

**NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
BASE SUPPORT VEHICLES & EQUIPMENT
SAN DIEGO, CA 92132-5190**

11262
BSVE SOP #11-2

BSVE STANDARD OPERATING PROCEDURE #11-2

From: NAVFAC SW BSVE PRODUCT LINE COORDINATOR

Subj: NAVAL BASE POINT LOMA CONTRACTOR CRANE OVERSIGHT PLAN

Ref: (a) NAVFAC P-307, Management of Weight Handling Equipment
(b) COMNAVREG SW San Diego msg R260001Z Sep 00

Encl: (1) Contractor Crane Compliance Review Checklist
(2) Contractor Rigging Oversight Checklist
(3) Certificate of Compliance
(4) CNRSW San Diego Metro Area Crane Operating Permit
(5) Contractor Crane Non-Operation Permit
(6) Contractor Crane Operation Checklist
(7) Complex Lift form
(8) Contractor Crane Discrepancy Form
(9) Contractor Crane Discrepancy Response Form
(10) Contractor Multi-Purpose Machine Review Form

1. Purpose. To establish a contractor crane oversight plan in accordance with references (a) and (b) that minimizes the potential for damage to government property and injury to government personnel by contractors operating weight handling equipment on Naval Base property. This contractor crane oversight plan is intended only to improve the internal management of Naval Base Point Loma (NBPL) and is not intended to, and does not, create any right, or benefit, or trust responsibility, substantive or procedural, enforceable against the United States, its agencies or instrumentalities, or its officers or employees.

2. Scope. This oversight plan relates directly to the use of non-Navy-owned cranes, rigging gear, material handling equipment (MHE), and construction equipment operated by contractor personnel, conducting business on Navy property. This oversight plan only pertains to MHE and construction equipment when the MHE or construction equipment is being used as a crane to lift suspended loads. This equipment, often from a variety of sources, is incidental to construction contracts, ship repair

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contracts, demolition contracts, maintenance and other service contracts, deliveries of supplies and equipment, etc. Numerous organizations, including tenant activities, ships, supply departments, Facilities Engineering and Acquisition Division (FEAD), Southwest Regional Maintenance Center (SWRMC) etc., have contracting authority which often involves the use of non-Navy-owned and operated cranes, rigging gear, material handling equipment and construction equipment.

3. General Requirements

a. The NAVFAC SW Base Support Vehicles and Equipment (BSVE) Product Line Coordinator (PLC) is responsible for the oversight of all contractor cranes and related equipment on Naval Base property in the San Diego Metropolitan area.

b. Contractor crane oversight services provided by the NAVFAC SW BSVE PLC will be funded by Commander Navy Installations Command (CNIC).

c. Contracting officers shall notify the NAVFAC SW Contractor Crane Oversight Office at 556-7156 or 619-666-1886 in advance, whenever a contractor crane is scheduled to enter NBPL property.

d. Contractor crane surveillance team personnel shall review contractor cranes and associated rigging gear for compliance with reference (a) and with all federal and state requirements. Contractor Crane Compliance Review Form (enclosure (1)), and Contractor Rigging Oversight Guidelines (enclosure (2)), shall be used as a guide to ensure compliance with applicable requirements. The Certificate of Compliance (enclosure (3)) must be completed by the contractor before the crane is brought on Navy property. If the crane is determined to be in compliance, and all required documentation has been verified, the person conducting the review shall issue a Crane Operating Permit (enclosure (4)). The Crane Operating Permit shall be valid for the duration of the contract, but not to exceed 30 days. For contracts with durations of more than 30 days, a complete review of the crane and documentation will be required. If determined to be in compliance, a new Crane Operating Permit will be issued. Contractor Cranes with a valid operating permit must submit a new Certificate of Compliance if they change contracts.

e. Commercial service vehicles and other commercial vendors often enter Navy property with commercial truck-mounted cranes

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that they do not intend to operate. For those instances, and in lieu of a compliance review, the oversight office will issue a Contractor Crane Non-Operation Permit (enclosure (5)) certifying that the crane will not be operated on Navy property. The Non-Operation Permit must be posted in a conspicuous location on the windshield or drivers-side of the truck cab. A Non-Operation Permit may be obtained from the contractor crane oversight office.

f. Contractor crane access to NBPL property shall be restricted to the gates listed below.

(1) Naval Submarine Base (SUBASE): Main gate Rosecrans, Post 116

(2) Space and Naval Warfare Systems Command (SPAWAR): Main Gate, SUBASE

(3) Fleet Anti Submarine Warfare Center (FLEASWTRACEN): Gate 1, Post 3

(4) Fleet Intelligence Training Center (FITCPAC): Main Gate

(5) Old Town Complex (OTC): Gate 23, Post 16

(6) Taylor Street Complex: Main Gate

(7) Fleet Combat Training Center Pacific (FCTCPAC): Electron Drive Gate

g. NBPL security personnel shall stop all contractor cranes without a valid Crane Operating Permit posted in the front windshield or a Contractor Crane Non-Operation Permit posted on the crane or in the vehicle cab.

h. During normal working hours (0700 - 1530), NBPL security personnel shall contact the NAVFAC SW Contractor Crane Oversight office at 556-7156, who will then direct contractor cranes without a valid Crane Operating Permit or Non-Operation Permit to the corresponding inspection location listed below.

(1) SUBASE: Parking lot at intersection of Steamplant Road, Rosecrans and McClellan Road.

(2) SPAWAR, Point Loma: SUBASE Parking lot at intersection of Steam-plant Road, Rosecrans and McClellan Road.

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(3) NMAWC: Right lane just inside Gate 1.

(4) FITCPAC and NMAWC: Right lane just inside Gate 1.

(5) Old Town Complex: Designated truck inspection area.

(6) Taylor Street Complex: OTC, Designated truck inspection area.

(7) FCTCPAC, Point Loma: Parking lot at intersection of Steam-plant Road, Rosecrans and McClellan Road.

i. After normal working hours (1530 - 0700), and on weekends, NBPL security personnel shall stop contractor cranes without a valid Crane Operating Permit or Non-Operation Permit at the gate. Contractors must utilize cranes that already have a valid Crane Operating Permit, or arrange to have their crane inspected during normal working hours.

j. Contractor crane oversight personnel shall randomly monitor contractor crane operations, when possible, using the Contractor Crane Operation Checklist (enclosure (6)) as a guide. To ensure contractor compliance, surveillance personnel will check for valid Crane Operating Permits, Certificates of Compliance, and crane operator qualifications. In addition to verifying proper documentation, surveillance personnel shall randomly observe crane operations for safe crane operation, proper set up, adequate pier support and proper rigging practices.

k. Contractor crane oversight personnel will be appropriately cleared and badged to access NBPL special areas, and shall be afforded unrestricted access to all piers and construction job sites where contractor crane operations are being performed for the purpose of conducting inspections and operational surveillances.

l. Contractors planning a complex lift, as defined by ref (a), section 1.7.2.g. must submit a completed Complex Lift Form, encl. (7), to the Contractor Crane Surveillance office for review and concurrence, prior to making the lift.

m. Deficiencies noted during crane and documentation review, or while monitoring crane operations shall be documented on the contractor crane oversight discrepancy form (enclosure (8)) and forwarded within two business days to the appropriate

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contracting official for resolution. When deficiencies are identified on a contractor crane that require production work to be stopped and the crane removed from Navy property, the contracting officer shall be notified immediately. Contracting officials shall submit a written response to all discrepancies within ten business days to the NAVFAC SW Contractor Crane Oversight Office. The contractor crane discrepancy response form, enclosure (9), shall be used to identify the root cause(s) and any corrective/preventive actions taken to prevent recurrence.

n. Contractors must notify the contracting officer of any multi-purpose machine, MHE, or construction equipment that will be used in a crane-like application to lift loads suspended by rigging gear. A Certificate of Compliance, enclosure (3), must be completed by the contractor, and all machines used in these applications will be inspected using the Contractor Multi-Purpose Machine Review Form, enclosure (10). Contractors must furnish proof from the Original Equipment Manufacturer (OEM) that the machine is capable of making lifts of loads suspended by rigging equipment. Lifts of personnel baskets suspended by rigging equipment from these machines are prohibited.

o. Contractor crane oversight personnel shall provide the NBPL Commanding Officer with a monthly status report of contractor crane operations. The monthly status report shall be sent to the NBPL Commanding Officer within the first ten business days of each month. The report shall consist of all deficiencies documented during the oversight of contractor cranes and a brief summary of the overall status of contractor crane compliance on NBPL property. Quarterly, the report will contain an overview of historical data on deficiencies over the previous three years.



LUANN BENSON
NAVFAC SW BSVE PLC

Distribution:
All NBPL Tenant Commands

CONTRACTOR CRANE COMPLIANCE REVIEW CHECKLIST

Contractor:		Sub:		Date:	
Crane Mfg.:		Owner:		Type:	Rated Capacity:
Year/Model:				Ser #:	
Quadrennial Certification Date:				Annual Certification Date:	
Location of Operations:				Duration of Contract:	
Contracting Officer			Phone:		Contract #:

	YES	NO	N/A
1. Is the crane certification valid? -- IAW Sept 08, EM 385 16.D.01 & 16.F.03 a, & 29 CFR 1919.71(a)-(a)(2), Cal OSHA Title 8 Article 99, 5021 (a) 1&2			
2. Are the load test (quad) and annual certification documents in the crane? Sept 08, EM 385, 16.D.02 - NAVSEA STD Item 009-40, 3.7, 3.7.1.3, 3.7.2, 3.7.3 & Cal OSHA Title 8 Article 99, 5021 (a) 2 & 5025			
3. Is there a certificate of compliance posted on the crane? -- NAVFAC P-307 1.7.2 (b), NAVSEA STD. Item 009-40, 3.6.3			
4. Is the operator qualified to operate this specific type crane? IAW – Sept 08, EM 385 16.B.03 & 16.C.01& ASME B30.5, 5-3.1.2(a) & NAVFAC P-307 1.7.2 c & Cal OSHA title 8, Article 98, 5006.1 & CFR 1926.1427 (a)			
5. Is there a copy of the OEM operator's manual for the specific make and model crane? -- IAW Sept 08 EM 385 16.G.01 a & ASME B30.5, 5-1.1.3(b)			
6. Is there a load rating chart specific to the make and model of the crane? -- IAW 29 CFR 1910.180(c)(2), & ASME B30.5, 5-1.1.3 (a)(1) & Sept 08 EM 385 1-1, 16.G.01.b, & NAVFAC P-307 1.7.2 e 6 & CFR 1926.1433 (b)			
7. Is the hoist reeved according to OEM recommendations? -- IAW Sept 08 EM 385 16.G.01.b (3) & ASME B30.5, 5-1.1.3 (a)(5) & 29 & Cal OSHA Title 8, Article 93, 4923 (a)			
8. Are operating limits set for specific weather conditions? -- IAW Sept 08 EM 385 16.G.01.b (4) & 16.G.I.01-16.i.06 & ASME B30.5, 5-3.1.3 (e) (8)			
9. Is the crane equipped with a boom angle indicator? IAW Sept 08 EM 385, 16.E.03 d(1)(a) & E(1) & ASME B30.5, 5-1.9.1(c)			
10. Is the crane equipped with a load indicating device? -- IAW Sept 08 EM 385 16.E.03 e(4) & ASME B30.5, 5-1.9.9.2 (long shoring)& 29 CFR 1917.46(a)(1) Ca OSHA Title 8, Article 93 §4924)			
11. Is the device calibrated in accordance with OEM recommendations? -- IAW 29 CFR 1917.46(a)(1)(ii) – long shoring & ASME B30.5, 5-2.1.6 (b)			

