



New ASCE Piers & Wharves Standard

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Tuesday, September 25, 2018, 3:40 PM

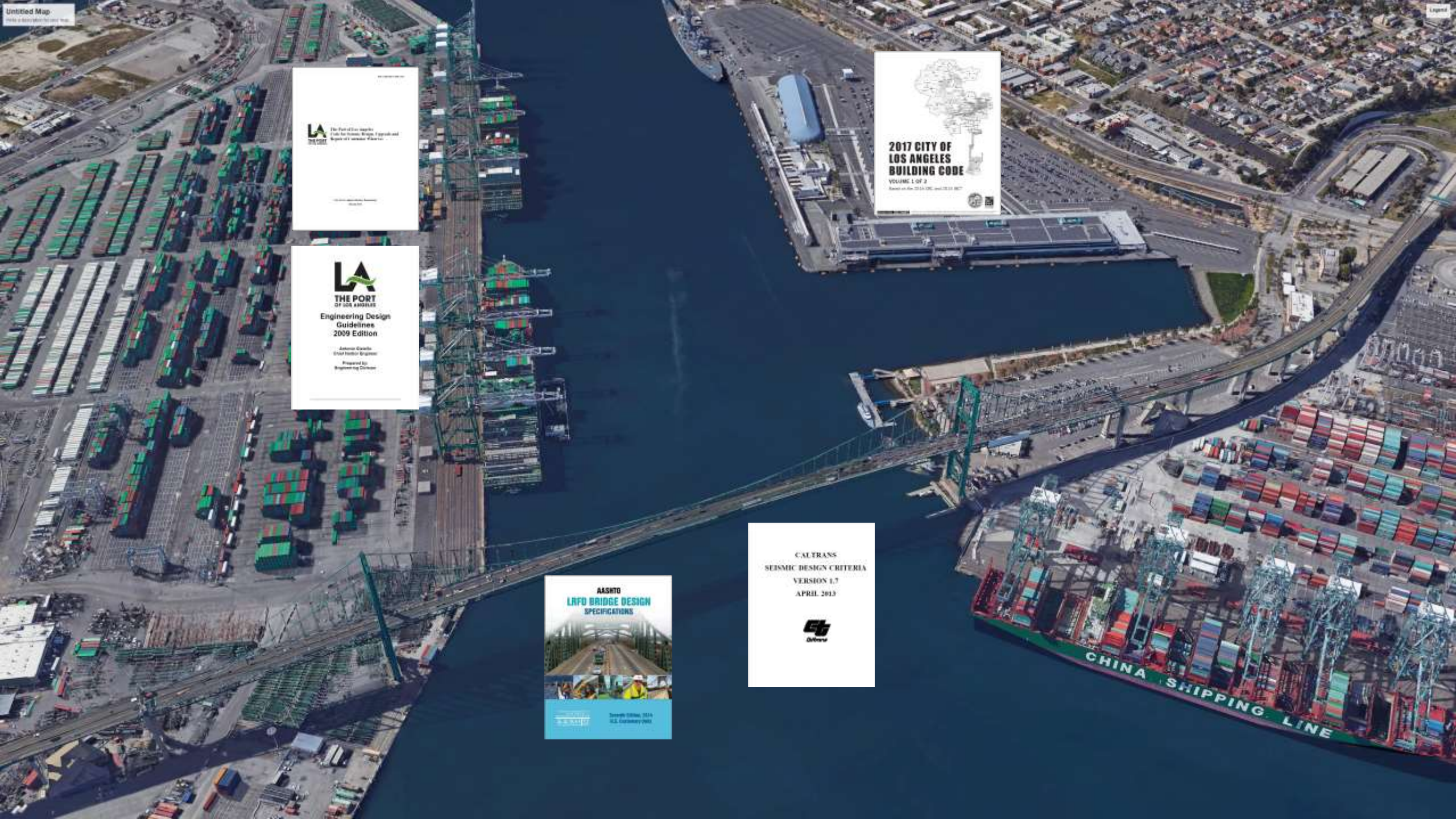
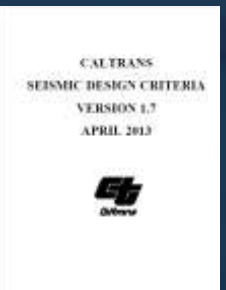
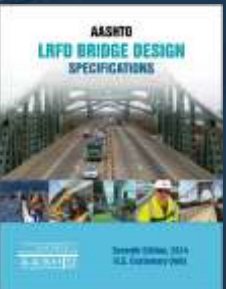
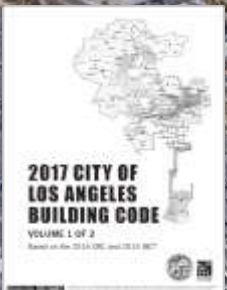
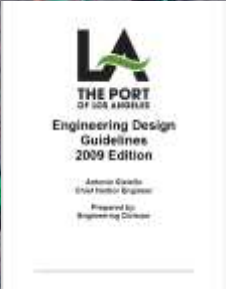


