Marine Oil Terminal Engineering & Maintenance Standards (MOTEMS)

Audit and Inspection Criteria

Overview and Discussion of Controversial Provisions

September 10, 2002

Ron Heffron, P.E.
Agenda

- Overview of Annual Inspections
- Overview of Audits
- Overview of Post-Event Inspections
- Discussion of Some Controversial Issues
Audits and Inspections - Flowchart

Existing Marine Oil Terminal

- Define the Physical Boundaries of Each Berthing System
  - Ref: Sect. 2.1.4

- Define the Operating Limits of the Berthing System
  - Ref: Sect. 2.3.6

ANNUAL INSPECTION

- Conduct Annual Inspection of Each Berthing System and Issue Report
  - Ref: Sect. 2.2

AUDIT

- Define the Operating Limits of the Berthing System
  - Ref: Sect. 2.3.7

POST-EVENT INSPECTION

- Submit Notification to SLC Within 24 Hours; Submit Action Plan to SLC Within 5 Days
  - Ref: Sect. 2.4.1

- Each Affected Berthing System

Are Accurate As-Built Records Available?

- No
  - Conduct Baseline Inspection
    - Ref: Sect. 2.1.5
  - Perform Above Water Audit Inspection
    - Ref: Sect. 2.3.5
  - Perform Underwater Audit Inspection
    - Ref: Sect. 2.3.5
  - Perform Mooring/Berthing Analysis & Evaluation
    - Ref: Sect. 5
  - Assign Condition Ratings & Follow-Up Actions; Prepare Report
    - Ref: Sects. 2.3.8, 2.3.9
  - Execute Follow-Up Actions as Necessary
  
- Yes
  - Conduct Baseline Inspection
    - Ref: Sect. 2.1.5
  - Evaluate Electrical/Mechanical Systems
    - Ref: Sects. 8, 9, 10, 11
  - Assign Condition Ratings & Follow-Up Actions; Prepare Report
    - Ref: Sects. 2.3.8, 2.3.9
  - Execute Follow-Up Actions as Necessary

Execute Follow-Up Actions as Necessary

Prepare Report of Action Plan Completed

SLC Acceptance of Completed Action Plan

SLC = California State Lands Commission, Marine Facilities Division

O = Owner and/or Operator of the MOT

FIGURE 1-1
REGULATORY PROCESS FLOWCHART
Existing Marine Oil Terminal

Define the Physical Boundaries of Each Berthing System of the MOT
Ref: Sect. 2.1.4

Annual Inspection
Conduct Annual Inspection of Each Berthing System and Issue Report
Ref: Sect. 2.2

Audit
Define the Operating Limits of the Berthing System
Ref: Sect. 2.3.6

Post-Event Inspection
Submit Notification to SLC Within 24 Hours and Action Plan to SLC Within 5 Days
Ref: Sect. 2.4.1

ANNUAL INSPECTION

AUDIT

POST-EVENT INSPECTION

Each Berthing System

SLC

Annually Specified Intervals Following a Significance Damage-Causing Event
Within 24 Hours and 5 days Following the Event
ANNUAL INSPECTION

- Conduct Annual Inspection of Each Berthing System and Issue Report
  
- Are Accurate As-Built Records Available?
  
  - Yes
    
    - Perform Above Water Audit Inspection
      
    - Perform Mooring/Berthing Analysis & Evaluation
      
    - Evaluate Electrical/Mechanical Systems
      
    - Assign Condition Ratings & Follow-Up Actions; Prepare Report
  
  - No
    
    - Conduct Baseline Inspection
      
    - Perform Underwater Audit Inspection
      
    - Perform Structural (including seismic) Analysis & Evaluation
      
    - Prepare Report of Action Plan Completed

AUDIT

- Define the Operating Limits of the Berthing System
  
- Ref: Sect. 2.3.6

POST-EVENT INSPECTION

- Submit Notification to SLC Within 24 Hours; Submit Action Plan to SLC Within 5 Days
  
