer with mechanical anchorage at spacings greater than required by the *current code* may remain, provided the anchorages have not corroded. Nail strength in withdrawal in wood sheathing may be utilized to its capacity in accordance with code values.

1207.6.8 Glass and glazing.

1207.6.8.1 Glazing subject to human impact. Historical glazing material located in areas subject to human impact may be approved subject to the concurrence of the enforcing agency where alternative protective measures are provided. These measures may include, but not be limited to, additional glazing panels, protective film, protective guards or systems, and devices or signs that would provide adequate public safety.

1207.6.8.2 Glazing in fire-rated systems. See Section 1203.7.

1207.7 Local materials. Local materials and their use for repair and restoration are subject to the *building official's* approval.

1207.7.1 Material types. The following is a representative list of materials to be used in repair and restoration of *historical buildings*:

1. Sarooj (traditional lime-based mortar).
2. Clay.
3. Local Palm wood and its derivatives.
4. Woods such as Kanda, Daun, Bamboo and Teak.
5. Stones (Wadi stone, Mountain stone and flat stone).
6. Potable water.
7. Portland cement.
8. Washed sand.
9. Asphalt.
10. Diesel.
11. Water proofing Nylon 1000 kg.
12. Traditional lamp fixtures.
13. Nora (roofing material).
14. Langlow paint.
15. Teak paint.

SECTION 1208
MECHANICAL, PLUMBING AND ELECTRICAL REQUIREMENTS

1208.1 Purpose. The purpose of this code is to provide regulations for the mechanical, plumbing and electrical systems of buildings designated as qualified *historical buildings* or properties. This code requires enforcing agencies to accept any reasonable equivalent solutions to the *current code* when dealing with qualified historical buildings or properties.

1208.2 Intent. This code is intended to preserve the integrity of qualified *historical buildings* or properties while providing a reasonable level of protection from fire, health and life safety hazards (hereinafter referred to as safety hazards) for the building occupants.

1208.3 Scope. This code shall be applied in conjunction with the *current code* whenever compliance with the *current code* is required for qualified *historical buildings* or properties.

1208.4 Safety hazard. No person shall permit any safety hazard to exist on premises under their control or fail to take immediate action to abate such hazard. Existing systems that constitute a safety hazard when operational may remain in place, provided they are completely and permanently rendered inoperative. Safety hazards created by inoperative systems shall not be permitted to exist. Requirements of the *current code* concerning general regulations shall be complied with, except that the enforcing agency shall accept solutions that do not cause a safety hazard.

1208.5 Energy conservation. Qualified *historical buildings* or properties covered by this section are exempted from compliance with energy conservation standards. When new nonhistorical lighting and space conditioning system components, devices, appliances and equipment are installed, they shall comply with the requirements of the *Oman Energy Efficiency and Sustainability Code,* except where the historical significance or character-defining features are threatened.

1208.6 Mechanical requirements.

1208.6.1 General. Mechanical systems shall comply with the *current code* unless otherwise modified by this chapter.

1208.6.1.1 Scope. The provisions of this code shall apply to the acceptance, location, installation, alteration, repair, relocation, replacement or addition of any heating, ventilating, air conditioning, domestic incinerators, kilns or miscellaneous heat-producing appliances or equipment within or attached to a *historical building.*

1208.6.1.2 Existing systems. Existing systems that do not, in the opinion of the enforcing authority, constitute a safety hazard may remain in use.

1208.6.1.3 Alternatives. The enforcing authority may approve any alternative to this code that would achieve equivalent life safety.

1208.6.2 Heating facilities. Reserved.

1208.6.3 Fuel oil piping and tanks. Reserved.

1208.6.4 Heat-producing and cooling equipment. Heat-producing and cooling equipment shall comply with the current code requirements governing equipment safety, except that the enforcing agency may accept alternatives that do not create a safety hazard.

1208.6.5 Combustion air.

1208.6.5.1 Air systems. All fuel-burning appliances and equipment shall be provided a sufficient supply of air for proper fuel combustion, ventilation and draft hood dilution.

1208.6.5.2 Alternatives. The enforcing agency may require operational tests for combustion air systems that do not comply with applicable requirements of the *current code*.

1208.6.6 Venting of appliances.

1208.6.6.1 Venting systems. Every appliance required to be vented shall be connected to an approved venting system. Venting systems shall develop a positive flow adequate to convey all combustion products to the outside atmosphere.

1208.6.6.2 Masonry chimneys. Masonry chimneys in structurally sound condition may remain in use for all fuel-burning appliances, provided the flue is evaluated and documentation provided that the masonry and grout are in good condition. Terra cotta chimneys and Type C metallic vents installed in concealed spaces shall not remain in use unless otherwise mitigated and approved on a case-by-case basis.

1208.6.6.3 Alternatives. The enforcing agency may require operational tests for venting systems that do not comply with applicable requirements of the *current code.*

1208.6.7 Ducts.

1208.6.7.1 Duct systems. New ducts shall be constructed and installed in accordance with applicable requirements of the *current code.*

1208.6.7.2 Alternatives. Existing duct systems that do not comply with applicable requirements of the *current code* and do not, in the opinion of the enforcing authority, constitute a safety or health hazard may remain in use.

1208.6.8 Ventilating systems.

1208.6.8.1 General. Ventilating systems shall be installed so that no safety hazard is created.

1208.6.8.2 Hood systems. Grease hoods and grease hood exhaust systems shall be furnished and installed in accordance with applicable requirements of the *current code*. Existing systems that are altered shall comply with the *current code.*

1208.6.9 Miscellaneous equipment requirements.

1208.6.9.1 General. The following appliances and equipment shall be installed so that no safety hazard is created: warm air furnaces, space heating equipment, vented decorative appliances, floor furnaces, vented wall furnaces, unit heaters, room heaters, absorption units, refrigeration equipment, duct furnaces, infrared radiant heaters, domestic incinerators, miscellaneous heat-producing appliances and water heaters.

1208.6.9.2 Temperature- and pressure-relief valve. Storage-type water heaters shall be equipped with a temperature- and pressure-relief valve in accordance with applicable requirements of the *current code*.

1208.7 Plumbing requirements.

1208.7.1 General. Plumbing systems shall comply with the *current code* unless otherwise noted.

1208.7.1.1 Scope. The provisions of this code shall apply to the acceptance, location, installation, alteration, repair, relocation, replacement or addition of any plumbing system or equipment within or attached to a *historical building.*

1208.7.1.2 Existing systems. Existing systems that do not, in the opinion of the enforcing agency, constitute a safety hazard may remain in use.

1208.7.1.3 Alternatives. The enforcing authority may approve any alternative to these regulations that achieves reasonably equivalent life safety.

1208.7.2 Residential occupancies.

1208.7.2.1 Sewage disposal. Where toilet facilities are provided, alternative sewage disposal methods may be acceptable if approved by the enforcing authority. In hotels, where private facilities are not provided, water closets at the ratio of one for each 15 rooms may be acceptable.

1208.7.2.2 Toilet facilities location. Toilet facilities are not required to be on the same floor or in the same building as sleeping rooms. Water-flush toilets may be located in a building immediately adjacent to the sleeping rooms. Where alternative sewage disposal methods are utilized, they shall be located a minimum distance from the sleeping rooms or other locations as approved by the enforcing authority.

1208.7.2.3 Kitchen facilities. Kitchen sinks shall be provided in all kitchens. The sink and countertop may be of any smooth nonabsorbent finish that can be maintained in a sanitary condition.

1208.7.2.4 Hand-washing facilities. Hand-washing facilities shall be provided for each dwelling unit and each hotel guestroom. A basin and pitcher may be acceptable as adequate hand-washing facilities.

1208.7.2.5 Water supply. Hot or cold running water is not required for each plumbing fixture, provided a sufficient amount of water is supplied to permit the fixture's normal operation.

1208.7.2.6 Filler spouts. Bathtubs and lavatories with filler spouts less than 25 mm above the fixture rim may remain in use, provided there is an acceptable overflow below the rim.

1208.7.2.7 Reuse of plumbing fixtures. Original or salvage water closets, urinals and flushometer valves shall be permitted in qualified *historical buildings* or properties. Historically accurate reproduction, nonlow-consumption water closets, urinals and flushometer valves shall be permitted except where historically accurate fixtures that comply with the *current code* are available.

1208.7.3 Materials. New nonhistorical materials shall comply with the *current code* requirements. The enforcing authority shall accept alternative materials that do not create a safety hazard where their use is necessary to maintain the historical integrity of the building.

1208.7.4 Drainage and vent systems. Plumbing fixtures shall be connected to an adequate drainage and vent system. The enforcing authority may require operational tests for drainage and vent systems that do not comply with applicable requirements of the *current code*. Vent terminations may be installed in any location that, in the opinion of the enforcing authority, does not create a safety hazard.

1208.7.5 Indirect and special wastes. Indirect and special waste systems shall be installed so that no safety hazard is created. Chemical or industrial liquid wastes that may detrimentally affect the sanitary sewer system shall be pretreated to render them safe prior to discharge.

1208.7.6 Traps and interceptors. Traps and interceptors shall comply with the *current code* requirements except that the enforcing authority shall accept solutions that do not increase the safety hazard. Properly maintained "S" and drum traps may remain in use.

1208.7.7 Joints and connections.

1208.7.7.1 New systems. Joints and connections in new plumbing systems shall comply with applicable requirements of the current code.

1208.7.7.2 Existing systems. Joints and connections in existing or restored systems may be of any type that does not create a safety hazard.

1208.8 Water distribution. Plumbing fixtures shall be connected to an adequate water distribution system. The enforcing authority may require operational tests for water distribution systems that do not comply with applicable requirements of the *current code*. Prohibited (unlawful) connections and cross connections shall not be permitted.

1208.9 Building sewers and private sewage disposal systems. New building sewers and new private sewage disposal systems shall comply with applicable requirements of the *current code*.

1208.10 Electrical requirements.

1208.10.1 General. Electrical systems shall comply with the *current code* unless otherwise permitted by this code or approved by the enforcing authority.

1208.10.1.1 Scope. The provisions of this code shall apply to the acceptance, location, installation, alteration, repair, relocation, replacement or addition of any electrical system or portion thereof, the premise wiring, or equipment fixed in place as related to restoration within or attached to a qualified *historical building* or property.

1208.10.1.2 Existing systems. Existing systems, wiring methods and electrical equipment that do not, in the opinion of the enforcing agency, constitute a safety hazard may remain in use.

1208.10.1.3 Alternatives. The enforcing agency may approve any alternative to this code that achieves equivalent safety.

1208.10.1.4 Archaic methods. Archaic methods that do not appear in present codes may remain and may be extended if, in the opinion of the enforcing agency, they constitute a safe installation.

1208.10.2 Wiring methods.

1208.10.2.1 General. Wiring methods shall be in accordance with the *Oman Electrical Standard.*

SECTION 1209
HISTORICAL COMMUNITIES

1209.1 Purpose. The purpose of this code is to provide regulations for communities designated as qualified *historical communities*. This code requires enforcing authorities to accept any reasonable equivalent solutions to the current code when dealing with qualified *historical buildings* or properties within these communities.

1209.2 Scope. All development and improvements in a qualified *historical community* for which a permit or approval has been requested.

1209.3. Inhabited community. All preservation, restoration, rehabilitation, relocation or reconstruction of buildings or properties within an inhabited qualified *historical community* shall comply with Chapter 12.

1209.4 Uninhabited community.

1209.4.1 Development. Prior to any preservation, restoration, rehabilitation, relocation or reconstruction of buildings or properties within an uninhabited qualified *historical community,* provisions shall be made to provide the necessary infrastructure as required to ensure life safety and habitability for building occupancy in accordance with the *Oman Building Code.* The installation of any infrastructure shall be subject to the enforcing authority.

1209.4.2 Compliance. All preservation, restoration, rehabilitation, relocation or reconstruction of buildings or properties within an uninhabited qualified *historical community,* provided with infrastructure as required by Section 1209.4.1, shall comply with Chapter 12.

CHAPTER 13
PERFORMANCE COMPLIANCE METHODS

User note:

About this chapter: *Chapter 13 allows for existing buildings to be evaluated so as to show that alterations, while not meeting new construction requirements, will improve the current existing situation. Provisions are based on a numerical scoring system involving 19 various safety parameters and the degree of code compliance for each issue.*

Informational Note: *The format and section numbering of this chapter follows the format and section numbering of the same chapter in the 2024 edition of the* International Existing Building Code *(2024 IEBC).*

SECTION 1301
GENERAL

1301.1 Scope. The provisions of this chapter shall apply to the *alteration*, *addition* and *change of occupancy* of *existing structures*, including historical structures, as referenced in Section 301.3.3. The provisions of this chapter are intended to maintain or increase the current degree of public safety, health and general welfare in *existing buildings* while permitting, *alteration*, *addition* and *change of occupancy* without requiring full compliance with Chapters 6 through 12, except where compliance with the prescriptive method of Chapter 5 or the work area method of other provisions of this code is specifically required in this chapter.

1301.1.1 Compliance with other methods. *Alterations*, *additions* and *changes of occupancy* to *existing structures* shall comply with the provisions of this chapter or with one of the methods provided in Section 301.3.

SECTION 1302
APPLICABILITY

1302.1 Applicability. *Existing buildings* in which there is work involving *additions*, *alterations* or *changes of occupancy* shall be made to conform to the requirements of this chapter or the provisions of Chapters 6 through 12. The provisions of Sections 1302.1.1 through 1302.1.6 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, I-2, M, R and S. These provisions shall also apply to Group U occupancies where such occupancies are undergoing a *change of occupancy* or a partial change in occupancy with separations in accordance with Section 1302.1.2. These provisions shall not apply to buildings with occupancies in Group H, I-1, I-3 or I-4.

1302.1.1 Change in occupancy. Where an *existing building* is changed to a new occupancy classification and this section is applicable, the provisions of this section for the new occupancy shall be used to determine compliance with this code.

1302.1.2 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barrier or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the *Oman Building Code* for the separate occupancies, or with *approved* compliance alternatives, the portion changed shall be made to conform to the provisions of this section. Only the portion separated shall be required to be evaluated for compliance.

Where a portion of the building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers or horizontal assemblies having a fire-resistance rating as required by Table 508.4 of the *Oman Building Code* for the separate occupancies, or with *approved* compliance alternatives, the provisions of this section that apply to each occupancy shall apply to the entire building. Where there are conflicting provisions, those requirements that secure the greater public safety shall apply to the entire building or structure.

1302.1.3 Additions. *Additions* to *existing buildings* shall comply with the requirements of the *Oman Building Code* for new construction. The combined height and area of the *existing building* and the new *addition* shall not exceed the height and area allowed by Chapter 5 of the *Oman Building Code*. Where a fire wall that complies with Section 706 of the *Oman Building Code* is provided between the *addition* and the *existing building*, the *addition* shall be considered a separate building. Where a new *occupiable roof* is added to a building or structure, the *occupiable roof* shall comply with the provisions of the *Oman Building Code*.

Exception: In-filling of floor openings and nonoccupiable appendages, such as elevator and exit stairway shafts, shall be permitted beyond that permitted by the *Oman Building Code.*

1302.1.4 Alterations. An *existing building* or portion thereof shall not be altered in such a manner that results in the building being less safe or sanitary than such building is currently.

Exception: Where the current level of safety or sanitation is proposed to be reduced, the portion altered shall conform to the requirements of the *Oman Building Code*.

1302.1.5 Escalators. Where escalators are provided in below-grade transportation stations, existing and new escalators shall be permitted to have a clear width of less than 800 mm.

1302.1.6 Plumbing fixtures. Plumbing fixtures shall be provided in accordance with Section 1009 for a change of occupancy and Section 808 for *alterations*. Plumbing fixtures for *additions* shall be in accordance with the *Oman Plumbing Code*.

SECTION 1303
ACCEPTANCE

1303.1 General. For *repairs*, *alterations*, *additions* and *changes of occupancy* to *existing buildings* that are evaluated in accordance with this section, compliance with this section shall be accepted by the *building official*.

1303.1.1 Hazards. Where the *building official* determines that an *unsafe* condition exists as provided for in Section 115, such *unsafe* condition shall be abated in accordance with Section 115.

1303.1.2 Compliance with other codes. Buildings that are evaluated in accordance with this section shall comply with the *Oman Fire Code*.

1303.1.3 Compliance with flood hazard provisions. In *flood hazard areas*, buildings that are evaluated in accordance with this section shall comply with Section 1612 of the *Oman Building Code*, if the work covered by this section constitutes *substantial improvement*. If the work covered by this section is a structurally connected horizontal *addition* that does not constitute *substantial improvement*, the *addition* is not required to comply with the flood design requirements for new construction, provided that both of the following apply:

1. The *addition* shall not create or extend any nonconformity of the *existing building* with the flood-resistant construction requirements.
2. The *lowest floor* of the *addition* shall be at or above the lower of the *lowest floor* of the *existing building* or the *lowest floor* elevation required in Section 1612 of the *Oman Building Code.*

SECTION 1304
INVESTIGATION AND EVALUATION

1304.1 Investigation and evaluation. For proposed work covered by this chapter, the building owner shall cause the *existing building* to be investigated and evaluated in accordance with the provisions of Sections 1304.1 through 1307.1.

1304.1.1 Structural analysis. The owner shall have a structural analysis of the *existing building* made to determine adequacy of structural systems for the proposed *alteration*, *addition* or *change of occupancy*. The analysis shall demonstrate that the building with the work completed is capable of resisting the loads specified in Chapter 16 of the *Oman Building Code*.

1304.1.2 Submittal. The results of the investigation and evaluation as required in Section 1304.1, along with proposed compliance alternatives, shall be submitted to the *building official*.

1304.1.3 Determination of compliance. The *building official* shall determine whether the *existing building*, with the proposed *addition*, *alteration* or *change of occupancy*, complies with the provisions of this section in accordance with the evaluation process in Sections 1305.1 through 1307.1.

SECTION 1305
SCORING AND EVALUATION

1305.1 Evaluation. The evaluation shall be composed of three categories: fire safety, means of egress and general safety, as defined in Sections 1305.1.1 through 1305.1.3.

1305.1.1 Fire safety. Included within the fire safety category are the structural fire resistance, automatic fire detection, fire alarm, automatic sprinkler system and fire suppression system features of the *facility*.

1305.1.2 Means of egress. Included within the means of egress category are the configuration, characteristics and support features for means of egress in the *facility*.

1305.1.3 General safety. Included within the general safety category are the fire safety parameters and the means of egress parameters.

1305.2 Evaluation process. The evaluation process specified herein shall be followed in its entirety to evaluate *existing buildings* in Groups A, B, E, F, M, R, S and U. For *existing buildings* in Group I-2, the evaluation process specified herein shall be followed and applied to each and every individual smoke compartment. Table 1306.1 shall be utilized for tabulating the results of the evaluation. References to other sections of this code or other codes indicate that compliance with those sections is required in order to gain credit in the evaluation herein outlined. In applying this section to a building with mixed occupancies, where the separation between the mixed occupancies does not qualify for any category indicated in Section 1305.2.16, the score for each occupancy shall be determined, and the lower score determined for each section of the evaluation process shall apply to the entire building or to each smoke compartment for Group I-2 occupancies.

Where the separation between the mixed occupancies qualifies for any category indicated in Section 1305.2.16, the score for each occupancy shall apply to each portion or smoke compartment of the building based on the occupancy of the space.

1305.2.1 Building height and number of stories. The value for building height and number of stories shall be the lesser value determined by the formula in Section 1305.2.1.1. Section 504 of the *Oman Building Code* shall be used to determine the allowable height and number of stories of the building. Subtract the actual building height from the allowable height and divide by 3.8 m. Enter the height value and its sign (positive or negative) in Table 1306.1 under Safety Parameter 1305.2.1, Building Height, for fire safety, means of egress and general safety. The maximum score for a building shall be 10.

1305.2.1.1 Height formula. The following formulas shall be used in computing the building height value.

$$\text{Height value, meters} = \frac{(AH\text{-}EBH)}{3.8} \qquad \textbf{(Equation 13-1)}$$

$$\text{Height value, stories} = (AS - EBS) \times CF \qquad \textbf{(Equation 13-2)}$$

where:

AH = Allowable height in meters from Section 504 of the *Oman Building Code*.

EBH = *Existing building* height in meters.

AS = Allowable height in stories from Section 504 of the *Oman Building Code*.

EBS = *Existing building* height in stories.

CF = 1 if (*AH*) – (*EBH*) is positive.

CF = Construction-type factor shown in Table 1305.2.6(2) if (*AH*) – (*EBH*) is negative.

Note: Where mixed occupancies are separated and individually evaluated as indicated in Section 1305.2, the values *AH*, *AS*, *EBH* and *EBS* shall be based on the height of the occupancy being evaluated.

1305.2.2 Building area. The value for building area shall be determined by the formula in Section 1305.2.2.2. Section 506 of the *Oman Building Code* and the formula in Section 1305.2.2.1 shall be used to determine the allowable area of the building. Enter the area value and its sign (positive or negative) in Table 1306.1 under Safety Parameter 1305.2.2, Building Area, for fire safety, means of egress and general safety. In determining the area value, the maximum permitted positive value for area is 50 percent of the fire safety score as listed in Table 1306.2, Mandatory Safety Scores. Group I-2 occupancies shall be scored zero.

1305.2.2.1 Allowable area formula. The following formula shall be used in computing allowable area:

$$A_a = 0.0929\ [A_t + (NS \times I_f)] \qquad \textbf{(Equation 13-3)}$$

where:

A_a = Allowable building area per story (m^2).

A_t = Tabular allowable area factor (NS, S1, S13R, or SM value, as applicable) in accordance with Table 506.2 of the *Oman Building Code*.

NS = Tabular allowable area factor in accordance with Table 506.2 of the *Oman Building Code* for a nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage as calculated in accordance with Section 506.3 of the *Oman Building Code*.

1305.2.2.2 Area formula. The following formulas shall be used in computing the area value. Equation 13-4 shall be used for a single occupancy buildings and Equation 13-5 shall be used for multiple occupancy buildings. Determine the area value for each occupancy floor area on a floor-by-floor basis. For multiple occupancy, buildings with the minimum area value of the set of values obtained for the particular occupancy shall be used as the area value for that occupancy.

For single occupancy buildings:

$$\text{Area value}_i = (\text{Allowable area} - \text{Actual area})/112\ m^2 \qquad \textbf{(Equation 13-4)}$$

For multiple occupancy buildings:

$$\text{Area value}_i = \frac{\text{Actual area}_i}{112\ m^2} = \left[1 - \left(\frac{\text{Actual area}_i}{\text{Allowable area}_i} + \cdots + \frac{\text{Actual area}_n}{\text{Allowable area}_n}\right)\right] \qquad \textbf{(Equation 13-5)}$$

where:

i = Value for an individual separated occupancy on a floor.

n = Number of separated occupancies on a floor.