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	Yes	No	N/A
12. Is the crane equipped with level indicators? – IAW Sept 08 EM 385, 16.E.01 a & ASME B30.5, 5-1.9.11(d)			
13. Is the crane equipped with drum rotation indicators? -- IAW Sept 08 EM 385 16.E.03 & ASME B30.5, 5-1.3.2(a)(5)			
14. Is the crane equipped with anti-two block devices? -- IAW Sept 08 EM 385, 16.E.03.(a)–(d) & ASME B30.5, 5-1.9.9.1 & 29 CFR 1926.1416(d)(3)(i)&(ii) & CFR 1917.45(j)(10) & NAVSEA Std. Item 009-40, 3.6.4 & Cal OSHA Title 8, Article 98, 5004(e)(3)			
15. Are operator aids (motion and load limiting devices) and other safety devices functioning properly? -- IAW Sept 08 EM 385,16.E.03 b &16.D.08 d& ASME B30.5, 5-2.1.6 & 29 CFR 1910.180(d)(3)			
16. Is the hydraulic system functioning properly (without leaks)? --IAW Sept 08 EM 385 16.D.08 f & ASME B30.5, 5-2.1.2(d)(h) & 29 CFR 1910.180(d)(3)(iv)			
17. Is the electrical system functioning properly? -- IAW Sept 08 EM 385 16.D.08 i & ASME B30.5, 5-2.1.2(g) & 29 CFR 1910.180 (d)(3)(vii)			
18. Are hooks and latches inspected for deformation, chemical damage, cracks and wear? –IAW Sept 08 EM 385 16.D.08 g & ASME B30.5, 5-2.1.2(e) & ASME B30.10, 10-2.2.1.3c			
19. Are audible signal devices (horns and warning devices, backup alarms) functioning? -- IAW ASME B30.5, 5-1.9.11(c) & ASME 5-3.3.7 & Sept 08 EM 385 16.A.08 j & 18.B.01 (a)-(e)			
20. Are warning signs for electrical lines posted on the crane? - IAW ASME B30.5, 5-1.9.11(g)			
21. Is the wire rope in satisfactory condition? -- IAW ASME B30.5, 5-2.4.3(1)(b) & 29 CFR 1910.180(g)(1) & 29 CFR 1926.1413 a & Sept 08 EM 385 16.D.12 a through f & table 16-2			
22. Does the minimum number of full wraps of wire remain on the hoist drum at all times? -- IAW, ASME B30.5, 5-1.3.2 (2)(a) & Cal OSHA Title 8, Article 93, 4929 & Sept 08 EM 385, 16.G.03 a&b			
23. Is the crane used for longshoring / cargo transfer? If so is the crane certified? – 29 CFR 1918.66(a)(1) & 29 CFR 1919.71(a) & 29 CFR 1919.72\ (a) & 29 CFR1917.50 (c)(1)			

Barge Mounted Mobile Cranes

24. Is the crane properly secured to the barge? – IAW NAVFAC P-307, 3.8.3 & Sept 08 EM 385-1-1, 16L.04 c 2&3			
25. Is the crane equipped with a load indicating device, a wind speed indicator and a list and trim indicator? -- IAW NAVFAC P-307, 1.7.2 a & Sept 08 EM 385 1-1 & 16.L.06 a & b			
26. Does the crane have a modified load chart based on calculated list and trim? —29 CFR 1926.1437 (m) (4) & Sept 08 EM 385 1-1, 16.L.04 a & b			

SIGNATURE:	Date:
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CONTRACTOR CRANE COMPLIANCE REVIEW CHECKLIST REFERENCES

General Industry

29-CFR, 1910.180(b) (2) “New and Existing equipment.” All new crawler, locomotive, and truck cranes constructed and utilized on or **after August 31, 1971**, shall meet the design specifications of the American National Standard Safety Code for Crawler, Locomotive, and Truck Cranes, ANSI B30.5-1968, which is incorporated by reference as specified in Sec. 1910.6. Crawler, locomotive, and truck cranes constructed **prior to August 31, 1971 should** be modified to conform to those design specifications by February 15, 1972, unless it can be shown that the crane cannot feasibility or economically be altered and that the crane substantially complies with the requirements of this section.

Construction

29 CFR, 1926.1400 Scope (a) This standard applies to power operated equipment, when used in construction, that can hoist, lower and horizontally move a suspended load. Such equipment includes, but is not limited to: Articulating cranes (such as knuckle boom cranes): crawler cranes; floating cranes; cranes on barges; locomotive cranes; mobile cranes (such as wheel mounted, rough terrain, all terrain, commercial truck mounted, and boom truck cranes); multi-purpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load; industrial cranes (such as carry-deck cranes); dedicated pile drivers; service and mechanics trucks with a hoisting device; a crane on a monorail; tower cranes (such as a fixed jib, i.e., “hammerhead boom”) , luffing boom and self erecting; pedestal cranes; portal cranes; overhead and gantry cranes; straddle cranes; sideboom cranes; derricks; and variations of such equipment. However, items listed in paragraph (c) of this section are excluded from the scope of this standard. **(b) Attachments.** This standard applies to equipment included in paragraph (a) in this section when used with attachments. Such attachments, whether crane attached or suspended include, but are not limited to: Hooks, magnets, grapples, clamshell buckets, concrete buckets, orange peel buckets, drag lines, personnel platforms, augers or drills and pile driving equipment.

ITEM

1. **29 CFR, 1917.71 a** Unit proof test of cranes shall be carried out at the following times. **(a)(1)** In the cases of new cranes, before initial use and every 4 years thereafter. **(a)(2)** In the cases of uncertified cranes which have been in use, at the time of initial certification and every 4 years thereafter.

September 08, EM385 1-1, 16.D.01 Inspections of cranes and hoisting equipment shall be in accordance with this section, applicable ASME standards, OSHA regulations and the manufacturer’s recommendations

September 08, EM385 1-1, 16.F.03 a Load test shall be performed in accordance with ANSI/ASME and the manufacturer’s recommendations by, or under the direction of a, qualified person. In the manufacturer has no procedures, a registered professional engineer familiar with the type of equipment involved must approve

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procedures and frequency of testing using as a minimum, Appendix I for use, testing and inspection, anticipated future use, and other such factors.

16.F.03 c Load testing shall be performed

(1) before initial use of crane or hoisting equipment in which a load bearing, or load controlling part or component, brake, travel component, or clutch has been altered, replaced or repaired.

(2) Every time a crane or hoisting equipment is reconfigured or reassembled after disassembly (to include booms); and (3) When the manufacturer requires load testing

Cal OSHA, Title 8 Article 99, §5021 Equipment Over Three Tons Rated Capacity

(a) All cranes and derricks used in lifting service, exceeding three tons rated capacity, and their accessory gear shall not be used until the employer has ascertained that such equipment has been certificated as evidenced by current and valid documents attesting to compliance with the following:

(1) Tests and examinations shall be conducted annually by a currently licensed certifying agency or designee listed in the certifying agency license, and a certificate shall be issued by the certifying agency.

(2) Certificates (annual and quadrennial) attesting to current compliance with testing and examination standards of requirements shall be maintained for each crane or derrick and shall be in a form acceptable to the Division.

2. **September 08, EM385 1-26.D.02**, Records of crane and hoisting equipment test and inspections shall be maintained onsite. Contractors shall make these records readily available upon request and, when submitted, they shall become part of the official project file.

NAVSEA Standard item 009-40, 3.2.1 Maintain written documentation of the last weight test of the crane and all related weight handling equipment on site.

3.7 conduct a joint verification with the supervisor to ensure that a legible and indelible completed copy of attachment A (Certificate of Compliance) is maintained on the crane and the following certification and testing documentation is on site prior to entry on any Naval Facility .

3.7.1 Crane Certification.

3.7.2 Load Testing.

3.7.3 Yearly, monthly, and daily inspection logs.

Cal OSHA, Title 8 Article 99, §5021 Equipment Over Three Tons Rated

(a)(2) Certificates (annual and quadrennial) attesting to current compliance with testing and examination standards of requirements shall be maintained for each crane or derrick and shall be in a form acceptable to the Division

CONTRACTOR CRANE COMPLIANCE REVIEW CHECKLIST REFERENCES

Article 99, §5025 Certificates. If the equipment meets the requirements set forth in Sections 5021, 5022, 5023 and 5024, a certificate shall be issued indicating that the required tests and/or examinations have been performed and that any defects found by such examination and tests have been corrected and that the equipment is in safe operating condition at the time of examination. A copy of such certificate shall be available with each crane and derrick or at the project site.

3. DECEMBER 2009 NAVFAC P-307, 1.7.2 b Require a certificate of compliance from the contractor (appendix P, figure P-1) that the crane (or other machine if used to lift suspended loads) and the rigging equipment meet applicable OSHA and ANSI/ASME regulations (with the contractor citing which OSHA and ANSI/ASME regulations are applicable, e.g., cranes/multipurpose machines used in cargo transfer shall comply with 29 CFR 1917; cranes/multi-purpose machines used in construction, demolition, or maintenance shall comply with 29 CFR 1926; cranes/multi-purpose machines used in shipbuilding, 1-8 ship repair, or shipbreaking shall comply with 29 CFR 1915; slings shall comply with ASME B30.9, rigging hardware shall comply with ASME B30.26). For cranes (or other machines used to lift suspended loads) and rigging equipment at naval activities in foreign countries, the contractor shall certify that the crane (or other machine) and the rigging equipment conform to the appropriate host country safety standards. The contractor shall also certify that all of its crane (or other machine) operators working on the naval activity have been trained not to bypass safety devices (e.g., anti-two block devices) during lifting operations. Require that the certifications be posted on the crane.

NAVSEA Standard Item 009-40, 3.6.3 Post a completed attachment A (Certificate of Compliance in the cab of the vehicle.

4. ASME, B30.5, 2004, 5-3.1.2(a) Operators shall be required to successfully meet the qualifications for the specific type crane that they are operating.

September 08 EM 385-1-1, 16.C.01 Designated personnel must be qualified to operate a particular type of crane or hoist (i.e., mobile, tower, overhead, etc.) and the training provided shall be applicable to that type of crane or hoist.

September 08 EM 385-1-1, 16.B.03 Crane Operator Qualifications and/or Certifications. Crane operators shall possess at least one of the following license or certifications.

a. Option 1. A current certification by an accredited (a nationally recognized accrediting agency) crane/derrick operator testing organization.

b. Option 2. Qualification by a professional source that qualifies crane operators (e.g. Independent testing and qualifying company. A union, or a qualified consultant who can be an in-house resource) as long as the program is an audited employer program.

December 2009 NAVFAC P-307, 1.7.2 c For mobile and commercial truck mounted cranes with OEM rated capacities of greater than 2000 pounds, require that the crane operator be designated as qualified by a source that qualifies crane operators

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(i.e., a union, a government agency, or an organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

Cal OSHA Title 8, Article 98, §5006.1. Mobile Crane and Tower Crane-Operator Qualifications and Certification.

(a) Qualifications. The employer shall only permit operators who have a valid certificate of competency (certificate) issued in accordance with this section by an Accredited Certifying Entity for the type of crane to be used to operate a crane covered by this section. Certificates shall be issued to operators who:

(1) Pass a physical examination conducted by a physician which at a minimum shall include the examination criteria specified in the American Society of Mechanical Engineers (ASME) B30.5-2000 standard, Chapter 5-3.1.2(a)(1-5, 7, 8) or the U.S. Department of Transportation (US DOT) physical examination requirements contained in 49 CFR Sections 391.41 through 391.49.

(2) Pass a substance abuse test. The level of testing shall be consistent with the standard practice for the industry where the crane is in use and this test shall be conducted by a recognized laboratory service;

(3) Pass a written examination developed, validated, and administered in accordance with the Standards for Educational and Psychological Testing (Copyright 1999) published jointly by the Joint Committee of the American Educational Research Association, the American Psychological Association, and the National Council in Measurement in Education. The exam shall test knowledge and skills identified as necessary for safe crane operations and shall, at a minimum, include the following:

(A) Operational characteristics and controls, including characteristic and performance questions appropriate to the crane type for which qualification is sought;

(B) Emergency control skills, such as a response to fire, power line contact, loss of stability, or control malfunction;

(C) a demonstration of basic arithmetic skills necessary for crane operation and the ability to read and comprehend the crane manufacturer's operation and maintenance instruction materials, including load capacity information (load charts) for the crane for which certification is sought;

(D) knowledge of chapters 5-0 through 5-3 of The American Society of Mechanical Engineers (ASME) B30.5-2000 and B30.5a-2002 Addenda to the standard for mobile and locomotive cranes or chapters 4-0 through 4-3 of the ASME B30.4-1996 standard for portal, tower, and pedestal cranes or Chapter 3-3 of the ASME B 30.3-1996 standard for Construction Tower Cranes, depending on the type of crane(s) the operator intends to operate.

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(4) Pass a "hands-on" examination to demonstrate proficiency in operating the specific type of crane, which at a minimum shall include pre-start and post-start inspection, maneuvering skills, shutdown, and securing procedures.