- Ref: Sect. 2.4.1

- Ref: Sect. 2.3.5

- Perform Audit Inspection on Electrical/Mechanical Systems
  
- Ref: Sect. 2.3.5

- Perform Mooring/Berthing Analysis & Evaluation
  
- Ref: Sect. 5

- Evaluate Electrical/Mechanical Systems
  
- Ref: Sects. 8, 9, 10 & 11

- Assign Condition Ratings & Follow-Up Actions; Prepare Report
  
- Ref: Sects. 2.3.7, 2.3.8 & 2.3.9

- Execute Follow-Up Actions as Necessary
  
- Ref: Sects. 2.3.7

- Prepare Report of Action Plan Completed
  
- Ref: Sect. 2.3.6

SLC = California State Lands Commission, Marine Facilities Division

O = Owner and/or Operator of the MOT
POST-EVENT INSPECTION

- Submit Notification to SLC Within 24 Hours; Submit Action Plan to SLC Within 5 Days
  - Ref: Sect. 2.4.1

- Action Plan Accepted by SLC
  - Each Affected Berthing System

- Perform Post-Event Inspection of Structural, Electrical and Mechanical Systems
  - Ref: Sect. 2.4

- Assign Post-Event Ratings and Follow-Up Actions; Prepare Brief Report
  - Ref: Sect. 2.4.4 - 2.4.7

- Execute Follow-Up Actions as Necessary

- Prepare Report of Action Plan Completed
  - Ref: Sect. 2.4.7

- SLC Acceptance of Completed Action Plan

Following a Significant Potentially Damage-Causing Event

- Conduct Baseline Inspection
  - Ref: Sect. 2.1.5

- Evaluate Electrical/Mechanical Systems
  - Ref: Sects. 8, 9, 10 & 11

- Perform Audit Inspection on Electrical/Mechanical Systems
  - Ref: Sect. 2.3.5

- No

Within 24 Hours and 5 days Following the Event
Berthing System: A complete set of structural, electrical and mechanical components for the transfer of product to or from the vessel to the first valve onshore.

Two Berthing Systems

One Berthing System
Audit / Inspection Types

- Annual Inspection
- Audit
- Post-Event Inspection
Annual Inspection

- Conducted by SLC
- 2 CCR 2320
- Walkdown Inspection - Primarily Topside
Audit Overview

- Objective
- Frequency - Issue 1
- Baseline Inspection - Issue 2
- Qualifications - Issue 3
- Scope
- Evaluation - Issue 4
- Ratings
- Follow-up
- Reporting
Audit Objective

- Review of All Structural, Electrical and Mechanical Systems on a Prescribed Periodic Basis
- Relative to a Specific, Defined Purpose
- Standards Define the Criteria; Audit Manual Defines the Execution Requirements
### TABLE 2-1
INITIAL AUDIT REPORT SUBMISSION DEADLINE FOR EXISTING BERTHING SYSTEMS

<table>
<thead>
<tr>
<th>MOT Classification</th>
<th>Submission Deadline²</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>30 Months</td>
</tr>
<tr>
<td>Medium</td>
<td>48 Months</td>
</tr>
<tr>
<td>Low</td>
<td>60 Months</td>
</tr>
</tbody>
</table>

¹ As defined in Sections 4 and 5, Tables 4-1 and 5-1
² From the effective date of this standard

### TABLE 4-1
MOT RISK CLASSIFICATION

<table>
<thead>
<tr>
<th>Risk Classification</th>
<th>Exposed Oil (bbls)</th>
<th>Transfers per Year per Berthing System</th>
<th>Maximum Vessel Size (DWTx1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>≥1200</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Moderate</td>
<td>&lt;1200</td>
<td>≥90</td>
<td>≥30</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;1200</td>
<td>&lt;90</td>
<td>&lt;30</td>
</tr>
</tbody>
</table>

### TABLE 5-1
MOT MOORING/BERTHING CLASSIFICATION

<table>
<thead>
<tr>
<th>Risk Classification</th>
<th>Wind, (Vₚ) (knots)</th>
<th>Current, (Vᵥ) (knots)</th>
<th>Passing Vessel Effects</th>
<th>Change in Draft (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>&gt;50</td>
<td>&gt;1.5</td>
<td>Yes</td>
<td>&gt;8</td>
</tr>
<tr>
<td>Moderate</td>
<td>30 to 50</td>
<td>1.0 to 1.5</td>
<td>No</td>
<td>6 to 8</td>
</tr>
<tr>
<td>Low</td>
<td>&lt;30</td>
<td>&lt;1.0</td>
<td>No</td>
<td>&lt;6</td>
</tr>
</tbody>
</table>
**TABLE 2-2**