1305.2.3 Compartmentation. Evaluate the compartments created by fire barriers or horizontal assemblies which comply with Sections 1305.2.3.2 and 1305.2.3.3 and which are exclusive of the wall elements considered under Sections 1305.2.4 and 1305.2.5. Conforming compartments shall be figured as the net area and do not include shafts, chases, stairways, walls or columns. Using Table 1306.1, determine the appropriate compartmentation value (CV) and enter that value into Table 1306.1 under Safety Parameter 1305.2.3, Compartmentation, for fire safety, means of egress and general safety.

TABLE 1305.2.3
COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]				
	a	b	c	d	e
A-1, A-3	0	6	10	14	18
A-2	0	4	10	14	18
A-4, B, E, S-2	0	5	10	15	20
F, M, R, S-1	0	4	10	16	22
I-2	0	2	8	10	14

a. For compartment sizes between categories, the compartmentation value shall be obtained by linear interpolation.

1305.2.3.1 Categories. The categories for compartment separations are:

1. Category a—Compartment size of 1400 m^2 or more.
2. Category b—Maximum compartment size 930 m^2.

3. Category c—Maximum compartment size of 700 m^2.
4. Category d—Maximum compartment size of 460 m^2.
5. Category e—Maximum compartment size of 230 m^2.

1305.2.3.2 Wall construction. A wall used to create separate compartments shall be a fire barrier conforming to Section 707 of the *Oman Building Code* with a fire-resistance rating of not less than 2 hours. Where the building is not divided into more than one compartment, the compartment size shall be taken as the total floor area on all floors. Where there is more than one compartment within a story, each compartmented area on such story shall be provided with a horizontal exit conforming to Section 1026 of the *Oman Building Code*. The fire door serving as the horizontal exit between compartments shall be so installed, fitted and gasketed that such fire door will provide a substantial barrier to the passage of smoke.

1305.2.3.3 Floor/ceiling construction. A floor/ceiling assembly used to create compartments shall conform to Section 711 of the *Oman Building Code* and shall have a fire-resistance rating of not less than 2 hours.

1305.2.4 Tenant and dwelling unit separations. Evaluate the fire-resistance rating of floors and walls separating tenants, including dwelling units, and not evaluated under Sections 1305.2.3 and 1305.2.5. Group I-2 occupancies shall evaluate the rating of the separations between care recipient sleeping rooms.

Under the categories and occupancies in Table 1305.2.4, determine the appropriate value and enter that value in Table 1306.1 under Safety Parameter 1305.2.4, Tenant and Dwelling Unit Separation, for fire safety, means of egress and general safety. The value shall be zero for single tenant buildings and buildings without dwelling units.

TABLE 1305.2.4
SEPARATION VALUES

OCCUPANCY	CATEGORIES				
	a	b	c	d	e
A-1	0	0	0	0	1
A-2	–5	–3	0	1	3
R	–4	–2	0	2	4
A-3, A-4, B, E, F, M, S-1	–4	–3	0	2	4
I-2	0	1	2	3	4
S-2	–5	–2	0	2	4

1305.2.4.1 Categories. The categories for tenant and dwelling unit separations are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing.
2. Category b—Fire partitions or floor assemblies with less than 1-hour fire-resistance ratings or not constructed in accordance with Section 708 or 711 of the *Oman Building Code*, respectively.
3. Category c—Fire partitions with 1-hour or greater fire-resistance ratings constructed in accordance with Section 708 of the *Oman Building Code* and floor assemblies with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 711 of the *Oman Building Code* or with only one tenant within the floor area.
4. Category d—Fire barriers with 1-hour but less than 2-hour fire-resistance ratings constructed in accordance with Section 707 of the *Oman Building Code* and floor assemblies with 2-hour or greater fire-resistance ratings constructed in accordance with Section 711 of the *Oman Building Code*.
5. Category e—Fire barriers and floor assemblies with 2-hour or greater fire-resistance ratings and constructed in accordance with Sections 707 and 711 of the *Oman Building Code*, respectively.

1305.2.5 Corridor walls. Evaluate the fire-resistance rating and degree of completeness of walls which create corridors serving the floor and that are constructed in accordance with Section 1020 of the *Oman Building Code*. This evaluation shall not include the wall elements considered under Sections 1305.2.3 and 1305.2.4. Under the categories and groups in Table

1305.2.5, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.5, Corridor Walls, for fire safety, means of egress and general safety.

TABLE 1305.2.5
CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	b	c[a]	d[a]
A-1	–10	–4	0	2
A-2	–30	–12	0	2
A-3, F, M, R, S-1	–7	–3	0	2
A-4, B, E, S-2	–5	–2	0	5
I-2	–10	0	1	2

a. Corridors not providing at least one-half the exit access travel distance for all occupants on a floor shall use Category b.

1305.2.5.1 Categories. The categories for corridor walls are:

1. Category a—No fire partitions; incomplete fire partitions; no doors; or doors not self-closing.
2. Category b—Less than 1-hour fire-resistance rating or not constructed in accordance with Section 708.4 of the *Oman Building Code*.
3. Category c—1-hour to less than 2-hour fire-resistance rating, with doors conforming to Section 716 of the *Oman Building Code* or corridors as permitted by Section 1020 of the *Oman Building Code* to be without a fire-resistance rating.
4. Category d—2-hour or greater fire-resistance rating, with doors conforming to Section 716 of the *Oman Building Code*.

1305.2.6 Vertical openings. Evaluate the fire-resistance rating of interior exit stairways or ramps, hoistways, escalator openings and other shaft enclosures within the building, and openings between two or more floors. Table 1305.2.6(1) contains the appropriate protection values. Multiply that value by the construction-type factor found in Table 1305.2.6(2). Enter the vertical opening value and its sign (positive or negative) in Table 1306.1 under Safety Parameter 1305.2.6, Vertical Openings, for fire safety, means of egress and general safety. If the structure is a one-story building or if all the unenclosed vertical openings within the building conform to the requirements of Section 712 of the *Oman Building Code*, enter a value of 2. The maximum positive value for this requirement (VO) shall be 2.

TABLE 1305.2.6(1)
VERTICAL OPENING PROTECTION VALUE

PROTECTION	VALUE
None (unprotected opening)	-2 times number of floors connected
Less than 1 hour	-1 times number of floors connected
1 to less than 2 hours	1
2 hours or more	2

TABLE 1305.2.6(2)
CONSTRUCTION-TYPE FACTOR

FACTOR	TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
	1.2	1.5	2.2	3.5	2.5	3.5	2.3	3.3	7

1305.2.6.1 Vertical opening formula. The following formula shall be used in computing vertical opening value.

$VO = PV \times CF$ **(Equation 13-6)**

where:

VO = Vertical opening value. The calculated value shall not be greater than positive 2.0.

PV = Protection value from Table 1305.2.6(1).

CF = Construction-type factor from Table 1305.2.6(2).

1305.2.7 HVAC systems. Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section 1305.222.7.1, determine the appropriate value and enter that value into Table 1307.1 under Safety Parameter 1305.2.7, HVAC Systems, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

1305.2.7.1 Categories. The categories for HVAC systems are:

1. Category a—Plenums not in accordance with Section 602 of the *Oman Mechanical Code*. –10 points.
2. Category b—Air movement in egress elements not in accordance with Section 1020.6 of the *Oman Building Code*. -5 points.
3. Category c—Both Categories a and b are applicable. –15 points.
4. Category d—Compliance of the HVAC system with Section 1020.6 of the *Oman Building Code* and Section 602 of the *Oman Mechanical Code*. 0 points.
5. Category e—Systems serving one story; or a central boiler/chiller system without ductwork connecting two or more stories or where systems have no ductwork. +5 points.

1305.2.8 Automatic fire detection. Evaluate the smoke detection capability based on the location and operation of automatic fire detectors in accordance with the *Oman Mechanical Code* and Section 907 of the *Oman Building Code.* Under the categories and occupancies in Table 1305.2.8, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.8, Automatic Fire Detection, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category a, b or c shall be considered to fail the evaluation.

TABLE 1305.2.8
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	–10	–5	0	2	6	NA
A-2	–25	–5	0	5	9	NA
A-4, B, E, S-2	–4	–2	0	4	8	NA
I-2	NP	NP	NP	4	5	2

NA = Not Applicable.
NP = Not Permitted.

1305.2.8.1 Categories. The categories for automatic fire detection are:

1. Category a—None.
2. Category b—Existing smoke detectors in HVAC systems and maintained in accordance with the *Oman Fire Code*.
3. Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the *Oman Mechanical Code*.
4. Category d—Smoke detectors throughout all floor areas other than individual sleeping units, tenant spaces and dwelling units.
5. Category e—Smoke detectors installed throughout the floor area.
6. Category f—Smoke detectors in corridors only.

1305.2.9 Fire alarm systems. Evaluate the capability of the fire alarm system in accordance with Section 907 of the *Oman Building Code*. Under the categories and occupancies in Table 1305.2.9, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.9, Fire Alarm System, for fire safety, means of egress and general safety.

TABLE 1305.2.9
FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b[a]	c	d
A-1, A-2, A-3, A-4, B, E, R	–10	–5	0	5
F, M, S	0	5	10	15
I-2	–4	1	2	5

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler water-flow device.

1305.2.9.1 Categories. The categories for fire alarm systems are:

1. Category a—None.
2. Category b—Fire alarm system with manual fire alarm boxes in accordance with Section 907.4 of the *Oman Building Code* and alarm notification appliances in accordance with Section 907.5.2 of the *Oman Building Code*.
3. Category c—Fire alarm system in accordance with Section 907 of the *Oman Building Code*.
4. Category d—Category c plus a required emergency voice/alarm communications system and a fire command station that conforms to Section 911 of the *Oman Building Code* and contains the emergency voice/alarm communications system controls, civil defense communication system controls, and any other controls specified in Section 911 of the *Oman Building Code* where those systems are provided.

1305.2.10 Smoke control. Evaluate the ability of a natural or mechanical venting, exhaust or pressurization system to control the movement of smoke from a fire. Under the categories and occupancies in Table 1305.2.10, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.10, Smoke Control, for means of egress and general safety.

TABLE 1305.2.10
SMOKE CONTROL VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-2, A-3	0	1	2	3	6	6
A-4, E	0	0	0	1	3	5
B, M, R	0	2[a]	3[a]	3[a]	3[a]	4[a]
F, S	0	2[a]	2[a]	3[a]	3[a]	3[a]
I-2	–4	0	0	0	3	0

a. This value shall be 0 if compliance with Category d or e in Section 1305.2.8.1 has not been obtained.

1305.2.10.1 Categories. The categories for smoke control are:

1. Category a—None.
2. Category b—The building is equipped throughout with an automatic sprinkler system. Openings are provided in exterior walls at the rate of 1.85 m^2 per 15.5 m of exterior wall in each story and distributed around the building perimeter at intervals not exceeding 15.5 m. Such openings shall be readily openable from the inside without a key or separate tool and shall be provided with ready access thereto. In lieu of operable openings, clearly and permanently marked tempered glass panels shall be used.
3. Category c—One enclosed exit stairway, with ready access thereto, from each occupied floor of the building. The stairway has operable exterior windows, and the building has openings in accordance with Category b.
4. Category d—One smokeproof enclosure and the building has openings in accordance with Category b.
5. Category e—The building is equipped throughout with an automatic sprinkler system. Each floor area is provided with a mechanical air-handling system designed to accomplish smoke containment. Return and exhaust air shall be moved directly to the outside without recirculation to other floor areas of the building under fire conditions. The system shall exhaust not less than six air changes per hour from the floor area. Supply air by mechanical means to the floor area is not required. Containment of smoke shall be considered as confining smoke to the floor area involved without migration to other floor areas. Any other tested and *approved* design that will adequately accomplish smoke containment is permitted.
6. Category f—Each stairway shall be one of the following: a smokeproof enclosure in accordance with Section 1023.12 of the *Oman Building Code*; pressurized in accordance with Section 909.20.5 of the *Oman Building Code*; or shall have operable exterior windows.

1305.2.11 Means of egress capacity and number. Evaluate the means of egress capacity and the number of exits available to the building occupants. In applying this section, the means of egress are required to conform to the following sections of the *Oman Building Code*: 1003.7, 1004, 1005, 1006, 1007, 1016.2, 1026.1, 1028.3, 1028.5, 1030.2, 1030.3, 1030.4 and 1031. The number of exits credited is the number that is available to each occupant of the area being evaluated. Existing fire escapes shall be accepted as a component in the means of egress when conforming to Section 504.

Under the categories and occupancies in Table 1305.2.11, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.11, Means of Egress Capacity, for means of egress and general safety.

TABLE 1305.2.11
MEANS OF EGRESS VALUES

OCCUPANCY	CATEGORIES				
	a[a]	b	c	d	e
A-1, A-2, A-3, A-4, E, I-2	–10	0	2	8	10
M	–3	0	1	2	4
B, F, S	–1	0	0	0	0
R	–3	0	0	0	0

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional –10 points.

1305.2.11.1 Categories. The categories for means-of-egress capacity and number of exits are:

1. Category a—Compliance with the minimum required means-of-egress capacity or number of exits is achieved through the use of a fire escape in accordance with Section 405.
2. Category b—Capacity of the means of egress complies with Section 1005 of the *Oman Building Code*, and the number of exits complies with the minimum number required by Section 1006 of the *Oman Building Code*.
3. Category c—Capacity of the means of egress is equal to or exceeds 125 percent of the required means-of-egress capacity, the means of egress complies with the minimum required width dimensions specified in the *Oman Building Code*, and the number of exits complies with the minimum number required by Section 1006 of the *Oman Building Code*.
4. Category d—The number of exits provided exceeds the number of exits required by Section 1006 of the *Oman Building Code*. Exits shall be located a distance apart from each other equal to not less than that specified in Section 1007 of the *Oman Building Code*.
5. Category e—The area being evaluated meets both Categories c and d.

1305.2.12 Dead ends. In spaces required to be served by more than one means of egress, evaluate the length of the exit access travel path in which the building occupants are confined to a single path of travel. Under the categories and occupancies in Table 1305.2.12, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.12, Dead Ends, for means of egress and general safety.

TABLE 1305.2.12
DEAD-END VALUES

OCCUPANCY	CATEGORIES[a]			
	a	b	c	d
A-1, A-3, A-4, B, F, M, R, S	–2	0	2	–4
A-2, E	–2	0	2	–4
I-2	–2	0	2	–6

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

1305.2.12.1 Categories. The categories for dead ends are:

1. Category a—Dead end of 10.5 m in nonsprinklered buildings or 21 m in sprinklered buildings.
2. Category b—Dead end of 6 m; or 15 m in Group B in accordance with Section 1020.5, Exception 2, of the *Oman Building Code*.
3. Category c—No dead ends; or ratio of length to width (l/w) is less than 2.5:1.
4. Category d—Dead ends exceeding Category a.

1305.2.13 Maximum exit access travel distance to an exit. Evaluate the length of exit access travel to an *approved* exit. Determine the appropriate points in accordance with the following equation and enter that value into Table 1306.1 under Safety Parameter 1305.2.13, Maximum Exit Access Travel Distance, for means of egress and general safety. The maximum allowable exit access travel distance shall be determined in accordance with Section 1017.1 of the *Oman Building Code*.

$$\text{Points} = 20 \times \frac{\text{Maximum allowable travel distance} - \text{Maximum actual travel distance}}{\text{Maximum allowable travel distance}} \quad \textbf{(Equation 13-7)}$$

1305.2.14 Elevator control. Evaluate the passenger elevator equipment and controls that are available to the civil defense to reach all occupied floors. Emergency recall and in-car operation of elevators shall be provided in accordance with the *Oman Fire Code*. Under the categories and occupancies in Table 1305.2.14, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.14, Elevator Control, for fire safety, means of egress and general safety. The values shall be zero for a single-story building.

TABLE 1305.2.14
ELEVATOR CONTROL VALUES

ELEVATOR TRAVEL	CATEGORIES			
	a	b	c	d
Less than 7.5 m of travel above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	–2	0	0	+2
Travel of 7.5 m or more above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	–4	NP	0	+4

NP = Not Permitted.

1305.2.14.1 Categories. The categories for elevator controls are:

1. Category a—No elevator.
2. Category b—Any elevator without Phase I emergency recall operation and Phase II emergency in-car operation.
3. Category c—All elevators with Phase I emergency recall operation and Phase II emergency in-car operation as required by the *Oman Fire Code*.
4. Category d—All meet Category c; or Category b where permitted to be without Phase I emergency recall operation and Phase II emergency in-car operation; and at least one elevator that complies with new construction requirements serves all occupied floors.

1305.2.15 Means of egress emergency lighting. Evaluate the presence of and reliability of means of egress emergency lighting. Under the categories and occupancies in Table 1305.2.15, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.15, Means of Egress Emergency Lighting, for means of egress and general safety.

TABLE 1305.2.15
MEANS OF EGRESS EMERGENCY LIGHTING VALUES

NUMBER OF EXITS REQUIRED BY SECTION 1006 OF THE *OMAN BUILDING CODE*	CATEGORIES		
	a	b	c
Two or more exits	NP	0	4
Minimum of one exit	0	1	1

NP = Not Permitted.

1305.2.15.1 Categories. The categories for means of egress emergency lighting are:

1. Category a—Means-of-egress lighting and exit signs not provided with emergency power in accordance with Section 2702 of the *Oman Building Code*.
2. Category b—Means of egress lighting and exit signs provided with emergency power in accordance with Section 2702 of the *Oman Building Code*.
3. Category c—Emergency power provided to means of egress lighting and exit signs, which provides protection in the event of power failure to the site or building.

1305.2.16 Mixed occupancies. Where a building has two or more occupancies that are not in the same occupancy classification, the separation between the mixed occupancies shall be evaluated in accordance with this section. Where there is no separation between the mixed occupancies or the separation between mixed occupancies does not qualify for any of the categories indicated in Section 1305.2.16.1, the building shall be evaluated as indicated in Section 1305.2, and the value for mixed occupancies shall be zero. Under the categories and occupancies in Table 1305.2.16, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.16, Mixed Occupancies, for fire safety and general safety. For buildings without mixed occupancies, the value shall be zero. *Facilities* in Group I-2 occupancies meeting Category a shall be considered to fail the evaluation.

TABLE 1305.2.16
MIXED OCCUPANCY VALUES[a]

OCCUPANCY	CATEGORIES		
	a	b	c
A-1, A-2, R	–10	0	10
A-3, A-4, B, E, F, M, S	–5	0	5
I-2	NP	0	5

NP = Not Permitted.
a. For fire-resistance ratings between categories, the value shall be obtained by linear interpolation.

1305.2.16.1 Categories. The categories for mixed occupancies are:

1. Category a—Occupancies separated by minimum 1-hour fire barriers or minimum 1-hour horizontal assemblies, or both.
2. Category b—Separations between occupancies in accordance with Section 508.4 of the *Oman Building Code*.
3. Category c—Separations between occupancies having a fire-resistance rating of not less than twice that required by Section 508.4 of the *Oman Building Code*.

1305.2.17 Automatic sprinklers. Evaluate the ability to suppress or control a fire based on the installation of an automatic sprinkler system in accordance with Section 903.3.1 of the *Oman Building Code*. "Required sprinklers" shall be based on the requirements of the *Oman Building Code*. Under the categories and occupancies in Table 1305.2.17, determine the appropriate

value and enter that value into Table 1306.1 under Safety Parameter 1305.2.17, Automatic Sprinklers, for fire safety, means of egress divided by 2, and general safety. High-rise buildings defined in Chapter 2 of the *Oman Building Code* that undergo a *change of occupancy* to Group R shall be equipped throughout with an automatic sprinkler system in accordance with Section 403 of the *Oman Building Code* and Chapter 9 of the *Oman Building Code*. *Facilities* in Group I-2 occupancies meeting Category a, b, c or f shall be considered to fail the evaluation.

TABLE 1305.2.17
SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a[a]	b[a]	c	d	e	f
A-1, A-3, F, M, R, S-1	–6	–3	0	2	4	6
A-2	–4	–2	0	1	2	4
A-4, B, E, S-2	–12	–6	0	3	6	12
I-2	NP	NP	NP	8	10	NP

NP = Not Permitted.
a. These options cannot be taken if Category a in Section 1305.2.18 is used.

1305.2.17.1 Categories. The categories for automatic sprinkler system protection are:

1. Category a— An *approved* automatic sprinkler system is required throughout; an *approved* automatic sprinkler system is not provided.
2. Category b—An *approved* automatic sprinkler system is required in a portion of a building; an *approved* automatic sprinkler system is not provided; the sprinkler system design is not adequate for the hazard protected in accordance with Chapter 9 of the *Oman Building Code*.
3. Category c—An *approved* automatic sprinkler system is not required; none are provided.
4. Category d—An *approved* automatic sprinkler system is required in a portion of a building; an *approved* automatic sprinkler system is provided in a portion of a building in accordance with Chapter 9 of the *Oman Building Code*.
5. Category e—An *approved* automatic sprinkler system is required throughout; an *approved* automatic sprinkler system is provided throughout in accordance with Chapter 9 of the *Oman Building Code*.
6. Category f—An *approved* automatic sprinkler system is not required throughout; an *approved* automatic sprinkler system is provided throughout in accordance with Chapter 9 of the *Oman Building Code*.

1305.2.18 Standpipes. Evaluate the ability to initiate attack on a fire by making a supply of water readily available through the installation of standpipes in accordance with Section 905 of the *Oman Building Code*. "Required Standpipes" shall be based on the requirements of the *Oman Building Code*. Under the categories and occupancies in Table 1305.2.18, determine the appropriate value and enter that value into Table 1306.1 under Safety Parameter 1305.2.18, Standpipes, for fire safety, means of egress and general safety.

TABLE 1305.2.18
STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	–6	0	4	6
A-2	–4	0	2	4
A-4, B, E, S-2	–12	0	6	12
I-2	–2	0	1	2

a. This option cannot be taken if Category a or Category b in Section 1305.2.17 is used.

1305.2.18.1 Standpipe categories. The categories for standpipe systems are:

1. Category a—Standpipes are required; standpipe is not provided or the standpipe system design is not in compliance with Section 905.3 of the *Oman Building Code*.
2. Category b—Standpipes are not required; none are provided.
3. Category c—Standpipes are required; standpipes are provided in accordance with Section 905 of the *Oman Building Code*.
4. Category d—Standpipes are not required; standpipes are provided in accordance with Section 905 of the *Oman Building Code*.

1305.2.19 Incidental uses. Evaluate the protection of incidental uses in accordance with Section 509.4.2 of the *Oman Building Code*. Do not include those where this code requires automatic sprinkler systems throughout the building including covered and open mall buildings, high-rise buildings, public garages and unlimited area buildings. Assign the lowest score from Table 1305.2.19 for the building or floor area being evaluated and enter that value into Table 1306.1 under Safety Parameter 1305.2.19, Incidental Uses, for fire safety, means of egress and general safety. If there are no specific occupancy areas in the building or floor area being evaluated, the value shall be zero.