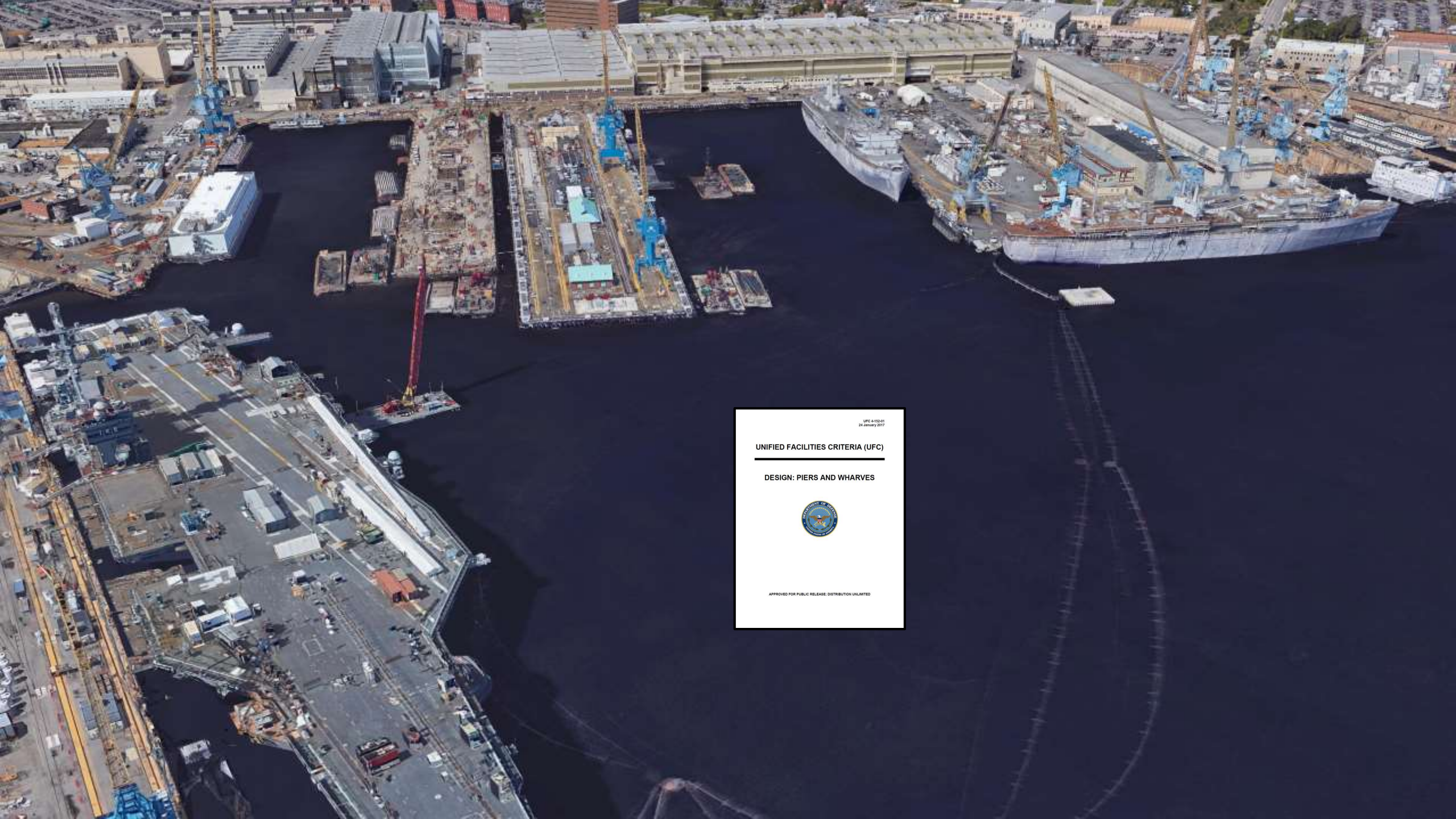
moffatt & nichol

Creative People, Practical Solutions.®

Waterfront Facilities

- Container terminals
- Marine oil terminals
- Military terminals
- Cruise/ Ferry terminals
- Recreational piers
- Marinas
- Buildings
- Highway Bridges