MAXIMUM INTERVAL BETWEEN UNDERWATER AUDIT INSPECTIONS (YEARS)

<table>
<thead>
<tr>
<th>Condition Rating From Previous Inspection</th>
<th>CONSTRUCTION MATERIAL</th>
<th>Channel Bottom or Mudline – Scour&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unwrapped Timber or Unprotected Steel (no coating or cathodic protection)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Concrete, Wrapped Timber, Protected Steel or Composite Materials (FRP, plastic, etc.)&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Benign&lt;sup&gt;2&lt;/sup&gt; Environment</td>
<td>Aggressive&lt;sup&gt;3&lt;/sup&gt; Environment</td>
</tr>
<tr>
<td>6 (Good)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>5 (Satisfactory)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>4 (Fair)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>3 (Poor)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2 (Serious)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1 (Critical)</td>
<td>N/A&lt;sup&gt;5&lt;/sup&gt;</td>
<td>N/A&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

1. The maximum interval between Underwater Audit Inspections shall be reduced as appropriate based on the extent of deterioration observed on a structure, the rate of further anticipated deterioration, or other factors.
2. Benign environments include fresh water and maximum current velocities less than 1.5 knots for the majority of the days in a calendar year.
3. Aggressive environments include brackish or salt water, polluted water, or waters with current velocities greater than 1.5 knots for the majority of the days in the calendar year.
4. For most structures, two maximum intervals will be shown in this table, one for the assessment of construction material (timber, concrete, steel, etc) and one for scour (last 2 columns). The shorter interval of the two should dictate the maximum interval used.
5. MOTs rated “Critical” will not be operational; and Emergency Action shall be required in accordance with Table 2-7.
Audit Frequency - Subsequent - Issue 1

- **Above Water** - 3 years

- **Justification:**
  - Consistent with other agencies

<table>
<thead>
<tr>
<th>Agency</th>
<th>Above Water Inspection Frequency</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Navy</td>
<td>Annual</td>
<td>Subject to change</td>
</tr>
<tr>
<td>Federal Highway Administration</td>
<td>Every Two Years</td>
<td>All US Bridges</td>
</tr>
<tr>
<td>Port of Los Angeles</td>
<td>Every Two Years</td>
<td>Over 200 WF Structures</td>
</tr>
<tr>
<td>New York City EDC</td>
<td>Every Two Years</td>
<td>Over 12 miles of Waterfront</td>
</tr>
</tbody>
</table>
Underwater - 1 to 6 years

Justification:

Consistent with ASCE UW Investigations Manual

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### TABLE 2-2
RECOMMENDED MAXIMUM INTERVAL BETWEEN UNDERWATER ROUTINE INSPECTIONS (YEARS)

<table>
<thead>
<tr>
<th>Condition Rating From Previous Inspection</th>
<th>Unwrapped Wood or Unprotected Steel (no coating or cathodic protection)</th>
<th>Concrete, Wrapped Wood, Protected Steel or Composite Materials (FRP, plastic, etc.)</th>
<th>Channel Bottom or Mudline - Scour&lt;sup&gt;4, 5&lt;/sup&gt; (Soundings&lt;sup&gt;6&lt;/sup&gt; / Direct Observation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benign&lt;sup&gt;2&lt;/sup&gt; Environment</td>
<td>Aggressive&lt;sup&gt;2&lt;/sup&gt; Environment</td>
<td>Benign&lt;sup&gt;2&lt;/sup&gt; Environment</td>
</tr>
<tr>
<td>6 (Good)</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5 (Satisfactory)</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>4 (Fair)</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3 (Poor)</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>2 (Serious)</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1 (Critical)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

1. The recommended maximum interval between Routine Inspections should be reduced as appropriate based on the extent of deterioration observed on a structure, the rate of further anticipated deterioration, the importance of the structure, or other factors. The intervals may likewise be increased as appropriate for non-typical cases such as alternative deterioration-resistance construction materials (i.e., special hardwoods), or other factors. Regulatory jurisdictions may also dictate the maximum inspection interval.
2. Benign environments include fresh water with low to moderate currents (maximum current always < .75 kts).
3. Aggressive environments include brackish or salt water, polluted water, or waters with moderate to swift currents (maximum current ≥ .75 kts).
4. The intervals indicate requirements for soundings and direct observation, respectively.
5. For most structures, two maximum intervals will be shown in this table, one for the assessment of construction material (wood, concrete, steel, etc) and one for scour (last 2 columns). The shorter interval of the two should dictate the maximum interval used.
6. Soundings may be performed at the time of the above water inspection.
Baseline Inspection - Issue 2