TABLE 1305.2.19
INCIDENTAL USE AREA VALUES

PROTECTION REQUIRED BY TABLE 509.1 OF THE *OMAN BUILDING CODE*	PROTECTION PROVIDED						
	None	1 hour	AS	AS with CRS	1 hour and AS	2 hours	2 hours and AS
2 hours and AS	–4	–3	–2	–2	–1	–2	0
2 hours, or 1 hour and AS	–3	–2	–1	–1	0	0	0
1 hour and AS	–3	–2	–1	–1	0	–1	0
1 hour	–1	0	–1	–1	0	0	0
1 hour, or AS with CRS	–1	0	–1	–1	0	0	0
AS with CRS	–1	–1	–1	–1	0	–1	0
1 hour or AS	–1	0	0	0	0	0	0

AS = Automatic Sprinkler System.
CRS = Construction capable of resisting the passage of smoke (see Section 509.4.2 of the *Oman Building Code*).

1305.2.20 Smoke compartmentation. Evaluate the smoke compartments for compliance with Section 407.5 of the *Oman Building Code*. Under the categories and occupancies in Table 1305.2.20, determine the appropriate smoke compartmentation value (SCV) and enter that value into Table 1306.1 under Safety Parameter 1305.2.20, Smoke Compartmentation, for fire safety, means of egress and general safety. *Facilities* in Group I-2 occupancies meeting Category b or c shall be considered to fail the evaluation.

TABLE 1305.2.20
SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a	b	c
A, B, E, F, M, R and S	0	0	0
I-2	0	–10	NP

NP = Not Permitted.
a. For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

1305.2.20.1 Categories. Categories for smoke compartment size are:

1. Category a—Smoke compartment complies with Section 407.5 of the *Oman Building Code*.
2. Category b—Smoke compartment are provided but do not comply with Section 407.5 of the *Oman Building Code*.
3. Category c—Smoke compartments are not provided.

1305.2.21 Care recipient ability, concentration, smoke compartment location and ratio to attendant. In I-2 occupancies, the ability of care recipients, their concentration and ratio to attendants shall be evaluated and applied in accordance with this section. Evaluate each smoke compartment using the categories in Sections 1305.2.21.1, 1305.2.21.2 and 1305.2.21.3 and enter the value in Table 1306.1. To determine the safety factor, multiply the three values together; if the product is less than 6, compliance has failed.

1305.2.21.1 Care recipient ability for self-preservation. Evaluate the ability of the care recipients for self-preservation in each smoke compartment in an emergency. Under the categories and occupancies in Table 1305.2.21.1, determine the appropriate value and enter that value in Table 1306.1 under Safety Parameter 1305.2.21.1, Care Recipient Ability for Self-preservation, for means of egress and general safety.

TABLE 1305.2.21.1
CARE RECIPIENT ABILITY VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

1305.2.21.1.1 Categories. The categories for care recipient ability for self-preservation are:

1. Category a—(mobile) Care recipients are capable of self-preservation without assistance.
2. Category b—(not mobile) Care recipients rely on assistance for evacuation or relocation.
3. Category c—(not movable) Care recipients cannot be evacuated or relocated.

1305.2.21.2 Care recipient concentration. Evaluate the concentration of care recipients in each smoke compartment under Section 1305.2.21.2. Under the categories and occupancies in Table 1305.2.21.2 determine the appropriate value and enter that value in Table 1306.1 under Safety Parameter 1305.2.21.2, Care Recipient Concentration, for means of egress and general safety.

TABLE 1305.2.21.2
CARE RECIPIENT CONCENTRATION VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

1305.2.21.2.1 Categories: The categories for care recipient concentration are:

1. Category a—smoke compartment has 1 to 10 care recipients.
2. Category b—smoke compartment has more than 10 to 40 care recipients.
3. Category c—smoke compartment has more than 40 care recipients.

1305.2.21.3 Attendant-to-care recipients ratio. Evaluate the attendant-to-care recipients ratio for each compartment under Section 1305.2.21.3. Under the categories and occupancies in Table 1305.2.21.3, determine the appropriate value and enter that value in Table 1306.1 under Safety Parameter 1305.2.21.3, Attendant-to-Care Recipients Ratio, for means of egress and general safety.

TABLE 1305.2.21.3
ATTENDANT-TO-CARE RECIPIENTS RATIO VALUES

OCCUPANCY	CATEGORIES		
	a	b	c
I-2	3	2	1

1305.2.21.3.1 Categories. The categories for attendant-to-care recipient concentrations are:

1. Category a—attendant-to-care recipients concentration is 1:5 or no care recipients.
2. Category b—attendant-to-care recipients concentration is 1:6 to 1:10.
3. Category c—attendant-to-care recipients concentration is greater than 1:10.

SECTION 1306
BUILDING SCORE

1306.1 Building score. After determining the appropriate data from Section 1305.2, enter those data in Table 1306.1 and total the building score.

TABLE 1306.1
SUMMARY SHEET—BUILDING CODE

Existing occupancy: _____		Proposed occupancy: _____	
Year building was constructed:_____		Number of stories: _____ Height in feet:_____	
Type of construction: _____		Area per floor: _____	
Percentage of open perimeter increase: _____ %			
Completely suppressed:	Yes_____ No_____	Corridor wall rating: _____	
		Type:_____	
Compartmentation:	Yes _____ No _____	Required door closers:	Yes_____ No_____
Fire-resistance rating of vertical opening enclosures: _____			
Type of HVAC system:_____, serving number of floors: _____			
Automatic fire detection:	Yes_____ No_____	Type and location: _____	
Fire alarm system:	Yes_____ No_____	Type:_____	
Smoke control:	Yes_____ No_____	Type:_____	
Adequate exit routes:	Yes_____ No_____	Dead ends: _____	Yes _____ No _____
Maximum exit access travel distance: _____		Elevator controls:	Yes _____ No _____
Means of egress emergency lighting:		Yes _____ No _____	Mixed occupancies:
Standpipes:		Yes_____ No_____	Care recipients ability for self-preservation: _____
Incidental use:		Yes_____ No_____	Care recipients concentration: _____
Smoke compartmentation less than 2092 m^2:		Yes_____ No_____	Attendant-to-care recipients ratio: _____

(continued)

TABLE 1306.1—continued
SUMMARY SHEET—BUILDING CODE

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1305.2.1 Building height			
1305.2.2 Building area			
1305.2.3 Compartmentation			
1305.2.4 Tenant and dwelling unit separations			
1305.2.5 Corridor walls			
1305.2.6 Vertical openings			
1305.2.7 HVAC systems			
1305.2.8 Automatic fire detection			
1305.2.9 Fire alarm system			
1305.2.10 Smoke control	* * * *		
1305.2.11 Means of egress	* * * *		
1305.2.12 Dead ends	* * * *		
1305.2.13 Maximum exit access travel distance	* * * *		
1305.2.14 Elevator control			
1305.2.15 Means of egress emergency lighting	* * * *		
1305.2.16 Mixed occupancies		* * * *	
1305.2.17 Automatic sprinklers		÷ 2 =	
1305.2.18 Standpipes			
1305.2.19 Incidental use			
1305.2.20 Smoke compartmentation			
1305.2.21.1 Care recipients ability for self-preservation[a]	* * * *		
1305.2.21.2 Care recipients concentration[a]	* * * *		
1305.2.21.3 Attendant-to-care recipients ratio[a]	* * * *		
Building score–total value			

* * * *No applicable value to be inserted.
a. Only applicable to Group I-2 occupancies.

1306.2 Safety scores. The values in Table 1306.2 are the required mandatory safety scores for the evaluation process listed in Section 1305.2.

TABLE 1306.2
MANDATORY SAFETY SCORES[a]

OCCUPANCY	FIRE SAFETY(MFS)	MEANS OF EGRESS (MME)	GENERAL SAFETY (MGS)
A-1	20	31	31
A-2	21	32	32
A-3	22	33	33
A-4, E	29	40	40
B	30	40	40
F	24	34	34
I-2	19	34	34
M	23	40	40
R	21	38	38
S-1	19	29	29
S-2	29	39	39

a. MFS = Mandatory Fire Safety.
MME = Mandatory Means of Egress.
MGS = Mandatory General Safety.

SECTION 1307
EVALUATION OF BUILDING SAFETY

1307.1 Evaluation of building safety. The mandatory safety score in Table 1306.2 shall be subtracted from the building score in Table 1306.1 for each category in accordance with the evaluation formulas in Table 1307.1. Where the final score for any category equals zero or more, the building is in compliance with the requirements of this section for that category. Where the final score for any category is less than zero, the building is not in compliance with the requirements of this section.

1307.1.1 Mixed occupancies. For mixed occupancies, the following provisions shall apply:

1. Where the separation between mixed occupancies does not qualify for any category indicated in Section 1305.2.16, the mandatory safety scores for the occupancy with the lowest general safety score in Table 1306.2 shall be utilized (see Section 1305.2).
2. Where the separation between mixed occupancies qualifies for any category indicated in Section 1305.2.16, the mandatory safety scores for each occupancy shall be placed against the evaluation scores for the appropriate occupancy. An evaluation is not required for areas of the building with separated occupancies in accordance with Table 508.4 of the *Oman Building Code* in which there are no *alterations* or *change of occupancy*.

TABLE 1307.1
EVALUATION FORMULAS[a]

FORMULA	TABLE 1306.1	TABLE 1306.2		SCORE	PASS	FAIL
FS – MFS ≥ 0	_____(FS) –	_____(MFS)	=	_____	_____	_____
ME – MME ≥ 0	_____(ME) –	_____(MME)	=	_____	_____	_____
GS – MGS ≥ 0	_____(GS) –	_____(MGS)	=	_____	_____	_____

a. FS = Fire Safety.
ME = Means of Egress.
GS = General Safety.
MFS = Mandatory Fire Safety.
MME = Mandatory Means of Egress.
MGS = Mandatory General Safety.

CHAPTER 14
RELOCATED OR MOVED BUILDINGS

User note:

About this chapter: *Chapter 14 is applicable to any building that is moved or relocated. The relocation of a building will automatically cause an inspection and evaluation process that enables the municipality to determine the level of compliance with the Oman Fire Code.*

SECTION 1401
GENERAL

1401.1 Scope. This chapter provides requirements for relocated or moved structures, including *relocatable buildings* as defined in Chapter 2.

1401.1.1 Bleachers, grandstands and folding and telescopic seating. Relocated or moved bleachers, grandstands and folding and telescopic seating shall comply with ICC 300.

1401.2 Conformance. The building shall be safe for human occupancy as determined by the *Oman Fire Code*. Any *repair*, *alteration* or *change of occupancy* undertaken within the moved structure shall comply with the requirements of this code applicable to the work being performed. Any field-fabricated elements shall comply with the requirements of the *Oman Building Code.*

SECTION 1402
REQUIREMENTS

1402.1 Location on the lot. The building shall be located on the lot in accordance with the requirements of the *Oman Building Code.*

1402.2 Foundation. The foundation system of relocated buildings shall comply with the *Oman Building Code*.

1402.2.1 Connection to the foundation. The connection of the relocated building to the foundation shall comply with the *Oman Building Code* cable.

1402.3 Wind loads. Buildings shall comply with *Oman Building Code*.

Exceptions:

1. Detached one- and two-family dwellings and Group U occupancies where wind loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 10 percent.

1402.4 Seismic loads. Buildings shall comply with *Oman Building Code*.

Exceptions:

1. Structures in Seismic Design Categories A and B and detached one- and two-family dwellings in Seismic Design Categories A, B and C where the seismic loads at the new location are not higher than those at the previous location.
2. Structural elements whose stress is not increased by more than 10 percent.

1402.5 Reserved.

1402.6 Flood hazard areas. If relocated or moved into a *flood hazard area*, structures shall comply with Section 1612 of the *Oman Building Code*.

1402.7 Required inspection and repairs. The *building official* shall be authorized to inspect, or to require *approved* professionals to inspect at the expense of the owner, the various structural parts of a relocated building to verify that structural components and connections have not sustained structural damage. Any *repairs* required by the *building official* as a result of such inspection shall be made prior to the final approval.

CHAPTER 15
CONSTRUCTION SAFEGUARDS

User note:

About this chapter: *Chapter 15 looks to the construction process. Parameters are provided for demolition and for protecting adjacent property during demolition and construction. Issues such as how to provide egress and adequate water supply while the building is growing, the timing of standpipe and sprinkler installation, and protection of pedestrians are addressed. Note that this chapter is consistent with Chapter 33 of the Oman Building Code.*

SECTION 1501
GENERAL

1501.1 Scope. The provisions of this chapter shall govern safety during construction and the protection of adjacent public and private properties.

1501.2 Storage and placement of construction equipment and materials. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

1501.3 Roof loads. Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

1501.4 Maintenance of exits, existing structural elements, fire protection devices and sanitary safeguards. Required exits, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during *alterations*, *repairs* or *additions* to any building or structure.

Exceptions:

1. Where such required elements or devices are being altered or repaired, adequate substitute provisions shall be made.
2. Maintenance of such elements and devices is not required where the *existing building* is not occupied.

1501.5 Removal of waste materials. Waste materials shall be removed in a manner that prevents injury or damage to persons, adjoining properties and public rights-of-way.

SECTION 1502
OWNER'S RESPONSIBILITY FOR FIRE PROTECTION

1502.1 Site safety plan. The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an *approved*, written site safety plan establishing a fire prevention program at the project site applicable throughout all phases of the construction, *repair*, *alteration* or demolition work. The plan shall be submitted and *approved* before a building permit is issued. Any changes to the plan shall address the requirements of this chapter and other applicable portions of the *Oman Fire Code*, the duties of staff and staff training requirements. The plan shall be submitted for approval in accordance with the *Oman Fire Code*.

1502.1.1 Components of site safety plans. Site safety plans shall include the following, as applicable:

1. Name and contact information of the site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Civil Defense vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, Civil Defense connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved and signage locations in accordance with the *Oman Fire Code*.

7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and, where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the *Oman Fire Code*.

1502.2 Site safety director. The owner shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the site safety plan. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with the *Oman Fire Code*, the site safety director shall be responsible for the guard service.

1502.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a *certificate of occupancy* has been issued. Documentation shall be immediately available on-site for inspection and review.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in the *Oman Fire Code*, and hot work is performed only in areas approved by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by the *Oman Fire Code* are maintained clear of obstructions that reduce the width of the usable roadway to less than 6 m.
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of Civil Defense connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 1509.
10. Portable fire extinguishers are available in locations required by Section 1507 and for roofing operations in accordance with the *Oman Fire Code*.
11. Where a fire watch is required, fire watch records complying with the *Oman Fire Code* are up-to-date.

1502.3.1 Violations. Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 113.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 113.2. Upon the third offense, the *building official* is authorized to issue a stop work order in accordance with Section 114, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the *building official.*

SECTION 1503
SANITARY

1503.1 Facilities required. Sanitary facilities shall be provided during construction or demolition activities in accordance with the *Oman Plumbing Code*.

SECTION 1504
PROTECTION OF PEDESTRIANS

1504.1 Protection of pedestrians. Pedestrians shall be protected during construction and demolition activities as required by Sections 1504.1.1 through 1504.1.7 and Table 1504.1. Signs shall be provided to direct pedestrian traffic.

TABLE 1504.1
PROTECTION OF PEDESTRIANS

HEIGHT OF CONSTRUCTION	DISTANCE OF CONSTRUCTION TO LOT LINE	TYPE OF PROTECTION REQUIRED
2.4 m or less	Less than 1.5 m	Construction railings
	1.5 m or more	None
More than 2.4 m	Less than 1.5 m	Barrier and covered walkway
	1.5 m or more, but not more than one-fourth the height of construction	Barrier and covered walkway
	1.5 m or more, but between one-fourth and one-half the height of construction	Barrier
	1.5 m or more, but exceeding one-half the height of construction	None

1504.1.1 Walkways. A walkway shall be provided for pedestrian travel in front of every construction and demolition site unless the applicable governing authority authorizes the sidewalk to be fenced or closed. A walkway shall be provided for pedestrian travel that leads from a building entrance or exit of an occupied structure to a public way. Walkways shall be of sufficient width to accommodate the pedestrian traffic, but shall be not less than 1.2 m in width. Walkways shall be provided with a durable walking surface and shall be accessible in accordance with Chapter 11 of the *Oman Building Code*. Walkways shall be designed to support all imposed loads and the design live load shall be not less than 7.2 kN/m^2.

1504.1.2 Directional barricades. Pedestrian traffic shall be protected by a directional barricade where the walkway extends into the street. The directional barricade shall be of sufficient size and construction to direct vehicular traffic away from the pedestrian path.

1504.1.3 Construction railings. Construction railings shall be not less than 1 m in height and shall be sufficient to direct pedestrians around construction areas.

1504.1.4 Barriers. Barriers shall be not less than 2.4 m in height and shall be placed on the side of the walkway nearest the construction. Barriers shall extend the entire length of the construction site. Openings in such barriers shall be protected by doors that are normally kept closed.

1504.1.4.1 Barrier design. Barriers shall be designed to resist loads required in Chapter 16 of the *Oman Building Code* unless constructed as follows:

1. Barriers shall be provided with 50 mm by 100 mm top and bottom plates.
2. The barrier material shall be boards not less than 19 mm in thickness or wood structural use panels not less than 6 mm in thickness.
3. Wood structural use panels shall be bonded with an adhesive identical to that for exterior wood structural use panels.
4. Wood structural use panels 6 mm or 24 mm in thickness shall have studs spaced not more than 600 mm on center.

5. Wood structural use panels 10 mm or 13 mm in thickness shall have studs spaced not more than 1.2 m on center, provided that a 50 mm by 100 mm stiffener is placed horizontally at mid-height where the stud spacing is greater than 600 mm on center.
6. Wood structural use panels 16 mm or thicker shall not span over 2.4 m.

1504.1.5 Covered walkways. Covered walkways shall have a clear height of not less than 2.4 m as measured from the floor surface to the canopy overhead. Adequate lighting shall be provided at all times. Covered walkways shall be designed to support all imposed loads. The design live load shall be not less than 7.2 kN/m^2 for the entire structure.

Exception: Roofs and supporting structures of covered walkways for new, light-frame construction not exceeding two stories above grade plane are permitted to be designed for a live load of 3.6 kN/m^2 or the loads imposed on them, whichever is greater. In lieu of such designs, the roof and supporting structure of a covered walkway are permitted to be constructed as follows:

1. Footings shall be continuous 50 mm by 100 mm members.
2. Posts not less than 100 mm by 150 mm shall be provided on both sides of the roof and spaced not more than 3.7 m on center.
3. Stringers not less than 100 by 300 shall be placed on edge on the posts.
4. Joists resting on the stringers shall be not less than 50 mm by 200 mm and shall be spaced not more than 600 mm on center.
5. The deck shall be planks not less than 50 mm thick or wood structural panels with an exterior exposure durability classification not less than 18 mm thick nailed to the joists.
6. Each post shall be knee-braced to joists and stringers by members not less than 50 mm by 100 mm; 1.2 m in length.
7. A curb that is not less than 50 mm by 100 mm shall be set on edge along the outside edge of the deck.

1504.1.6 Repair, maintenance and removal. Pedestrian protection required by Section 1504.1 shall be maintained in place and kept in good order for the entire length of time pedestrians are subject to being endangered. The owner or the owner's authorized agent, on completion of the construction activity, shall immediately remove walkways, debris and other obstructions and leave such public property in as good a condition as it was before such work was commenced.

1504.17 Adjacent to excavations. Every excavation on a site located 1.5 m or less from the street lot line shall be enclosed with a barrier not less than 1.8 m in height. Where located more than 1.5 m from the street lot line, a barrier shall be erected where required by the *building official*. Barriers shall be of adequate strength to resist wind pressure as specified in Chapter 16 of the *Oman Building Code*.

SECTION 1505
PROTECTION OF ADJOINING PROPERTY

1505.1 Protection required. Adjoining public and private property shall be protected from damage during construction and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities. The person making or causing an excavation to be made shall provide written notice to the owners of adjoining buildings advising them that the excavation is to be made and that the adjoining buildings should be protected. Said notification shall be delivered not less than 10 days prior to the scheduled starting date of the excavation.

1505.2 Excavation retention systems. Where a retention system is used to provide support of an excavation for protection of adjacent structures, the system shall conform to the requirements in Section 1505.2.1 through 1505.2.3.

1505.2.1 Excavation retention system design. Excavation retention systems shall be designed by a *registered design professional* to provide vertical and lateral support.

1505.2.2 Excavation retention system monitoring. The retention system design shall include requirements for monitoring of the system and adjacent structures for horizontal and vertical movement.

1505.2.3 Retention system removal. Elements of the system shall only be removed or decommissioned where adequate replacement support is provided by backfill or by the new structure. Removal or decommissioning shall be performed in such a manner that protects the adjacent property.

SECTION 1506
TEMPORARY USE OF STREETS, ALLEYS AND PUBLIC PROPERTY

1506.1 Storage and handling of materials. The temporary use of streets or public property for the storage or handling of materials or equipment required for construction or demolition, and the protection provided to the public shall comply with the provisions of the applicable governing authority and this chapter.

1506.2 Obstructions. Construction materials and equipment shall not be placed or stored so as to obstruct access to fire hydrants, standpipes, fire or police alarm boxes, catch basins or manholes, nor shall such material or equipment be located within 6 m of a street intersection, or placed so as to obstruct normal observations of traffic signals or to hinder the use of public transit loading platforms.

1506.3 Utility fixtures. Building materials, fences, sheds or any obstruction of any kind shall not be placed so as to obstruct free approach to any fire hydrant, civil defense connection, utility pole, manhole, fire alarm box or catch basin, or so as to interfere with the passage of water in the gutter. Protection against damage shall be provided to such utility fixtures during the progress of the work, but sight of them shall not be obstructed.

SECTION 1507
FIRE EXTINGUISHERS

1507.1 Where required. Structures under construction, *alteration* or demolition shall be provided with not less than one *approved* portable fire extinguisher in accordance with the *Oman Fire Code* and sized for not less than ordinary hazard as follows:

1. At each stairway on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed.
3. Additional portable fire extinguishers shall be provided where special hazards exist, such as the storage and use of flammable and combustible liquids.

1507.2 Fire hazards. The provisions of this code and of the *Oman Fire Code* shall be strictly observed to safeguard against all fire hazards attendant upon construction operations.

SECTION 1508
MEANS OF EGRESS

1508.1 Stairways required. Where building construction exceeds 12 m in height above the lowest level of civil defense vehicle access, a temporary or permanent stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

1508.2 Maintenance of means of egress. Means of egress and required accessible means of egress shall be maintained at all times during construction, demolition, remodeling or *alterations* and *additions* to any building.

Exception: Existing means of egress need not be maintained where *approved* temporary means of egress and accessible means of egress systems and facilities are provided.