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(b) Certification. Certificates shall be valid for a maximum of five (5) years. An Accredited Certifying Entity shall issue the certificate of competency to operators who successfully demonstrate the qualifications set forth in (a) (1) - (4) of this section.

(c) Accredited Certifying Entity. A certifying entity is any organization whose certification program is accredited by the National Commission for Certifying Agencies (NCCA).

(d) Re-certification. Crane operators shall re-certify every five (5) years and shall be required to meet all of the qualifications set forth in subsection (a). Operators with at least one-thousand (1,000) hours of documented

experience operating the specific type of crane for which re-certification is sought as covered by this section during the immediately preceding certification period and who meet the physical examination, substance abuse, and written examination requirements set forth in subsections (a) (1), (a) (2) and (a) (3) of this section shall not be required to take the "hands-on" examination specified in subsection (a) (4) to re-certify.

(e) Trainees may be authorized to operate mobile or tower cranes provided they are under the direct supervision of an operator possessing a valid certificate of competency for the type of crane operated by the trainee.

The term direct supervision means the supervising operator is in the immediate area of the trainee and within visual sighting distance and able to effectively communicate with the trainee. When performing direct supervision, the supervising operator shall have no other duties other than to observe the operation of the crane by the trainee.

(f) Effective Date. The requirements of Section 5006.1 shall become effective on June 1, 2005.

EXCEPTIONS TO SECTION 5006.1:

(1) Mobile cranes having a boom length of less than 25 feet or a maximum rated load capacity of less than 15,000 pounds.

(2) Operators of electric line trucks (digger derrick trucks) as defined in Section 2700 of the Electrical Safety Orders, and regulated by Section 2940.7 of the High Voltage Electrical Safety Orders. **This exception does not include mobile truck cranes designed and built in accordance with the American Society of Mechanical Engineers (ASME) B30.5 standards.**

(3) Marine terminal operations regulated by Article 14 of these Orders.

5. **September 08 EM 385-1-1 16.G.02** All cranes and hoisting equipment shall have the following documents with them (in the cab) at all times they are to be operated

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a A copy of the operating manual developed by the manufacturer for the specific make and model of the crane: a copy of the operating manual for any crane or hoist

CONTRACTOR CRANE COMPLIANCE REVIEW CHECKLIST REFERENCES

ASME, B30.5, 2004, 5-1.1.3(b) In addition to the data required on the crane load rating chart, the following information **shall** be shown on the rating chart or in the operating manual. (1 through 12)

6. ASME, B30.5, 2004, 5-1.1.3 (a) A durable rating Chart(s) with legible letters and figures **shall** be provided with each crane and attached in a location accessible to the operator while at the controls. 1 through 12)

29 CFR, 1910.180(c) (2) "Load rating chart." A substantial and durable rating chart with clearly legible letters and figures shall be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his controls.

29 CFR 1926.1433 (b) Mobile (including crawler and truck) and locomotive cranes manufactured on or after November 8, 2010 must meet the following portions of ASME B30.5-2004 (incorporated by reference, see 1926.6) as applicable:

Cal OSHA, Title 8, Article 93, §4923. Load Rating Chart. (a) A durable load chart with clearly legible letters and figures provided by the certified agent shall be securely fixed to the crane in a location clearly visible to the operator or within reach of the operator while at the control station. The chart shall contain a full and complete range of crane load ratings, consistent with the manufacturers' recommendations, at all stated operating radii or boom angles and for all permissible boom lengths, jib lengths and angles, also alternate ratings for use and non-use of optional equipment on the mobile crane, such as outriggers and counterweights which affect ratings. The chart shall also contain essential precautionary or warning notes relative to limitations on equipment and operating procedures, including indication of the least stable position. In addition, no crane shall be rerated unless such rating changes are approved by the certified agent. Load ratings shall be expressed in terms related to method of measuring boom angle and length or lifting radius.

September 08 EM 385-1-1 16.G.01 b 1-4 All cranes and hoisting equipment shall have the following documents with them (in the cab) at all times they are to be operated.

a. A copy of the load-rating chart (separate or included in the operating manual), shall include.

- (1)** The crane/hoist make and model, serial number, and year of manufacturer
- (2)** Load ratings for all operating configurations, including optional equipment
- (3)** Recommended reeving for the hoist line; and
- (4)** Operating limits in windy or cold weather conditions

7. ASME, B30.5 2004, 5-5.1.1.3 (a) (5) Recommended reeving for the hoist lines shall be shown.

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September 08 EM 385-1-1 16.G.01 b (3) recommended reeving for the hoist line.

8. September 08 EM 385-1-1, 16.C.02. b (4) Operating limits in windy or cold weather.

September 08 EM 385-1-1, 16.I. Environmental Conditions

16.I.01 Projects shall have adequate means for monitoring local weather conditions, including a wind indicating device

16.I.02 Cranes shall not be operated when wind speeds at the site attain the maximum velocity recommendations of the manufacturer. At winds greater than 20 mph (9 m/s), the operator, rigger, and lift supervisor shall cease all crane operations, evaluate conditions and determine if the lift shall proceed. The determination to proceed or not shall be documented in the crane operator's logbook.

16.I.03 When a local storm warning has been issued, the competent person shall determine whether it is necessary to implement manufacturer recommendations for securing the crane.

16.I.04 Operations performed during weather conditions that produce icing of the crane and hoisting equipment structure or reduced visibility shall be performed at reduced functional speeds and with signaling means appropriate to the situation.

16.I.05 When conditions are such that lightning is observed all crane and hoisting equipment operations cease. A period of 30 minutes between subsequent observations shall be observed prior to resuming work.

16.I.06 For night operations, lighting adequate to illuminate the working areas while not interfering with the operator's vision shall be provided.

ASME, 5-3.1.3(E)(8) When a local weather storm warning exist; considerations shall be given to the recommendations of the manufacture for securing the crane.

September 08 EM 385-1-1 16.G.01 b (4) Operating Limits in windy or cold conditions.

9. September 08 EM 385-1-1, 16.E.03 Operational Aids.

a. the devices listed here as operational aids are required on all cranes and derricks covered by section 16 unless otherwise specified.

d (1) (a) Use boom angle indicator

September 08 EM 385 16.E.03 E, e (1) Boom angle indicator. The equipment (except articulating boom cranes shall have a boom angle or radius indicator readable from the operator's station. Temporary alternative measures: radi or boom angle with a

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measuring device. Calibration and testing of indicators will be performed in accordance with the manufacturer's recommendations.

ASME B30.5 2004, 5-1.9.1(c) A boom angle or radius indicator readable from the operator's station shall be provided.

10. September 08 EM 385-1-1, 16.E.03 e (4) Load weighing and similar devices. Equipment, other than derricks, shall have at least one of the following: load weighing device, load moment indicator (LMI), rated capacity indicator or rated capacity limiter. **Note: When cranes are used in duty cycle operations they are exempt from the requirements for load indicating devices and LMI devices.**

ASME, B30.5, 2004, 5-1.9.9.2 Load Indicators, Rated Capacity Indicators and Rated Capacity Limiters. All new cranes with a maximum rated load capacity of 3 tons or more **shall** have a load indicator, rated capacity indicator, or rated capacity (load) limiter (see IV, New and Existing Installations).

29 CFR 1917.46 (a) (1) Except as provided in paragraph (a) (1) (viii) of this section, every crane after October 1984 **shall** be fitted with a load indicating device or alternative device in proper working condition.

Ca OSHA Title 8, Article 93. Boom-Type Mobile Cranes §4924. Load Safety Devices. All mobile cranes including truck-mounted tower cranes having either a maximum rated boom length exceeding 200 feet or a maximum rated capacity exceeding 50 tons shall be equipped with a load indicating device or a load moment device, or a device that prevents an overload condition. Only approved devices as defined in the General Industry Safety Orders, Section 3206 shall be used.

(1) All other mobile cranes manufactured after September 27, 2005, with a maximum rated capacity exceeding 3 tons shall be equipped with a load indicating device, load moment device, or a device that prevents an overload condition.

11. ASME B30.5 2004 5-2.1.6 (b) Operational aids shall be inspected and tested by a qualified person in accordance with the device/crane manufacturer's recommended procedures as part of the periodic inspection of para. 5-2.2.1

29 CFR 1917.46(a) (1) (ii) The accuracy of the load indicating device, weight-moment device, or overload protection device shall be such that any indicated load (or limit), including the sum of actual weight hoisted and additional equipment or "add ons" such as slings, sensors, blocks, etc., is within the range between 95 percent (5 percent under load) and 110 percent (10 percent overload) of the actual true total load. Such accuracy shall be required over the range of daily operating variables reasonably anticipated under the conditions of use.

12. ASME, B30.5, 5-1.9.11(d) Means shall be provided for operator to visually determine the levelness of the crane.

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September 08 EM 385-1-1, 16.E.01 a The following safety devices are required on all cranes unless otherwise specified. **(1)** The equipment shall have a crane level indicator that is either built into the equipment or is available on the equipment.

13. September 08 EM 385-1-1, 16.E.03 e (5) Hoist drum rotation indicator if the drum is not visible from the operator's cab. Temporary alternative measurers: mark the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

ASME, B30.5, 2004, 5-1.3.2(a) (5) Drum rotation indicators **should** be provided and located to afford sensing by the operator.

14. ASME, B30.5, 2004, 5-1.9.9.1

(a) Telescopic boom cranes shall be equipped with an anti-two-blocking device or a two-block damage prevention feature for all points of two-blocking (i.e., jibs, extensions; see section IV, New and existing Installations).

(b) Lattice boom cranes shall be equipped with an anti two-block warning feature that functions for all points of two-blocking. (See Section IV, New and Existing Installations)

September 08 EM 385-1-1, 16.E.03 Operational Aids.

(3) Anti-two-blocking device (A2B). Anti two-blocking devices shall be installed at all points of two-blocking.

(a) All cranes and derricks shall be equipped with A2B/hoist-limit device that will disengage the function that is causing the two-blocking or an A2B Damage prevention feature (except as Noted) They shall be tested and certified functional by a competent person prior to operating the crane.

(b) Lattice boom cranes: Lattice boom cranes shall be equipped with an A2B device to stop the load hoisting and boom-down functions before the load contacts the boom

Exception 1 Duty Cycle. Lattice boom cranes that are used exclusively for duty cycle operations are exempt from A2B equipment requirements.

Exception 2 Lattice boom cranes with manually operated friction brakes: Lattice boom crane and hoisting equipment with manually activated friction brakes, A2B warning devices may be used in lieu of A2B prevention devices.

(c) Telescopic boom cranes.

(i) Telescopic boom cranes shall be equipped with A2B Device to stop the load hoisting function before the load block or load contacts the boom tip to prevent damage to the hoist rope or other machine components when extending the boom.

(ii) Telescopic boom cranes that are used exclusively for duty cycle operations shall be equipped with a two-blocking warning device to prevent damage to the hoist rope or other machine components when extending the boom.

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(d) Floating cranes. Floating cranes may use an A2B alarm system in lieu of a disengaging device unless they are hoisting personnel.

29 CFR 1917.45(j) (10) All cranes and derricks used to hoist personnel shall be equipped with an anti-two-blocking device.

29 CFR 1926.1416 (d)(3)(i)&(ii) Telescopic boom cranes manufactured after Feb. 28, 1992, must be equipped with a device which automatically prevents damage from contact between the load block, overhall ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur. **(ii)** Lattice boom cranes manufactured after Feb. 28, 1992, must be equipped with a device that either automatically prevents damage and load failure from contact between the load block, overhall ball, or similar component, and the boom tip (or fixed upper block or similar component), or warns the operator in time for the operator to prevent two-blocking/failure or provide adequate warning for all points where two-blocking could occur.

NAVSEA Std. Item 009-40, 3.6.4 Have an operational anti-two blocking device or a two-blocking damage prevention feature for all points of two-blocking.

15. September EM 385-1-1, 16. D 08 Start Up Inspection. Start up Inspections. (Pre-operational, each shift). Before every crane or derrick operation (at beginning of each shift) or following a change of operator, a competent person shall visually inspect the items listed below. If any deficiency is identified, on immediate determination shall be made by the competent person as to whether the deficiency constitutes a safety hazard. If it does, the equipment shall be properly removed from service. **d** Operator aids and other safety devices for proper functioning and accuracy of setting

September EM 385-1-1, 16.E.03 Operational Aids.

b. Operations shall not begin unless operational aids are in proper working order except where the employer meets the specified temporary alternative measures. More protective alternative measures specified by the crane/derrick manufacturer, if any, shall be followed

ASME, B30.5, 2004, 5-2.1.6

(a) Prior to daily operation, operational aids shall be checked in accordance with the device/crane manufacturer's recommended procedures to determine if they are functioning properly.