- Railroad Bridges





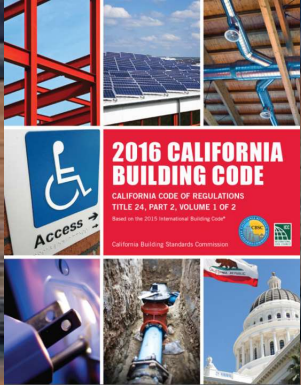
UFC 4-102-01
24 January 2017

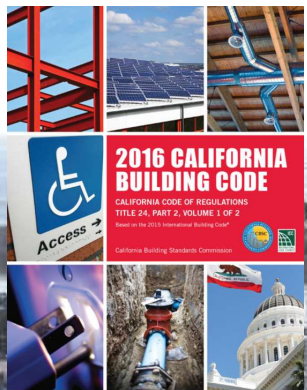
UNIFIED FACILITIES CRITERIA (UFC)

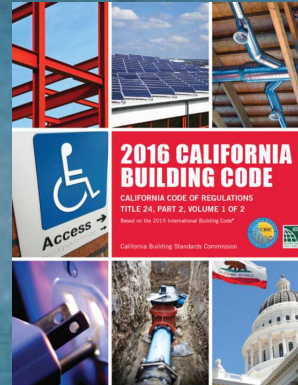
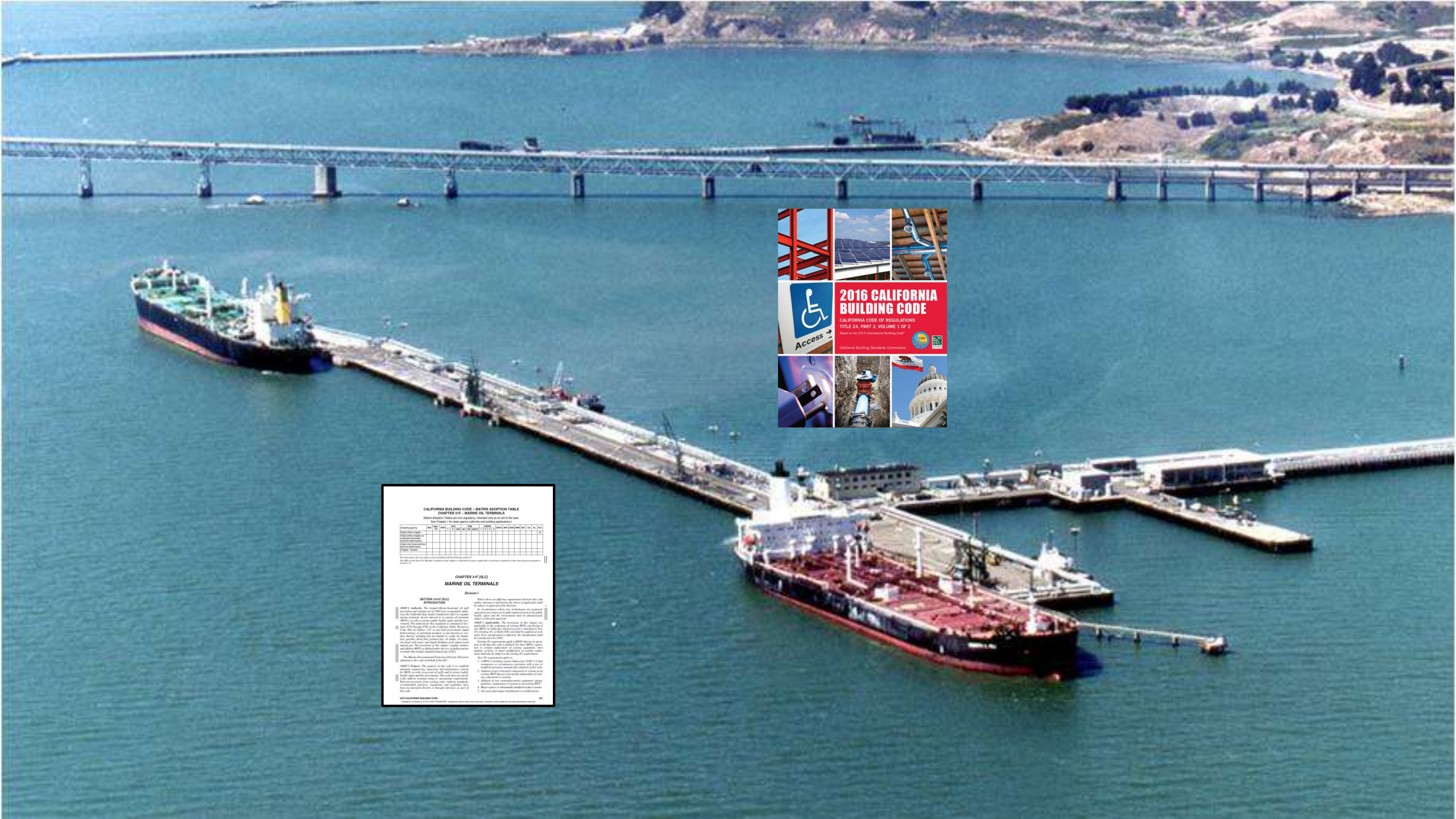
DESIGN: PIERS AND WHARVES