SECTION 1509
STANDPIPES

1509.1 Where required. In buildings required to have standpipes by Section 905.3.1 of the *Oman Building Code*, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 12 m in height above the lowest level of civil defense vehicle access. Such standpipes shall be provided with civil defense hose

connections at locations adjacent to *stairways*, complying with Section 1508.1. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.

1509.2 Buildings being demolished. Where a building or portion of a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by civil defense. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

1509.3 Detailed requirements. Standpipes shall be installed in accordance with the provisions of Chapter 9 of the *Oman Building Code*.

Exception: Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes conform to the requirements of Section 905 of the *Oman Building Code* as to capacity, outlets and materials.

SECTION 1510
AUTOMATIC SPRINKLER SYSTEM

1510.1 Completion before occupancy. In buildings where an automatic sprinkler system is required by this code or the *Oman Building Code*, it shall be unlawful to occupy any portions of a building or structure until the automatic sprinkler system installation has been tested and *approved*, except as provided in Section 110.3.

1510.2 Operation of valves. Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

SECTION 1511
ACCESSIBILITY

1511.1 Construction sites. Structures, sites and equipment directly associated with the actual process of construction, including, but not limited to, scaffolding, bridging, material hoists, material storage or construction trailers, are not required to be accessible.

SECTION 1512
WATER SUPPLY FOR FIRE PROTECTION

1512.1 When required. An *approved* water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building material arrives on the site, on commencement of vertical combustible construction, and on installation of a standpipe system in buildings under construction, in accordance with Sections 1512.1 through 1512.5.

Exception: The building official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

1512.2 Combustible building materials. When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 1893 L/m shall be provided. The fire hydrant used to provide this fire flow supply shall be within 150 m of the combustible building materials as measured along an *approved* fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 150 m of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

1512.3 Vertical construction of Types III, IV and V construction. Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Sections 1512.3.1 through 1512.3.3 shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

1512.3.1 Fire separation up to 9 meters. Where a building of Type III, IV or V construction has a fire separation distance of less than 9 m from property lot lines, and an adjacent property has an *existing structure* or otherwise can be built on, the water supply shall provide either a minimum of 1893 L/m, or the entire fire flow required for the building when constructed, whichever is greater.

1512.3.2 Fire separation of 9 meters up to 18 meters. Where a building of Type III, IV or V construction has a fire separation distance of 9 m up to 18 m from property lot lines, and an adjacent property has an *existing structure* or otherwise can be constructed upon, the water supply shall provide a minimum of 1893 L/m, or 50 percent of the fire flow required for the building when constructed, whichever is greater.

1512.3.3 Fire separation of 18 meters or greater. Where a building of Type III, IV or V construction has a fire separation of 18 m or greater from a property lot line, a water supply of 1893 L/m shall be provided.

11512.4 Vertical construction, Types I and II construction. If combustible construction materials are delivered to the construction site, water supply in accordance with Section 1512.2 shall be provided. Additional water supply for fire flow is not required prior to commencing vertical construction of Type I and II buildings.

1512.5 Standpipe supply. Regardless of the presence of combustible building materials, the construction type or the fire separation distance, where a standpipe is required in accordance with Section 1509, a water supply providing a minimum flow of 1893 L/m shall be provided. The fire hydrant used for this water supply shall be located within 30 m of the civil defense connection supplying the standpipe.

CHAPTER 16
REFERENCED STANDARDS

User note:

About this chapter: *This code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 16 contains a comprehensive list of all standards that are referenced in the code, including the appendices. The standards are part of the code to the extent of the reference to the standard. Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the building code official, contractor, designer and owner.*

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.4.

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI, 48331-3439

562—21: Assessment, Repair, and Rehabilitation of Existing Concrete Structures—Code Requirements
405.1.1

APSR

Authority for Public Service Regulations
PO Box 954, PC 133
Muscat, Sultanate of Oman

OES-4—19: Oman Electrical Standard
107.3, 302.2, 406.1.1, 406.1.2, 406.1.3, 406.1.5, 806.1, 806.4.4, 1007.1, 1007.2, 1007.3, 1007.4

ASCE/SEI

American Society of Civil Engineers
Structural Engineering Institute
1801 Alexander Bell Drive
Reston, VA 20191-4400

7—1988: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—1993: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—1995: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—1998: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—2002: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—2005: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—2010: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
503.12 , 706.3.2

7—2016: Minimum Design Loads and Associated Criteria for Buildings and Other Structures with Supplement 1
304.3.1, 503.4, 503.12, 503.13, 706.3.2, 805.3, 805.4

ASCE/SEI—continued

41—2017: Seismic Evaluation and Retrofit of Existing Buildings
304.3.1, Table 304.3.1, 304.3.2, Table 304.3.2, 503.11, 506.5.3, 906.2, 1006.3

ASHRAE

ASHRAE
1791 Tullie Circle NE
Atlanta, GA 30329

62.1—2019: Ventilation for Acceptable Indoor Air Quality
807.2

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016

A17.1—2019/CSA B44—19: Safety Code for Elevators and Escalators
306.7.7, 902.1.2

A17.3—2020: Safety Code for Existing Elevators and Escalators
902.1.2

A18.1—2020: Safety Standard for Platform Lifts and Stairway Chair Lifts
306.7.8

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

C94/C94M—17A: Specification for Ready-mixed Concrete
109.3.1

E108—17: Standard Test Methods for Fire Tests of Roof Coverings
1204.5

E136—16A: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C
202

F2006—17: Standard Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows
505.2, 702.4

F2090—17: Standard Specification for Window Fall Prevention Devices with Emergency (Egress) Release Mechanisms
505.2, 505.3.1, 702.4, 702.5.1

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington, DC 20001

ICC 300—17: ICC Standard on Bleachers, Folding and Telescopic Seating and Grandstands
301.1.1

ICC 500—20: Standard for the Design and Construction of Storm Shelters
303.1.1

ICC A117.1—17: Accessible and Usable Buildings and Facilities
306.2, 306.7, 306.7.11, 306.7.12

ICC—continued

IFGC—21: International Fuel Gas Code®
302.2, 702.7.1

ICCPC—21: International Code Council Performance Code for Buildings and Facilities®
104.2.3, 1302.1.2, 1302.1.3, 1303.1.3

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

72—19: National Fire Alarm and Signaling Code
803.4, 803.4.3

99—21: Health Care Facilities Code
302.2.1, 406.1.4, 408.3, 501.3, 707.1, 806.3, 808.1, 1007.1

101—21: Life Safety Code
804.2

OMAN MoHUP

Oman Ministry of Housing and Urban Planning
PO Box 173, PC 100
Muscat, Sultanate of Oman

OBC—25: Oman Building Code
101.4.2, 104.3.1, 106.2.2, 109.3.3, 109.3.6, 109.3.9, 109.3.10, 110.2, 202, 301.1.1 301.3, 302.4.1, 302.5, 303.1, 303.3, 304.1, 304.3.1, 304.3.2, 305.1, 306.5, 306.7, 306.7.2, 306.7.4, 306.7.5, 306.7.9, 306.7.10, 306.7.10.1, 306.7.10.2, 306.7.10.3, 306.7.11, 306.7.12, 306.7.13, 306.7.15, 306.7.16, 306.7.16.3, 306.7.16.4, 306.7.16.5, 306.7.16.7, 309.2, 401.1.1, 401.3, 402.1, 405.2.3.1, 405.2.3.3, 405.2.4, 405.2.6, 501.2, 502.1, 502.1.2, 502.2, 502.3, 502.4, 502.5, 503.1, 503.2, 503.3, 503.4, 503.11, 503.12, 503.13, 503.14, 503.15, 503.17, 503.18, 505.3, 505.4, 506.1, 506.3, 506.4, 506.5.1, 506.5.2, 506.5.3, 506.5.4, 701.2, 701.3, 702.1, 702.2, 702.3, 702.5, 702.6, 702.7, 704.1.1, 704.3, 705.1, 705.2, 706.2, 706.3.2, 801.4, 802.2.1, 802.2.3, 802.3, 802.4, 802.5.2, 802.6, 803.1.1, 803.2, 803.2.2, 803.2.3, 803.2.4, 803.2.5, 803.2.6, 803.3, 803.4.3, 804.3, 804.4, 804.5.1, 804.5.1.1, Table 804.5.1.1(1), Table 804.51.1(2), 804.5.1.2.1, 804.6.1.2, 804..6.3, 804.6.4, 804.6.5, 804.7, 804.7.3, 804.8, 804.9.1, 804.10.1, 804.11, 804.13.2, 804.14.2, 805.2, 805.3, 805.4, 902.3, 902.3.1, 902.4 904.1.2, 904.1.3, 904.1.4, 904.1.5, 904.1.6, 904.1.7, 904.2, 904.2.1, 904.2.2, 905.2, 905.3, 905.4, 906.2, 1001.2, 1001.3, 1002.1, 1002.2, 1002.3, 1002.4, 1004.1, 1006.1, 1006.2, 1006.3, 1006.4, 1010.1, 1011.1, 1011.2.1, 1011.2.2, 1011.3, 1011.5.1, 1011.5.2, 1011.5.3, 1011.5.6, 1011.6.1, 1011.6.1.1, 1011.6.3, 1011.7.1, 1011.7.3, 1011.8.1, 1011.8.2, 1011.8.3, 1101.2, 1101.3, 1101.5, 1101.6, 1102.1, 1102.2, 1102.3, 1103.1, 1103.2, 1103.3, 1201.2, 1201.4, 1202.2, 1203.3, 1203.5.1, 1203.5.2, 1203.12, 1203.13, 1204.2, 1204.9, 1206.1, 1302.1.2, 1302.1.3, 1302.1.4, 1303.1.3, 1304.1.1, 1305.2.1, 1305.2.1.1, 1305.2.2, 1305.2.2.1, 1305.2.3.2, 1305.2.3.3, 1305.2.4.1, 1305.2.5, 1305.2.5.1, 1305.2.6, 1305.2.7.1, 1305.2.8, 1305.2.9, 1305.2.9.1, 1305.2.10.1, 1305.2.11, 1305.2.11.1, 1305.2.12.1, 1305.2.13, Table 1305.2.15, 1305.2.15.1, 1305.2.16.1, 13052.17, 1305.2.17.1, 1305.2.18, 1305.2.18.1, 2305.2.19, Table 1305.2.19, 1305.2.20, 1305.2.20.1, 1307.1, 1401.2, 1402.1, 1402.2, 1402.2.1, 1402.3, 1402.4, 1402.6, 1504.1.1, 1504.1.4, 1504.1.4.1, 1504.1.7, 1509.1, 1509.3, 1510.1, 1507.1

OEESC—25: Oman Energy Efficiency and Sustainability Code
302.2, 702.7, 708.1, 809.1, 907.1, 1104.1

OMC—25: Oman Mechanical Code
302.2, 702.7, 807.1, 902.1.1, 1008.1, 1301.6.7.1, 1301.6.8, 1301.6.8.1

OPC—25: Oman Plumbing Code
302.2, 408.1, 702.7, 1009.1, 1009.2, 1009.3, 1009.5, 1501.7

ROP

Royal Oman Police
PO Box 381, PC 116
Muscat, Sultanate of Oman

OFC—25: Oman Fire Code
101.2.2, 101.4.2, 101.6, 301.3.1, 302.2, 307.1, 308.1, 802.2.1, 802.2.3, 803.2.3, 803.4.1.1, 803.4.1.2, 803.4.1.3, 803.4.1.4, 803.4.1.5, 803.4.1.6, 1303.1.2, 1305.2.14, 1305.2.14.1, 1401.2, 1502.1, 1502.1.1, 1502.2, 1502.3

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

790—04: Standard Test Methods for Fire Tests of Roof Coverings—with Revisions through October 2018
1204.5

Appendix A: GUIDELINES FOR THE SEISMIC RETROFIT OF EXISTING BUILDINGS

CHAPTER A1

SEISMIC STRENGTHENING PROVISIONS FOR UNREINFORCED MASONRY BEARING WALL BUILDINGS

User note:

About this appendix: *Appendix A provides guidelines for upgrading the seismic-resistance capacity of different types of existing buildings. It is organized into separate chapters that deal with buildings of different types, including unreinforced masonry buildings, reinforced concrete and reinforced masonry wall buildings.*

SECTION A101
PURPOSE

A101.1 Purpose. The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury from the effects of earthquakes on existing unreinforced masonry bearing wall buildings.

The provisions of this chapter are intended as minimum standards for structural seismic resistance, and are established primarily to reduce the risk of life loss or injury. Compliance with these provisions will not necessarily prevent loss of life or injury, or prevent earthquake damage to retrofitted buildings.

SECTION A102
SCOPE

A102.1 General. The provisions of this chapter shall apply to all *existing buildings* not more than six stories in height above the base of the structure and having not less than one unreinforced masonry bearing wall. The elements regulated by this chapter shall be determined in accordance with Table A102.1. Except as provided herein, other structural provisions of the building code shall apply. This chapter does not apply to the *alteration* of existing electrical, plumbing, mechanical or fire safety systems.

TABLE A102.1
ELEMENTS REGULATED BY THIS CHAPTER

BUILDING ELEMENTS	S_{D1}			
	$\geq 0.067_g < 0.133_g$	$\geq 0.133_g < 0.20_g$	$\geq 0.20_g < 0.30_g$	$\geq 0.30_g$
Parapets	X	X	X	X
Walls, anchorage	X	X	X	X
Walls, *h/t* ratios		X	X	X
Walls, in-plane shear		X	X	X
Diaphragms[a]			X	X
Diaphragms, shear transfer[b]		X	X	X
Diaphragms, demand-capacity ratios[b]			X	X

a. Applies only to buildings designed according to the general procedures of Section A110.
b. Applies only to buildings designed according to the special procedures of Section A111.

A102.2 Essential and hazardous facilities. The provisions of this chapter shall not apply to the strengthening of buildings in *Risk Category* III or IV. Such buildings shall be strengthened to meet the requirements of the *Oman Building Code* for new buildings of the same *risk category* or other such criteria *approved* by the *building official*.

SECTION A103
DEFINITIONS

A103.1 Definitions. For the purpose of this chapter, the applicable definitions in the building code shall also apply.

BED JOINT. The horizontal layer of mortar on which a masonry unit is laid.

COLLAR JOINT. The vertical space between adjacent wythes. A collar joint may contain mortar or grout.

CROSSWALL. A new or existing wall that meets the requirements of Section A111.3. A crosswall is not a shear wall.

CROSSWALL SHEAR CAPACITY. The unit shear value times the length of the crosswall, $v_c L_c$.

DETAILED BUILDING SYSTEM ELEMENTS. The localized elements and the interconnections of these elements that define the design of the building.

DIAPHRAGM EDGE. The intersection of the horizontal diaphragm and a shear wall.

DIAPHRAGM SHEAR CAPACITY. The unit shear value times the depth of the diaphragm, $v_u D$.

FLEXIBLE DIAPHRAGM. A diaphragm of wood or untopped metal deck construction in which the horizontal deformation along its length is at least two times the average story drift.

HEAD JOINT. The vertical mortar joint placed between masonry units within the wythe.

NORMAL WALL. A wall perpendicular to the direction of seismic forces.

OPEN FRONT. An exterior building wall line on one side only without vertical elements of the seismic force-resisting system in one or more stories.

POINTING. The process of removal of deteriorated mortar from between masonry units and placement of new mortar. Also known as repointing or tuckpointing for purposes of this chapter.

REPOINTING. See "*Pointing*."

RIGID DIAPHRAGM. A diaphragm of concrete construction or concrete-filled metal deck construction.

TUCKPOINTING. See "*Pointing*."

UNREINFORCED MASONRY (URM). Includes burned clay, concrete or sand-lime brick; hollow clay or concrete block; plain concrete; and hollow clay tile. These materials shall comply with the requirements of Section A106 as applicable.

UNREINFORCED MASONRY BEARING WALL. A URM wall that provides the vertical support for the reaction of floor or roof-framing members for which the total superimposed vertical load exceeds 1460 N/m of wall length.

UNREINFORCED MASONRY WALL. A masonry wall that relies on the tensile strength of masonry units, mortar and grout in resisting design loads, and in which the area of reinforcement is less than the minimum amounts as defined for reinforced masonry walls.

YIELD STORY DRIFT. The lateral displacement of one level relative to the level above or below at which yield stress is first developed in a frame member.

SECTION A104
SYMBOLS AND NOTATIONS

A104.1 Symbols and notations. For the purpose of this chapter, the following notations supplement the applicable symbols and notations in the building code.

a_n = Diameter of core multiplied by its length or the area of the side of a square prism.

A = Cross-sectional area of unreinforced masonry pier or wall, mm^2.

A_b = Total area of the bed joints above and below the test specimen for each in-place shear test, mm^2.

A_n = Area of net mortared or grouted section of a wall or wall pier.

D = In-plane width dimension of pier, mm, or depth of diaphragm, m.

DCR = Demand-capacity ratio specified in Section A111.4.2.

f'_m = Lower bound masonry compressive strength.

f_{sp} = Splitting-tensile strength of masonry.

F_{wx} = Force applied to a wall at level x, N.

H = Least clear height of opening on either side of a pier, mm.

h/t = Height-to-thickness ratio of URM wall. Height, h, is measured between wall anchorage levels and/or slab-on-grade.

L = Span of diaphragm between shear walls, or span between shear wall and open front, m.

L_c = Length of crosswall, m.

L_i = Effective diaphragm span for an open-front building specified in Section A111.8, m.

P = Applied force as determined by standard test method of ASTM C496 or ASTM E519, N.

P_D = Superimposed dead load at the location under consideration, kN. For determination of the rocking shear capacity, dead load at the top of the pier under consideration shall be used.

P_{D+L} = Stress resulting from the dead plus actual live load in place at the time of testing, kPa.

P_{test} = Splitting tensile test load determined by standard test method ASTM C496, N.

P_w = Weight of wall, N.

R = Response modification factor for Ordinary plain masonry shear walls in Bearing Wall System from Table 12.2-1 of ASCE 7, where $R = 1.5$.

S_{DS} = Design spectral acceleration at short period, in g units.

S_{D1} = Design spectral acceleration at 1-second period, in g units.

v_a = The shear strength of any URM pier, N.

v_c = Unit shear strength for a crosswall sheathed with any of the materials given in Table A108.1(1) or Table A108.1(2), N/m.

v_{mL} = Shear strength of unreinforced masonry, kPa.

V_{aa} = The shear strength of any URM pier or wall, N.

V_{ca} = Total shear capacity of crosswalls in the direction of analysis immediately above the diaphragm level being investigated, v_cL_c, N.

V_{cb} = Total shear capacity of crosswalls in the direction of analysis immediately below the diaphragm level being investigated, v_cL_c, N.

V_p = Shear force assigned to a pier on the basis of its relative shear rigidity, N.

V_r = Pier rocking shear capacity of any URM wall or wall pier, N.

v_{test} = Load at incipient cracking for each in-place shear test performed in accordance with Section A106.2.3.6, kN.

v_{tl} = Lower bound mortar shear strength, kPa.

v_{to} = Mortar shear test values as specified in Section A106.2.3.6, kPa.

v_u = Unit shear capacity value for a diaphragm sheathed with any of the materials given in Table A108.1(1) or A108.1(2), N/m.

V_{wx} = Total shear force resisted by a shear wall at the level under consideration, N.

W = Total seismic dead load as defined in the building code, N.

W_d = Total dead load tributary to a diaphragm level, N.

W_w = Total dead load of a URM wall above the level under consideration or above an open-front building, N.

W_{wx} = Dead load of a URM wall assigned to level x halfway above and below the level under consideration, N.

$\Sigma v_u D$ = Sum of diaphragm shear capacities of both ends of the diaphragm, N.

$\Sigma\Sigma v_u D$ = For diaphragms coupled with crosswalls, $v_u D$ includes the sum of shear capacities of both ends of diaphragms coupled at and above the level under consideration, N.

ΣW_d = Total dead load of all the diaphragms at and above the level under consideration, N.

SECTION A105
GENERAL REQUIREMENTS

A105.1 General. The seismic force-resisting system specified in this chapter shall comply with the *Oman Building Code* and referenced standards, except as modified herein.

A105.2 Alterations and repairs. *Alterations* and *repairs* required to meet the provisions of this chapter shall comply with applicable structural requirements of the building code unless specifically provided for in this chapter.

A105.3 Requirements for plans. The following construction information shall be included in the plans required by this chapter:

1. Dimensioned floor and roof plans showing existing walls and the size and spacing of floor and roof-framing members and sheathing materials. The plans shall indicate all existing URM walls, and new crosswalls and shear walls, and their materials of construction. The location of these walls and their openings shall be fully dimensioned and drawn to scale on the plans.
2. Dimensioned URM wall elevations showing openings, piers, wall classes as defined in Section A106.2.3.9, thickness, heights, wall shear test locations, cracks or damaged portions requiring *repairs*, the general condition of the mortar joints, and if and where pointing is required. Where the exterior face is veneer, the type of veneer, its thickness and its bonding and/or ties to the structural wall masonry shall be noted.
3. The type of interior wall and ceiling materials, and framing.
4. The extent and type of existing wall anchorage to floors and roof where used in the design.
5. The extent and type of parapet corrections that were previously performed, if any.
6. *Repair* details, if any, of cracked or damaged unreinforced masonry walls required to resist forces specified in this chapter.
7. All other plans, sections and details necessary to delineate required retrofit construction.
8. The design procedure used shall be stated on both the plans and the permit application.
9. Details of the anchor prequalification program required by Section A107.5.3, if used, including location and results of all tests.
10. Quality assurance requirements of special inspection for all new construction materials and for retrofit construction including: anchor tests, pointing or repointing of mortar joints, installation of adhesive or mechanical anchors, and other elements as deemed necessary to ensure compliance with this chapter.

A105.4 Structural observation, testing and inspection. Structural observation, in accordance with Section 1704.6 of the *Oman Building Code*, shall be required for all structures in which seismic retrofit is being performed in accordance with this chapter.

Structural observation shall include visual observation of work for compliance with the *approved* construction documents and confirmation of existing conditions assumed during design.

Structural testing and inspection for new and existing construction materials shall be in accordance with the building code, except as modified by this chapter.

Special inspection as described in Section A105.3, Item 10, shall be provided equivalent to Level 3 as prescribed in TMS 402, Table 3.1(2).

SECTION A106
MATERIALS REQUIREMENTS

A106.1 Condition of existing materials. Existing materials used as part of the required vertical load-carrying or seismic force-resisting system shall be evaluated by on-site investigation and: determined to be in good condition (free of degraded mortar, degraded masonry units or significant cracking); or shall be repaired, enhanced, retrofitted or removed and replaced with new materials. Mortar joint deterioration shall be patched by pointing or repointing of the eroded joint in accordance with Section A106.2.3.10. Existing significant cracks in solid unit unreinforced and solid grouted hollow unit masonry shall be repaired.

A106.2 Existing unreinforced masonry.