- Must be conducted if drawings are not available
- Level of detail must support what is needed to conduct the structural analysis
- Strength / ductility characteristics must be determined
- Non-destructive testing, partially-destructive testing and/or laboratory testing may be required
- Electrical and mechanical systems must be determined as to location, capacity, operating limits and physical condition
Minimum Qualifications - Issue 3

**Project Manager:** In-depth knowledge of systems under audit

**Team Leader:** Registered civil/structural engineer; commercially trained diver (or equal) for u/w inspections

**Team Members:**
- Graduate civil/structural engineer or certified technician; commercially trained diver (or equal) for u/w inspections

- **Lead Engineer:** Registered civil/structural engineer
  - **(Structural)**

- **Lead Engineer:** Registered electrical engineer
  - **(Electrical)**

- **Lead Engineer:** Registered mechanical engineer
  - **(Mechanical)**
<table>
<thead>
<tr>
<th>Team Leader:</th>
<th>Minimum Qualifications - Issue 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered civil/structural</td>
<td>Registered civil/structural</td>
</tr>
<tr>
<td>engineer; commercially</td>
<td>engineer; commercially trained</td>
</tr>
<tr>
<td>trained diver (or equal) for</td>
<td>diver (or equal) for u/w</td>
</tr>
<tr>
<td>u/w inspections</td>
<td>inspections</td>
</tr>
</tbody>
</table>

Why Engineers?
Why Engineers?

Because Professional Judgement is Required Throughout the Inspection Process

Examples:
- Assigning Condition Ratings
- Understanding Load Paths
- Understanding the Structural Significance of Damage
Why Engineers?

Because Professional Judgement is Required Throughout the Inspection Process

Examples:

♦ Quantifying Damage for Structural Analysis
♦ Requires first-hand knowledge of the deterioration
♦ Requires judgement to know what data to collect
Why Engineers?

Because Professional Judgement is Required Throughout the Inspection Process

Examples:
- Estimating the Remaining Useful Life of a Structure
- Requires understanding of deterioration mechanisms and rates
Example:

“The timber piles were wrapped, so we just assumed they were adequately protected...besides, it’s expensive to remove and replace wraps and the owner had no rational basis for spending the extra money”

Solution: Engineers must be aware of the industry issues and help develop the scope of work - educating Owners to understand that recent research has found timber pile wraps to often be woefully inadequate. Removal of a representative sample of wraps may be essential to understanding the structure’s condition.
Why Engineers? - Anecdote B

Failure of Timber Marginal Wharf in Boston

- PAVEMENT
- FILL MATERIAL
- GRANITE RETAINING WALL
- RELIEVING PLATFORM
- WATERLINE (MLLW)
- PILE CONNECTIONS CORRODED (PINS FAILED)
- TIMBER PILE (ORIGINALLY VERTICAL)
- TIMBER PILE (ORIGINALLY BATTER)
- STEEL SHEET PILE WALL BROKEN & ROTATED
- TIMBER PILE (ORIGINALLY BATTER)
- TIMBER PILE (ORIGINALLY VERTICAL)
- GRANITE RETAINING WALL
- WATERLINE (MLLW)
- FILL MATERIAL
Why Engineers? - Anecdote C

Timber Pier in Boston Harbor

Old Piles

New Piles

Bent Caps

Deck

Plan

Section
"The badly deteriorated column above the footing was ignored (it was more difficult to inspect), while all the remedial attention was focused on footing ‘deterioration’ that was primarily voids from formwork"
Navy Construction Project in Virginia - “The current knocked the risers over so we need a change order to reconstruct them and install protection so it won’t happen again”
Recent Pier Collapse in Philadelphia - Killing Several People

**Facts:**

- **Pier had just been inspected the day before collapse**
- **Pier collapsed due to extensive deterioration**
- **Owner may have no recourse since he hired a non-engineer-diver with no Professional Liability Insurance**
Why Commercially Trained Divers?

