2016 RPIC Marine Infrastructure National Workshop
February 2-3, 2016
Quebec City, QC
Agenda

- Need and Purpose
- Scope
- The Team
- New Topics Introduced
- Cutting-Edge and Controversial Topics Introduced
- Content of the Guidelines
- What’s Next?
Need and Purpose

  – 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

• Manual 101 remains valid for underwater inspection of non-waterfront structures
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 Owners and Engineers — by Owners and 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
  – Bill Bruin
  – Elizabeth Burkhart
  – Andrew Cairns
  – Sean Chapman
  – Steve Curtis
  – John Daley
  – Frank Davidson
  – Anna Dix
  – Joshua Johnson
  – Bryan Jones
  – Ikaika Kincaid
  – Shawn Lindmark
  – Matthew Martinez
  – Todd Mitchell
  – Bruce Ostbo
  – Ralph Peteriet
  – 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, APM Terminals
  – Richard Jenkins, Port of Seattle
  – Angel Lim, Port of Los Angeles
  – William Stahlman, America’s Central Port
  – Philip Vitale, Naval Facilities Engineering Command
The Team

Representing:

• Port Authorities
• U.S. Navy
• Academia
• Consulting Engineers
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
• 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
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
• Standardized 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. Glossary
- Compendium of definitions for waterfront facilities and inspections of same

F. References
- Comprehensive list of references
How to Obtain a Copy of the Manual


Google: ASCE Waterfront Inspection Manual

$150.00 List / $112.50 ASCE Member

Hardcopy or PDF
What’s Next?

Rehabilitation Manuals:

• Timber Waterfront Structures
• Concrete Waterfront Structures
• Steel Waterfront Structures
What’s Next?

Continuing Education:

• 4-Hour WFI Short Course at the PORTS ’16 Conference
  – New Orleans, June 2016
  – Oriented towards Owners

• Seminars and Webinars
Also of Interest…

New PIANC Document:

- Recommendations for the Design and Assessment of Marine Oil and Petrochemical Terminals
  - Fall 2016 Target Publication
Google: ASCE Waterfront Inspection Manual

QUESTIONS?

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