A106.2.1 General. Unreinforced masonry walls used to support vertical loads or seismic forces parallel and perpendicular to the wall plane shall be tested as specified in this section. Masonry that does not meet the minimum requirements established by this chapter shall be repaired, enhanced, removed and replaced with new materials, or alternatively, shall have its structural functions replaced with new materials and shall be anchored to supporting elements.

A106.2.2 Lay-up of walls. Unreinforced masonry walls shall be laid in a running bond pattern.

A106.2.2.1 Header in multiple-wythe solid brick. The facing and backing wythes of multiple-wythe walls shall be bonded so that not less than 10 percent of the exposed face area is composed of solid headers extending not less than 100 mm into the backing wythes. The clear distance between adjacent header courses shall not exceed 600 mm vertically or horizontally. Where backing consists of two or more wythes, the headers shall extend not less than 100 mm into the most distant wythe, or the backing wythes shall be bonded together with separate headers for which the area and spacing conform to the foregoing. Wythes of walls not meeting these requirements shall be considered to be veneer, and shall not be included in the effective thickness used in calculating the height-to-thickness ratio and the shear capacity strength of the wall.

Exception: Where SD1 is 0.3 g or less, veneer wythes anchored and made composite with backup masonry are permitted to be used for calculation of the effective thickness.

A106.2.2.2 Lay-up patterns. Lay-up patterns other than those specified in Section A106.2.2.1 are allowed if their performance can be justified.

A106.2.3 Testing of masonry.

A106.2.3.1 Concrete masonry units and structural clay load-bearing tile. Grouted or ungrouted hollow concrete masonry units shall be tested in accordance with ASTM C140. Grouted or ungrouted structural clay load-bearing tile shall be tested in accordance with ASTM C67.

A106.2.3.2 In-place mortar joint shear tests. Mortar joint shear test values, v_{to}, shall be obtained by one of the following:

1. ASTM C1531.
2. For masonry walls that have high shear strength mortar, or where in-place testing is not practical because of crushing or other failure mode of the masonry, alternative procedures for testing shall be used in accordance with Section A106.2.3.2.

A106.2.3.3 Alternative procedures for testing masonry. The splitting tensile strength of existing masonry, f_{sp}, or the prism strength of existing masonry, f'_m, is permitted to be determined in accordance with ASTM C496 and calculated by the following equation:

$$f_{sp} = \frac{0.494P}{a_n} \qquad \textbf{(Equation A1-1)}$$

A106.2.3.4 Location of tests. The shear tests shall be taken at locations representative of the mortar conditions throughout the building. Test locations shall be determined at the building site by the *registered design professional* in charge. Results of all tests and their locations shall be recorded.

A106.2.3.5 Number of tests. The minimum number of tests per masonry class shall be determined as follows:

1. At each of both the first and top stories, not less than two tests per wall or line of wall elements providing a common line of resistance to seismic forces.
2. At each of all other stories, not less than one test per wall or line of wall elements providing a common line of resistance to seismic forces.
3. In any case, not less than one test per 150 m^2 of wall surface and not less than a total of eight tests.

A106.2.3.6 Minimum quality of mortar.

1. Mortar shear test values, v_{to}, in kPa, shall be obtained for each in-place shear test in accordance with the following equation:

   $$v_{to} = (V_{test}/A_b) - P_{D+L} \qquad \textbf{(Equation A1-2)}$$

   where:

   V_{test} = Load at first observed movement.

   A_b = Total area of the bed joints above and below the test specimen.

   P_{D+L} = Stress resulting from actual dead plus live loads in place at the time of testing.
2. Individual unreinforced masonry walls with more than 50 percent of mortar test values, v_{to}, less than 200 kPa shall be pointed prior to and retested.
3. The lower bound mortar shear strength, v_{tL}, is defined as the mean minus one standard deviation of the mortar shear test values, v_{to}.
4. Unreinforced masonry with mortar shear strength, v_{tL}, less than 200 kPa shall be pointed and retested or shall have its structural function replaced, and shall be anchored to supporting elements in accordance with Sections A106.2.1 and A113.8. When existing mortar in any wythe is pointed to increase its shear strength and is retested, the condition of the mortar in the adjacent bed joints of the inner wythe or wythes and the opposite outer wythe shall be examined for extent of deterioration. The shear strength of any wall class shall be not greater than that of the weakest wythe of that class.

A106.2.3.7 Minimum quality of masonry. Where the alternative procedures of Section A106.2.3.2 are used to determine masonry quality, the following minimums apply:

1. The minimum average value of splitting tensile strength, f_{sp}, as calculated by Equation A1-1 shall be 350 kPa.
2. Individual unreinforced masonry walls with average splitting tensile strength of less than 350 kPa shall be pointed and retested.
3. The lower-bound mortar strength f_{spL} is defined as the mean minus one standard deviation P_{D+L} of the splitting tensile test values f_{sp}.

A106.2.3.8 Collar joints. The collar joints shall be inspected at the test locations during each in-place shear test, and estimates of the percentage of surfaces of the adjacent wythe that are covered with mortar shall be reported along with the results of the in-place shear tests.

A106.2.3.9 Unreinforced masonry classes. Existing unreinforced masonry shall be categorized into one or more classes based on shear strength, quality of construction, state of *repair*, deterioration and weathering. A class shall be characterized by the masonry shear strength determined in accordance with Section A108.2. Classes are defined for whole walls, not for small areas of masonry within a wall. Discretion in the definition of classes of masonry is permitted to avoid unnecessary testing.

A106.2.3.10 Pointing. Deteriorated mortar joints in unreinforced masonry walls shall be pointed in accordance with the following requirements:

1. **Joint preparation**. Deteriorated mortar shall be cut out by means of a toothing chisel or nonimpact power tool until sound mortar is reached, to a depth not less than 20 mm or twice the thickness of the joint, whichever is less, but not greater than 50 mm. Care shall be taken not to damage the masonry edges. After cutting is complete, all loose material shall be removed with a brush, or air or water stream.
2. **Mortar preparation.** The mortar mix shall be proportioned as required by the construction specifications and manufacturer's *approved* instructions.
3. **Packing.** The joint into which the mortar is to be packed shall be dampened but without free-standing water. The mortar shall be tightly packed into the joint in layers not exceeding 6 mm deep until it is filled; then it shall be tooled to a smooth surface to match the original profile.

Nothing shall prevent pointing of any masonry wall joints before testing is performed in accordance with Section A106.2.3, except as required in Section A107.2.

SECTION A107
QUALITY CONTROL

A107.1 Pointing. Preparation and mortar pointing shall be performed with special inspection.

Exception: At the discretion of the *building official*, incidental pointing may be performed without special inspection.

A107.2 Masonry shear tests. In-place masonry shear tests shall comply with Section A106.2.3.1. Testing of masonry for determination of splitting tensile strength shall comply with Section A106.2.3.3.

A107.3 Existing wall anchors. Existing wall anchors used as all or part of the required tension anchors shall be tested in pullout according to Section A107.5.1. Not fewer than four anchors tested per floor shall be tested in pullout, with not fewer than two tests at walls with joists framing into the wall and two tests at walls with joists parallel to the wall, but not less than 10 percent of the total number of existing tension anchors at each level.

A107.4 New wall anchors. New wall anchors embedded in URM walls shall be subject to special inspection prior to placement of the anchor and grout or adhesive in the drilled hole. Five percent of all anchors that do not extend through the wall shall be subject to a direct-tension test, and an additional 20 percent shall be tested using a calibrated torque wrench. Testing shall be performed in accordance with Section A107.5.

New wall anchors embedded in URM walls resisting tension forces or a combination of tension and shear forces shall be subject to special inspection, prior to placement of the anchor and grout or adhesive in the drilled hole. Five percent of all anchors resisting tension forces shall be subject to a direct-tension test, and an additional 20 percent shall be tested using a calibrated torque wrench. Testing shall be performed in accordance with Section A107.5.

Exception: New bolts that extend through the wall with steel plates on the far side of the wall need not be tested.

A107.5 Tests of anchors in unreinforced masonry walls. Tests of anchors in unreinforced masonry walls shall be in accordance with Sections A107.5.1 through A107.5.3. Results of all tests shall be reported to the municipality. The report shall include the test results of maximum load for each test; pass-fail results; corresponding anchor size and type; orientation of loading; details of the anchor installation, testing apparatus and embedment; wall thickness; and joist orientation and proximity to the tested anchor.

A107.5.1 Direct tension testing of existing anchors and new anchors. The test apparatus shall be supported by the masonry wall. The test procedure for prequalification of tension and shear anchors shall comply with ASTM E488. Existing wall anchors shall be given a preload of 1.4 kN before establishing a datum for recording elongation. The tension test load reported shall be recorded at 3 mm relative movement between the existing anchor and the adjacent masonry surface. New embedded

tension anchors shall be subject to a direct tension load of not less than 2.5 times the design load but not less than 7 kN for 5 minutes.

Exception: Where obstructions occur, the distance between the anchor and the test apparatus support shall be not less than one-half the wall thickness for existing anchors and 75 percent of the embedment length for new embedded anchors.

A107.5.2 Torque testing of new anchors. Anchors embedded in unreinforced masonry walls shall be tested using a torque-calibrated wrench to the following minimum torques:

- 13 mm bolts: 52 N-m.
- 16 mm bolts: 70 N-m.
- 20 mm bolts: 87 N-m.

A107.5.3 Prequalification test for bolts and other types of anchors. ASTM E488 or the test procedure in Section A107.5.1 is permitted to be used to determine tension or shear strength values for anchors greater than those permitted by Table A108.1(2). Anchors shall be installed in the same manner and using the same materials as will be used in the actual construction. Not fewer than five tests for each bolt size and type shall be performed for each class of masonry in which they are proposed to be used. The tension and shear strength values for such anchors shall be the lesser of the average ultimate load divided by 5.0 or the average load at which 3 mm elongation occurs for each size and type of anchor and class of masonry.

SECTION A108
DESIGN STRENGTHS

A108.1 Strength values.

1. Strength values for existing materials are given in Table A108.1(1) and for new materials in Table A108.1(2).
2. The strength reduction factor, Φ, shall be taken equal to 1.0.
3. The use of materials not specified herein shall be based on substantiating research data or engineering judgment, as *approved* by the *building official*.

TABLE A108.1(1)
STRENGTH VALUES FOR EXISTING MATERIALS

EXISTING MATERIALS OR CONFIGURATION OF MATERIALS[a]		STRENGTH VALUES
Horizontal diaphragms	Roofs with straight sheathing and roofing applied directly to the sheathing.	4.4 kN/m for seismic shear
	Roofs with diagonal sheathing and roofing applied directly to the sheathing.	10.9 kN/m for seismic shear
	Floors with straight tongue-and-groove sheathing.	4.4 kN/m for seismic shear
	Floors with straight sheathing and finished wood flooring with board edges offset or perpendicular.	21.9 kN/m for seismic shear
	Floors with diagonal sheathing and finished wood flooring.	26.3 kN/m for seismic shear
	Metal deck welded with minimal welding.[c]	26.3 kN/m for seismic shear
	Metal deck welded for seismic resistance.[d]	43.8 kN/m for seismic shear

(continued)

TABLE A108.1(1)—continued
STRENGTH VALUES FOR EXISTING MATERIALS

EXISTING MATERIALS OR CONFIGURATION OF MATERIALS[a]		STRENGTH VALUES
Crosswalls[b]	Plaster on wood or metal lath.	8.8 kN/m for seismic shear
	Plaster on gypsum lath.	8.0 kN/m for seismic shear
	Gypsum wallboard, unblocked edges.	2.9 kN/m for seismic shear
	Gypsum wallboard, blocked edges.	5.8 kN/m for seismic shear
Existing footing, wood framing, structural steel, reinforcing steel	Plain concrete footings.	F'_c = 10 Mpa unless otherwise shown by tests
	Douglas fir wood.	Same as D.F. No. 1
	Reinforcing steel.	F_y = 275 Mpa maximum
	Structural steel.	F_y = 225 Mpa maximum

a. Material must be sound and in good condition.
b. Shear values of these materials may be combined, except the total combined value should not exceed 13 kN/m.
c. Minimum 0.6 mm steel deck with welds to supports satisfying the standards of the Steel Deck Institute.
d. Minimum 0.6 mm with 20 mm diameter plug welds at an average spacing not exceeding 200 mm and with sidelap welds appropriate for the deck span.

TABLE A108.1(2)
STRENGTH VALUES OF NEW MATERIALS USED IN CONJUNCTION WITH EXISTING CONSTRUCTION

NEW MATERIALS OR CONFIGURATION OF MATERIALS		STRENGTH VALUES
Horizontal diaphragms	Plywood sheathing applied directly over existing straight sheathing with ends of plywood sheets bearing on joists or rafters and edges of plywood located on center of individual sheathing boards.	9.9 kN/m
Crosswalls	Plywood sheathing applied directly over wood studs; no value should be given to plywood applied over existing plaster or wood sheathing.	1.2 times the value specified in the current building code.
	Drywall or plaster applied directly over wood studs.	The value specified in the current building code.
	Drywall or plaster applied to sheathing over existing wood studs.	50 percent of the value specified in the current building code.
Tension anchors[f]	Anchors extending entirely through unreinforced masonry wall secured with bearing plates on far side of a wall 0.019 m^2 of area.[b, c]	24 kN. Per anchor for three-wythe minimum walls. 12 kN. For two-wythe walls.
Shear bolts[e, f]	Anchors embedded not less than 200 mm into unreinforced masonry walls; anchors should be centered in 64 mm diameter holes with dry-pack or nonshrink grout around the circumference of the anchor.	The value for plain masonry specified for solid masonry TMS 402; and no value larger than those given for 20 mm bolts should be used.
Combined tension and shear anchors[f]	Through-anchors—anchors meeting the requirements for shear and for tension anchors.[b, c]	Tension—same as for tension anchors. Shear—same as for shear anchors.
	Embedded anchors—anchors extending to the exterior face of the wall with a 64 mm round plate under the head and drilled at an angle of 22.5 degrees to the horizontal; installed as specified for shear anchors.[a, b, c]	Tension—16 kN. Per anchor. Shear—same as for shear anchors.

(continued)

TABLE A108.1(2)—continued
STRENGTH VALUES OF NEW MATERIALS USED IN CONJUNCTION WITH EXISTING CONSTRUCTION

NEW MATERIALS OR CONFIGURATION OF MATERIALS		STRENGTH VALUES
Infilled walls	Reinforced masonry infilled openings in existing unreinforced masonry walls; provide keys or dowels to match reinforcing.	Same as values specified for unreinforced masonry walls.
Reinforced masonry[d]	Masonry piers and walls reinforced per the current building code.	The value specified in the current building code for strength design.
Reinforced concrete[d]	Concrete footings, walls and piers reinforced as specified in the current building code.	The value specified in the current building code for strength design.

a. Embedded anchors to be tested as specified in Section A107.4.
b. Anchors shall be 13 mm minimum in diameter.
c. Drilling for anchors shall be done with an electric rotary drill; impact tools should not be used for drilling holes or tightening anchors and shear bolt nuts.
d. Load factors or capacity reduction factors shall not be used.
e. Other bolt sizes, values and installation methods may be used, provided that a testing program is conducted in accordance with Section A107.5.3. The strength value shall be determined by multiplying the calculated allowable value, determined in accordance with Section A107.5.3, by 3.0, and the usable value shall be limited to not greater than 1.5 times the value given in the table. Bolt spacing shall not exceed 1.8 m on center and shall be not less than 300 mm on center.
f. An alternative adhesive anchor bolt system is permitted to be used providing: its properties and installation conform to an ICC Evaluation Service Report; and the report states that the system's use is in unreinforced masonry as an acceptable alternative to Sections A107.4 and A113.1 or TMS 402, Section 2.1.4. The report's allowable values shall be multiplied by a factor of three to obtain strength values and the strength reduction factor, Φ, shall be taken equal to 1.0.

A108.2 Masonry shear strength. The unreinforced masonry shear strength, v_{mL}, shall be determined for each masonry class from one of the following equations:

1. When testing is performed in accordance with Section A106.2.3.1, the unreinforced masonry shear strength, v_m, shall be determined by Equation A1-3.

$$v_{mL} = \frac{0.75\left(0.75 v_{tL} \frac{P_D}{A_n}\right)}{1.5} \qquad \textbf{(Equation A1-3)}$$

   The mortar shear strength values, v_{tL}, shall be determined in accordance with Section A106.2.3.6.

2. When alternate testing is performed in accordance with Section A106.2.3.3, unreinforced masonry shear, v_{mL}, shall be determined by Equation A1-4.

$$v_{mL} = \frac{0.75\left(f_{sp} + \frac{P_D}{A_n}\right)}{1.5} \qquad \textbf{(Equation A1-4)}$$

A108.3 Masonry compression. Where any increase in wall dead plus live load compression stress occurs, the maximum compression stress in unreinforced masonry, Q_G/A_n, shall not exceed 2 MPa.

A108.4 Masonry tension. Unreinforced masonry shall be assumed to have no tensile capacity.

A108.5 Wall tension anchors. The tension strength of wall anchors shall be the average of the tension test values for anchors having the same wall thickness and framing orientation.

A108.6 Foundations. For existing foundations, new total dead loads are permitted to be increased over the existing dead load by 25 percent. New total dead load plus live load plus seismic forces may be increased over the existing dead load plus live load by 50 percent. Higher values may be justified only in conjunction with a geotechnical investigation.

SECTION A109
ANALYSIS AND DESIGN PROCEDURE

A109.1 General. The elements of buildings hereby required to be analyzed are specified in Table A102.1.

A109.2 Selection of procedure. Buildings with rigid diaphragms shall be analyzed by the general procedure of Section A110. Buildings with flexible diaphragms shall be analyzed by the general procedure or, where applicable, are permitted to be analyzed by the special procedure of Section A111.

SECTION A110
GENERAL PROCEDURE

A110.1 Minimum design lateral forces. Buildings shall be analyzed to resist minimum lateral forces assumed to act nonconcurrently in the direction of each of the main axes of the structure in accordance with the following:

$$V = \frac{0.75 S_{DS} W}{R} \qquad \textbf{(Equation A1-5)}$$

A110.2 Seismic forces on elements of structures. Parts and portions of a structure not covered in Section A110.3 shall be analyzed and designed per the current building code, using force levels defined in Section A110.1.

Exceptions:

1. Unreinforced masonry walls for which height-to-thickness ratios do not exceed ratios set forth in Table A110.2 need not be analyzed for out-of-plane loading. Unreinforced masonry walls that exceed the allowable *h/t* ratios of Table A110.2 shall be braced according to Section A113.5.
2. Parapets complying with Section A113.6 need not be analyzed for out-of-plane loading.
3. Where walls are to be anchored to flexible floor and roof diaphragms, the anchorage shall be in accordance with Section A113.1.

TABLE A110.2
ALLOWABLE VALUE OF HEIGHT-TO-THICKNESS RATIO OF UNREINFORCED MASONRY WALLS

WALL TYPES	$0.13_g \le S_{D1} < 0.25_g$	$0.25_g \le S_{D1} < 0.4_g$	$S_{D1} \ge 0.4_g$ BUILDINGS WITH CROSSWALLS[a]	$S_{D1} \ge 0.4_g$ ALL OTHER BUILDINGS
Walls of one-story buildings	20	16	16[b, c]	13
First-story wall of multiple-story building	20	18	16	15
Walls in top story of multiple-story building	14	14	14[b, c]	9
All other walls	20	16	16	13

a. Applies to the special procedures of Section A111 only. See Section A111.7 for other restrictions.
b. This value of height-to-thickness ratio shall be used where mortar shear tests establish a tested mortar shear strength, v_t, of not less than 690 KPa. This value shall also be used where the tested mortar shear strength is not less than 414 KPa, and where a visual examination of the collar joint indicates not less than 50-percent mortar coverage.
c. Where a visual examination of the collar joint indicates not less than 50-percent mortar coverage, and the tested mortar shear strength, v_t, is greater than 207 kPa but less than 414 kPa, the allowable height-to-thickness ratio may be determined by linear interpolation between the larger and smaller ratios in direct proportion to the tested mortar shear strength.

A110.3 In-plane loading of URM shear walls and frames. Vertical seismic force-resisting elements shall be analyzed in accordance with Section A112.

A110.4 Redundancy and overstrength factors. Any redundancy or overstrength factors contained in the building code may be taken as unity. The vertical component of seismic force (E_v) may be taken as zero.

SECTION A111
SPECIAL PROCEDURE

A111.1 Limits for the application of this procedure. The special procedures of this section shall be applied only to buildings having the following characteristics:

1. Flexible diaphragms at all levels above the base of the structure.
2. Vertical elements of the seismic force-resisting system consisting predominantly of masonry or a combination of masonry and concrete shear walls.
3. Except for single-story buildings with an open front on one side only, not fewer than two lines of vertical elements of the seismic force-resisting system parallel to each axis of the building (see Section A111.8 for open front buildings).

A111.2 Seismic forces on elements of structures. With the exception of the provisions in Sections A111.4 through A111.7, elements of structures shall comply with Sections A110.2 through A110.4.

A111.3 Crosswalls. Crosswalls shall meet the requirements of this section.

A111.3.1 Crosswall definition. A crosswall is a wood-framed wall sheathed with any of the materials described in Table A108.1(1) or Table A108.1(2) or other system as defined in Section A111.3.5. Crosswalls shall be spaced not more than 12 m on center measured perpendicular to the direction of consideration, and shall be placed in each story of the building. Crosswalls shall extend the full story height between diaphragms.

Exceptions:

1. Crosswalls need not be provided at all levels where used in accordance with Section A111.4.2, Item 4.
2. Existing crosswalls need not be continuous below a wood diaphragm at or within 1.2 m of grade, provided that:
   2.1. Shear connections and anchorage requirements of Section A111.5 are satisfied at all edges of the diaphragm.
   2.2. Crosswalls with total shear capacity of $0.5S_{D1}\Sigma W_d$ interconnect the diaphragm to the foundation.
   2.3. The demand-capacity ratio of the diaphragm between the crosswalls that are continuous to their foundations does not exceed 2.5, calculated as follows:

$$DCR = \frac{(2.1S_{D1}W_d + V_{co})}{2v_uD} \qquad \textbf{(Equation A1-6)}$$

A111.3.2 Crosswall shear capacity. Within any 12 m measured along the span of the diaphragm, the sum of the crosswall shear capacities shall be not less than 30 percent of the diaphragm shear capacity of the strongest diaphragm at or above the level under consideration.