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CALIFORNIA BUILDING CODE - MATRIX ADOPTION TABLE
CHAPTER 31F - MARINE OIL TERMINALS
(2016 Building Code is based on the 2015 International Building Code as shown in the text. See Chapter 1 for state agency authority and building applications.)

Building Types	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Group 1a - Single-Family Dwelling Units															
Group 1b - Two-Family Dwelling Units															
Group 2 - Residential Occupancies															
Group 3 - Business, Professional, Institutional, and Mercantile Occupancies															
Group 4 - Public Assembly															
Group 5 - Educational															
Group 6 - Government															
Group 7 - Industrial															
Group 8 - Storage															
Group 9 - Utility															
Group 10 - Other															

The user should refer to the applicable code section for the building code. If the building code is not applicable to the building, the user should refer to the applicable code section for the building code.

CHAPTER 31F (BLC)
MARINE OIL TERMINALS

Division 1

SECTION 31F01 (BLC)
INTRODUCTION

31F01.1 Authority. The Commission has jurisdiction of all building codes and regulations of the State of California. The Commission has jurisdiction of all building codes and regulations of the State of California. The Commission has jurisdiction of all building codes and regulations of the State of California. The Commission has jurisdiction of all building codes and regulations of the State of California.

31F01.2 Purpose. The purpose of this code is to establish minimum requirements for the design, construction, and maintenance of marine oil terminals. This code does not apply to other types of marine oil terminals.

31F01.3 Scope. This code applies to all marine oil terminals. This code does not apply to other types of marine oil terminals.

31F01.4 Construction. Construction of marine oil terminals shall conform to the provisions of this code.

31F01.5 Maintenance. Maintenance of marine oil terminals shall conform to the provisions of this code.

31F01.6 Enforcement. Enforcement of this code shall be the responsibility of the local authority having jurisdiction.

31F01.7 Severability. If any provision of this code is found to be invalid, the remaining provisions shall remain in effect.

31F01.8 Construction. Construction of marine oil terminals shall conform to the provisions of this code.

31F01.9 Maintenance. Maintenance of marine oil terminals shall conform to the provisions of this code.

31F01.10 Enforcement. Enforcement of this code shall be the responsibility of the local authority having jurisdiction.

31F01.11 Severability. If any provision of this code is found to be invalid, the remaining provisions shall remain in effect.

