

Marine Oil Terminal Engineering and Maintenance Standards Implementation & Updates

MOTEMS

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MARINE OIL TERMINAL ENGINEERING AND MAINTENANCE STANDARDS (MOTEMS)

MANDATED:

LEMPERT-KEENE-SEASTRAND OIL SPILL PREVENTION AND RESPONSE ACT OF 1990

CURRENT CONDITIONS OF 40 TERMINALS: Grandfathering – vessel size Structural degradation Inadequate fire detection/suppression Build dates 1901 to 1984 (Average age is 50)



- Audit and Inspection Criteria
- Structural Loading Criteria
- Seismic Analysis and Design Criteria
- Mooring and Berthing Analysis and Design Criteria
- Geotechnical Hazards Criteria
- Structural Analysis and Design of Components
- Piping and Pipeline Criteria
- Mechanical, Fire and Electrical Criteria



Industry & Peer Review

- Two workshops: industry, consulting and port engineers and academia (80 to 100 attendees).
- Technical Advisory Group peer review of all structural portions of MOTEMS.
- Industry (WSPA) working group review of all fire, piping, electrical and mechanical portions.



REGULATORY PROCESS

 <u>APPROVED</u> - CALIFORNIA STATE LANDS COMMISSION, AUGUST 17, 2004

 <u>ADOPTED</u> - CALIFORNIA BUILDING STANDARDS COMMISSION, JANUARY 19, 2005

 <u>PUBLISHED -</u> CALIFORNIA BUILDING STANDARDS CODE (TITLE 24, PART 2, VOL 1, CHAPTER 31F) AUGUST 6, 2005.

♦ EFFECTIVE FEBRUARY 6, 2006



FACILITY CLASSIFICATIONS (E) (INITIAL AUDIT DEADLINES)

HIGH : >1200 Bbls at risk (30 Months)

MEDIUM: <1200 Bbls at risk or > 90 transfers/year (48 Months)

LOW: < 1200 Bbls at risk, < 90 transfers/year < 30,000 DWT (60 Months)



TO DETERMINE AMOUNT OF OIL "AT RISK"

Table 31F-8-2 of the MOTEMS:

TOTAL VOLUME OF OIL AT RISK = STORED + FLOWING

 $V_{F} = Qc x (\Delta t) x (1/3600)$

Where $\Delta t = ESD$ valve closure in 30 or 60 seconds (post November 1, 1980 uses 30 seconds)



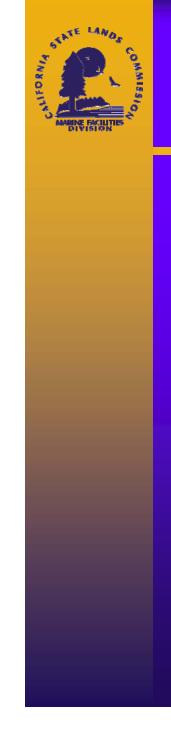
MOTs in California (Estimated Ratings)

Number of MOTs Considered "HIGH" = 14 (Audit within <u>30 months</u>)

Number of MOTs Considered "MEDIUM" = 12 (Audit within <u>48 months</u>)

Number of MOTs Considered "LOW" = 15 (Audit within <u>60 months</u>)

After the Audit, rehabilitation is scheduled and agreed upon by operator and MFD.



Mooring/Berthing Risk Classification

Current > 1.5 knots

Passing Vessel Effects: YES

Change in Draft > 8 ft.