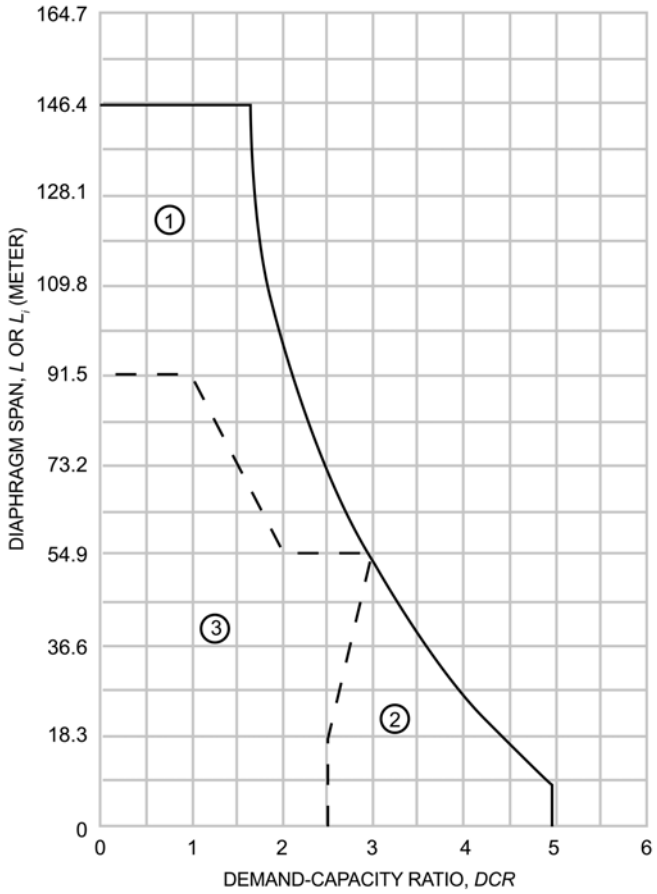
A111.3.3 Existing crosswalls. Existing crosswalls shall have a maximum height-to-length ratio between openings of 1.5 to 1. Existing crosswall connections to diaphragms need not be investigated as long as the crosswall extends to the framing of the diaphragms above and below.

A111.3.4 New crosswalls. New crosswall connections to the diaphragm shall develop the crosswall shear capacity. New crosswalls shall have the capacity to resist an overturning moment equal to the crosswall shear capacity times the story height. Crosswall overturning moments need not be cumulative over more than two stories.

A111.3.5 Other crosswall systems. Other systems, such as moment-resisting frames, may be used as cross-walls provided that the yield story drift does not exceed 25 mm in any story.

A111.4 Wood diaphragms.

A111.4.1 Acceptable diaphragm span. A diaphragm is acceptable if the point (*L,DCR*) on Figure A111.4.1 falls within Region 1, 2 or 3.



1. Region of demand-capacity ratios where crosswalls may be used to increase *h/t* ratios.
2. Region of demand-capacity ratios where *h/t* ratios of "buildings with crosswalls" may be used, whether or not crosswalls are present.
3. Region of demand-capacity ratios where *h/t* ratios of "all other buildings" shall be used, whether or not crosswalls are present.

FIGURE A111.4.1
ACCEPTABLE DIAPHRAGM

A111.4.2 Demand-capacity ratios. Demand-capacity ratios shall be calculated for the diaphragm at any level according to the following formulas:

1. For a diaphragm without qualifying crosswalls at levels immediately above or below:

   $DCR = 2.1 S_{D1} W_d / \Sigma v_u D$ **(Equation A1-7)**

2. For a diaphragm in a single-story building with qualifying crosswalls, or for a roof diaphragm coupled by crosswalls to the diaphragm directly below:

   $DCR = 2.1 S_{D1} W_d / \Sigma v_u D + V_{cb}$ **(Equation A1-8)**

3. For diaphragms in a multiple-story building with qualifying crosswalls in all levels:

   $DCR = 2.1 S_{D1} \Sigma W_d / (\Sigma\Sigma v_u D + V_{cb})$ **(Equation A1-9)**

   DCR shall be calculated at each level for the set of diaphragms at and above the level under consideration. In addition, the roof diaphragm shall meet the requirements of Equation A1-10.

4. For a roof diaphragm and the diaphragm directly below, if coupled by crosswalls:

   $DCR = 2.1 S_{D1} \Sigma W_d / \Sigma\Sigma v_u D$ **(Equation A1-10)**

A111.4.3 Chords. An analysis for diaphragm flexure need not be made, and chords need not be provided.

A111.4.4 Collectors. An analysis of diaphragm collector forces shall be made for the transfer of diaphragm edge shears into vertical elements of the lateral force-resisting system. Collector forces may be resisted by new or existing elements.

A111.4.5 Diaphragm openings.

1. Diaphragm forces at corners of openings shall be investigated and shall be developed into the diaphragm by new or existing materials.
2. In addition to the demand-capacity ratios of Section A111.4.2, the demand-capacity ratio of the portion of the diaphragm adjacent to an opening shall be calculated using the opening dimension as the span.
3. Where an opening occurs in the end quarter of the diaphragm span, the calculation of v_uD for the demand-capacity ratio shall be based on the net depth of the diaphragm.

A111.5 Diaphragm shear transfer. Diaphragms shall be connected to shear walls and new vertical seismic force-resisting elements with connections capable of developing the diaphragm-loading tributary to the shear wall or new seismic force-resisting elements given by the lesser of the following formulas:

$V = 1.2S_{D1}C_pW_d$ **(Equation A1-11)**

using the C_p values in Table A111.5, or

$V = v_uD$ **(Equation A1-12)**

TABLE A111.5
HORIZONTAL FORCE FACTOR, C_p

CONFIGURATION OF MATERIALS	C_p
Roofs with straight or diagonal sheathing and roofing applied directly to the sheathing, or floors with straight tongue-and-groove sheathing.	0.50
Diaphragms with double or multiple layers of boards with edges offset, and blocked plywood systems.	0.75
Diaphragms of metal deck without topping:	
Minimal welding or mechanical attachment.	0.6
Welded or mechanically attached for seismic resistance.	0.68

A111.6 Shear walls (In-plane loading).

A111.6.1 Wall story force. The wall story force distributed to a shear wall at any diaphragm level shall be the lesser value calculated as:

$F_{wx} = 0.8S_{D1}(W_{wx} + W_d/2)$ **(Equation A1-13)**

but need not exceed

$F_{wx} = 0.8S_{D1}W_{wx} + v_uD$ **(Equation A1-14)**

A111.6.2 Wall story shear. The wall story shear shall be the sum of the wall story forces at and above the level of consideration.

$V_{wx} = \Sigma F_{wx}$ **(Equation A1-15)**

A111.6.3 Shear wall analysis. Shear walls shall comply with Section A112.

A111.6.4 New seismic force-resisting elements. New seismic force-resisting elements such as moment frames, braced frames or shear walls shall be designed as required by the building code, except that the seismic forces shall be as specified in Section A111.6.1, and the story drift ratio shall be limited to 0.015, except as further limited by Section A112.4.2 for moment frames.

A111.7 Out-of-plane forces—unreinforced masonry walls.

A111.7.1 Allowable unreinforced masonry wall height-to-thickness ratios. The provisions of Section A110.2 are applicable, except the allowable height-to-thickness ratios given in Table A110.2 shall be determined from Figure A111.4.1 as follows:

1. In Region 1, height-to-thickness ratios for buildings with crosswalls may be used if qualifying crosswalls are present in all stories.
2. In Region 2, height-to-thickness ratios for buildings with crosswalls may be used whether or not qualifying crosswalls are present.
3. In Region 3, height-to-thickness ratios for "all other buildings" shall be used whether or not qualifying crosswalls are present.

A111.7.2 Walls with diaphragms in different regions. Where diaphragms above and below the wall under consideration have demand-capacity ratios in different regions of Figure A111.4.1, the lesser height-to-thickness ratio shall be used.

A111.8 Open-front design procedure. A single-story building with an open front on one side and crosswalls parallel to the open front may be designed by the following procedure:

1. Effective diaphragm span, L_i, for use in Figure A111.4.1 shall be determined in accordance with the following formula:

   $$L_i = 2[(W_w/W_d)L + L] \qquad \textbf{(Equation A1-16)}$$

2. Diaphragm demand-capacity ratio shall be calculated as:

   $$DCR = 2.1S_{D1}(W_d + W_w)/[(v_uD) + V_{cb}] \qquad \textbf{(Equation A1-17)}$$

SECTION A112
ANALYSIS AND DESIGN

A112.1 General. The following requirements are applicable to both the general procedure and the special procedure for analyzing vertical elements of the lateral force-resisting system.

A112.2 In-plane shear of unreinforced masonry walls.

A112.2.1 Flexural rigidity. Flexural components of deflection need not be considered in determining the rigidity of an unreinforced masonry wall.

A112.2.2 Shear walls with openings. Wall piers shall be analyzed according to the following procedure, which is diagrammed in Figure A112.2.2.

1. For any pier,
   1.1. The pier shear capacity shall be calculated as:

   $$v_a = v_mA_n \qquad \textbf{(Equation A1-18)}$$

   where:

   A_n = area of net mortared or grouted section of a wall or wall pier.

   1.2. The pier rocking shear capacity shall be calculated as:

   $$V_r = 0.9P_DD/H \qquad \textbf{(Equation A1-19)}$$

2. The wall piers at any level are acceptable if they comply with one of the following modes of behavior:

   2.1. Rocking controlled mode. Where the pier rocking shear capacity is less than the pier shear capacity, in other words, $V_r < v_a$, for each pier in a level, forces in the wall at that level, V_{wx}, shall be distributed to each pier in proportion to $P_D D/H$.

   For the wall at that level:

   $0.7V_{wx} < \Sigma V_r$ **(Equation A1-20)**

   2.2. Shear controlled mode. Where the pier shear capacity is less than the pier rocking capacity, in other words, $v_a < V_r$ in one or more pier(s) in a level, forces in the wall at the level, V_{wx}, shall be distributed to each pier in proportion to D/H.

   For each pier at that level:

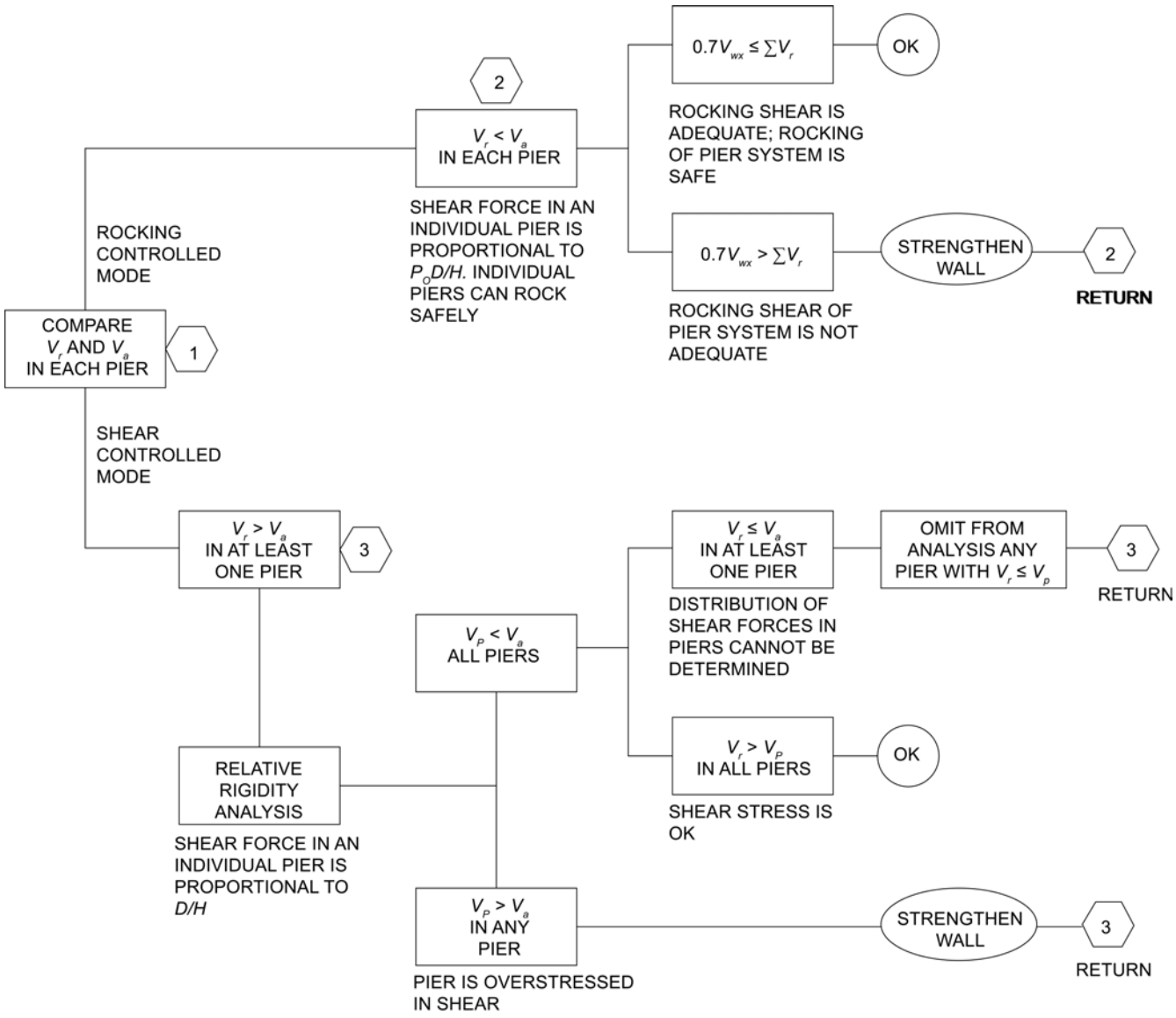
   $V_p < v_a$ **(Equation A1-21)**

   and

   $V_p < V_r$ **(Equation A1-22)**

   If $V_p < v_a$ for each pier and $V_p > V_r$ for one or more piers, such piers shall be omitted from the analysis, and the procedure shall be repeated for the remaining piers, unless the wall is strengthened and reanalyzed.

3. Masonry pier tension stress. Unreinforced masonry wall piers need not be analyzed for tension stress.



V_a = Allowable shear strength of a pier.
V_p = Shear force assigned to a pier on the basis of a relative shear rigidity analysis.
V_r = Rocking shear capacity of pier.
V_{wx} = Total shear force resisted by the wall.
$\sum V_r$ = Rocking shear capacity of all piers in the wall.

FIGURE A112.2.2
ANALYSIS OF URM WALL IN-PLANE SHEAR FORCES

A112.2.3 Shear walls without openings. Shear walls without openings shall be analyzed the same as for walls with openings, except that V_r shall be calculated as follows:

$$V_r = 0.9(P_D + 0.5P_w)D/H \qquad \textbf{(Equation A1-23)}$$

A112.3 Plywood-sheathed shear walls. Plywood-sheathed shear walls may be used to resist lateral forces for URM buildings with flexible diaphragms analyzed according to provisions of Section A111. Plywood-sheathed shear walls shall not be used to share lateral forces with other materials along the same line of resistance.

A112.4 Combinations of vertical elements.

A112.4.1 Seismic force distribution. Seismic forces shall be distributed among the vertical-resisting elements in proportion to their relative rigidities, except that moment-resisting frames shall comply with Section A112.4.2.

A112.4.2 Moment-resisting frames. Moment resisting frames shall not be used with an unreinforced masonry wall in a single line of resistance unless the wall has piers that have adequate shear capacity to sustain rocking in accordance with Section A112.2.2. The frames shall be designed in accordance with the building code to resist 100 percent of the seismic forces tributary to that line of resistance, as determined from Section A111.2. The story drift ratio shall be limited to 0.0075.

SECTION A113
DETAILED BUILDING SYSTEM DESIGN REQUIREMENTS

A113.1 Wall anchorage.

A113.1.1 Anchor locations. Unreinforced masonry walls shall be anchored at the roof and floor levels as required in Section A110.2. Ceilings of plaster or similar materials, where not attached directly to roof or floor framing and where abutting masonry walls, shall either be anchored to the walls at a maximum spacing of 1.8 m or be removed.

A113.1.2 Anchor requirements. Anchors shall consist of bolts installed through the wall as specified in Table A108.1(2), or an *approved* equivalent at a maximum anchor spacing of 1.8 m. Wall anchors shall be secured to the framing members parallel or perpendicular to the wall to develop the required forces.

A113.1.3 Minimum wall anchorage. Anchorage of masonry walls to each floor or roof shall resist a minimum force determined as $0.9S_{DS}$ times the tributary weight or 3 kN/m, whichever is greater, acting normal to the wall at the level of the floor or roof. Existing wall anchors, if used, must be tested and meet the requirements of Section A107.5.1 or be upgraded.

A113.1.4 Anchors at corners. At the roof and floor levels, both shear and tension anchors shall be provided within 600 mm horizontally from the inside of the corners of the walls.

A113.2 Diaphragm shear transfer. Anchors transmitting shear forces shall have a maximum spacing of 1.8 m and shall have nuts installed over malleable iron or plate washers where bearing on wood, and heavy-cut washers where bearing on steel.

A113.3 Collectors. Collector elements shall be provided that are capable of transferring the seismic forces originating in other portions of the building to the element providing the resistance to those forces.

A113.4 Ties and continuity. Ties and continuity shall conform to the requirements of the building code.

A113.5 Wall bracing.

A113.5.1 General. Where a wall height-to-thickness ratio exceeds the specified limits, the wall may be laterally supported by vertical bracing members per Section A113.5.2 or by reducing the wall height by bracing per Section A113.5.3.

A113.5.2 Vertical bracing members. Vertical bracing members shall be attached to floor and roof construction for their design loads independently of required wall anchors. Horizontal spacing of vertical bracing members shall not exceed one-half of the unsupported height of the wall or 3 m. Deflection of such bracing members at design loads shall not exceed one-tenth of the wall thickness.

A113.5.3 Intermediate wall bracing. The wall height may be reduced by bracing elements connected to the floor or roof. Horizontal spacing of the bracing elements and wall anchors shall be as required by design, but shall not exceed 1.8 m on center. Bracing elements shall be detailed to minimize the horizontal displacement of the wall by the vertical displacement of the floor or roof.

A113.6 Parapets. Parapets and exterior wall appendages not conforming to this chapter shall be removed, or stabilized or braced to ensure that the parapets and appendages remain in their original positions.

The maximum height of an unbraced unreinforced masonry parapet above the lower of either the level of tension anchors or the roof sheathing shall not exceed the height-to-thickness ratio shown in Table A113.6. If the required parapet height exceeds this maximum height, a bracing system designed for the forces determined in accordance with the building code shall support the top of the parapet. Parapet corrective work must be performed in conjunction with the installation of tension roof anchors.

The height of a URM parapet above any wall anchor shall be not less than 300 mm.

Exception: If a reinforced concrete beam is provided at the top of the wall, the height above the wall anchor is permitted to be not less than 150 mm.

TABLE A113.6
MAXIMUM ALLOWABLE HEIGHT-TO-THICKNESS RATIO FOR PARAPETS

	S_{D1}		
	$0.13_g \le S_{D1} \le 0.25g$	$0.25_g \le S_{D1} < 0.4g$	$S_{D1} \ge 0.4_g$
Maximum allowable height-to-thickness ratios	2.5	2.5	1.5

A113.7 Veneer.

1. Veneer shall be anchored with *approved* anchor ties conforming to the required design capacity specified in the building code and shall be placed at a maximum spacing of 600 mm with a maximum supported area of 0.36 m^2.

   Exception: Existing anchor ties for attaching brick veneer to brick backing shall be acceptable, provided that the ties are in good condition and conform to the following minimum size and material requirements.

   Existing veneer anchor ties shall be considered adequate if they are of corrugated galvanized iron strips not less than 25 mm in width, 200 mm in length and 1.5 mm in thickness, or the equivalent.

2. The location and condition of existing veneer anchor ties shall be verified as follows:

   2.1. An *approved* testing laboratory shall verify the location and spacing of the ties and shall submit a report to the *building official* for approval as part of the structural analysis.

   2.2. The veneer in a selected area shall be removed to expose a representative sample of ties (not less than four) for inspection by the *building official*.

A113.8 Nonstructural masonry walls. Unreinforced masonry walls that do not carry design vertical or lateral loads and that are not required by the design to be part of the lateral force-resisting system shall be adequately anchored to new or existing supporting elements. The anchors and elements shall be designed for the out-of-plane forces specified in the building code. The height- or length-to-thickness ratio between such supporting elements for such walls shall not exceed nine.

A113.9 Truss and beam supports. Where trusses and beams other than rafters or joists are supported on masonry, independent secondary columns shall be installed to support vertical loads of the roof or floor members.

Exception: Secondary supports are not required where S_{D1} is less than 0.3 g.

A113.10 Adjacent buildings. Where elements of adjacent buildings do not have a separation of 125 mm or greater, the allowable height-to-thickness ratios for "all other buildings" per Table A110.2 shall be used in the direction of consideration.

SECTION A114
WALLS OF UNBURNED CLAY, ADOBE OR STONE MASONRY

A114.1 General. Walls of unburned clay, adobe or stone masonry construction shall conform to the following:

1. Walls of unburned clay, adobe or stone masonry shall not exceed a height- or length-to-thickness ratio specified in Table A114.1.
2. Adobe shall be allowed a maximum value of 62.1 kPa for shear unless higher values are justified by test.
3. Mortar for repointing may be of the same soil composition and stabilization as the brick, in lieu of cement mortar.

TABLE A114.1
MAXIMUM HEIGHT-TO-THICKNESS RATIO FOR ADOBE OR STONE WALLS

	S_{D1}		
	$0.13_g \le S_{D1} < 0.25_g$	$0.25_g \le S_{D1} < 0.4_g$	$S_{D1} \ge 0.4_g$
One-story buildings	12	10	8
Two-story buildings			
First story	14	11	9
Second story	12	10	8

CHAPTER A2
EARTHQUAKE HAZARD REDUCTION IN EXISTING REINFORCED CONCRETE AND REINFORCED MASONRY WALL BUILDINGS WITH FLEXIBLE DIAPHRAGMS

SECTION A201
PURPOSE

A201.1 Purpose. The purpose of this chapter is to promote public safety and welfare by reducing the risk of death or injury as a result of the effects of earthquakes on reinforced concrete and reinforced masonry wall buildings with flexible diaphragms. Based on past earthquakes, these buildings have been categorized as being potentially hazardous and prone to significant damage, including possible collapse in a moderate to major earthquake. The provisions of this chapter are minimum standards for structural seismic resistance established primarily to reduce the risk of life loss or injury on both subject and adjacent properties. These provisions will not necessarily prevent loss of life or injury, or prevent earthquake damage to an *existing building* that complies with these standards.

SECTION A202
SCOPE

A202.1 Scope. The provisions of this chapter shall apply to wall anchorage systems that resist out-of-plane forces and to collectors in existing reinforced concrete or reinforced masonry buildings with flexible diaphragms. Wall anchorage systems that were designed and constructed in accordance with the 1997 *Uniform Building Code* or the 2000 or subsequent editions of the *International Building Code* shall be deemed to comply with these provisions.

SECTION A203
DEFINITIONS

A203.1 Definitions. For the purpose of this chapter, the applicable definitions in the *Oman Building Code* and the following shall apply:

CONTINUITY CONNECTOR. A component, typically a plate, rod, strap or hold-down that ensures load path continuity along the full length of a crosstie or strut.