**Justification:**

- OSHA has ruled that recreational SCUBA training is *inadequate for this type of work*
- **PADI, NAUI and YMCA have all written letters to OSHA stating that their training does NOT qualify individuals for this type of work**
- Owners may ultimately be liable, if anything happens, for hiring unqualified divers
- **Unqualified divers may have inadequate insurance**
### TABLE 2-4

#### SCOPE OF UNDERWATER INSPECTIONS

<table>
<thead>
<tr>
<th>Level</th>
<th>Steel</th>
<th>Concrete</th>
<th>Timber</th>
<th>Composite</th>
<th>Slope Protection/Channel Bottom or Mudline-Scour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Piles</td>
<td>Piles</td>
<td>Piles</td>
<td>Piles</td>
<td>Piles</td>
</tr>
<tr>
<td>I</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>II</td>
<td>10%</td>
<td>Every 100 LF</td>
<td>10%</td>
<td>Every 100 LF</td>
<td>Every 50 LF</td>
</tr>
<tr>
<td>III</td>
<td>5%</td>
<td>Every 200 LF</td>
<td>0%</td>
<td>N/A</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary</td>
<td>N/A</td>
<td>5% Internal marine borer infestation evaluation</td>
<td>Every 100 LF</td>
<td>0% Internal marine borer infestation evaluation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Size and Methodology</th>
<th>Sample Size:</th>
<th>Method:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>100%</td>
<td>Visual/Tactile</td>
</tr>
<tr>
<td>II</td>
<td>10%</td>
<td>Visual: Removal of marine growth in 3 bands</td>
</tr>
<tr>
<td>III</td>
<td>5%</td>
<td>Remaining thickness measurement; electrical potential measurement; corrosion profiling as necessary</td>
</tr>
</tbody>
</table>

1. The stated sample size may be reduced in the case of large structures where statistically representative sampling can be demonstrated to the Division in accordance with these standards. The sampling plan must be representative of all areas and component types (i.e. approach trestles, pier/wharf, dolphins, inboard, outboard, batter, vertical, concrete, steel, timber, etc.). Any reduced sampling plan proposed to the Division must include the Level I inspection of all piles around the perimeter of the facility where vessels may berth or where debris may impact or accumulate. If the reduced sampling plan proposes to conduct less than 100 percent Level I effort, then the results of the inspection must be carefully monitored. If significant deterioration is observed on any component, which could reasonably be expected to be present on additional components, and which could have a detrimental effect on the load bearing capacity of the structure either locally or globally, then the inspection scope shall be increased to include a 100 percent Level I effort. See reference [2.1].

2. The minimum inspection sampling size for small structures shall include at least two components.

LF = Linear Feet; SF = Square Feet; N/A = Not Applicable
Terminal Operating Limits (Statement of Purpose)

- Physical Limits
- Minimum / Maximum Vessel Sizes - LOA / Beam / Max. Arrival Draft with Associated Displacement
- Must Consider Water Depths, Dolphin Spacing, Fender System Limitations, Manifold Height and Hose / Loading Arm Reach, Tidal Fluctuations, Surge, & Drift

Mooring and Berthing Analysis

Structural Evaluation (including seismic)

Electrical / Mechanical Systems Evaluation
Audit Evaluation - Issue 4

- **Structural Evaluation (including seismic)**
  - Grandfathering is over
  - All terminals must meet minimum standards
  - Seismic, mooring, berthing, etc.

