



Minimum Structural Parameters for Structural Elements



EKO ATLANTIC CITY

MINIMUM STRUCTURAL PARAMETERS FOR STRUCTURAL ELEMENTS

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by:

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CHAPTER ONE

INTRODUCTION

1.1 General

The structural design of a building is governed by the loads to which it will be subjected, as defined in the relevant Codes and Standards. These loads vary depending on the intended function of the building — whether residential, commercial, or industrial.

In addition to these load-related factors, certain parameters that influence structural design are environmental, geographical, or regulatory in nature. Given the close proximity of **Eko Atlantic City** to the Atlantic Ocean, specific design considerations are required to ensure that all structures achieve the necessary durability, safety, and performance over their design life.

This Manual identifies and defines these parameters under the following sections:

1.2 Exposure Classes

1.2.1 Scope

This section specifies the minimum exposure classes applicable to the following:

- **Substructure elements:** e.g., piles, pile caps, rafts, and basement walls.
- **Superstructure elements:** e.g., columns, beams, and slabs.

1.2.2 Objective

The purpose of defining exposure classes is to establish the environmental conditions to which reinforced and prestressed concrete elements will be exposed throughout their service life.

1.2.3 Design Basis

These classifications form the design basis for:

- Selecting appropriate concrete mix designs.
- Specifying adequate concrete cover and reinforcement protection.
- Implementing durability-enhancing measures suited to a coastal and potentially aggressive marine environment.

1.3 Chloride Content in Concrete Mix

1.3.1 Requirement

The maximum permissible chloride content in the concrete mix shall be defined and strictly adhered to in order to prevent reinforcement corrosion and ensure the long-term durability of concrete structural components.

1.3.2 Compliance

Chloride limits shall comply with the values stipulated in the applicable design Codes and Standards, or as specified by the Structural Engineer, whichever is more stringent.

1.4 Fire Protection

1.4.1 General Requirements

Fire protection measures shall be incorporated in the design to maintain the structural stability and safety of the building under fire conditions. The requirements outlined in this section apply to both **concrete** and **steel** structural elements.

1.4.2 Concrete Structural Elements

For reinforced and prestressed concrete members, the following shall be specified in accordance with the required fire resistance period:

- Minimum cross-sectional dimensions.
- Minimum concrete cover to reinforcement.

The above parameters shall be determined with consideration for the occupancy type, use of the structure, and the required fire resistance rating.

1.4.3 Steel Structural Elements

Unless otherwise specified on the approved Drawings, or where steel members are completely encased in solid structural concrete, all exposed steelworks shall be protected against fire by the application of suitable insulating or protective materials.

(a) The fire protection system shall ensure that the steel sections achieve at least the minimum fire resistance period specified by the Structural Engineer or stated in this Code of Practice, whichever requirement is more stringent.

(b) Acceptable methods of protection may include:

- Intumescent coatings,
- Fire-resistant boards, or
- Spray-applied fireproofing materials.

All fire protection systems shall be tested, certified, and installed in accordance with recognized international standards and manufacturer's recommendations.

1.5 Lateral Loads

1.5.1 General

The design of structures shall include adequate provisions to resist all applicable lateral loads.

1.5.2 Applicable Load Types

Lateral load considerations shall include, but are not limited to:

- Wind loads
- Thermal loads
- Seismic (earthquake) loads

1.5.3 Design Intent

The overall design shall ensure stability, serviceability, and safety of the structure under the combined effects of vertical and lateral loads.