CROSSTIE. A member or group of members continuous across the main diaphragm that connects opposite wall lines and transfers out-of-plane wall anchorage forces into the diaphragm.

FLEXIBLE DIAPHRAGM. A roof or floor sheathed with plywood, wood decking (1-by or 2-by) or metal deck without a concrete topping slab.

STRUT. A member or group of members continuous across a subdiaphragm that transfers out-of-plane wall anchorage forces into the subdiaphragm.

WALL ANCHORAGE SYSTEM. The components comprising a complete load path for out-of-plane wall forces from the wall to the main diaphragm, typically including anchors embedded in or fastened to the wall; rods, straps, plates, hold-downs or other hardware; subdiaphragms and their chords; crossties; struts; and continuity connectors.

WALL SEGMENT. Any length of concrete wall with continuous horizontal reinforcing and not interrupted or intersected by a pilaster or vertical construction joint, or any length of reinforced masonry wall with continuous horizontal reinforcing and not interrupted or intersected by a pilaster or vertical control joint.

SECTION A204
SYMBOLS AND NOTATIONS

A204.1 General. For the purpose of this chapter, the applicable symbols and notations in the *Oman Building Code* shall apply.

SECTION A205
GENERAL REQUIREMENTS

A205.1 General. The seismic-resisting elements specified in this chapter shall comply with applicable provisions of Section 1613 of the *Oman Building Code* and Chapter 12 of ASCE 7, except as modified herein.

A205.2 Requirements for plans. The plans shall accurately reflect the results of the engineering investigation and design and shall show all pertinent dimensions and sizes for plan review and construction. The following shall be provided:

1. Floor plans and roof plans shall show existing framing construction, diaphragm construction, proposed wall anchors, crossties and collectors. Existing nailing, anchors, crossties and collectors shall be shown on the plans if they are considered part of the lateral force-resisting systems.
2. At elevations where there are alterations or damage, details shall show roof and floor heights, dimensions of openings, location and extent of existing damage and proposed repair.
3. Typical wall panel details and sections with panel thickness, height, pilasters and location of anchors shall be provided.
4. Details shall include existing and new anchors and the method of developing anchor forces into the diaphragm framing, existing and new crossties, and existing and new or improved support of roof and floor girders at pilasters or walls.
5. The basis for design and the building code used for the design shall be stated on the plans.

A205.3 Structural observation. Structural observation, in accordance with Section 1704.6 of the *Oman Building Code* is required, regardless of seismic design category, height or other conditions. Structural observation shall include visual observation of work for conformance to the *approved* construction documents and confirmation of existing conditions assumed during design.

A205.3.1 Additional special inspection. In addition to the requirements of Section 1705.13 of the *Oman Building Code*, special inspection shall be required for:

1. Installation of anchors into existing concrete or masonry walls to form part of a wall anchorage system.
2. Fastening of new or existing steel deck forming part of a wall anchorage system.
3. Installation of continuity connectors along the length of crossties, to ensure compliance with Section A206.2. This inspection may be periodic special inspection.

A205.3.2 Testing to establish adequacy of existing wall anchors. Testing shall show that the existing anchors can sustain a test load of 1.5 times the design tension load without noticeable deformation or damage to the anchor, to the masonry or concrete element, or to any part of the existing load path between the anchor and new retrofit components. Three anchors of each existing detail type shall be tested, and all three shall satisfy the requirement. Prior to testing, the design professional shall submit a test plan for *building official* approval identifying the expected locations of the existing anchors in question, the locations of the proposed tests, and the test procedure and criteria. After testing, the design professional shall submit a report of the satisfactory testing showing the test results, the design strengths derived from them, and the size and spacing as confirmed by investigation.

A205.4 Testing and Inspection. Structural testing and inspection for new construction materials, submittals, reports and certificates of compliance shall be in accordance with Sections 1704 and 1705 of the *Oman Building Code*. Work done to comply with this chapter shall not be eligible for Exception 1 to Section 1704.2 of the *Oman Building Code* or Exception 2 to Section 1705.13 of the *Oman Building Code*.

SECTION A206
ANALYSIS AND DESIGN

A206.1 Reinforced concrete and reinforced masonry wall anchorage. Concrete and masonry walls shall be anchored to all floors and roofs that provide lateral support for the wall in accordance with Section 12.11.2 of ASCE 7. The anchorage shall provide a direct connection capable of resisting 75 percent of the forces specified in Section 12.11.2.1 of ASCE 7.

Exceptions:

1. Existing walls need not be evaluated or retrofitted for bending between anchors.
2. Work required by this chapter need not consider shrinkage, thermal changes or differential settlement.

A206.1.1 Seismicity parameters, site class and geologic hazards. For any site designated as Site Class E, the value of F_a shall be taken as 1.2. Site-specific procedures are not required for compliance with this chapter. Mitigation of existing geologic site hazards such as liquefiable soil, fault rupture or landslide is not required for compliance with this chapter.

A206.2 Additional requirements for wall anchorage systems. The wall anchorage system shall comply with the requirements of this section and Section 12.11.2.2 of ASCE 7.

The maximum spacing between wall anchors shall be 2.4 m, and each wall segment shall have at least two wall anchors.

The wall anchorage system, excluding subdiaphragms and existing roof or floor framing members, shall be designed and installed to limit the relative movement between the wall and the diaphragm to no more than 3 mm before engagement of the anchors. Wall anchors shall be provided to resist out-of-plane forces, independent of existing shear anchors.

Where new members are added as crossties, they shall be spaced no more than 7.3 m apart. Where existing girders are used as crossties, their actual spacing shall be deemed adequate even where the spacing exceeds 7.3 m, as long as the girders are provided with continuity connectors as required.

Wall anchorage shall not be provided by fastening the edge of plywood sheathing to steel ledgers. Wall anchorage shall not be provided solely by fastening the edge of steel decking to steel ledgers unless analysis demonstrates acceptable capacity. The existing connections shall be subject to field verification and the new connections shall be subject to special inspection.

New wall anchors shall be provided to resist the full wall anchorage design force independent of existing shear or tension anchors.

Exception: Existing cast-in-place anchors shall be permitted as part of the wall anchorage system if the tie element can be readily attached to the anchors, and if the anchors are capable of resisting the total vertical and lateral shear load (including dead load) while being acted on by the maximum wall anchorage tension force caused by an earthquake. Acceptable tension values for the existing anchors shall be established by testing in accordance with Section A205.4.

A206.3 Development of anchor forces into the diaphragm. Development of the required anchorage forces into roof and floor diaphragms shall comply with the requirements of this section and Section 12.11.2.2 of ASCE 7.

Lengths of development of anchor loads in wood diaphragms shall be based on existing field nailing of the sheathing unless existing edge nailing is positively identified on the original construction plans or at the site.

A206.4 Anchorage at pilasters. Where pilasters are present, the wall anchorage system shall comply with the requirements of this section and Section 12.11.2.2.7 of ASCE 7. The pilasters or the walls immediately adjacent to the pilasters shall be anchored directly to the roof framing such that the existing vertical anchor bolts at the top of the pilasters are bypassed without permitting tension or shear failure at the top of the pilasters.

Exception: If existing vertical anchor bolts at the top of the pilasters are used for the anchorage, additional exterior confinement shall be provided as required to resist the total anchorage force.

A206.5 Combination of anchor types. New anchors used in combination on a single framing member shall be of compatible behavior and stiffness.

A206.6 Anchorage at interior walls. Existing interior reinforced concrete or reinforced masonry walls that extend to the floor above or to the roof diaphragm shall be anchored for out-of-plane forces per Sections A206.1 and A206.3. Walls extending through the roof diaphragm shall be anchored for out-of-plane forces on both sides, and continuity ties shall be spliced across or continuous through the interior wall to provide diaphragm continuity.

A206.7 Collectors. Collectors designed in accordance with this section shall be provided at reentrant corners and at interior shear walls. Existing or new collectors shall have the capacity to develop into the diaphragm a force equal to the lesser of the rocking or shear capacity of the reentrant wall or the tributary shear based on 75 percent of the diaphragm design forces specified in Section 12.10 of ASCE 7. The capacity of the collector need not exceed the capacity of the diaphragm to deliver loads to the collector. A connection shall be provided from the collector to the reentrant wall to transfer the full collector internal force. If a truss or beam other than a rafter or purlin is supported by the reentrant wall or by a column integral with the reentrant wall, then an independent secondary column is required to support the roof or floor members whenever rocking or shear capacity of the reentrant wall is less than the tributary shear.

A206.8 Mezzanines. Existing mezzanines relying on reinforced concrete or reinforced masonry walls for vertical or lateral support shall be anchored to the walls for the tributary mezzanine load. Walls depending on the mezzanine for lateral support shall be anchored per Sections A206.1, A206.2 and A206.3.

Exception: Existing mezzanines that have independent lateral and vertical support need not be anchored to the walls.

SECTION A207
MATERIALS OF CONSTRUCTION

A207.1 Materials. Materials permitted by the building code, including their appropriate strength or allowable stresses, shall be used to meet the requirements of this chapter

CHAPTER A3

RESERVED

CHAPTER A4

RESERVED

CHAPTER A5
REFERENCED STANDARDS

SECTION A501
REFERENCED STANDARDS

A501.1 General. See Table A501.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that references the standard.

TABLE A501.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
AISC 341—16	*Seismic Provisions for Structural Steel Buildings*	A403.10.1, A403.10.2
ASCE/SEI 7—16	*Minimum Design Loads for Buildings and Other Structures with Supplement No. 1*	A104.1, A205.1, A206.1, A206.2, A206.3, A206.4, A206.7, A403.3
ASTM A36/A36M—14	*Specification for Carbon Structural Steel*	A405.3.3
ASTM A653/A653M—15	*Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process*	A304.2.6
ASTM B695—04(2009)	*Standard Specification for Coating of Zinc Mechanically Deposited on Iron and Steel*	A304.2.6
ASTM C67—14	*Test Methods of Sampling and Testing Brick and Structural Clay Tile*	A106.2.3.1
ASTM C140/C140M—15	*Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units*	A106.2.3.1
ASTM C496 —96/C496M—11	*Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens*	A104.1, A106.2.3.3
ASTM C1531—15	*Standard Test Methods for In Situ Measurement of Masonry Mortar Joint Shear Strength Index*	A106.2.3.2
ASTM E488/E488M—15	*Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements*	A107.5.1, A107.5.3
ASTM E519/E519M—2010	*Standard Test Method for Diagonal Tension (Shear) in Masonry Assemblages*	A104.1
IBC—00	*International Building Code*	A202.1
IBC—03	*International Building Code*	A202.1
IBC—06	*International Building Code*	A202.1
IBC—09	*International Building Code*	A202.1
IBC—12	*International Building Code*	A202.1
IBC—15	*International Building Code*	A202.1

(continued)

TABLE A501.1—continued
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
IBC—18	*International Building Code*	A202.1
OBC—21	*Oman Building Code*	A102.2, A105.1, A105.4, A202.1, A203.1, A204.1, A205.1, A205.3, A205.3.1, A205.4, A301.3, A304.1.1, A403.1, A405.1, A407.1, A407.2, A407.3
UBC—97	*Uniform Building Code*	A202.1

APPENDIX B
RESERVED

APPENDIX C
RESERVED

APPENDIX D
BOARD OF APPEALS

The provisions contained in this appendix are not mandatory unless specifically adopted.

User notes:

About this appendix: *Appendix D provides criteria for Board of Appeals members. Also provided are procedures by which the Board of Appeals should conduct its business.*

SECTION D101
GENERAL

D101.1 Scope. A board of appeals shall be established within the municipality for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section 112. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the *building official* pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

D101.2 Application for appeal. Any person shall have the right to appeal a decision of the *building official* to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the *building official* within 20 days after the notice was served.

D101.2.1 Limitation of authority. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

D101.2.2 Stays of enforcement. Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.

D101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the municipality. Each member shall serve for 3 years (or as determined by the appointing authority) or until a successor has been appointed. The board members' terms shall be staggered at intervals, so as to provide continuity. The *building official* shall be a nonvoting member of said board.

D101.3.1 Qualifications. The board shall consist of five individuals, who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the municipality.

D101.3.2 Alternate members. The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member. Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.

D101.3.3 Vacancies. Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.

D101.3.4 Chairperson. The board shall annually select one of its members to serve as chairperson.

D101.3.5 Secretary. The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings, which shall set forth the reasons for the board's decision, the vote of each member, the absence of a member and any failure of a member to vote.

D101.3.6 Conflict of interest. A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

D101.3.7 Compensation of members. Compensation of members shall be determined by law.

D101.3.8 Removal from the board. A member shall be removed from the board prior to the end of their terms only for cause. Any member with continued absence from regular meeting of the board may be removed at the discretion of the chief appointing authority.

D101.4 Rules and procedures. The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.

D101.5 Notice of meeting. The board shall meet upon notice from the chairperson, within 10 days of the filing of an appeal or at stated periodic intervals.

D101.5.1 Open hearing. All hearings before the board shall be open to the public. The appellant, the appellant's representative, the *building official* and any person whose interests are affected shall be given an opportunity to be heard.

D101.5.2 Quorum. Three members of the board shall constitute a quorum.

D101.5.3 Postponed hearing. When five members are not present to hear an appeal, either the appellant or the appellant's representative shall have the right to request a postponement of the hearing.

D101.6 Legal counsel. The municipality shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the municipality's expense in all matters arising from service within the scope of their duties.

D101.7 Board decision. The board shall only modify or reverse the decision of the *building official* by a concurring vote of three or more members.

D101.7.1 Resolution. The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the *building official* within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant's representative and to the *building official*.

D101.7.2 Administration. The *building official* shall take immediate action in accordance with the decision of the board.

D101.8 Court review. Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.

APPENDIX E
TEMPORARY EMERGENCY USES

User note:

About this appendix: *The primary purpose for Appendix E is to provide guidance for designers, engineers, architects and fire and building officials to allow temporary emergency uses of existing buildings with respect to the minimum code requirements. This appendix is intended to serve as a template or checklist for use during an emergency that references the relevant code requirements.*

SECTION E101
GENERAL

E101.1 Scope. The provisions of this appendix shall apply to the use, installation, *alteration*, relocation and location of *existing buildings* and any service utilities or systems that serve such *existing buildings* during or based on the response to the emergency.

E101.1.1 Objective. The objective of this appendix is to provide flexibility for the *building official* to permit the temporary uses of *existing buildings* during an emergency to address unusual circumstances that temporarily overwhelm response capabilities of an entity while maintaining the level of safety intended by the code.

E101.1.2 Temporary use. Where temporary uses during emergencies exceed 180 days, judgment shall be used by the *building official* to allow for temporary uses and conditions to continue for the duration of the emergency based on the needs of the emergency. The *building official* is authorized to grant extensions for demonstrated cause.

SECTION E102
DEFINITIONS

E102.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

EMERGENCY. Any event declared by governmental entities that temporarily overwhelms response capabilities and that requires the temporary suspension or modification of regulations, codes or standards to facilitate response to such an event.

TEMPORARY USE. An activity or practice that is established at a designated location for a period of less than 180 days. Uses include, but are not limited to, those functional designations listed within the occupancy group descriptions in Section 302.1 of the *Oman Building Code*.

TINY VILLA. A *dwelling* that is 37 m^2 or less in floor area, excluding *lofts*.

SECTION E103
SUBMITTAL DOCUMENTS

E103.1 General. Submittal documents shall be of sufficient clarity to indicate the location, nature and extent of the work or use proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *building official*.

SECTION E104
CONFORMANCE

E104.1 General. Temporary use of existing buildings shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to provide a reasonable level of safety, health and general welfare, as determined by the *building official*.

E104.2 Changes over time. As an emergency evolves, submittal documents shall be submitted to demonstrate that the temporary uses of the *existing buildings* are in compliance with the requirements of this code.

SECTION E105
PERMITS

E105.1 Emergency permits. In an emergency situation, where an existing building undergoes a temporary change of use or occupancy, the permit application shall be submitted as soon as practicable to the *building official.*

SECTION E106
GENERAL STANDARDS FOR EMERGENCY USES

E106.1 Scope. The provisions of Sections E106.2 through E106.7 shall apply to all existing structures being repurposed and to all structures relocated to support the response to an emergency.

E106.2 Intent. The intent of this section is to provide a reasonable level of safety in a structure repurposed for *emergency use*.

E106.3 Change of use or occupancy. *Existing buildings* used in a way that was not originally intended by occupancy class or use shall be allowed without formally changing the occupancy. The previous occupancy and use shall resume upon the conclusion of the emergency. Where the temporary live load of the floor is more than that required by Section 1607 of the *Oman Building Code* for the original use, the area designated for the temporary live load shall be posted with placards for the approved live load.

E106.4 Fire safety provisions. Determination of the fire safety requirements by the *building official* shall be in accordance with Section E106.4.1 through E106.4.5 in order to make determinations of safe conditions.

E106.4.1 Fire safety and evacuation plans. Fire safety and evacuation plans shall be provided in accordance with the *Oman Fire Code*. Submittal documents shall be updated where there are any physical changes to the layout of the structure.

E106.4.2 Training and practice drills. Training of staff and practice drills shall comply with the *Oman Fire Code*. Structures in place for longer than 30 days shall conduct evacuation drills in accordance with the *Oman Fire Code* based on the temporary use.

E106.4.3 Fire protection. An evaluation utilizing NFPA 550 shall be performed to decide on the fire protection needed.

E106.4.4 Emergency access. Emergency vehicle access roads shall be approved by Civil Defense.

E106.4.5 Fire watch. A fire watch in accordance with the *Oman Fire Code* shall be permitted to be provided in lieu of other fire protection systems.

E106.5 Means of egress. Means of egress shall comply with Section 1011.5, in addition to Sections E106.5.1 through E106.5.3.

Exception: In Group I-2 occupancies, in areas where corridors are used for movement of care recipients in beds, the clear width of ramps and corridors shall be not less than 1.2 m.

E106.5.1 Exit discharge. Exit discharge shall provide access to a public way or to a safe dispersal area in accordance with Section 1028.5 of the *Oman Building Code*.

E106.5.2 Means of egress lighting. The means of egress shall be illuminated when the space is occupied.

Exception: Sleeping areas.

E106.5.3 Exit signs. Exit signs shall be provided where the means of egress is not readily identifiable. Exit signs shall be permitted to be illuminated by the lighting provided in the structure.

E106.6 Accessibility. A facility that is constructed to be accessible shall be maintained accessible during occupancy.

E106.7 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility; the source of energy, fuel or power; or the water system or sewer system in accordance with Section 111. Water closets and lavatories shall be either permanent plumbing fixtures installed within the structure or temporary water closets or lavatories, such as chemical toilets or other means approved by the *building official*.

E106.7.1 Portable heating, cooling and cooking equipment. Portable heating, cooling and cooking equipment shall be used in accordance with the *Oman Fire Code*, their listing and manufacturer's instructions.

SECTION E107
USE OF SPECIFIC STANDARDS

E107.1 Increased occupant load. Allowing for additional occupants in *existing buildings* shall comply with Sections E107.1.1 through E107.1.3.

E107.1.1 Authorization. The *building official* is authorized to allow for an increase in the number of occupants or a *change of use* in a building or portion of a building during an *emergency*.

E107.1.2 Maintenance of the means of egress. The existing means of egress shall be maintained.

E107.1.3 Sleeping areas. Where a space is used for sleeping purposes, the space shall be equipped with smoke alarms in accordance with the *Oman Fire Code* or be provided with a fire watch in accordance with *Oman Fire Code*. Carbon monoxide alarms shall be installed in accordance with the *Oman Fire Code* where the structure uses any fossil fuel or wood-burning appliances.

E107.2 Temporary health care facilities. Temporary health care facilities shall comply with Sections E107.2.1 and E107.2.2.

E107.2.1 General. Temporary health care facilities shall be erected, maintained and operated to minimize the possibility of a fire emergency requiring the evacuation of occupants.

E107.2.2 Membrane structures under projections. Membrane structures of less than 9.3 m^2 shall be permitted to be placed under projections of a permanent building, provided the permanent building is protected with an automatic sprinkler system installed in accordance with the *Oman Fire Code*.

E107.3 Use of tiny villas or manufactured homes. *Tiny villas* or manufactured homes used for temporary housing shall comply with Sections E107.3.1 through E107.3.4.

E107.3.1 Fire separation distances. *Tiny villas* or manufactured homes shall be separated by not less than 1.5 m between structures.

E107.3.2 Fire breaks. *Tiny villas* and manufactured homes shall not be located in groups of more than 20 units. Fire breaks of at least 6 m shall be provided between each group.

E107.3.3 Smoke alarms. *Tiny villas* and manufactured homes used for sleeping purposes shall be equipped with a smoke alarm complying with the *Oman Fire Code*. Smoke alarms are not required to be hard wired.

E107.3.4 Carbon monoxide alarms. Carbon monoxide alarms shall be installed in accordance with the *Oman Fire Code* where the *tiny villa* or manufactured home uses any fossil fuel or wood-burning appliances.

SECTION E108
REFERENCED STANDARDS

E108.1 General. See Table E108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title and the section or sections of this appendix referenced in the standard.

TABLE E108.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS REFERENCED HEREIN
OBC—25	*Oman Building Code*	E106.3, E106.5.1
NFPA 550—2017	*Guide to the Fire Safety Concepts Tree*	E106.4.3

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RESOURCE A

EQUIVALENT STANDARDS FOR SELECT OMAN EXISTING AND HISTORICAL BUILDING CODE REFERENCED STANDARDS

This resource chapter of the *Oman Existing and Historical Building Code* (OEHBC) is intended for general information for consideration of suggested equivalency with certain British standards (BS), European Norm Standards (EN), ISO or other standards. The use of the listed equivalent standards is subject to the approval of the building official.

OEHBC Referenced Standard	Applicable 2025 OEHBC Sections	Suggested Equivalent Standard(s) if Approved by the Building Official
ASCE 7—16: Minimum Design Loads and Associated Criteria for Buildings and Other Structures	304.3.1, 503.4, 503.12, 503.13, 706.3.2, 805.3, 805.4	Eurocode 1, EN 1991—2002–2006 Eurocode 8, EN 1998—2004–2006
ASME A17.1/CSA B44: Safety Code for Elevators and Escalators	306.7.7, 902.1.2	BS EN 81-20 ISO 8100-1 BS EN 115-1
ASTM E108: Standard Test Methods for Fire Tests of Roof Coverings	1204.5	ISO 9001 EN 13501-53 BS 476-20
ICC 500: Standards for the Design and Construction of Storm Shelters	303.1.1	BS 6229
NFPA 13: Standard for Installation of Sprinkler Systems	803.2.4	BS EN 12845

RESOURCE B
REGULATIONS OF SULTANATE OF OMAN

User Note:

About this resource chapter: *This resource chapter provides a listing of various Oman Ministries, government agencies, or authorities that have policies and/or regulations that might overlap with this code. Developers, consultants, designers, contractors and others involved in a building construction project are encouraged to use the links provided or to directly contact the listed entities to identify any policies and/or regulations that might need to be complied with.*

Provisions of the above mentioned, however, may not be within the scope of the Oman Building Codes that include the Oman Building Code (OBC), Oman Existing and Historical Building Code (OEHBC), Oman Plumbing Code (OPC), Oman Mechanical Code (OMC), Oman Energy Efficiency and Sustainability Code (OEESC) and Oman Private Sewage Disposal Code (OPSDC). While compliance with the provisions of the policies and regulations of the entities listed in this resource chapter might be mandatory (depending on the stated scope in each such policy or regulation), in cases where there might be conflicts between the Oman Building Codes and provisions by the listed authorities, the Oman Building Codes provisions will take precedence and will govern.