31F01.12 Construction. Construction of marine oil terminals shall conform to the provisions of this code.

31F01.13 Maintenance. Maintenance of marine oil terminals shall conform to the provisions of this code.

31F01.14 Enforcement. Enforcement of this code shall be the responsibility of the local authority having jurisdiction.

31F01.15 Severability. If any provision of this code is found to be invalid, the remaining provisions shall remain in effect.

**CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE
CHAPTER 31F – MARINE OIL TERMINALS**

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC- CG	SFM	HCD			DSA			OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	SS/CC	1	2	3	4								
Adopt entire chapter																					X
Adopt entire chapter as amended (amended sections listed below)																					
Adopt only those sections that are listed below																					
Chapter / Section																					

The state agency does not adopt sections identified with the following symbol: †
The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.1.1.

**CHAPTER 31F [SLC]
MARINE OIL TERMINALS**

Division I

**SECTION 3101F [SLC]
INTRODUCTION**

3101F.1 Authority. The Lempert-Keene-Seastrand oil spill prevention and response act of 1990 (act), as amended, authorizes the California State Lands Commission (SLC) to regulate marine terminals, herein referred to as marine oil terminals (MOTs), in order to protect public health, safety and the environment. The authority for this regulation is contained in Sections 8750 through 8760 of the California Public Resources Code. This act defines "oil" as any kind of petroleum, liquid hydrocarbons, or petroleum products or any fraction or residues thereof, including but not limited to, crude oil, bunker fuel, gasoline, diesel fuel, aviation fuel, oil sludge, oil refuse, oil mixed with waste, and liquid distillates from unprocessed natural gas. The provisions of this chapter regulate onshore and offshore MOTs as defined under this act, including marine terminals that transfer liquefied natural gas (LNG).

The Marine Environmental Protection Division (Division) administers this code on behalf of the SLC.

3101F.2 Purpose. The purpose of this code is to establish minimum engineering, inspection and maintenance criteria for MOTs in order to prevent oil spills and to protect public health, safety and the environment. This code does not specifically address terminal siting or operational requirements. Relevant provisions from existing codes, industry standards, recommended practices, regulations and guidelines have been incorporated directly or through reference, as part of this code.

Where there are differing requirements between this code and/or references cited herein, the choice of application shall be subject to approval of the Division.

In circumstances where new technologies are proposed, equivalent prevention of oil spills and protection to the public health, safety and the environment must be demonstrated, subject to Division approval.

3101F.3 Applicability. The provisions of this chapter are applicable to the evaluation of existing MOTs and design of new MOTs in California. Each provision is classified as New (N), Existing (E), or Both (N/E) and shall be applied accordingly. If no classification is indicated, the classification shall be considered to be (N/E).

Existing (E) requirements apply to MOTs that are in operation on the date this code is adopted. For these MOTs, equivalent or in-kind replacement of existing equipment, short pipeline sections, or minor modification of existing components shall also be subject to the existing (E) requirements.

New (N) requirements apply to:

1. A MOT or berthing system (Subsection 3102F.1.3) that commences or recommences operation with a new or modified operations manual after adoption of this code.
2. Addition of new structural components or systems at an existing MOT that are structurally independent of existing components or systems.
3. Addition of new (nonreplacement) equipment, piping, pipelines, components or systems to an existing MOT.
4. Major repairs or substantially modified in-place systems.
5. Any associated major installations or modifications.



**2016 CALIFORNIA
BUILDING CODE**

CALIFORNIA CODE OF REGULATIONS
TITLE 24, PART 2, VOLUME 1 OF 2

Based on the 2015 International Building Code*



California Building Standards Commission





Port of Long Beach Wharf Design Criteria

**POLB WDC Version 4.0
May 20, 2015**



The Port of Los Angeles Code for Seismic Design, Upgrade and Repair of Container Wharves

**City of Los Angeles Harbor Department
March 2010**

UFC 4-152-01
24 January 2017

UNIFIED FACILITIES CRITERIA (UFC)

DESIGN: PIERS AND WHARVES



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ASCE STANDARD [ASCE/COPRI
61-14]

Seismic Design of Piers and Wharves

This document uses both the
International System of Units (SI)
and customary units