- **Electrical / Mechanical Systems Evaluation**
  - A pipeline stress analysis may be required
  - Piping and structural analyses must be co-dependent
<table>
<thead>
<tr>
<th>Rating</th>
<th>Description of Structural Systems Above and Below Water Line</th>
</tr>
</thead>
</table>
| 6      | Good  
No problems or only minor problems noted. Structural elements may show very minor deterioration, but no overstressing observed. The capacity of the structure meets the requirements of this standard.  
The structure should be considered fit-for-purpose. No repairs or upgrades are required. |
| 5      | Satisfactory  
Limited minor to moderate defects or deterioration observed, but no overstressing observed. The capacity of the structure meets the requirements of this standard.  
The structure should be considered fit-for-purpose. No repairs or upgrades are required. |
| 4      | Fair  
All primary structural elements are sound; but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present, but do not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 15 percent below the structural requirements of this standard, as determined from an engineering evaluation.  
The structure should be considered as marginal. Repair and/or upgrade measures may be required to remain operational. Facility may remain operational provided a plan and schedule for remedial action is presented to and accepted by the Division. |
<table>
<thead>
<tr>
<th>Rating</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Poor</td>
<td>Advanced deterioration or overstressing observed on widespread portions of the structure, but does not significantly reduce the load bearing capacity of the structure. The capacity of the structure is no more than 25 percent below the structural requirements of this standard, as determined from an engineering evaluation. The structure is not fit-for-purpose. Repair and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted or contingency basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.</td>
</tr>
<tr>
<td>2</td>
<td>Serious</td>
<td>Advanced deterioration, overstressing or breakage may have significantly affected the load bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. The capacity of the structure is more than 25 percent below than the structural requirements of this standard, as determined from an engineering evaluation. The structure is not fit-for-purpose. Repairs and/or upgrade measures may be required to remain operational. The facility may be allowed to remain operational on a restricted basis until the deficiencies are corrected, provided a plan and schedule for such work is presented to and accepted by the Division.</td>
</tr>
<tr>
<td>1</td>
<td>Critical</td>
<td>Very advanced deterioration, overstressing or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be implemented as necessary. The capacity of the structure is critically deficient relative to the structural requirements of this standard. The structure is not fit-for-purpose. The facility shall cease operations until deficiencies are corrected and accepted by the Division.</td>
</tr>
</tbody>
</table>
## Remedial Action Priorities

### TABLE 2-6

**REMEDIAL ACTION PRIORITIES (RAP) FOR ELECTRICAL AND MECHANICAL DEFICIENCIES**

<table>
<thead>
<tr>
<th>Remedial Priorities</th>
<th>Description and Remedial Actions</th>
</tr>
</thead>
</table>
| **P1**              | Specified whenever a condition that poses an immediate threat to public health, safety or the environment is observed. *Emergency Actions* may consist of barricading or closing all or portions of the berthing system, evacuating product lines and ceasing transfer operations.  
The berthing system is not fit-for-purpose. *Immediate remedial actions are required prior to the continuance of normal operations.* |
| **P2**              | Specified whenever defects or deficiencies pose a potential threat to public health, safety and the environment. Actions may consist of limiting or restricting operations until remedial measures have been completed.  
The berthing system is not fit-for-purpose. *This priority requires investigation, evaluation and urgent action.* |
| **P3**              | Specified whenever systems require upgrading in order to comply with the requirement of these standards or current applicable codes. These deficiencies do not require emergency or urgent actions.  
The berthing system is not fit-for-purpose. The MOT may have limitations placed on its operational status. |
| **P4**              | Specified whenever damage or defects requiring repair are observed.  
The berthing system is fit-for-purpose. *Repair can be performed during normal maintenance cycles, but not to exceed one year.* |
## TABLE 2-7
### STRUCTURAL FOLLOW-UP ACTIONS

<table>
<thead>
<tr>
<th>Follow-up Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Action</td>
<td>Specified whenever a condition which poses an immediate threat to public health, safety or the environment is observed. Emergency Actions may consist of barricading or closing all or portions of the berthing system, limiting vessel size, placing load restrictions, evacuating product lines, ceasing transfer operations, etc.</td>
</tr>
<tr>
<td>Engineering Evaluation</td>
<td>Specified whenever structural damage or deficiencies are observed which require further investigation or evaluation, to determine appropriate follow-up actions.</td>
</tr>
<tr>
<td>Repair Design Inspection</td>
<td>Specified whenever damage or defects requiring repair are observed. The repair design inspection is performed to the level of detail necessary to prepare appropriate repair plans, specifications and estimates.</td>
</tr>
<tr>
<td>Upgrade Design and Implementation</td>
<td>Specified whenever the structural system requires upgrading in order to comply with the requirements of these standards and current applicable codes.</td>
</tr>
<tr>
<td>Special Inspection</td>
<td>Typically specified to determine the cause or significance of non-typical deterioration, usually prior to designing repairs. Special testing, laboratory analysis, monitoring or investigation using non-standard equipment or techniques are typically required.</td>
</tr>
<tr>
<td>Develop and Implement Repair Plans</td>
<td>Specified when the Repair Design Inspection and required Special Inspections have been completed. Indicates that the structure is ready to have repair plans prepared and implemented.</td>
</tr>
<tr>
<td>No Action</td>
<td>Specified when no further action is necessary until the next scheduled audit or inspection.</td>
</tr>
</tbody>
</table>
### EXECUTIVE SUMMARY TABLE (ES-1)
#### STRUCTURAL CONDITION ASSESSMENT RATINGS (CAR)