(b) Operational aids shall be inspected and tested by a qualified person in accordance with the device/crane manufacturer's recommended procedures as part of the periodic inspection.

(c) When operational aids are inoperative or malfunctioning, the crane and / device manufacturer's for continued operation or shutdown of the crane shall be followed until the problems are corrected.

29 CFR 1910.180(d) (3) "Frequent inspection" Items such as the following shall be inspected for defects at intervals as defined in paragraph (d)(2)(i) of this section

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or as specifically indicated including observation during operation for any defects which might appear between regular inspections. Any deficiencies such as listed shall be

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carefully examined and determination made as to whether they constitute a safety hazard:

29 CFR 1910.180(d) (3) (iii) All safety devices for malfunction.

16. September 08 EM 385-1-1, 16.D.08 f Hydraulic and pneumatic systems for deterioration or leakage with particular emphasis given to those that flex during normal operation.

ASME, B30.5, 5-2.1.2 Items such as the following **shall** be inspected by a designated person for defects at the intervals as defined in par. 5-2.1.1(b)(1) or as specifically indicated by the manufacture, including observations during

operation for any deficiencies which might appear between regular inspections. Any deficiencies, such as those listed shall be carefully examined and a determination made as to whether they constitute a hazard.

(d) All hydraulic hoses, and particularly those which flex in normal operation of crane functions, **should** be visually inspected once every working day when used.

(h) Hydraulic system for proper oil level – daily when used.

ASME, B30.5, 5-2.1.2 Periodic Inspection Complete inspections of the crane shall be performed by a qualified person at intervals as generally defined in para. 5-2.1.1(b) (2), depending on the crane's activity, severity of service, and environment, or as specifically indicated below. These inspections shall include the requirements of para. 5-2.1.2 and items such as the following any deficiencies shall be examined and determination made as to whether they constitute a hazard.

(l) Hydraulic and pneumatic hose, fittings, and tubing

(1) Evidence of leakage at the surface of the flexible hose or its junction with the metal and couplings.

(2) Blistering or abnormal deformation of the outer covering of the hydraulic or pneumatic hose.

(3) Leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures.

(4) Evidence of excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or fitting. Means shall be taken to eliminate the interference of element

(m) Hydraulic and pneumatic pumps and motors

(1) Loose bolts or fasteners

(2) Leaks at joints between sections

(3) Shaft seal leaks

(4) Unusual noises or vibration

(5) Loss of operating speed

(6) Excessive heating of the fluid

(7) Loss of pressure

(n) Hydraulic and pneumatic valves

(1) Cracks in valve housing

(2) Improper return of spool to neutral position

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- (3) Leaks at spools or joints
- (4) Sticking spools
- (5) Failure of relief valves to attain correct pressure setting
- (6) Relief valve pressures as specified by the manufacturer
- (o) Hydraulic and pneumatic cylinders
 - (1) Drifting caused by fluid leaking across the piston.
 - (2) Rod seals leakage
 - (3) Leaks at welded joints
 - (4) Scored, nicked, or dented cylinder rods
 - (5) Dented case (barrel)
 - (6) Loose or deformed rod eyes or connecting joints

29 CFR 1910.180(d) (3) "Frequent inspection." Items such as the following shall be inspected for defects at intervals as defined in paragraph

29 CFR 1910.180 (d) (2) (i) of this section or as specifically indicated including observation during operation for any defects which might appear between regular inspections. Any deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard:

29 CFR 1910.180(d) (3) (iv) Deterioration or leakage in air or hydraulic systems: Daily.

17. ASME, B30.5, 5-2.1.2(g) Check electrical apparatus for proper functioning and absence of signs of excessive deterioration, dirt, and moisture accumulation.

September 08 EM 385-1-1, 16.D.08 I Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt and moisture accumulation

29 CFR 1910.180(d) (3) (vii) Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.

18. ASME, B30.5, 5-2.1.2(e) Check hooks and latches for deformation, chemical damage, cracks, and wear (refer to ASME B30.10).

ASME B30.10, 10-2.2.1.3 (c) Hooks having any of the following conditions shall be removed from service until repaired or replaced.

- (1) **Deformation.** Any visibly apparent bend or twist from the plane of the unbent hook
- (2) **Throat Opening.** Any distortion causing an increase in throat opening of 5% not to exceed ¼ in. (or as recommended by the manufacturer.)
- (3) **Wear.** Any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin.

September 08 EM 385-1-1, 16.D.08 g Hooks and latches for absence of deterioration, chemical damage, cracks, and wear.

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19. **ASME, B30.5, 5-1.9.11(c)** An audible signal device shall be provided. The control of the device shall be within reach of the operator.

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ASME B30.5, 5-3.3.7 Audible Travel Signals. When moving the vehicle, the following signals shall be used.

- (a) **Stop:** one short audible signal
- (b) **Go Ahead:** Two short audible signals
- (c) **Back Up:** Three short audible signals

September 08 EM 385-1-1, 16.D.08 j All self-propelled equipment, whether moving alone or in combination, shall be equipped with a backup alarm. >See 18.B.01

September 08 EM 385-1-1, 18.B.01 Reverse signal (backup) alarm.

(a) All self-propelled construction and industrial equipment whether moving alone or in combination, shall be equipped with a backup alarm.> Equipment designed and operated so that the operator is always facing the direction of motion does not require a backup alarm.

(b) Backup alarms shall be audible and sufficiently distinct to be heard above the surrounding noise level.

(c) Alarms shall operate automatically upon commencement of backward motion. Alarms may be continuous or intermittent (not to exceed 3-second intervals) and shall operate during the entire backward movement.

(d) Backup alarms shall be in addition to requirements for signal persons.

(f) The removal or disabling of any backup alarm is strictly prohibited.

20. ASME, B30.5, 5-1.9.11 (g) A sign shall be installed, visible from the operator's station, warning that electrocution or serious bodily injury may occur unless a minimum clearance of 10 ft (3 m) is maintained between the crane or load for energized power lines up to 50 kV, and that greater clearances are required for higher voltages.

where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following: For lines rated 50kV of below, minimum clearance between the lines and any part of the crane or load be 10 feet.

21. 29 CFR 1926.1413 (a)

(1) A competent person must begin a visual inspection prior to each shift the equipment is used, which must be completed before or during that shift. The inspection must consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed in paragraph (a) (2) of this section. Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

(2) *Apparent deficiencies.*

(i) *Category I.* Apparent deficiencies in this category include the following:

(A) Significant distortion of the wire rope structure such as kinking, crushing, unstranding, birdcaging, signs of core failure or steel core protrusion between the outer strands.

(B) Significant corrosion.

(C) Electric arc damage (from a source other than power lines) or heat damage.

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(D) Improperly applied end connections.

(E) Significantly corroded, cracked, bent, or worn end connections (such as from severe service).

(ii) **Category II.** Apparent deficiencies in this category are:

(A) Visible broken wires, as follows:

(1) In running wire ropes: Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope.

(2) In rotation resistant ropes: Two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.

(3) In pendants or standing wire ropes: More than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection.

(B) A diameter reduction of more than 5% from nominal diameter. (iii)

Category III Apparent deficiencies in this category include the following:

(A) In rotation resistant wire rope, core protrusion or other distortion indicating core failure.

(B) Prior electrical contact with a power line.

(C) A broken strand.

(3) **Critical review items.** The competent person must give particular attention to all of the following:

(i) Rotation resistant wire rope in use.

(ii) Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends.

(iii) Wire rope at flange points, crossover points and repetitive pickup points on drums.

(iv) Wire rope at or near terminal ends.

(v) Wire rope in contact with saddles, equalizer sheaves or other sheaves where rope travel is limited.

(4) **Removal from service.**

(i) If a deficiency in Category I (see paragraph (a) (2) (i) of this section) is identified, an immediate determination must be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question must be prohibited until:

(A) The wire rope is replaced (see 1926.1417), or

(B) If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(ii) If a deficiency in Category II (see paragraph (a) (2) (ii) of this section) is

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identified, operations involving use of the wire rope in question must be prohibited until:

(A) The employer complies with the wire rope manufacturer's established criterion for removal from service or a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope (see § 1926.1417),

(B) The wire rope is replaced (see § 1926.1417), or

(C) If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(iii) If a deficiency in Category III is identified, operations involving use of the wire rope in question must be prohibited until:

(A) The wire rope is replaced (see 1926.1417), or

(B) If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited. If a rope is shortened under this paragraph, the employer must ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position. (iv) Where a wire rope is required to be removed from service under this section, either the equipment (as a whole) or the hoist with that wire rope must be tagged-out, in accordance with § 1926.1417(f)(1), until the wire rope is repaired or replaced.

29 CFR 1910.180 (g) "Running ropes." A through inspection of all ropes shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes **shall** be prepared and kept on file where readily available. All inspections **shall** be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength **shall** be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some conditions that could result in an appreciable loss of strength are as follows:

(g)(1)(i) Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

(g)(1)(ii) A number of broken outside wires and the degree of distribution of concentration of such broken wires.

(g)(1)(iii) Worn outside wires.

(g)(1)(iv) Corroded or broken wires at the end connection.

(g)(1)(v) Corroded, cracked, bent, worn, or improperly applied connections.

(g)(1)(vi) Severe kinking, crushing, cutting, or unstranding.

ASME B30.5, 5-2.4.3(1) (b) In rotation resistant ropes, two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in thirty

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rope diameters. For special conditions relating to rotation resistant rope, refer to paragraph. 5-3.2.1.1(d)(1)(b).

ASME B30.5, 5-2.4.3 Rope Replacement

(a) No precise rules can be given for determination of the exact time for rope replacement since many variable factors are involved. Once a rope reaches any one of the specified removal criteria, it may be allowed to operate to the end of the work shift, based on the judgment of a qualified person. The rope shall be replaced after that work shift, at the end of the day, or at the latest time prior to the equipment being used by the next work shift.

(b) Removal criteria for rope replacement shall be as follows:

(1) Broken Wires

(a) In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.

(b) In rotation-resistant ropes, two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters. For special conditions relating to rotation-resistant rope, refer to para. 5-3.2.1.1(d)(1)(b).

(2) One outer wire broken at the point of contact with the core of the rope that has worked its way out of the rope structure and protrudes or loops out from the rope structure. Additional inspection of this section is required.

(3) Wear of one-third the original diameter of outside individual wires.

(4) Kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure.

(5) Evidence of any heat damage from any cause.

(6) Reductions from nominal diameter of more than the following:

(a) 1/64 in. (0.4 mm) for diameters up to and including 5/16 in. (8.0 mm)

(b) 1/32 in. (0.8 mm) for diameters from 3/8 in. (9.5 mm) to and including 1/2 in. (13.0 mm)

(c) 3/64 in. (1.2 mm) for diameters from 9/16 in. (14.5 mm) to and including 3/4 in. (19.0 mm)

(d) 1/16 in. (1.6 mm) for diameters from 7/8 in. (22.0 mm) to and including 1 1/8 in. (29.0 mm)

(e) 3/32 in. (2.4 mm) for diameters from 1 1/4 in. (32.0 mm) to and including 1 1/2 in. (38.0 mm)

(7) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

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September 08 EM 385-1-1, table 16.2

TABLE 16-2

Wire Rope Removal and Replacement Criteria

Standard	Equipment	# OF BROKEN WIRES IN RUNNING ROPES			# OF BROKEN WIRES IN STANDING ROPES		
		In one rope lay	In one strand	At end connection	In one rope lay	At end connection	
ASME/B30.2	Overhead & gantry cranes	12**	4	N/S	Not Specified		
ASME/B30.4	Portal, tower, & pillar cranes	6**	3	2	3	2	
ASME/B30.5	Mobile & locomotive cranes	Running ropes	6**	3	2	3	2
		Rotation-resistant ropes	2 randomly distributed broken wires in 6 rope dia. or 4 randomly distributed broken wires in 30 rope dia. **				
ASME/B30.6	Demicks	6**	3	2	3	2	
ASME/B30.7	Base-mount drum hoists	6**	3	2	3	2	
ASME/B30.8	Floating cranes and demicks	6**	3	2	3	2	
ASME/B30.16	Overhead hoists	12**	4	N/S	Not Specified		
ANSI/A10.4	Personnel hoists	6**	3	2	2**	2	
ANSI/A10.5	Material hoists	6**	Not Specified		Not Specified		

22. ASME B30.5, 5-1.3.2 (2)(a) Load hoist drums shall have rope capacity with the recommended rope size and reeving sufficient to perform crane service within the range of boom lengths, operating radii, and vertical lifts specified by the manufacturer
(a) No less than two full wraps of rope shall remain on the drum when the hook is in the extreme low position

SEPT 08 EM 385 1-1, 16.G.03 Hoisting wire ropes shall be installed in accordance with ANSI/ASME standards and the equipment manufacture’s recommendations.