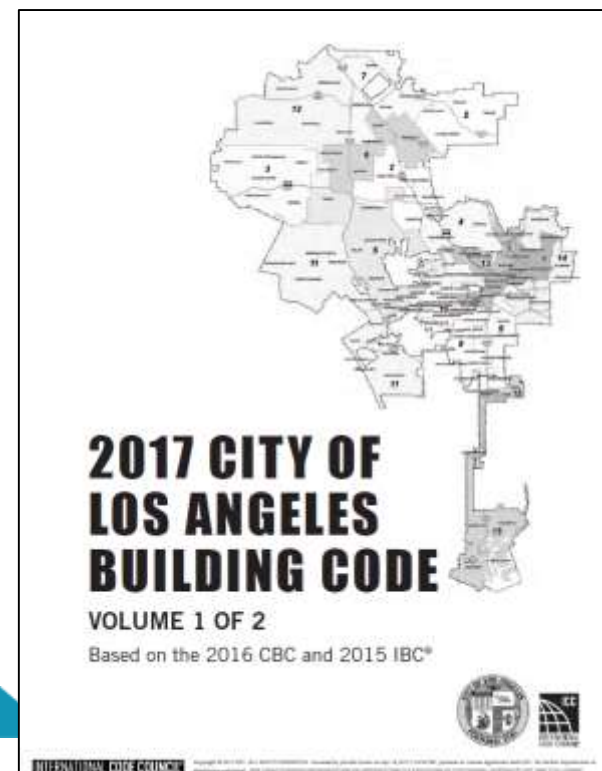
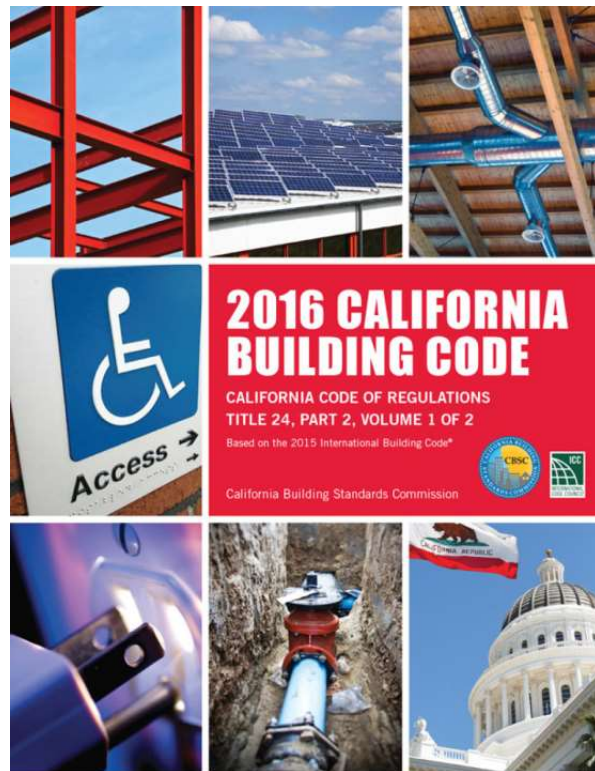
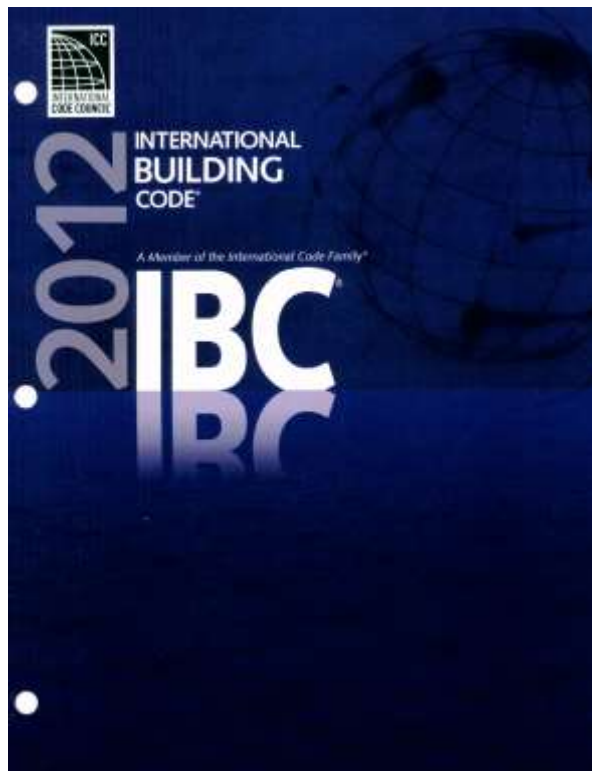
ASCE



Minimum Design Loads for Buildings and Other Structures

This document covers both the International System of Units (SI) and customary units.

