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 Peterieit
  – 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
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
- 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
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
What’s Next?

Rehabilitation Manuals:

- Timber Waterfront Structures *(nearing completion)*
- 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
QUESTIONS?

Ron Heffron, PE, D.PE
rheffron@moffattnichol.com