PACIFIC COAST CONGRESS

ASCE Manuals and Reports on Engineering Practice No. 130

Waterfront Facilities Inspection and Assessment

NEW ASCE WATERFRONT FACILITIES INSPECTION & ASSESSMENT MANUAL

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Waterfront Inspection Task Committee

Edited by Ronald E. Heffron, P.E.

ASCE

Agenda

- Need and Purpose
- Scope
- The Team
- New Topics Introduced
- Cutting-edge and Controversial Topics Introduced
- Content of the Guidelines

Need and Purpose

- "Underwater Investigations Standard Practice Manual" (ASCE Manual 101)
  - Published in 2001
  - Written by engineers, for engineers
  - Provides guidance on many structure types, from piers & wharves to bridges, dams and tunnels
- The Need for a Waterfront Facilities focused manual became evident
  - Inclusive of the entire structure and fixed appurtenances
  - New concepts and technical approaches needeD

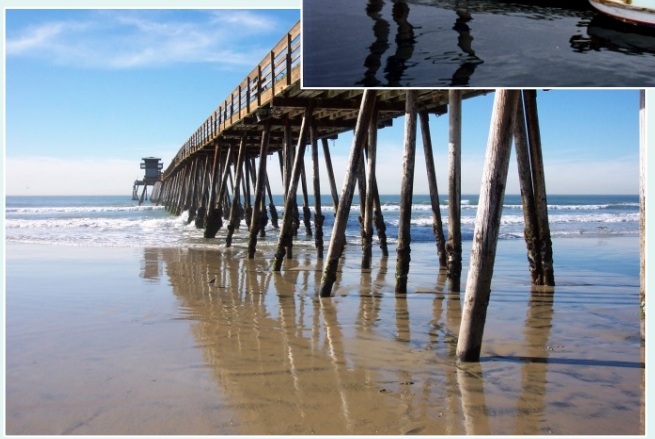
Need and Purpose

"Waterfront Facilities Inspection & Assessment Manual"

- Covers inspection of the entire asset
- Provides guidance to Owners, as well as "executing" engineers

Scope

- Comprehensive treatment of waterfront facilities:
  - Piers/jetties
  - Wharves/quays
  - Bulkheads/quaywalls
  - Wave screens
  - Marinas
  - Boat ramps
  - Floating structures
  - Buoys
  - Slope protection



Scope

- Guidance provided for:
  - Structural components
    - Above water and underwater
  - Fixed utilities
  - Equipment
  - Mooring hardware
  - Topside paving and drainage
  - Safety features
  - Appurtenances
  - Excluded: container cranes; material offloading/conveyance equipment

Scope

- Written for Engineers — by Engineers
  - Working knowledge of waterfront structures is assumed
  - Focuses on “what, when, why, and where”
  - Detailed “how to” guidance NOT provided

The Team

- Members:
  - Ron Heffron, Chairman
  - Noah Elwood, Secretary
  - Terry Browne
  - Andrew Cairns
  - Sean Chapman
  - Steve Curtis
  - John Daley
  - Frank Davidson
  - Bill Bruin
  - Elizabeth Burkhart
  - Anna Dix
  - Joshua Johnson
  - Bryan Jones
  - Ikaika Kincaid
  - Shawn Lindmark
  - Matthew Martinez
  - Todd Mitchell
  - Bruce Ostbo
  - Ralph Petereit
  - Heath Pope
  - Kirk Riden
  - Charlie Roberts
  - Paul Roberts
  - Craig Sams
  - Alberto Sanchez
  - Shelley Sommerfeld
  - Tom Spencer
  - Warren Stewart
  - Erling Vegsund
- Blue Ribbon Panel Reviewers:
  - Lee Barco
  - Richard Jenkins
  - Angel Lim
  - William Stahlman
  - Philip Vitale

The Team

Representing:

- Port Authorities
- U.S. Navy
- Consulting Engineers
- Academia

New Topics Introduced

- Seven Inspection Types Remain from Manual 101:
  - Routine Inspection
  - Structural Repair or Upgrade Inspection
  - New Construction Inspection
  - Baseline Inspection
  - Special Inspection
  - Repair Construction Inspection
  - Post-Event Inspection

- Eighth Inspection Type Introduced:
  - Due Diligence Inspection

New Topics Introduced

- Service Life Modeling
- Definition of element-level ratings, with sketches
- Mooring and berthing system condition inspections and rating scheme
- Addition of utility system condition inspections and rating scheme
- Addition of coating system defect definitions
- Addition of load isolators and bearing defect definitions
- Addition of a comprehensive appendix on specialized inspection techniques

New Topics Introduced

- Extensive coverage of “Special Considerations” for specific structure and system types
  - Pile-supported waterfront structures
  - Relieving platforms
  - Bulkheads and retaining walls
  - Seawalls and revetments
  - Gravity block walls
  - Paving in immediate vicinity of structure
  - Caisson, cofferdams and cellular structures
  - Floating structures
  - Mooring hardware and fender systems
  - Mooring buoy systems