ASCE



Prevention First



2014

Manual for Railway Engineering

Volume 1

Track

Introduction

Foreword

Table of Contents

Chapter 1 Roadway and Ballast

(Chapters 3 and 10 were combined in 2000 to form Chapter 30)

Chapter 4 Rail

Chapter 5 Track

Chapter 30 Ties

General Subject Index



AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS



AMERICAN ASSOCIATION OF
STATE HIGHWAY AND
TRANSPORTATION OFFICIALS
AASHTO
THE ROAD OF TOMORROW'S TODAY

Seventh Edition, 2014
U.S. Customary Units

CALTRANS SEISMIC DESIGN CRITERIA

VERSION 1.7

APRIL 2013



Codes/Standards Applicable to Port Facilities

Facility	Public access	Code/Standard
Container terminals	No	POLA/ POLB/ ASCE 61
Marine oil terminals	No	MOTEMS/ CBC/ ASCE 61
Military terminals	No	UFC/ ASCE 61
Cruise/ Ferry terminals	Yes	LABC/ CBC/ IBC/ ASCE 7
Recreational piers	Yes	LABC/ CBC/ IBC/ ASCE 7
Marinas	Yes	LABC/ CBC/ IBC/ ASCE 7
Buildings	Yes	LABC/ CBC/ IBC/ ASCE 7
Highway Bridges	No	AASHTO/ Caltrans Design Criteria
Railroad Bridges	No	AREMA

LRFD Load Combinations for Selected Codes/Standards

- MOTEMS, Chapter 31F, California Building Code, 2017
- UFC 4-152, “Design: Piers and Wharves”, 2017
- Port of Long Beach, “Wharf Design Criteria”, 2015

LRFD Load Combinations for MOTEMS

TABLE 31F-3-10
LRFD LOAD FACTORS FOR LOAD COMBINATIONS [3.19]

LOAD TYPE	VACANT CONDITION		MOORING & BREASTING CONDITION	BERTHING CONDITION	EARTHQUAKE CONDITION ³	
Dead Load (D)	1.2	0.9	1.2	1.2	$1.2 + k^1$	$0.9 \cdot k^1$
Live Load (L)	1.6	—	1.6^2	1.0	1.0	—
Buoyancy (B)	1.2	0.9	1.2	1.2	1.2^1	0.9^1
Wind on Structure (W)	1.6	1.6	1.6	1.6	—	—
Current on Structure (C)	1.2	0.9	1.2	1.2	1.2	0.9
Earth Pressure on the Structure (H)	1.6	1.6	1.6	1.6	1.6^4	1.6^4
Mooring/Breasting Load (M)	—	—	1.6	—	—	—
Berthing Load (B_e)	—	—	—	1.6	—	—
Earthquake Load (E)	—	—	—	—	1.0	1.0

1. $k = 0.50$ (PGA) The k factor ($k=0.5$ (PGA)) and buoyancy (B) shall be applied to the vertical dead load (D) only, and not to the inertial mass of the structure.
2. The load factor for live load (L) may be reduced to 1.3 for the maximum outrigger float load from a truck crane.
3. For Level 1 and 2 earthquake conditions with strain levels defined in Division 7, the current on structure (C) may not be required.
4. An earth pressure on the Structure factor (H) of 1.0 may be used for pile or bulkhead structures.