- a. Overhead and gantry cranes shall have at least two full wraps of wire on the drum at all times.
- b. All other cranes shall have at least three full wraps (not layers) of wire on the drums at all times.

Cal OSHA, Title 8, Article 93, §4929. Load Hoist Drums. **(c)** Load hoist drums shall have rope capacity with recommended rope size and reeving to perform crane service within the range of boom lengths, operating radii and vertical lifts specified by the certified agent.

(1) No less than 2 full wraps of rope shall remain on the drum when the hook is in its extreme low position.

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23. 29 CFR, 1917.50 (c)(1) Each crane and derrick **shall** tested as a unit quadrennially, and shall be examined annually. Certificates of test and examination shall be made readily available for inspection.

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29 CFR, 1918.66(a)(1) Certification. Cranes shall be certified in accordance with part 1919 of this chapter.

29 CFR, 1919.71

(a) Unit proof test of cranes shall be carried out at the following times:

(a)(1) In the case of new cranes, before initial use and every 4 years thereafter.

(a)(2) In the cases of uncertified cranes which have been in use, at the time of initial certification and every 4 years there after.

(a)(3) After important alterations and renewals and after repairs due to failure f, or damage to major components.

(b) Unit proof load test of cranes shall be carried out where applicable with the boom in the least stable direction relative to the mounting, based on the manufacture's specifications.

1919.72(a) In any Year in which no quadrennial unit proof test is required, an examination shall be carried out by an accredited person or his authorized representative. Such examination shall be made not later than the anniversary date of the quadrennial certification and shall conform with the requirements of 1919.71(d)

24. September 08 EM 385-1-1, 16L.04 Land cranes/derricks mounted on barges, pontoons or other means of flotation.

16L.04 c (2) Cranes shall be blocked or secured to prevent -shifting.

16L.04 c (3) The crane shall be allowed to travel on the barge for repositioning only. If traveling is required while lifting the load, this lift shall be deemed a critical lift and a critical lift plan is required. It must include a Naval Architectural Analysis to determine these parameters. A marine engineer or registered professional engineer familiar with floating crane design shall perform this analysis. In addition, the manufacturer's recommendations shall be followed.

December 2009 NAVFAC P-307, 3.8 Mobile Cranes Temporarily Mounted on Barges. Mobile cranes certified for use onshore may be mounted on barges after meeting the requirements detailed below.

3.8.3 Sizing and Analyzing the Barge Deck. The engineering organization shall conduct an analysis of the barge deck structure for the expected crane outrigger (or crawler) and tie-down loads. Except for crawler cranes without outriggers, the crane must be equipped with and used on outriggers. Outriggers shall rest on wood blocking. The crane carrier frame shall be secured to the barge deck with tie-downs to resist lateral loads. Tie-down sizes shall be calculated by the activity engineering organization based on expected maximum lateral loads and shall have some slack when the crane is fully raised on outriggers.

25. December 2009 NAVFAC P-307 1.7.2 a Require the contractor to comply with specific activity regulations pertaining to crane safety and operation (including allowable

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crane access routes and ground 1-7 loading limitations), and to notify the contracting officer, in advance, of any cranes entering the activity. Require the contractor to comply

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with applicable ASME standards (e.g., ASME B30.5 for mobile cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes). For barge-mounted mobile cranes, require a third party certification from an OSHA accredited organization, load indicating device, a wind indicating device, and a marine type list and trim indicator a readable in one-half degree increments.

September 08 EM 385-1-1, 16L.06 Safety Devices And Operational Aids. In addition to those required by section 16.E.03, the following are required: **a.** Pontoon, barge, vessel or flotation device list and trim device; Shall be located in the cab or at the operator's station (if there is no cab) as a means for the operator to visually determine the list and trim. **b.** Wind speed and direction indicator: within clear view of the operator's station.

EM 385-1-1, 16.E.03 e(4) Load weighing and similar devices. Equipment, other than derricks, shall have at least one of the following: load weighing device, load moment indicator (LMI), rated capacity indicator or rated capacity limiter. **Note: *When cranes are used in duty cycle operations they are exempt from the requirements for load indicating devices and LMI devices.***

26. September 08 EM 385-1-1, 16L.04 Land cranes/derricks mounted on barges, pontoons or other means of flotation.

a. the rated capacity of the equipment (load charts) applicable for use on land shall be reduced by the equipment manufacturer, or a qualified person who had expertise with respect to both land crane/derrick capacity and the stability of vessels/flotation devices.

b. Load Charts. The rated capacity of the equipment for use on land shall be reduced to:

(1) Account for increased loading from list, trim, wave action and wind.

(2) Be applicable to a specified location(s) on the specific barge, pontoons, vessel or other means of flotation that will be used, under the expected environmental conditions.

(3) Insure allowable list and trim for the land crane/derrick shall not exceed the amount specified by the crane/derrick manufacturer or if not specified, the amount specified by the qualified person.

(4) Maximum allowable list and trim for the barge, pontoon or other means of flotation shall not exceed the amount to ensure.

(a) All deck surfaces of the barge, pontoon or flotation device shall be above the water:

(b) The entire bottom area of the barge, pontoon or flotation device shall be submerged;

(c) The maximum allowable list or trim shall not exceed the least of the following: 5 degrees, the maximum specified by the crane/derrick manufacture or if not specified, the amount specified by the qualified person.

29 CFR 1926. 1437 (m) (4) If the equipment is employer made, it must not be used unless the employer has documents demonstrating that the load charts and applicable parameters for use meet the requirements of paragraphs (m)(1) through (3) of this section. Such documents must be signed by a registered professional engineer

CONTRACTOR CRANE COMPLIANCE REVIEW FORM REFERENCES

who is a qualified person with respect to the design of this type of equipment (including the means of flotation).

DECEMBER 2009 NAVFAC P-307, 1.7.2 e (6) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements

CONTRACTOR RIGGING GEAR CHECKLIST

Contractor:	Sub:	Date:
Crane Mfg.:	Ser.#:	
Location:	Rigging Gear Owner:	
Contracting Officer:	Phone:	Contract #:

	YES	NO	N/A
1. Is rigging gear inspected prior to use? -- I IAW Sept 08 EM 385 15.A.01.a & 29 CFR 1926.251 (a)(1) & Cal OSHA Title 8 Article 101, 5043			
2. Is defective rigging removed from service? -- IAW Sept. 08 EM 385 15.A.01.b & CFR 29 1926.251 (a)(6)			
3. Is the rigging used in accordance with its working load limit? – IAW Sept 08 EM 385 15.A.01 c & 29 CFR 1926.251 (a)(2) & ASME B30.5, 5-3.2.1.3(b) & Cal OSHA Title 8 Article 101 5045 (a)			
4. Are positive latching devices on hooks used to secure the load and rigging? -- IAW, Sept 08 EM 385 15. A.05 & 29 CFR 1017.45 (longshoring)			
5. Is rigging hardware, hooks, shackles, rings, padeyes etc. inspected for damage and is defective gear removed from service? -- IAW, Sept 08 EM 385 15.A.06 & 29 CFR 1926.251 (a)(1) & 1926.251 (a)(4) & ASME B30.26			
6. Are custom designed grabs, hooks, clamps, or other lifting accessories marked to indicate the working load limit? -- IAW Sept EM 385 15.A.07 & 29 CFR 1926.251 (a)(4) & Cal OSHA Title 8 Article 101 5049 (f) & ASME B30.20, 20-1.2.1(a)(b)(c)			
7. Are wire rope clips used correctly? -- IAW Sept. 08 EM 385 15.D.03 & 29 CFR 1926.251 (c)(5) & ASME B30.5, 5-1.7.3 (b) & Cal OSHA Title 8 Article 101 5045 (d) (3) & ASME B30.26, 26.3.1-26.3.1.3			
8. Is wire rope used for hoisting, one continuous piece without knots or splices? (Exception - eye splices in the ends of wire rope pendants and endless slings) -- IAW, Sept 08 EM 385 15.D.07 & 29 CFR 1926.251 (c) (4) (ii) & ASME B30.9, 9-2.3.1 a-b			
9. Are the eyes in wire rope slings properly fabricated without the use of clips or knots? -- IAW, Sept. 08 EM 385 15.D.08 & CFR 1926.251(c) (4) (i) & Cal OSHA Title 8 Article 101 5045 (f) & ASME B30.9, 9-2.3.1 a-b			

CONTRACTOR RIGGING GEAR CHECKLIST

	YES	NO	N/A
10. Are slings protected from sharp edges by the use of chaffing gear? -- IAW Sept. 08 EM 385 15.G.02 & 29 CFR 1926.251(c)(9) & Cal OSHA Title 8 Article 101 5042 (a) (7)			
11. Is the minimum length of wire maintained between the splices, sleeves or end fittings? -- IAW 29 CFR 1926.251 (c)(13)(i) & Sept 08 EM 385-1-1 15-G.04(a)(b) & Cal OSHA Title 8 Article 101 5045 (b) (1) & ASME B30.9, 9-2.3.2 (b)			
12. Is the minimum circumferential length maintained for wire rope endless slings? -- IAW 29 CFR 1926.251(c)(13)(i)-(iii) ASME B30.9, 9-2.3.2 (a)-(c) & Cal OSHA Title 8 Article 101 5045 (b) (3) & ASME B30.9, 9-2.3.2(d)			
13. Are wire rope and synthetic slings marked with manufacture's name, type of material, and rated capacity for all three configurations? -- IAW Sept. 08 EM 385 15 G.O7. & 29 CFR 1926.251 (e)(1) & ASME B30.9, 9-5.7.1			
14. Is the removal criteria for synthetic slings followed? -- IAW 29 CFR 1926.251 (e)(8) & 29 CFR 1910.184 (i)(9) & Sept. 08 EM 385 1-1, 15.G.01 b & ASME B30.9, 9-5.9.4			
15. Is the removal criteria for wire rope slings followed? -- IAW ASME B30.9 9-2.9.4 & 29 CFR 1910.184 (f)(5) & Cal OSHA Title 8 Article 101 5045 (e) (1-8)			
16. Are eyebolts, eye nuts and swivel hoist rings properly marked, are they in satisfactory condition, and are they used correctly? -- IAW, Sept 08 EM 385 15.H.10 f-g & ASME B30.26, 26-2.5.1 & 26-2.9.4.2-, 26-2.9.4.4			
17. Are alloy steel chains assembled from grade 80 or higher chain? —IAW Sept. 08 EM 385 1-1, 15G & ASME B30.9,9-1.3.1(a)			
18. Are alloy steel chain slings properly marked to show name of manufacturer, grade or size, number of legs, rated loads for the hitches used and reach? - IAW Sept. 08 EM 385 1-1, 15G & ASME B30.9,9-1.7.1 (a-f) & 29 CFR 1910.184(e)(1)			
19. Is the removal criteria for synthetic round slings followed? —IAW Sept. 08 EM 385 1-1, 15G & ASME B30.9, 9-6.9.4			
20. Is the minimum Dd ratio maintained between the sling and the pin, shackle, hook, or ring. NAVFAC P-307 14.7.2.3			

SIGNATURE:	Date:
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Contractor Crane Rigging Gear References

Item

1. **29 CFR, 1926.251 (a)(1)** Rigging equipment for Material handling *shall* be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.

Sept 08. EM 385-1-1 15.A.01 a Rigging equipment shall be inspected as specified by the manufacture, by a competent person, before use on each shift and as necessary during its use to ensure that it is safe.

