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SI

International System of Units

Design and Construction of Fixed Offshore Concrete Structures—Guide

Reported by ACI Committee 357

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Design and Construction of Fixed Offshore Concrete Structures—Guide

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Design and Construction of Fixed Offshore Concrete Structures—Guide

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This document is a guide for the design and construction of fixed reinforced and prestressed concrete structures for service in a marine environment. Only fixed structures that are founded on the seabed are covered.

Contents include materials and durability; dead, deformation, live, environmental, and accidental loads; design and analysis; foundations; construction and installation; and inspection and repair. The two appendixes discuss environmental loads such as wave, wind, and ice loads in detail, and the design of offshore concrete structures for earthquake resistance.

Keywords: concrete construction; cracking; dynamic loads; earthquakes; earthquake-resistant structures; grouting; foundations; gravity-based structure(s); grouting; harbor structures; ice; inspection; marine; offshore structures; platform; post-tensioning; prestressed concrete; slipforming; underwater construction; waves.

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CONTENTS

CHAPTER 1—GENERAL, p. 2

- 1.1—Introduction, p. 2
- 1.2—Scope, p. 2
- 1.3—Instrumentation, p. 3
- 1.4—Auxiliary systems and interfaces, p. 3

CHAPTER 2—NOTATION AND DEFINITIONS, p. 3

- 2.1—Notation, p. 3
- 2.2—Definitions, p. 3

CHAPTER 3—MATERIALS AND DURABILITY, p. 4

- 3.1—General, p. 4
- 3.2—Testing, p. 4
- 3.3—Prequalification of materials, p. 4
- 3.4—Quality control, p. 4
- 3.5—Durability, p. 4
- 3.6—Cementitious materials, p. 5
- 3.7—Mixing water, p. 5
- 3.8—Aggregates, p. 5
- 3.9—Chemical admixtures, p. 6

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- 3.10—Concrete, p. 6
- 3.11—Reinforcing steel, p. 7
- 3.12—Prestressing steel, p. 8
- 3.13—Fiber reinforcement, p. 9
- 3.14—Grout for underbase, p. 9
- 3.15—Anchorages for embedments and connections to steel work, p. 9
- 3.16—Electrical ground, p. 9
- 3.17—Durability of pipes containing pressure, p. 9
- 3.18—Epoxy resins, p. 9
- 3.19—Formwork, p. 10

CHAPTER 4—LOADS, p. 10

- 4.1—General, p. 10
- 4.2—Load categories, p. 10
- 4.3—Design phases, p. 10
- 4.4—Limit states and load combinations, p. 11
- 4.5—Interfaces among various disciplines, p. 11

CHAPTER 5—DESIGN AND ANALYSIS, p. 11

- 5.1—General, p. 11
- 5.2—Strength, p. 11
- 5.3—Serviceability, p. 11
- 5.4—Design considerations, p. 12
- 5.5—Special requirements, p. 13
- 5.6—Other strength requirements, p. 15
- 5.7—Structural analysis, p. 16

CHAPTER 6—FOUNDATIONS, p. 17

- 6.1—Site investigation, p. 17
- 6.2—Sea floor stability, p. 19
- 6.3—Scour, p. 19
- 6.4—Design of shallow foundations, p. 19
- 6.5—Skirt piles, p. 20

CHAPTER 7—CONSTRUCTION, INSTALLATION, AND RELOCATION, p. 21

- 7.1—General, p. 21
- 7.2—Buoyancy and floating stability, p. 21
- 7.3—Construction joints, p. 22
- 7.4—Concreting in hot or cold weather, p. 22
- 7.5—Curing of concrete, p. 22
- 7.6—Reinforcement, p. 22
- 7.7—Prestressing tendons, ducts, and grouting, p. 23
- 7.8—Initial floatation, p. 23
- 7.9—Construction while afloat or temporarily grounded, p. 23
- 7.10—Towing, p. 23
- 7.11—Installation, p. 24
- 7.12—Construction on site, p. 24
- 7.13—Connection of adjoining structures, p. 25
- 7.14—Prevention of damage due to freezing, p. 25
- 7.15—Relocation, p. 25

CHAPTER 8—INSPECTION AND REPAIR, p. 25

- 8.1—General, p. 25
- 8.2—Inspection, p. 25
- 8.3—Repair of concrete, p. 26

- 8.4—Repairs of cracks, p. 26

CHAPTER 9—REFERENCES, p. 26

- Authored documents, p. 28

APPENDIX A—ENVIRONMENTAL LOADS, p. 29

- A.1—Introduction, p. 29
- A.2—Wave loads, p. 29
- A.3—Wave diffraction, p. 30
- A.4—Currents, p. 30
- A.5—Design wave analysis, p. 30
- A.6—Wave response spectrum analysis, p. 30
- A.7—Dynamic response analysis, p. 30
- A.8—Wind loads, p. 31
- A.9—Ice/iceberg loads, p. 31
- A.10—Earthquakes, p. 31

APPENDIX B—DESIGN FOR EARTHQUAKES, p. 31

- B.1—Introduction, p. 31
- B.2—Overall design procedure, p. 32
- B.3—Seismicity study, p. 32
- B.4—Site response studies, p. 32
- B.5—Selection of design criteria, p. 32
- B.6—Dynamic analysis, p. 33
- B.7—Stress analysis, p. 34
- B.8—Failure modes, p. 34
- B.9—Detailing requirements, p. 34
- B.10—Proper reinforcement detailing, p. 35
- B.11—Other factors, p. 35

CHAPTER 1—GENERAL

1.1—Introduction

Concrete structures have been constructed and used all over the world, including for fixed offshore structures. As concrete and construction technology continues to advance, fixed concrete structures are increasingly being used in areas with relatively shallow water depths and/or regions subjected to extreme waves and ice/iceberg impact loads. This guide summarizes considerations for the design and construction of fixed offshore concrete structures. [Widianto et al. \(2016, 2019\)](#) described distinctive characteristics of offshore concrete gravity-based structures (GBSs) compared to typical buildings and bridges.

Where adequate data are available, specific recommendations are made, whereas in less developed areas, particular points are indicated for consideration by the designer. The design of offshore structures requires much creativity from the designer, and it is intended that this guide encourage creativity and continuing research advancements in the development of structures that are safe, serviceable, and economical. [Widianto et al. \(2018\)](#) presents innovative design and effective execution method in one of the recent offshore structures supported by concrete GBS.

1.2—Scope

This guide is intended to be used for the design of fixed concrete structures for service in a marine environment.