LRFD Load Combinations for UFC 4-152

Table 3-7 Load Combinations - Load and Resistance Factor Design

	U0	U1	U2	U3	U4	U5	U6	U7	U8	U9
D^a	1.4	1.2	1.2	1.2	1.2	1.2	1.0+k	1.0-k	1.2	1.2
(Lc+l) Lu	-	1.6 ^b	-	1.6 ^b	-	1.6 ^b	0.1	-	1.6 ^b	1.0
B	1.4	1.2	1.2	1.2	1.2	1.2	1.2	0.9	1.2	1.2
Be	-	-	1.6 ^c	-	-	-	-	-	-	-
C	-	-	1.2	1.2	1.2	1.2	-	-	-	1.2
H^d	-	1.6	1.6	1.6	1.6	1.6	1.0	1.0	1.6	1.6
Eq	-	-	-	-	-	-	1.0	1.0	-	-
W	-	-	-	-	1.0	-	-	-	-	1.0
M	-	-	-	-	-	1.6	-	-	-	-
R+S+T	-	-	-	1.2	-	-	-	-	-	-
Ice		-	-	0.5	-	-	-	-	1.0	1.0

LRFD Load Combinations for POLB WDC

Table 3-4: Load Combinations^a

LOAD AND RESISTANCE FACTOR DESIGN (LRFD) ^b									
Case	LOAD COMBINATION FACTORS								
	D	L+I ^c	E	W	BE	M	R+S+T	BU	C
I	1.20	1.60	1.60	1.00	—	—	1.20	1.20	1.20
II ^d	0.90	—	1.60	1.00	—	—	1.20	1.00	1.20
III	1.20	1.00	1.60	1.00	1.60	—	—	1.20	1.20
IV	1.20	1.60	1.60	1.00	—	1.60	—	1.20	1.20

LRFD Load Combinations Comparison

Load Description	MOTEMS	UFC 4-152	POLB WDC
Wind Load on Structure	1.6	1.0	1.0
Berthing + Wind	1.6 + 1.6	1.6 + 0.0	1.6 + 1.0
Mooring/Breasting + Wind	1.6 + 1.6	1.6 + 0.0	1.6 + 1.0

Design of Piers & Wharves

- ASCE/COPRI 61-14 Seismic Design of Piers & Wharves
- New ASCE/COPRI Design Standards for Piers & Wharves



New Design Standards Purpose and Objective

- Establishes comprehensive and consistent national Standard
- Provides a consensus-driven, single resource document
- References existing recommended practice documents

Proposed Schedule

Item	Date
Draft proposal discussed with ASCE	March 2016
Ports & Harbor Committee Presentation/Approval	June 2106
Final proposal submitted to ASCE/COPRI	July 2016
COPRI Governing Board Approval	September 2016
Ports & Harbor Sub-Committee first meeting	October 2016
ASCE Codes & Standards Committee Approval	March 30, 2017
ASCE/ ANSI formal announcement for New Standards Committee	July 30, 2017
ASCE Call for members	September 2017
ASCE Standards Committee kick-off meeting	October 11, 2018
Draft Standard completed	Spring 2022
Publish Standard	Fall 2023

Committee Membership

- Minimum number of voting members for a Standard committee is 12
- Current number of members is 31
- Membership breakdown consists of:

Category	Target Participation	Current Participation
Consumers	20-40%	45%
Producers	20-40%	0%
General	20-40%	45%
Regulators	0-15%	10%

Join at: <https://www.asce.org/codes-and-standards/standards-committee-application-form/>

Next Steps

- Identify existing useful Standards and other source information
- Identify gaps and research needed from design engineers
- Identify and resolve design provisions conflicts
- Identify Working Group team members

Standards Working Groups Chapter Details

- **Group 1: Introduction to Standards**
 - Jurisdiction applicability (Federal, State, and Local)
 - Structure type
 - Use/production
 - Regulations applicability by geography
- **Group 2: Loads and Loads Combination**
 - Criteria for metocean and other environmental loads
 - Water level fluctuation and surges (sea level rise, tsunami...)
 - Mooring and breasting loads
 - Berthing loads
 - Load combinations for vacant, berthing and moored conditions

Standards Working Groups by Chapter Detail

- **Group 3: Analysis and Design**

- Methods of structural analysis
- Geotechnical criteria
- Design procedures
- Design for extreme events such as hurricanes, earthquakes, tsunami, man-made disaster
- Design codes (steel, concrete, timber, synthetics)

- **Group 4: Sustainable Design**

- **Group 5: Marina Design**



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