Cal OSHA Title 8 Article 101, 5043 Each Day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a qualified person. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

2. **29 CFR, 1926.251 (a)(6)** "Inspections" Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

Sept. 08 EM 385-1-1, 15.A.01 b Defective rigging shall be removed from service.

3. **29 CFR, 1926.251 (a)(2)** Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in Tables H-1 through H-20 in this section, following 1926.252(e) for the specific equipment.

Sept. EM 385-1-1, 15.A.01 c The use and maintenance of rigging equipment shall be in accordance with recommendations of the rigging manufacturer and the equipment manufacturer: Rigging equipment shall not be loaded in excess of its recommended safe working load.

ASME B30.5, 5-3.2.1.3 (b) The load shall be attached to the hook by means of slings or other devices of sufficient capacity.

Cal OSHA Title 8 Article 101, 5045 (a) Sling use. Wire rope slings shall not be used with loads in excess of their rated capacities.

4. **Sept. 08 EM 385-1-1, 15.A.05** When hoisting loads, a positive latching device shall be used to secure the load and rigging (i.e., self closing safety latches, hook with a spring- loaded gate, an alloy anchor type shackle with a bolt, nut, and retaining pin).

29 CFR, 1917.45 (e)(2) (Longshoring) Crane hooks shall be latched or otherwise secured to prevent accidental load disengagement.

Contractor Crane Rigging Gear References

Contractor Crane Rigging Gear References

5. **Sept. 08 EM 385-1-1, 15.A.06** Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.

29 CFR, 1926.251 (a) (1) Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.

6. **29 CFR, 1926.251 (a)(4)** Special custom design grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125 percent of their rated load.

Cal OSHA Title 8 Article 101, 5049 (f) Special Design grabs, hooks, clamps, or other lifting accessories for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested to 125 percent of the rated load prior to use.

Sept 08 EM 385 1-1, 15.A.07 Custom designed grabs, hooks, clamps, or other lifting accessories (i.e. equalizing beams, lifting or spreader beams, etc.) for such units as modular panels, prefabricated structures, and similar materials shall be marked to indicate the safe working loads and shall be proof-tested before use, to 125% of their load.

7. **29 CFR, 1926.251 (c)(5)(i)** When used for eye splices, the U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

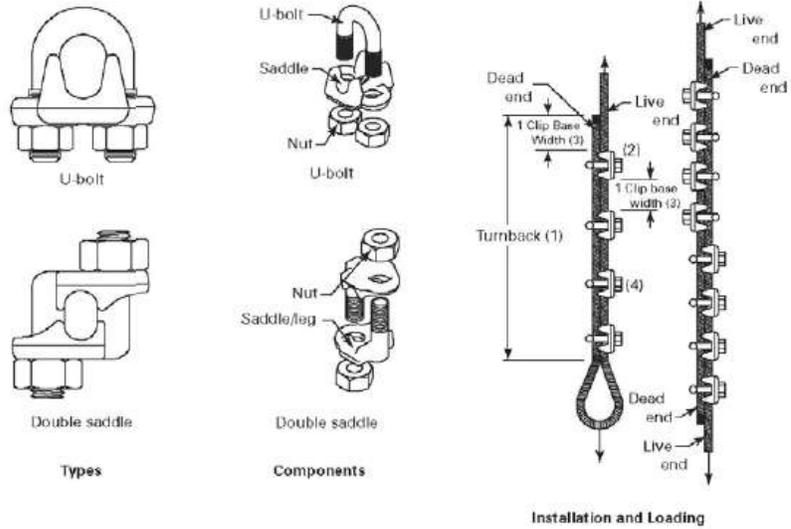
ASME B30.5, 5-1.7.3(b) Wire rope clips shall be drop forged steel of the single saddle (U-bolt) or double saddle type clip. Malleable cast iron clips shall not be used. For spacing, number of clips, and torque values, refer to the clip manufacturer's recommendation. Wire rope clips attached with U-bolts over the dead end of the rope and the live rope resting in the clip saddle. Clips shall be tightened evenly to the recommended torque. After the initial load is applied to the rope, the clip nuts shall be retightened to the recommended torque to compensate for any decrease in rope diameter caused by the load.

Sept 08 EM 385 1-1, 15.D.03 Wire rope clips attached with U-bolts shall have the U-bolts on the (unloaded) dead end or short end of the rope. The clip nuts shall be retightened immediately after initial load carrying use and at frequent intervals thereafter. >see Figure 15-1 and table 15-1

Contractor Crane Rigging Gear References

FIGURE 15-1

Wire Rope Clip Spacing (Not to be used for slings)



GENERAL NOTE: Correct number of clips for wire rope size shall be used.

NOTES:

- (1) correct turnback length should be used
- (2) correct orientation of saddle on live end shall be observed
- (3) correct spacing of clips should be used
- (4) correct torque on nuts shall be applied

Contractor Crane Rigging Gear References

TABLE 15-1

**NUMBER OF CLIPS AND THE PROPER TORQUE NECESSARY
TO ASSEMBLE WIRE ROPE EYE LOOP CONNECTIONS WITH
A PROBABLE EFFICIENCY NOT MORE THAN 80%**

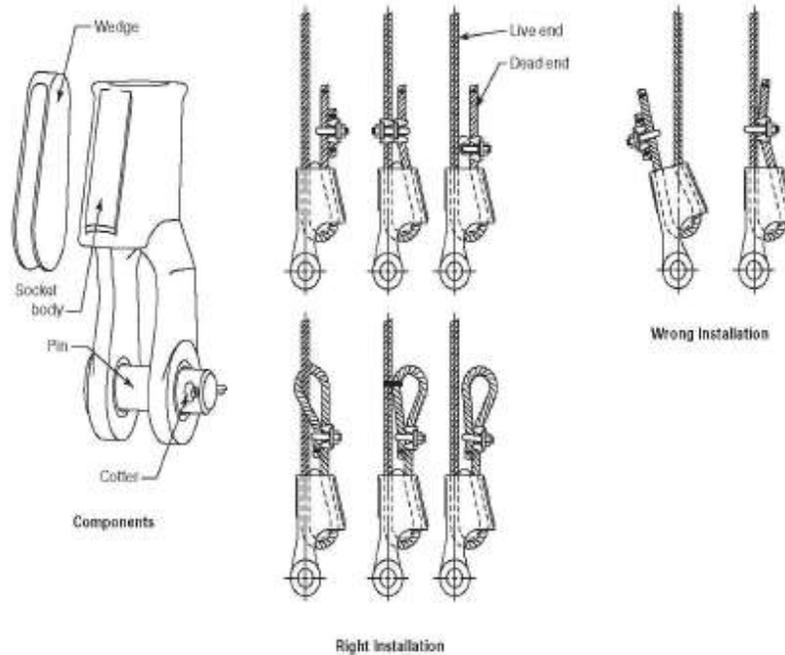
Rope diameter (in/cm)	Nominal size of clips (in/cm)	Number of clips	Torque to be applied to nuts of clips (ft-lb/N-m)
5/16 (0.7)	3/8 (0.9)	3	25 (33.9)
3/8 (0.9)	3/8 (0.9)	3	25 (33.9)
7/16 (1.0)	1/2 (1.2)	4	40 (54.3)
1/2 (1.2)	1/2 (1.2)	4	40 (54.3)
5/8 (1.5)	5/8 (1.5)	4	65 (88.2)
3/4 (1.9)	3/4 (1.9)	5	100 (135.7)
7/8 (2.2)	1 (2.5)	5	165 (223.9)
1 (2.5)	1 (2.5)	6	165 (223.9)
1 1/4 (3.1)	1 1/4 (3.1)	7	250 (339.3)
1 3/8 (3.4)	1 1/2 (3.8)	7	375 (508.9)
1 1/2 (3.8)	1 1/2 (3.8)	8	375 (508.9)
1 3/4 (4.3)	1 3/4 (4.3)	8	560 (760.0)

The spacing of clips should be 6 times the diameter of the wire rope. Thimbles shall be used if wire rope is to be spliced.

Contractor Crane Rigging Gear References

FIGURE 15-2

**WIRE ROPE CLIP ORIENTATION
(NOT TO BE USED FOR SLINGS)**



Cal OSHA Title 8, Article 101, 5045 (d) (3) Where rope clip attachments are used, they shall be made with U-bolts on the dead or short end of the rope and the saddle on the live end. The minimum number of clips for end attachments shall not be less than indicated in manufacturer's tables, but in no case shall be less than three for any permanent installation. Clips shall be drop forged steel. The clips shall be spaced at a distance equal to at least six times the diameter of the rope. All clip or clamp bolts shall be kept tight after tightening while rope is under tension.

8 Sept. 08 EM 385-1-1, 15.D.07 Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads shall consist of one continuous piece without knot or splice.

29 CFR 1926.251 (c)(4)(ii) Except for eye splices in the ends of wires and for endless slings, each wire rope used in hoisting or lowering, or pulling loads, shall consist of one continuous piece without knot or splice.

9 29 CFR 1926.251 (c)(4)(i) An eye splice made in any wire rope shall have not less than three full tucks. However, this requirement shall not operate to preclude the use of another form

Contractor Crane Rigging Gear References

of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.

29 CFR 1926.251 (c)(3) Wire rope shall not be secured by knots except on haul back lines on scrapers.

29 CFR 1926.251 (c)(4)(iii) Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips.

Sept. 08 EM 385 1-1, 15.D.08 Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.

Cal OSHA Title 8, Article 101, 5049 (f) Special Design grabs, hooks, clamps, or other lifting accessories for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested to 125 percent of the rated load prior to use

10. 29 CFR 1926.251 (c)(9) Slings shall be padded or protected from the sharp edged of their loads.

29 CFR 1915.116 (f) Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.

Sept 08 EM 385-1-1, 15.G.02 Protection shall be provided between the sling and sharp unyielding surfaces of the load to be lifted.

Cal OSHA Title 8 Article 101, 5042 (a) (7) Slings shall be padded or protected from the sharp edges of their loads

11. 29 CFR, 1926.251(c)(13)(i) Cable laid and 6 x 19 and 6 x 37 slings shall have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings.

29 CFR, 1926.251(c)(13)(ii) Braided slings shall have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings.

Sept 08 EM 385 1-1, 15.G.04 a Wire rope slings shall have a minimum of length of clear wire rope equal to ten times the rope diameter between each end fitting or eye splice.

(b) Braided slings shall have a clear length of braided body equal to forty times the diameter of component ropes between each end fitting or eye splice.

Cal OSHA Title 8, Article 101, 5045 (b) (1) Cable laid and 6 X19 and 6 X 37 slings shall have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings.

Contractor Crane Rigging Gear References

12. 29 CFR, 1926.251(c)(13)(iii) Cable laid grommets, strand laid grommets and endless slings shall have a minimum circumferential length of 96 times their body diameter.

Cal OSHA Title 8, article 101, 5045 (b) (3) Cable laid grommets, strand laid grommets and endless slings shall have a minimum circumferential length of 96 times their body diameter.

13. 29 CFR, 1926.251(e)(1) The employer shall have each synthetic web sling marked or coded to show:

- (i) Name and trade mark of manufacturer.
- (ii) Rated capacities for the type of hitch. (iii) Type of material.

ASME B30.9, 9-5.7.1 Each sling shall be marked to show: (a) name or trademark of manufacture (b) Manufacture's code or stock number (c) Rated load for types of hitches, and the angle upon which it is based: (d) type of synthetic web material.

Sept. 08 EM 385 1-1 15.G.07 The employer shall have each synthetic rope sling, metal mesh sling, synthetic web sling, or roundsling marked or coded to show name or trademark of the manufacturer, rated capacities for the type of hitch, and type of material.

ASME B30.9 Slings 9-2.7: SLING IDENTIFICATION (Wire Rope)

9-2.7.1 Identification Requirements Each Sling shall be marked to show
(a) name or trademark of manufacturer
(b) rated loads for the type(s) of hitch(es) used and
(c) diameter or size the angle upon which it is based

14. Sept. 08 EM 385 1-1, 15G Slings. All Slings shall be in accordance with ASME B30.9.

Sept. 08 EM 385 1-1, 15.G.01 Synthetic Webbing Shall Be Inspected for the Following:

- (1) Acid or caustic burns.
- (2) Melting or charring of any part of the sling.
- (3) Snags, holes, tears, or cuts.
- (4) Broken and worn stitches.
- (5) Excessive abrasive wear.
- (6) Knots in any part of the sling.
- (7) Wear or elongation exceeding the amount recommended by the manufacturer.
- (8). Excessive pitting or corrosion, or cracked distorted, or broken fittings.
- (9) Other visible damage that caused doubt as to the strength of the sling.