New Topics Introduced

- Extensive coverage of “Special Considerations” for specific structure and system types
  - Wave screens and attenuators
  - Waterfront security barriers
  - Cathodic protection systems
  - Marinas and small craft harbor components
  - Gangways
  - Boat ramps
  - Marine railways
  - Bullrails, ladders and safety features
  - Crane rails, trenching and cables
  - Waterfront utility systems

Cutting-edge and Controversial Topics Introduced

- Guidance provided on “Significant Changes and Owner Responsibilities”
  - Significant changes include:
    - Reduction in design capacity due to damage or deterioration
    - Increased loads
      - Larger vessels
      - Increased sail or current area
      - Increased live loads
    - Upgrades that modify load paths
  - No “significant” deterioration or damage
    - Repair/rehabilitation may proceed normally

Cutting-edge and Controversial Topics Introduced

- Guidance provided on “Significant Changes and Owner Responsibilities”
  - “Significant” deterioration or damage requires structural evaluation prior to repair or rehabilitation
    - Reduction in design capacity of primary members of 20% or more is considered potentially significant
    - Structures that are rated “Poor” or below are considered to exhibit potentially significant damage
    - Method of structural evaluation should be determined by a registered professional engineer
  - For upgrade projects where loads are “significantly” increased, performance of system should be ensured
    - “Significant” is when demand-capacity ratio is 10% or greater than without increased loads

Content of the Guidelines

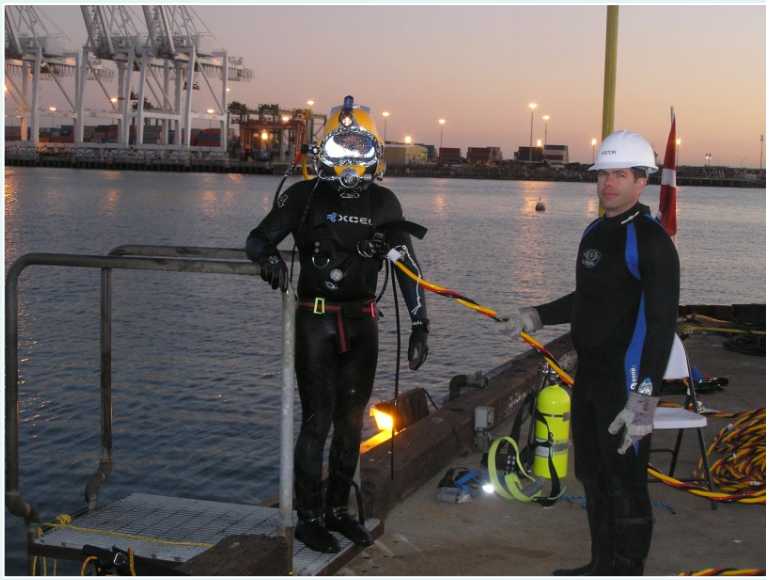
1. Introduction

- Intent of Manual and target audience
- Importance of inspection over life cycle of asset
- Guidance on Owner responsibilities
- Terminology clarification
  - Preservation
  - Sustainment
  - Rehabilitation
  - Upgrade

Content of the Guidelines

2. Standards of Practice

- Introduction of the 8 inspection types
- Guidance on choosing the right inspection type based on project needs
- Guidance on inspection frequency
- Introduction to Service Life Modeling
- Minimum qualifications of inspection personnel
- Rating systems for both elements and overall systems
- Guidelines for follow-up actions