Exceptions:

1. *In cases of conflict between the Oman Building Codes and national or municipal planning and zoning regulations, the most restrictive shall govern.*
2. *In cases of conflict between the* Oman Building Code *and the Civil Aviation Authority building heights and related matters in the vicinity of airports, the most restrictive shall govern.*

Authority for Public Services Regulation (APSR) **https://www.apsr.om/**

Regulations relating to public services (electricity, water and waste water).

Civil Aviation Authority **https://www.caa.gov.om/**

Approvals for building and structures heights and Obstacle Limitation Surfaces (OLS) based on Civil Aviation Authority (CAA) zoning, and regulations for airport facilities buildings.

Environment Authority **https://www.ea.gov.om/**

Environment Impact Assessment (EIA) requirements for buildings at special planning zones.

Ministry of Commerce, Industry, and Investment Promotion **https://tejarah.gov.om/**

Omani technical regulation on conformity schemes of specific building materials and paints.

Ministry of Culture, Sports & Youth **https://mcsy.om/**

Regulations to establish cultural centers, libraries, exhibition halls, sports facilities, specialized studios and institutes for teaching and training in the fields of arts, music, and movement performance and related occupational facilities.

Ministry of Education **https://www.moe.gov.om/**

Guidelines, requirements and specifications of planning, safety and security school buildings.

Ministry of Endowments & Religious Affairs **https://mara.gov.om/**

Technical specifications for building mosques and religious establishments.

Ministry of Health **https://moh.gov.om/**

Standards for health establishments.

Ministry of Heritage and Tourism **https://mht.gov.om/**

Assessment of building and restoration of heritage and archaeological buildings. Classification requirements for hospitality establishments and Integrated Tourism Complexes (ITC) projects.

Ministry of Higher Education, Research & Innovation **https://www.moheri.gov.om/**

Regulations for specifications and standards for establishments and facilities of higher education institutions, research centers and entrepreneurship centers.

Ministry of Housing and Urban Planning **https://www.housing.gov.om/**

Planning standards and zoning requirements that include setbacks, building heights (calculated by number of floors), and LOC specifications, which are based on long-established frameworks.

Ministry of Interior **https://www.moi.gov.om/**

Zoning, Planning, and Architectural design requirements for buildings, by the Ministry of Interior and Municipalities Regulations.

Ministry of Social Development **https://mosd.gov.om/**

Requirements for facilities for people with disabilities and specialized rehabilitation centers.

Royal Oman Police **https://www.rop.gov.om/**

Approvals and studies related to traffic impact, security permits, safety compliance for roads, real estate, tourism projects, event halls, and surveillance systems.

Royal Oman Police—Civil Defense and Ambulance Authority **https://www.cdaa.gov.om/**

Building fire prevention and protection requirements and civil defense safety regulations. Review and approval of design based on fire life safety.

Telecommunications Regulatory Authority **https://www.tra.gov.om/**

Regulations and technical specifications set for in-building telecommunication networks.

RESOURCE C

RECOMMENDED PRACTICES FOR REMOTE VIRTUAL INSPECTIONS (RVI)

User note:

About this resource: *The typical process of inspecting projects by inspectors driving to job sites and performing on-site inspections has certain challenges that impact timeliness and resource efficiencies both for building construction and safety industry and regulating jurisdictions. The time spent driving to job sites, particularly in larger cities with busy traffic patterns, takes up a substantial part of the day, reducing the number of inspections possible to complete and creating a backlog of requested inspections.*

To address some of the challenges, many jurisdictions have implemented remote virtual inspections (RVI) for more routine and simpler inspections such as water heater replacements or other, similar items. RVI is an alternative to on-site inspections using a video call with the inspector. With advances in technology and availability of sophisticated smart phones and tablets, RVI have become more common, and some jurisdictions plan to implement them for more complicated and larger inspection items or projects.

To assist the building construction industry and member jurisdictions in adoption of an RVI program, in May 2020, the International Code Council® (ICC®) published Recommended Practices for Remote Virtual Inspections (RVI)*. This publication offers a comprehensive framework for both local jurisdictions and building industry professionals that desire to implement a remote inspection program.*

Recommended Practices for Remote Virtual Inspections (RVI)

Recommended Practices for Remote Virtual Inspections (RVI)

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Preface

Technological advances have created enormous possibilities in all aspects of life, including the building construction and safety industry. Digital and online tools for building design, construction and administrative functions, such as permit application, plan review, inspection and commissioning, have drastically increased the efficiency and accuracy of achieving safe and resilient communities. Local, state and national governments have taken advantage of advancing technologies and have incorporated various levels of digitization into their processes in order to save time and reduce costs. Examples of such efforts include online offering of permit applications, payment of permit fees, submittal of plans and digital plan review.

The speed of adoption and implementation of technology, however, varies by geographic region and depends on a number of factors, including the availability of financial resources and the infrastructure needed to support the technology. Many Authorities Having Jurisdiction (AHJs) have implemented technology at various levels with good success and have embraced greater reliance on digitization as time goes by.

The 2020 global coronavirus pandemic created an impetus in speeding the implementation of modern technologies and taking advantage of new ideas in a much shorter time frame. The spread of COVID-19 and the closing of most businesses and social activities in many parts of the world to create social distancing resulted in many sectors of the economy searching to find new solutions for conducting business.

Many AHJs needed to come up with solutions to perform all aspects of codes and standards administration from remote locations and/or home offices. One such solution using available technology is Remote Virtual Inspections (RVI).

RVI is a method of inspection that allows the needed inspections to proceed in a timely manner by the owner or contractor located on the jobsite and the inspector or inspection teams performing the inspection remotely. While this practice gained good acceptance and implementation during the weeks and months of COVID-19 social distancing, its advantages are so great that it will likely become a popular and routine tool for the foreseeable future.

The advantages and opportunities created by RVI locally, nationally and globally are enormous, allowing those with technical expertise in their specific subjects to offer their services across the globe. Building code specialists, inspectors and consultants will be able to provide services and consulting from far distances and to help building safety and resiliency anywhere needed at the local, national or global level.

Recommended Practices for Remote Virtual Inspections (RVI) was developed based on study, research, and discussions related to items that should be considered and addressed for an effective and consistent RVI program and to assist AHJs in implementing the readily available technologies in the adoption and implementation of their own RVI program.

ICC welcomes your comments and feedback to improve future editions of this Recommended Practices publication. Submit feedback at www.iccsafe.org/RVI.

About the International Code Council®

The International Code Council is a nonprofit association that provides a wide range of building safety solutions including product evaluation, accreditation, certification, codification and training. It develops model codes and standards used worldwide to construct safe, sustainable, affordable and resilient structures. The mission of the Code Council is to provide the highest quality codes, standards, products and services for all concerned with the safety and performance of the built environment. ICC Evaluation Service (ICC-ES) is the industry leader in performing technical evaluations for code compliance fostering safe and sustainable design and construction.

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Family of Solutions:

1.0 Introduction

Hand-held devices such as smartphones and tablets have capabilities for real time, online communication of videos and photos. Use of advanced tools and technologies, combined with the power of such hand-held devices, has made it possible for anyone to observe the construction activities of a jobsite from any location, near or thousands of miles away. Using Remote Virtual Inspection (RVI) allows construction projects to continue without impediment and allows the Authority Having Jurisdiction (AHJ) to continue to provide the vital services needed for construction of safe buildings.

Purpose and Scope

The purpose and scope of these Recommended Practices is to provide guidance to the Authority Having Jurisdiction (AHJ) when implementing a Remote Virtual Inspection (RVI) program as well as to the construction industry user. This document specifically addresses implementation and administration of RVI. These procedures are organized in a fashion that can be readily implemented by the AHJ as part of their inspection procedures. This document also provides recommended practices to construction industry professionals submitting to an RVI.

Until recently, Remote Virtual Inspections have been conducted only by a few AHJs at varying levels. As a result, there has not been a standardized program that addresses how to prepare for, conduct and participate in these types of inspections.

2.0 Definitions and Acronyms

1. **RVI: Remote Virtual Inspection:** Remote Virtual Inspection, also known as RVI, is a form of visual inspection which uses visual or electronic aids to allow an inspector or team of inspectors to observe products and/or materials from a distance because the objects are inaccessible or are in dangerous environments, or whereby circumstances or conditions prevent an in-person inspection.
2. **AHJ: Authority Having Jurisdiction.**

3.0 Remote Virtual Inspection Process

Remote Virtual Inspections (RVI) may provide benefits to AHJs and customers alike. In certain circumstances, an RVI may provide a better quality inspection with an increase in efficiency and cost savings. It will increase the efficiency of the inspection process utilizing modern technology. Depending on the location and complexity of a project, some limitations may impact its use. In cases where an RVI is not suitable or technology fails to provide sufficient visual clarity (i.e., poor/no service or Wi-Fi, poor lighting, etc.), an onsite inspection may be required. Subject to local approval, the AHJ may choose to use an approved third-party inspection agency or utilize staff inspectors. Where Wi-Fi and/or cellular recep-

tion are poor or not available, some AHJs may consider allowing the contractor to provide an acceptable electronic documentation of the area that needs an inspection for review by the assigned inspector or team of inspectors.

A clear understanding of the RVI requirements and communication throughout the process by both parties is paramount to the completion of a successful inspection. The inspector will check all aspects of the permitted construction project to the adopted codes and other applicable laws and regulations no differently than if it were an onsite inspection. Identification of the project jobsite location, posted address and its location within the building will be a critical part of the process.

The applicable Codes and Standards to be used for RVI are the same as the adopted codes and referenced standards of the AHJ. The implementation of the RVI is intended to achieve the same results as the typical in-person site inspection by applying the provisions of adopted codes such as the IBC®, IRC®, IPC®, IFC® and other applicable and adopted International Codes.

Customer: Requesting a Remote Virtual Inspection

1. Ensure there is an active permit issued or certificate application filed or obtain the appropriate one prior to attempting to schedule an inspection for the project in question.
2. Electronically sign a notice indicating that the permit holder of record or representative:
   - 2.1. Consents to the use of the remote inspections.
   - 2.2. Is responsible for their own safety during the remote inspection.
   - 2.3. Allows the complete use of the videos and photos of the remote inspection by the AHJ.
   - 2.4. Certifies they are making available the site and inspection items truthfully and to the best of their ability.
   - 2.5. Is responsible for compliance with all codes and standards applicable to the project.
   - 2.6. Acknowledges that participation in the remote inspection program is voluntary (if not a mandatory program within the AHJ's jurisdiction).
   - 2.7. Acknowledges that the decision to perform an RVI is at the sole discretion of the AHJ.

3. Prior to contacting the department to schedule the inspection, confirm that the minimum criteria for a remote inspection are met. See Appendix A for examples of qualified inspection activities.
   3.1. Note that some types of inspections may be too complex or otherwise not compatible for remote inspections.
4. Call or go online to schedule an appointment for inspection with the AHJ.
5. Must be at least 18 years old or with an adult to perform the virtual inspection.
6. When scheduling the inspection, provide the address, permit number, and type and number of requested inspections.

AHJ: Scheduling Remote Virtual Inspection

1. Schedule Inspection Time.
   1.1. All remote inspections scheduled should be requested by the customer a minimum of one business day prior to the desired inspection date.
   1.2. Schedule inspection either online or by telephone.
   1.3. Schedule sufficient time for the type of inspection requested.
   1.4. AHJ to send an inspection confirmation email or text to the customer with the date, approximate time of RVI and name of inspector.
   1.5. Send notice of customer consent and acknowledgment for electronic signature. Must be returned by customer prior to inspection scheduled time.
2. Time slots for inspections.
   2.1. Anticipated length of inspections per type (i.e., water heater installation, HVAC replacement, etc.) needs to be established.
   2.2. Each customer will be given an approximate time window for inspection.
3. Post the earliest available time for remote inspections and the latest time of the day a remote inspection may be scheduled Monday through Friday or other days selected by the AHJ.
4. Schedule after-hours or emergency inspections on a case-by-case basis.
5. Determine the types of inspections allowed for remote inspections. See Appendix A for examples of qualified inspection activities.
   5.1. All inspections may qualify for an RVI, depending on the AHJ's resources and policies.
6. Determine which type of videotelephony is available for use and is compatible with the AHJ's permitting software and videotelephony equipment.
   6.1. Videotelephony platform examples: FaceTime, Google Duo, Zoom, WhatsApp, Skype, Tango, WebEx, Microsoft Teams, GoToMeeting, etc.

Customer: Prepare for Remote Virtual Inspection

1. Prior to the inspection, ensure that:
   1.1. The jobsite is safe at all times for the individual(s) using the device during the remote inspection including health safety.
   1.2. The device (smartphone, tablet, drone, etc.) is fully charged and has a suitably charged additional power supply (battery pack).
   1.3. The use of a noise-canceling headset is recommended.
   1.4. The jobsite has high-speed Wi-Fi connectivity or minimum 4G cellular service with a strong signal.
   1.5. The necessary tools based on type of inspection are readily available.
      1.5.1. For example, carry a flashlight, tape measure, level, step ladder (for close ups of ceiling), GFCI tester, etc. An extending pole for the video device, such as selfie pole, may be very helpful in taking the smartphone or other video device closer to the point of inspection in various places such as very high ceilings.
2. Have approved plans, permit card, and other necessary construction documents available onsite.
3. Make sure good lighting is available and clear the area of any unnecessary objects.
4. All features applicable to the required inspection must be visible at the time of the remote inspection. These features must be captured sufficiently and clearly for the inspector to evaluate.
5. If at any point the inspector believes that the remote inspection process is not allowing them to properly assess compliance, they may require that a site inspection be conducted at a future date or instruct the customer to make different arrangements.
   5.1. In areas within the jobsite where there is no Wi-Fi or cell service, at the sole discretion of the inspector, the contractor may be allowed to provide video and/or photographic documentation of the item(s) to be inspected for review by the authorized inspector at a later time.
6. The onsite inspection may be conducted by an approved third-party inspection agency or by the AHJ's inspection staff.

Customer: Prepare to Receive Remote Virtual Inspection Call

1. Ensure that the lens and screen of any device being used to capture images or video has been cleaned. Dust, grit, smudges, etc., might interfere with the image quality and distorting the inspector's view.
2. To minimize interruptions during the RVI and to ensure that the video feed will be uninterrupted, make sure that all notifications are turned off in the Settings of the mobile device used for the RVI. Should the video be interrupted, the inspection could be delayed or have to be rescheduled.
3. Be prepared to answer the inspector's call at any time during the scheduled timeframe. Be cooperative and closely follow the inspector's instructions.

4. As each site and inspection is different, allot the proper amount of time for the type of inspection and accessibility of the site.
5. Carefully follow the inspector's instructions for where to direct the device and for covering the site. Do not rush the inspector but allow him or her adequate time to conduct the RVI to his or her satisfaction.
6. As much as possible, minimize background noise as that can interfere with communication with the inspector.

What to Expect During the Inspection

1. Begin inspection at the street view looking at the structure with the address or other required jobsite identification in the video display.
    1.1. Inspector may also verify location through GPS/Geotagging where the service is available.
2. Follow the directions of the inspector with respect to the order and direction of inspection.
3. As the inspection progresses, write down any items that the inspector finds that need to be corrected. Be sure the notes are detailed and ask questions of or seek clarification from the inspector at the time of the RVI.
4. If provided a permit card, do not write on it. During the next in-person visit, the inspector should update it then.
5. In most cases, the inspector will relay the results of the inspection before the end of the RVI of passing, failing or not ready for inspection.
6. Do not cover any work needing corrections until corrections are verified by reinspection. Reinspection fees may apply in accordance with the AHJ's policies.
7. Note: At a minimum, there must be an adult of the required legal age on site who will represent the owner/representative during the entire duration of the RVI.
8. The owner/representative must be able to verbally communicate with the remote inspector at all times during the inspection.

Inspection Results

1. Results of the inspection will be entered into the AHJ's permit database as soon as practicable after the RVI is completed. It is important to note that the inspection was completed using the RVI process.
2. Where an approval tag for utility connections is required, the AHJ should work directly with the utility company.
3. Following the inspection:
    3.1. Inspection comments will be available on the AHJ's website, within the AHJ's normal timelines, indicating passing or failing with the list of corrections when applicable.
    3.2. In addition, the inspector may email the inspection information upon request to the customer as soon as inspection information is available.

3.3. The inspector will determine whether additional fee(s) for reinspection is required.

4. Scheduling a reinspection or the next inspection needed is based on availability of time slots.
5. The authorized inspector may provide an option for the owner/representative to submit electronic documentation that a deficiency or deficiencies have been corrected.
6. It is incumbent on the owner/representative to provide the address and permit number on all submitted correspondence or communications.

Maintaining Records of Inspections

Required inspection records, including, but not limited to, correction notices, electronic media, recordings or photo documentation, shall be maintained in accordance with the AHJ's policy, laws, regulations, and applicable codes, and may be subject to disclosure.

4.0 Training and Communication

Training and effective communication of processes, procedures and requirements are essential and a critical part to the success of any program. This program is no different as it lends itself to new technology, new programs, and methods that are in many cases, new to the building construction and safety industry. Therefore, training of the AHJ's staff as well as the building industry on the various programs and procedures will save time and money and make the administrative and enforcement process a positive experience with minimal confusion. Training also leads to better communications between an AHJ and its customers.

Staff Training

1. Ensure all staff are trained in the appropriate areas of responsibility.
2. Permit Technicians:
   2.1. Review of approved permit applications relative to RVI requirements.
   2.2. Required departmental approvals are complete.
   2.3. Fee collection process.
   2.4. Required documents for the project (plans, calculations, etc.).
3. Remote Inspection Staff:
   3.1. Inspection software and hardware.
   3.2. Remote inspection procedures.
   3.3. Types of platforms used (Facetime, Skype, etc.).
   3.4. Reinspection fee procedures.
   3.5. Recording inspection results in permit tracking system.

Customer/Applicant

1. Ensure the owner and representative are trained in their areas of responsibility.
2. Permit applicant:
   - 2.1. Knowledge of the AHJ's departmental approvals required for the project.
   - 2.2. Knowledge of the AHJ's RVI protocol.
   - 2.3. Ensuring project meets RVI protocol.
   - 2.4. Ensure that the project is ready for the RVI at the scheduled time.
   - 2.5. Comply with the inspector's direction.
3. Owner/Contractor/Subcontractor:
   - 3.1. Requesting remote inspection process.
   - 3.2. Knowledge of remote inspections procedures.
   - 3.3. Platform required (Facetime, Skype, Google Duo, etc.).
   - 3.4. Jobsite communication requirements (Wi-Fi, 4G, etc.).
   - 3.5. Communication skills.

Additional Considerations

1. Adopt basic online security practices. Consult with your IT department for guidance.
2. Consult with your legal counsel to ensure compliance with all federal, state and local requirements related to your RVI program. For example, you may want to consult counsel to find out whether a homeowner's release is needed to conduct an RVI.
3. Ensure that all staff have access to the codes and standards that are applicable to what they are inspecting. The Code Council's Digital Codes Library (https://codes.iccsafe.org/) offers online access to all ICC model codes and standards and most state codes.
4. Document lessons learned to improve your RVI program and to support potential long-term establishment of virtual inspection processes.

5.0 Appendix A (Examples of Potential Activities)

The following are a few examples of construction activities that may be considered to be included in a RVI Program. This list is not all-inclusive. The determination of whether an inspection can be conducted remotely is at the sole discretion of the AHJ.

- Plumbing system repairs or fixture replacements.
- Construction trailer installations.
- Swimming pool excavations.
- Gas line repairs or gas utility clearance.
- Electric utility clearances.
- HVAC direct replacement or repair.
- Minor residential electrical.
- Miscellaneous repair/exterior repair or upgrades (stucco, windows, etc.).
- Re-roofing/roof covering replacement.
- Water heater or water softener direct replacement.
- New residential plumbing rough-in.
- New residential rough framing inspections.
- Residential rooftop-mounted photovoltaic panel systems.
- HUD manufactured home installation verification.
- Any other inspection approved by the AHJ.

KEYS TO SUCCESS FOR REMOTE VIRTUAL INSPECTIONS

The Value of Communication

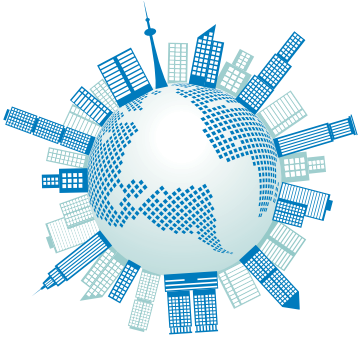
WHAT ARE REMOTE VIRTUAL INSPECTIONS (RVI)?

Remote Virtual Inspections, also known as RVI, are a form of inspections which use visual or electronic aids to allow an inspector or team of inspectors to observe certain types of construction, products and/or materials from a distance.

RVI are a solution to help inspectors observe construction and objects that might be inaccessible or in dangerous environments, or whereby circumstances or conditions prevent an in-person inspection.

RVI BENEFITS

- Construction projects can continue without impediment
- Building professionals can continue providing services with minimal health risk during pandemics such as COVID-19
- Authorities Having Jurisdiction (AHJs), testing agencies, manufacturers, laboratories, home builders and contractors are able to provide the vital services needed on all levels for the construction of safe buildings
- Inspectors can continue providing services remotely while saving time and money
- Safe and resilient construction projects can continue to grow and thrive anywhere needed at the local, national or global level



THE KEY STEPS TO A REMOTE VIRTUAL INSPECTION

1. **Scheduling**
The customer works with the AHJ to schedule remote virtual inspections and ensure both parties have the required documents and equipment necessary

2. **Customer Preparation**
The customer prepares the jobsite and devices as well as minimizes disruptions for remote virtual inspection, ready to cooperate with the inspector when on the call

3. **Jobsite Identification**
The inspector makes sure the jobsite is identified on the video display and begins inspection, keeping close communication with the customer

4. **Inspection Results**
Results are entered into the AHJ's permit database as soon as RVI is completed and communicated with the customer

5. **Maintaining Records of Inspections**
Required inspection records are maintained in accordance with the AHJ's policies, laws, regulations, and applicable codes, and may be subject to disclosure

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