ASME B30.9, 9-5.9.4 Removal Criteria. A synthetic webbing sling shall be removed from service in conditions such as the following are present.

- (a) Missing or illegible sling identification

Contractor Crane Rigging Gear References

- (b) Acid or caustic burns.
- (c) Melting or charring of any part of the sling.
- (d) Holes, tears, cuts or snags.
- (e) Broken or worn stitching in load bearing splices.
- (f) Excessive abrasive wear.
- (g) Knots in any part of the sling.
- (h) Discoloration and brittle or stiff areas on any part of the sling, which may mean chemical or ultraviolet/ sunlight damage.
- (i) Fittings that are pitted, corroded, cracked, bent, twisted, gouged, or broken.
- (j) For hooks, removal criteria as stated in ASME B30.10.
- (k) Other conditions, including visible damage, that cause doubt as to the continued use of the sling.

29 CFR, 1926.251 (e) (8) "Removal from service." Synthetic web slings shall be immediately removed from service if any of the following conditions are present:

- (i) Acid or caustic burns,
- (ii) Melting or charring of any part of the sling surface,
- (iii) Snags, punctures, tears or cuts
- (iv) Broken or worn stitching,
- (v) Distortion of fittings.

15. Sept. 08 EM 385 1-1, 15G Slings. All Slings shall be in accordance with ASME B30.9

ASME, B30.9, 9-2.9.4 A wire rope sling shall be removed from service if conditions such as the following are present:

- (a) Missing or illegible sling identification
- (b) Broken wires
 - (1) for strand laid and single part slings, ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay,
 - (2) For cable-laid slings, 20 broken wires per lay
 - (3) For six-part braided slings, 20 broken wires per braid
 - (4) For eight-part braided slings, 40 broken wires per braid
- (c) Severe localized abrasion or scraping,
- (d) Kinking, crushing, bird-caging, or any other damage resulting in damage of the rope structure,
- (e) Evidence of heat damage,
- (f) End attachments that are cracked, deformed, or worn to the extent that the strength of the sling is substantially affected,
- (g) Severe corrosion of the rope, end attachments, or fittings
- (h) For hooks, removal criteria as stated in ASME B30.10
- (i) Other conditions, including visible damage, that cause doubt as to the continued use of the sling.

Contractor Crane Rigging Gear References

29 CFR, 1910.184(f) (5) Remove from service. Wire rope slings shall be removed from service if any of the following conditions are present.

- (f)(5)(i)** Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one lay.
- (f)(5)(ii)** Wear or scraping of one third the original diameter of the outside individual wires.
- (f)(5)(iii)** Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure.
- (f)(5)(v)** Evidence of heat damage.
- (f)(5)(vi)** End attachments that are cracked, deformed or worn.
- (f)(5)(vii)** Hooks that have been opened more that 15 percent of the normal throat opening measured at the narrowest point or twisted more than ten degrees from the plane of the unbent hook.

Cal OSHA Title 8 Article 101, 5045 (e) (1-8) Wire rope slings shall be immediately removed from service if any of the following conditions are present:

- (1)** Six randomly distributed broken wires in one lay, or 3 broken wires in one strand in one rope lay.
- (2)** Wear or scraping of one-third the original diameter of outside individual wires.
- (3)** Kinking, crushing, bird-caging or any other damage resulting in distortion of the wire rope structure.
- (4)** Evidence of heat damage.
- (5)** End attachments that are cracked, deformed or worn to the point where the rated capacity is reduced.
- (6)** Hooks that have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook.
- (7)** Corrosion that is of such severity or extent as to reduce the rated load capacity of the rope end attachment.
- (8)** One or more broken wires within one rope lay of the end fitting.

16. EM 385-1-1, 15.H.10 (f) Eyebolts shall be tightened and secured against rotation during the lift. Eye bolts shall only be loaded in the plain of the eye and shall not be loaded at angles of less than 45 degrees to the horizontal,

g. Shoulderless eyebolts shall not be loaded at an angle.

ASME B30.26, 26-2.5.1 Each turnbuckle, eyebolt, and eye nut shall be marked to show

- (a)** Name or trademark of manufacturer
- (b)** Size or rated capacity.
- (c)** Grade for alloy eyebolts.

ASME B30.26, 26-2.5.2 Swivel hoist ring Identification Each swivel hoist ring shall be marked to show

Contractor Crane Rigging Gear References

- (a) Name or trademark of manufacturer
- (b) Rated Load
- (c) Torque Value

ASME B30.26, 26-2.9.4.2 Eyebolts

- (a) Eyebolts should be tightened or otherwise secured against rotation during the lift
- (b) When used in a tapped blind hole, the effective thread length shall be at least 1 1/2 times the diameter of the bolt for engagement in steel (See Fig.6). For other thread engagements or engagement in other materials, contact the eye bolt manufacturer or a qualified person.
- (c) When used in a tapped through hole of less than one diameter thickness, a nut shall be used under the load and shall be fully engaged and tightened securely against the load (see Fig. 6)
- (d) When used in an untapped through hole the nut under the load shall be fully engaged. If the eyebolt is not shouldered to the load, a second nut on top of the load should be used in possible (see Fig 6).
- (e) Eyebolts not shouldered to the load shall only be used for in-line loads (see Fig 6).
- (f) Only shoulder eyebolts shall be used for angular lifting. When used for angular lifting, the shoulder shall be flush and securely tightened against the load. The working load limit (WWL) must be reduced as shown in Fig 6
- (g) When using shoulder eyebolts for angular lifts, the plane of the eye shall be aligned with the direction of loading. Flat washers may be used under the shoulder to position the plane of the eye (see Fig. 6)
- (h) Eyebolts shall be in good working condition prior to use. Alterations or modifications shall comply with Para. 26-2.8.5(a)
- (i) Shock loading should be avoided.

Contractor Crane Rigging Gear References

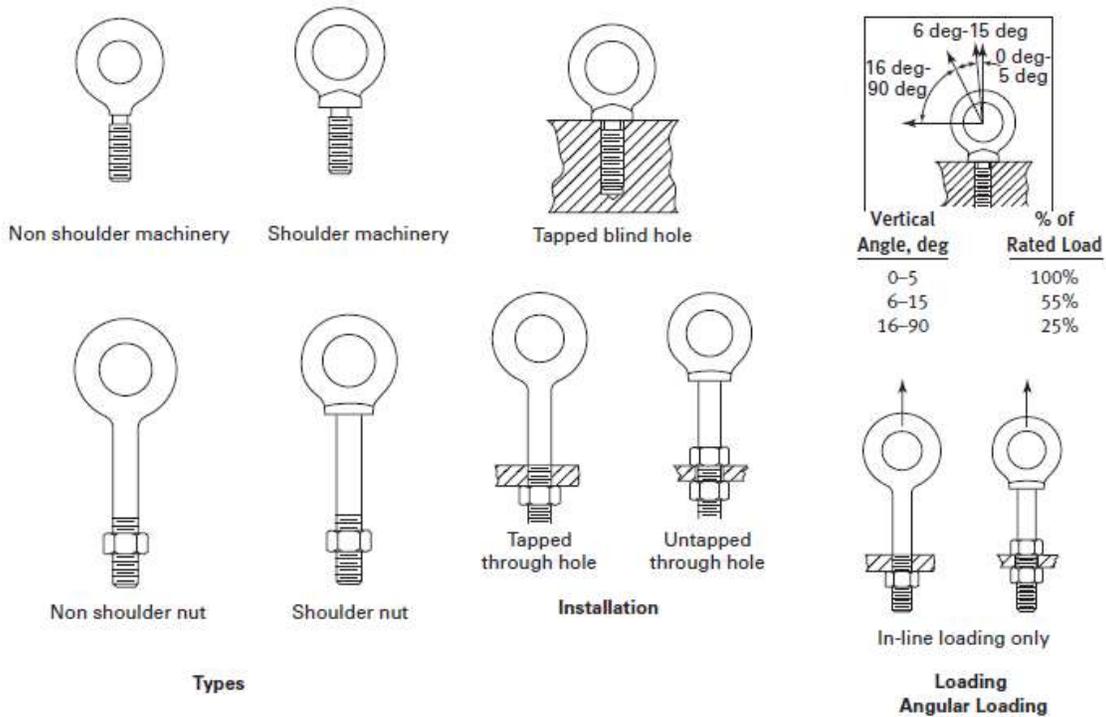


Fig. 6 Eyebolts

Eye Bolt Loading for Shoulder Eye Bolts

Direction of Loading (in the plane of the eye)	Maximum Allowable Percentage of Rated Load
Along the axis of the shank	100
15 degrees	65
30 degrees	35
45 degrees	25
60 degrees	20
90 degrees (As permitted by OEM)	15

Note: For intermediate angles, use the lower percentage shown.

NAVFAC P-307 – Table 14-4

ASME B30.26, 26-2.9.4.3 Eye Nuts

- (a) Eye nuts should be secured against rotation during the lift.
- (b) The threads of the eye nut shall be fully engaged (see Fig. 7).
- (c) Eye nuts shall only be used for in-line loads (see Fig. 7)
- (d) The plane of the eye may be positioned with a flat washer(s) or lock nut
- (e) Components shall be in good working condition prior to use. Alterations or modifications shall comply with para. 26-2.8.5
- (f) Shock loading should be avoided.

Contractor Crane Rigging Gear References

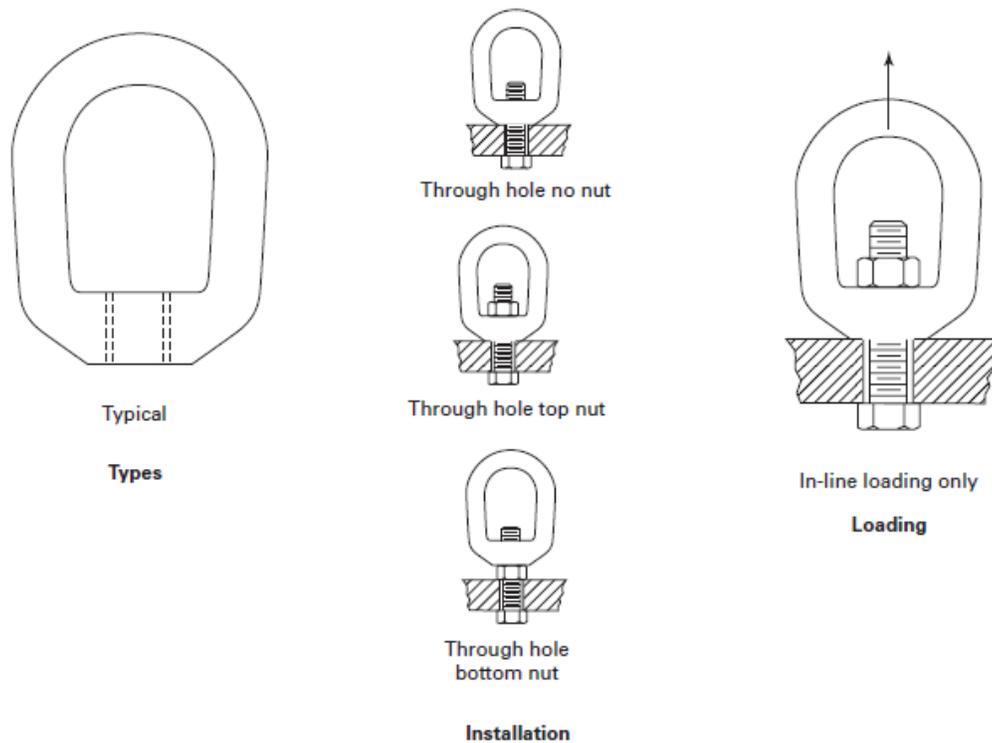


Fig. 7 Eye Nuts

ASME B26, 26-2.9.4.4 Swivel Hoist Rings

- (a) When used in a threaded hole, the effective thread length shall be $1\frac{1}{2}$ times the diameter of the bolt for Steel (see Fig. 8). For other thread engagements or engagement in other materials, contact the swivel hoist ring manufacturer or a qualified person.
- (b) When used in a through-hole application, a nut and washer shall be used. The washer and nut shall be in accordance with the swivel hoist ring manufacturer's recommendations. The nut shall be fully engaged (see Fig. 8).
- (c) The bushing flange (see Fig. 8) shall full contact the load surface.
- (d) Spacers or washers shall not be used between the bushing flange and the mounting surface of the load being lifted.
- (e) The swivel hoist ring shall be tightened to the torque specifications of the manufacturer
- (f) The swivel hoist ring shall be free to rotate and pivot without interference during lifting (see Fig 8).
- (g) The load applied to the swivel hoist ring shall be centered in the bail to prevent side loading.
- (h) Any attached lifting component shall be narrower than the inside width of the bail to avoid spreading (see Fig. 8).