Content of the Guidelines

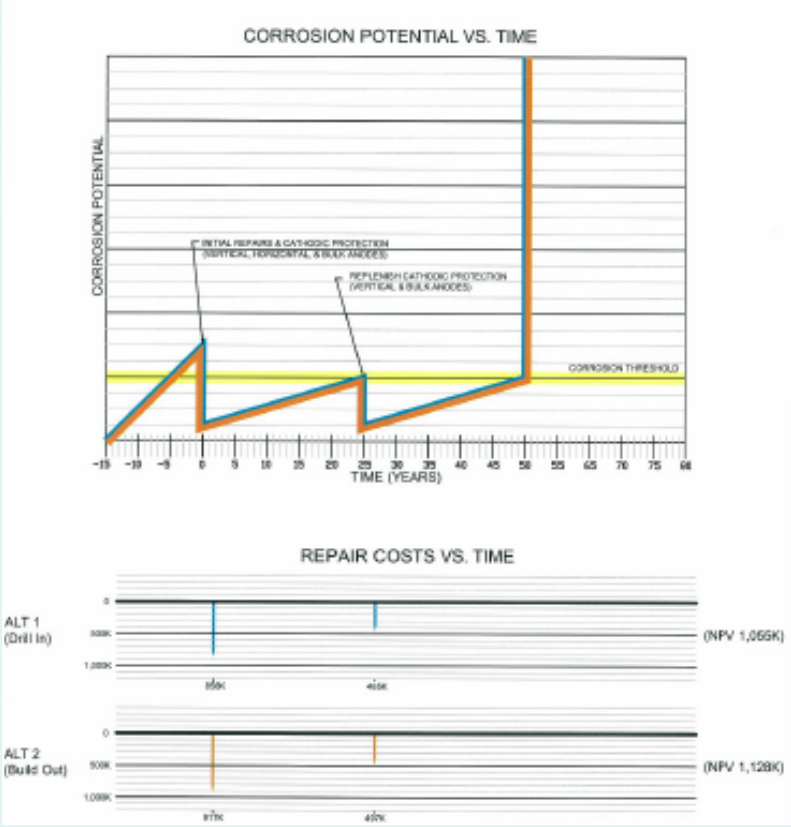
3. Scope of Inspection

- Guidance on boundaries and limits
- Definitions of the three levels of inspection effort
- For each of the 8 inspection types:
  - Objectives
  - Methods of inspection and documentation
  - Guidance on evaluating, rating and recommending follow-up actions

Content of the Guidelines

4. Service Life Modeling

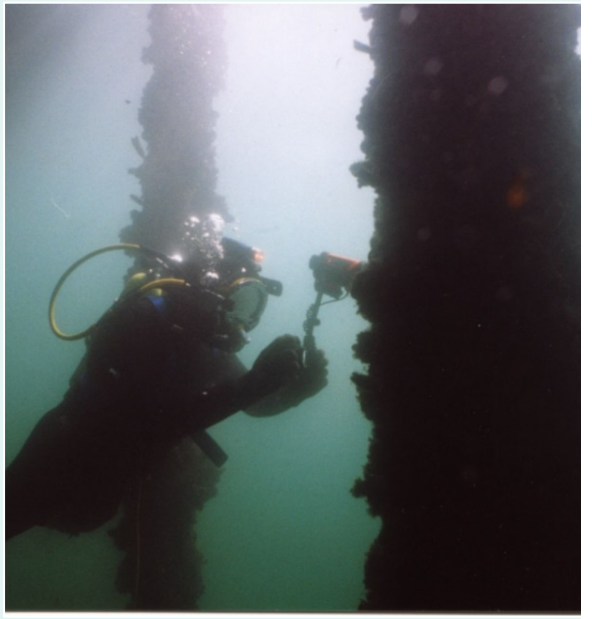
- Guidance on when and how to conduct SLM as part of inspection & rehabilitation strategy for a project
- Guidance on field sampling and testing
- Guidance on laboratory testing & analysis
- Key modeling considerations
- How to find optimum solution for extending life of existing asset



Content of the Guidelines

5. Documentation and Reporting

- Guidance on appropriate level of documentation and reporting
- Guidance on tailoring report content to project and client requirements



6. Administrative Considerations

- Guidance on contractual agreements
- Guidance on insurance considerations
  - Longshoreman's and Harbor Worker's Insurance
  - Jones Act Maritime Insurance
  - Professional Liability Insurance
  - Railroad Protective Insurance

Content of the Guidelines - Appendices

A. Special Considerations for Specific Structure Types and Systems

- Very Comprehensive!
- Detailed guidance for virtually every type of waterfront structure
- “What” to look for, not “how” to inspect
- Detailed guidance on inspection of utility systems
- Guidance on appurtenant systems and features

Content of the Guidelines - Appendices

B. Types and Causes of Defects/Deterioration

- Extensive guidance on defining defect types
- Insights on determining root cause of defects
- Materials and systems covered:
  - Concrete
  - Steel
  - Timber
  - Masonry
  - Composite materials
  - Coating systems
  - Load isolators and bearings
  - Undermining/scour

Content of the Guidelines - Appendices

C. Specialized Inspection Techniques

- Infrared thermography
- Ground penetrating radar
- Acoustic emission
- R-Meter testing
- Schmidt Hammer
- Impact echo testing
- Windsor Probe
- Half-cell corrosion testing
- Chloride ion testing
- Material sampling
- Ultrasonic testing
- Liquid dye penetrant
- Magnetic particle
- Structure monitoring systems
- Unknown foundation investigations
- Underwater acoustic imaging and channel bottom soundings
- Bacteria testing

Content of the Guidelines - Appendices

D. Inspection Nomenclature

- Guidance on standardized nomenclature for both components and defect types
- Guidance on numbering schemes
- Guidance on reporting schemes

E. Bibliography

- Comprehensive list of references

F. Glossary

- Compendium of definitions for waterfront facilities and inspections of same

What's Next?

REHABILITATION MANUALS:

- Timber Waterfront Structures (Started 2004!)
- Concrete Waterfront Structures
- Steel Waterfront Structures

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QUESTIONS?

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