<table>
<thead>
<tr>
<th>Berthing System</th>
<th>System</th>
<th>Condition Assessment Rating</th>
<th>From this Audit(^1)</th>
<th>From Previous Audit(^1)</th>
<th>Next Audit Due (Mo/Yr)</th>
<th>Assigned Follow-Up Actions</th>
<th>Fit-for-Purpose?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Wharf</strong></td>
<td>Above Water Structure</td>
<td>4 (Fair)</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>6/2004</td>
<td>Upgrade Design and Implementation</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Underwater Structure</td>
<td>5 (Satisfactory)</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>10/2006</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>South Wharf</strong></td>
<td>Above Water Structure</td>
<td>4 (Fair)</td>
<td>(\text{(\text{(\text{(\text{(date))}}))}}</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>6/2004</td>
<td>Repair Design Inspection</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Underwater Structure</td>
<td>3 (Poor)</td>
<td>(\text{(\text{(\text{(\text{(date))}}))}}</td>
<td>(\text{(\text{(\text{(\text{(date))}}))})}</td>
<td>10/2006</td>
<td>Special Inspection; Repair Design Inspection</td>
<td>No</td>
</tr>
</tbody>
</table>

### EXECUTIVE SUMMARY TABLE (ES-2)
#### ELECTRICAL AND MECHANICAL SYSTEM REMEDIAL ACTION PRIORITIES (RAP)

<table>
<thead>
<tr>
<th>Berthing System</th>
<th>Deficiency</th>
<th>Remedial Action Priority (RAP) (P1-P4)</th>
<th>From this Audit</th>
<th>From Previous Audit</th>
<th>Next Audit Due (Mo/Yr)</th>
<th>Description of Planned Remedial Action</th>
<th>Fit-For-Purpose?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Wharf</strong></td>
<td>Fire main leaking</td>
<td>P3</td>
<td>(\text{(\text{(\text{(date))}}))}</td>
<td></td>
<td>6/2004</td>
<td>Repair</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Pipeline badly corroded</td>
<td>P2</td>
<td>(\text{(\text{(\text{(date))}}))}</td>
<td></td>
<td>6/2004</td>
<td>Investigate; urgent action required</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Electrical (Class I, Div 2 violation)</td>
<td>P1</td>
<td>(\text{(\text{(\text{(date))}}))}</td>
<td></td>
<td></td>
<td>Immediate remedial action required</td>
<td>No</td>
</tr>
</tbody>
</table>
Post-Event Audit

- **Initial notification to SLC within 24 hours**

- **Action Plan to SLC within 5 working days**
### TABLE 2-8

**POST-EVENT RATINGS AND ACTIONS**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Summary of Damage</th>
<th>Remedial Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No significant event-induced damage observed.</td>
<td>No further action required. The berthing system may continue operations.</td>
</tr>
<tr>
<td>B</td>
<td>Minor to moderate event-induced damage observed but all primary structural elements and electrical/mechanical systems are sound.</td>
<td>Repairs or mitigation may be required to remain operational. The berthing system may continue operations.</td>
</tr>
<tr>
<td>C</td>
<td>Moderate to major event-induced damage observed which may have significantly affected the load bearing capacity of primary structural elements or the functionality of key electrical/mechanical systems.</td>
<td>Repairs or mitigation may be necessary to resume or remain operational. The berthing system may be allowed to resume limited operations. (See 2 CCR 2385 (f)).</td>
</tr>
<tr>
<td>D</td>
<td>Major event-induced damage has resulted in localized or widespread failure of primary structural components; or the functionality of key electrical/mechanical systems has been significantly affected. Additional failures are possible or likely to occur.</td>
<td>The berthing system may not resume operations until the deficiencies are corrected (See 2 CCR 2385 (f)).</td>
</tr>
</tbody>
</table>