Prevention First 2018

An Onshore & Offshore Pollution Prevention Symposium & Technology Exhibition

MOTEEMS Inspections
Subsequent Audit Process

September 25, 2018

Anthony Mets, P.E., D. CE
Scott Nordholm, P.E.
What is MOTEMS?

The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS)

“establish minimum engineering, inspection and maintenance criteria for MOTs in order to prevent oil spills and to protect public health, safety and the environment”
What are Audits?

- Initial Audit

- Subsequent Audits

Also Included in MOTEMS, but not detailed in this presentation are:
- Post Event Inspections
- Baseline Inspections

3102F.3 Audits.

3102F.3.1 Objective. The objective of the audit is to review structural, mechanical and electrical systems on a prescribed periodic basis to verify that each berthing system is fit for its specific defined purpose. The audit includes above water and underwater inspections, engineering evaluation, documentation and recommended follow-up actions.
What is a Subsequent Audit?

- Relies on previously performed initial audit, and comprises a compendium of sequential MOTEMS compliance records
- Performed on a Prescribed Periodic Basis
- Included the review of all structural, electrical and mechanical systems
- Structured template for methodically documenting characteristics and assessing compliance of MOTs
What is the Subsequent Audit Process?

- PRE-INSPECTION ACTIVITIES
- INSPECTION ACTIVITIES
  - Above Water Inspection
  - Below Water Inspection
- SUBSEQUENT AUDIT REPORT
  - Executive Summary Tables
Pre-Inspection Activities

Define and/or obtain:
- Physical Boundaries of the MOT
- Facility Description
- Facility and Berth Layout Drawings
- Previous Audit & Inspection Reports
- Executive Summary Tables
- Systems & Equipment Capacities and Specifications
- Terminal Operating Limits (TOLs), Vessel Sizes and Environmental Limits
- Mooring and Berthing Analyses
- Operating and Emergency Procedures
- Mooring Hardware and Fender Capacities
- As-Built MOT Drawings

Prior to starting field inspections, “as-built” documentation shall be reviewed. Review shall include all changes since the previous audit. For example, modification and/or replacement of structural components, electrical/mechanical equipment and operations, new construction, and maintenance manuals.
Inspection Activities

During field inspections, discrepancies between documentation and actual installations shall be noted and marked. If “as-built” documentation is not available, incomplete or inaccurate, baseline inspection may be required to gather data in sufficient detail for adequate evaluation.

Conduct comprehensive structural (above and below water), mechanical, electrical and corrosion inspections. Findings shall be reported, including supporting data, photographs and sketches.
Above Water Inspection

3102F.3.5.1.1 Above water structural inspection. The above water inspection shall include all accessible components above and below deck that are reachable without the need for excavation or extensive removal of materials that may impair visual inspection. The above water inspection shall include, but not be limited to, the following:

1. Piles
2. Pile caps
3. Beams
4. Deck soffit
5. Bracing
6. Retaining walls and bulkheads
7. Connections
8. Seawalls
9. Slope protection
10. Deck topsides and curbing
11. Expansion joints
12. Fender system components
13. Dolphins and deadmen
14. Mooring points and hardware
15. Navigation aids
16. Platforms, ladders, stairs, handrails and gangways
17. Backfill (sinkholes/differential settlement)
Why Registered Professional Engineer-Divers?

- Because professional judgement is required throughout the inspection process
- Accurately Quantifying Damage for Structural Analysis
- First-hand knowledge of the deterioration required
- Engineering Judgement for what data to collect required

**TABLE 31F-2-2**

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>PURPOSE</th>
<th>DETECTABLE DEFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Steel</strong></td>
<td><strong>Concrete</strong></td>
</tr>
<tr>
<td>I</td>
<td>General visual/tactile inspection to confirm as-built condition and detect severe damage</td>
<td>Extensive corrosion, holes, severe mechanical damage</td>
</tr>
<tr>
<td>II</td>
<td>To detect surface defects normally obscured by marine growth</td>
<td>Moderate mechanical damage, corrosion pitting and loss of section</td>
</tr>
<tr>
<td>III</td>
<td>To detect hidden or interior damage, evaluate loss of cross-sectional area, or evaluate material homogeneity</td>
<td>Thickness of material, electrical potentials for cathodic protection</td>
</tr>
</tbody>
</table>
Prepare the relevant Executive Summary (ES) Tables. Compare findings to previous audits and identify progression and patterns of deterioration.