MEDIUM RISK: Wind 30 – 50 knots

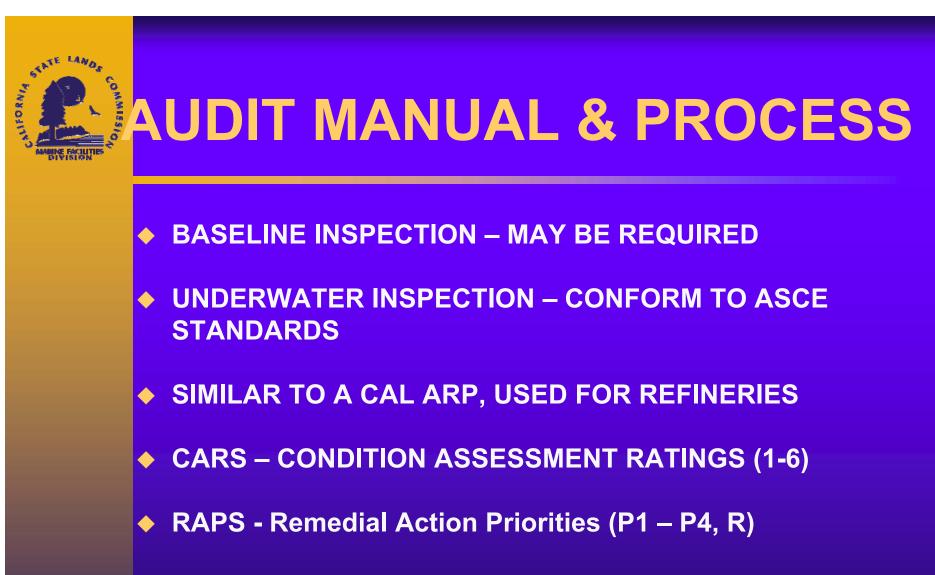
Current 1.0 to 1.5 knots

Change in Draft 6 to 8 ft.

LOW RISK: Wind < 30 knots

Current < 1.0 knot

Change in Draft < 6 ft.



ANALYSES MAY BE REQUIRED



AUDIT RATINGS Inspection & Analyses

CONDITION ASSESSMENT RATINGS (CAR)

- 6 = GOOD fit-for-purpose
- **5 = SATISFACTORY fit-for-purpose**
- 4 = FAIR Marginal, capacity less than 15% degraded
- 3 = POOR Not fit-for-purpose
- 2 = SERIOUS Not fit-for-purpose
- 1 = CRITICAL Cease operations



COMPONENT REMEDIAL ACTION PRIORITIES (RAP)

- P1 Condition poses an immediate threat to public health, safety or the environment. Emergency action required
- P2 Condition pose a potential threat to public health, safety and the environment
- P3 Upgrading required, no emergency or urgent action required
- P4 Fit-for-purpose, do the repairs during normal maintenance intervals
- R Recommended action for good engineering or maintenance practice, but not required by these standards



PIPING AND PIPELINES

STRESS ANALYSIS MAY BE REQUIRED IF:

NEW PIPING

SIGNIFICANT RE-ROUTING

REPLACEMENT OF NOT "IN KIND"

SIGNIFICANT REARRANGEMENT OF ANCHORS/SUPPORTS

SIGNIFICANT SEISMIC DISPLACEMENTS



MECHANICAL AND ELECTRICAL EQUIPMENT

MARINE LOADING ARMS

ELECTRICAL AND HYDRAULIC POWER SYSTEMS

WINCHES AND CRANES

SHORE-TO-VESSEL ACCESS FOR PERSONNEL

SUMPS, DISCHARGE CONTAINMENT AND ANCILLARY EQUIPMENT

VCS



MOTEMS UPDATES

San Francisco Bay Tsunami Study (Borrero, Dengler, Uslu and Synolakis)

Passing Vessel Forces on Moored Vessels (Kriebel)

Multiple Mooring Hooks – Tie-down capacity



MOTEMS IMPLEMENTATION (OUTSIDE CALIFORNIA)

"SEISMIC DESIGN GUIDELINES FOR PORT STRUCTURES", WORKING GROUP 34 OF PIANC, 2001.

"NEHRP RECOMMENDED PROVISIONS FOR SEISMIC REGULATIONS FOR NEW BUILDINGS AND OTHER STRUCTURES", FEMA 450/1, 2, 2003 EDITION

UNIFIED FACILITIES CRITERIA (UFC) – "DESIGN: PIERS AND WHARVES", UFC 4-152-01, 28 JULY 2005



MOTEMS – CONCLUSIONS

- 1. INITIAL AUDITS FOR HIGH RISK FACILITIES ARE DUE IN AUGUST 2008
- 2. A MOTEMS UPDATE WILL BE PUBLISHED SHORTLY.
- 3. RECENT STUDIES (SF BAY TSUNAMI & PASSING VESSEL LOADS) ARE AVAILABLE ON THE CSLC WEBSITE.
- 4. MOTEMS IS NOW AN ENFORCEABLE PART OF THE CALIFORNIA BUILDING CODE.