A summary of structural, mooring and berthing, mechanical and electrical deficiencies found during the inspection shall be recorded. In preparation for populating Tables ES-1A and ES-1B, necessity for additional structural, geotechnical, mooring/berthing and pipeline analyses shall be identified.
Subsequent Audit Report

Compiled per MOTEMS Section 3102F.3.8.
The MOTEMS Initial Audit shall include “as-built” documentation for installations, attached within the audit report’s applicable sections.

Audit team shall prescribe follow-up actions as required.

MOTEMS Audits shall be referenced by the month and year of its completion and not as Revision 1, Revision 2, etc. This is important to eliminate confusion with the ES Tables Revision #s.

The Initial and Subsequent Audits comprise a compendium of sequential MOTEMS compliance records that shall be maintained and readily accessible at the MOT.
Subsequent Audit Challenges

Incomplete or out of date facility records or
Undocumented facility changes since previous audit and/or inspection

Often, this information is not available before the commencement of the inspection

Contracts have already been issued, and due to inconsistencies in the information, and baseline inspection may be required.

Shut the barn door . . . . . . . .

<table>
<thead>
<tr>
<th>3102F.1.4 RECORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.1.2</strong></td>
</tr>
<tr>
<td><strong>2.1.3</strong></td>
</tr>
<tr>
<td><strong>2.1.4</strong></td>
</tr>
</tbody>
</table>
Subsequent Audit Challenges

Incorrect, or inaccurate nomenclature carried through from previous reports, often not compatible with recent facility modifications.

5. New inspection findings shall be compared to previous MOTEMS Audit results to identify and report progression and patterns of damage/deterioration.
Subsequent Audit Challenges

Level III inspection Monitoring Locations

Locations will vary from inspection to inspection, but are areas which may be representative of the underwater structure.

A 1:1 comparison of previous inspections is not always possible.
Subsequent Audit Challenges

Implementation or non-implementation affect the subsequent audits and evaluate the assumption of responsibility for “trickle-down” defects and audit data carried through several subsequent audits and collected by different auditors/consultants.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUESTION</th>
<th>RESPONSE</th>
<th>RAP RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.88</td>
<td>Have recommended repairs from latest underwater inspection for mating system been completed?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3102F.3.8 Documentation and reporting. The audit reports shall be signed and stamped by the audit team leader. The inspection and other reports and drawings shall be signed and stamped by the engineers in responsible charge.

Each audit and inspection, whether partial or complete, shall be adequately documented. Partial inspections cover only specific systems or equipment examined. The resulting reports shall summarize and reference relevant previous ratings and deficiencies. Inspection reports shall be included in subsequent audits.
Proposed Code Modifications

REGARDING PROPOSED CHANGES TO
THE 2019 CALIFORNIA BUILDING CODE,
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2

2.4. Update footnote for "TABLE 31F-2-4 ASSESSMENT RATINGS" as follows:
   1. ...
   2. ...
   3. ICAR = Inspection Condition Assessment Ratings [2.2]: Ratings shall be assigned comparing the observed condition to the as-built original condition.

2.5. Update footnote for "TABLE 31F-2-7C" as follows:
   ...
   9. Ratings shall be assigned comparing the observed condition to the as-built original condition.
   10. ...

STATEMENT OF SPECIFIC PURPOSE, PROBLEM, RATIONALE and BENEFITS:
The terminology “original” is updated to “as-built” for clarity and consistency with industry and code terminology, such as utilized in the “Purpose” defined for Level I inspections in Table 31F-2-2. Therefore, this change is editorial and non-substantive.

2.4 "...Rating shall be assigned comparing the observed condition to the as-built original condition”, As-built information is not always available

2.5 "...Rating shall be assigned comparing the observed condition to the as-built original condition”, As-built information is not always available
Questions