Contractor Crane Rigging Gear References

- (i) Components shall be in good working condition prior to use. Alterations or modifications shall comply with para. 26-8-5(a).
- (j) Ensure that the swivel hoist ring WLL meets or exceeds the anticipated angular rigging tension (see Fig. 9).
- (k) Shock loading should be avoided.

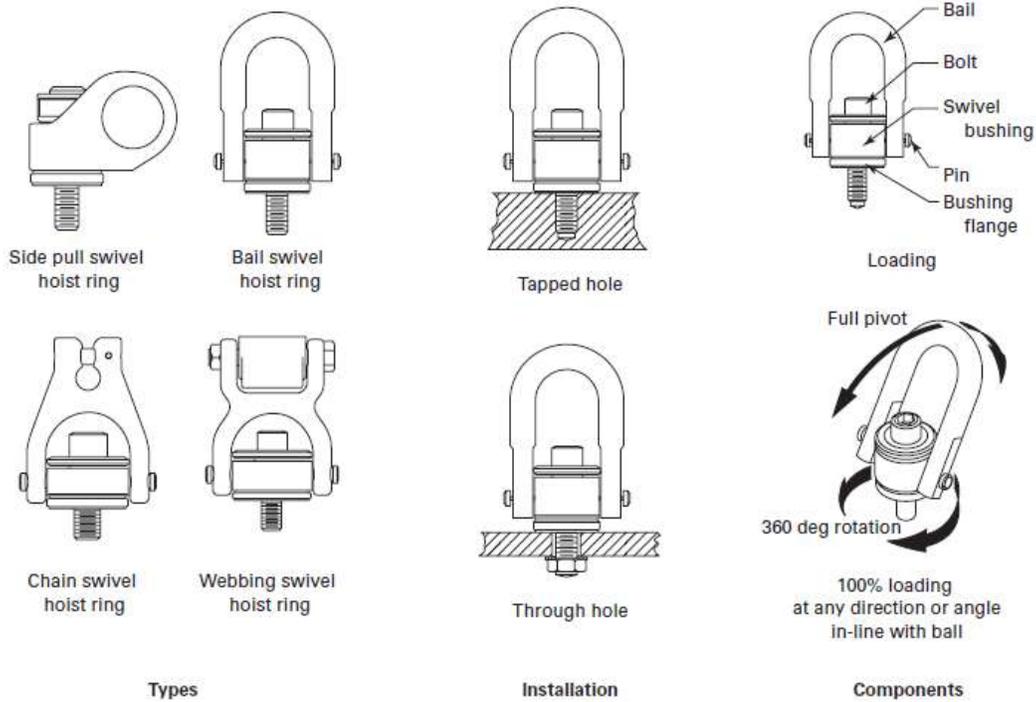


Fig. 8 Swivel Hoist Rings

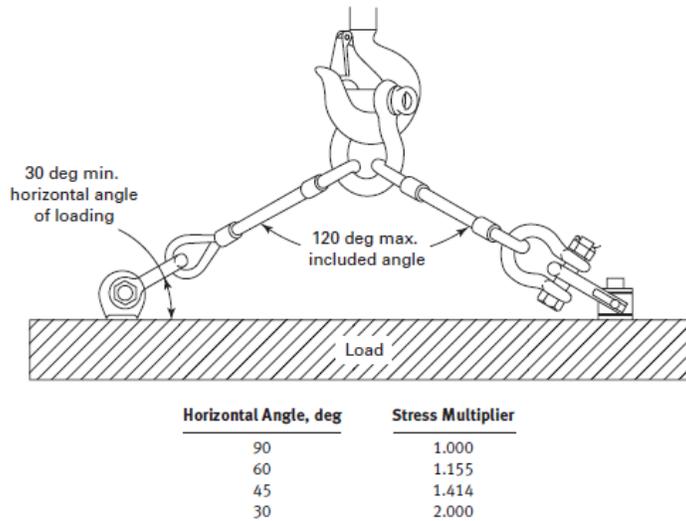


Fig. 9 Angle of Loading (Adjustable Hardware)

Contractor Crane Rigging Gear References

17. Sept. 08 EM 385 1-1, 15G Slings. All Slings shall be in accordance with ASME B30.9.

ASME B30.9, 9-1.3.1 (a) Grade **80** and Grade **100** alloy steel chain slings shall be fabricated in accordance with ASTM A 906/ A 906M

18. Sept. 08 EM 385 1-1, 15G Slings. All Slings shall be in accordance with ASME B30.9.

ASME B30.9, 9-1.7.1 Each sling shall be marked to

- (a) Name or trademark of manufacturer
- (b) Grade
- (c) Nominal size
- (d) Number of legs
- (e) Rated loads for the type(s) of hitch(s) used and the angle upon which it is based
- (f) Length (reach).

19. Sept. 08 EM 385 1-1, 15G Slings. All Slings shall be in accordance with ASME B30.9.

ASME B30.9, 9-6.9-4 A synthetic roundsling shall be removed from service if conditions such as the following are present:

- (a) Missing or illegible sling identification
- (b) Acid or caustic burns
- (c) Evidence of heat damage
- (d) Holes, tears, cuts, abrasive wear, or snags that expose the core yarns
- (e) Broken or damaged core yarns
- (f) Weld splatter that exposes core yarns
- (g) Roundslings that are knotted
- (h) Discoloration and brittle or stiff area on any part of the slings, which may mean chemical or ultraviolet/ sunlight damage
- (i) Fittings that are pitted, corroded, cracked, bent, twisted, gouged, or broken
- (j) For hooks, removal criteria as stated in ASME B30.30
- (k) Other conditions, including other visible damage, that may cause doubt as to the continued use of the sling.

20. NAVFAC P- 307 14.7.2.3 Wire rope slings shall not be used over a pin, shackle, hook, or ring of less than the nominal diameter of the wire rope.

Contractor Crane Rigging Gear References

Efficiency Factors for Various Wire Rope Slings

D/d Ratio	Efficiency Percentage
1:1	50
2:1	65
4:1	75
5:1	78
8:1	83
12:1	87.5
16:1	90
24:1	92.5
40:1	95
over 40:1	100

CERTIFICATE OF COMPLIANCE

This certificate shall be signed by an official of the company that provides cranes (or multi-purpose machines, material handling equipment, or construction equipment used to lift loads suspended by rigging gear) or rigging gear for any application under this contract. Post a completed certificate on each crane or alternate machine (or in the contractor's on-site office for rigging operations) brought onto Navy property.

CONTRACTING OFFICER'S POINT OF CONTACT (Government Representative)	PHONE
---	-------

PRIME CONTRACTOR/PHONE	CONTRACT NUMBER
------------------------	-----------------

CRANE OR ALTERNATE MACHINE SUPPLIER/PHONE (if different from prime contractor)	CRANE OR ALTERNATE MACHINE NUMBER (i.e., ID number)
---	---

CRANE OR ALTERNATE MACHINE MANUFACTURER/TYPE/CAPACITY

CRANE OR ALTERNATE MACHINE OPERATOR'S NAME(S)

I certify that

1. The above noted crane and associated rigging gear conform to applicable OSHA regulations (host country regulations for naval activities in foreign countries) and applicable ASME B30 standards. The following OSHA regulations and ASME standards apply: _____
2. The operators noted above have been trained and are qualified for the operation of the above noted crane.
3. The operators noted above have been trained not to bypass safety devices during lifting operations.
4. The operators, riggers and company officials are aware of the actions required in the event of an accident as specified in the contract.

COMPANY OFFICIAL SIGNATURE	DATE
----------------------------	------

COMPANY OFFICIAL NAME/TITLE

**POST ON CRANE (OR ALTERNATE MACHINE)
(IN CAB OR VEHICLE)**

Crane Accident Reporting

Contractors shall notify the contracting officer or Tenant Command Designated POC as soon as practical, but not later than four hours, after any WHE accident. Secure the accident site and protect evidence until released by the contracting officer. Conduct an accident investigation to establish the root cause(s) of any WHE accident. Crane operations shall not proceed until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer.

Contracting Officers and Tenant Command operated cranes shall notify the NAVFAC SW BSV&E PLC, Navy Crane Center, Command Duty Officer of any crane related work stoppage, or accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any damage to the crane or adjacent property within 24 hours.

Contractor Crane Oversight: 805-982-5791
Navy Crane Center, San Diego Detachment: 619-556-9077

Command Duty Officer:

The contractor shall provide the contracting officer within 30 days of any accident a Crane Accident Report consisting of a summary of circumstances, an explanation of causes(s), photographs (if available), and corrective actions taken.

The contracting officer or Tenant Command Designated POC shall provide the Navy Crane Center, NAVFACSW BSV&E PLC and the Deputy Public Works Officer a copy of the accident report upon receipt from the contractor. These requirements are in addition to any notification requirements promulgated in OPNAVINST 5100.23 and claimant instructions."

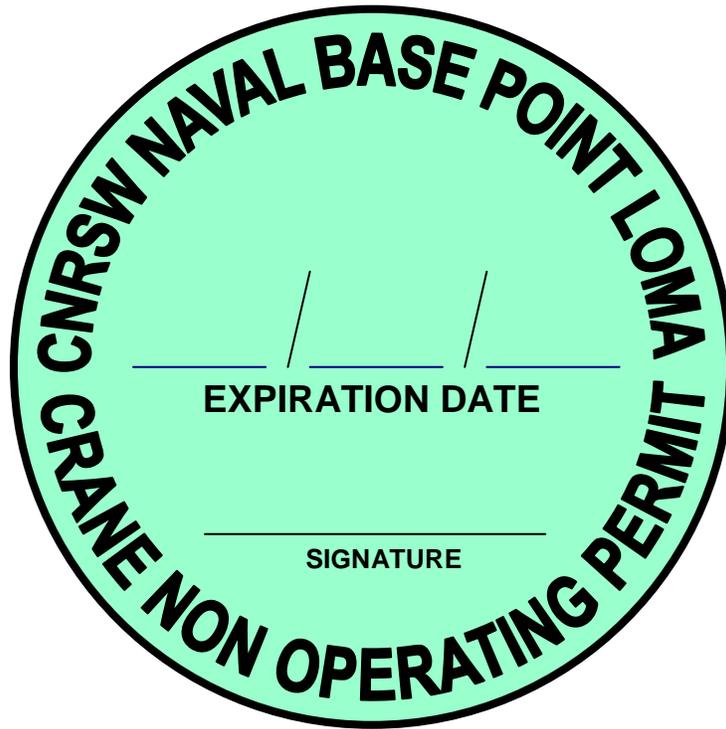
Operating Envelope: For the purpose of this definition, it is assumed there is an "operating envelope" around any crane, and inside the envelope are the following elements:

- a. The crane.
- b. The operator.
- c. The riggers and crane walker.
- d. Other personnel involved in the operation (supervisor, mechanic, tag line handler, engineer, etc.).
- e. The rigging gear between the hook and the load.
- f. The load.
- g. The crane's supporting structure (ground, rail, etc.).
- h. The lift procedure.

Definition: A crane accident occurs when any of the elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in the following:

- a. Personnel injury or death. Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements.
- b. Material or equipment damage.
- c. Dropped load.
- d. Derailment.
- e. Two-blocking.
- f. Overload.
- g. Collision, including unplanned contact between the load, crane, and/or other objects. Items c, d, e, f, and g are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.)

CONTRACTOR CRANE NON-OPERATION PERMIT



CONTRACTOR CRANE OPERATION CHECKLIST

Contractor:		Sub:		Date:	
Crane Mfg.:		Owner:		Rated Capacity:	
Year/Model:		Ser #			
Quadrennial Certification Date:		Annual Certification Date:			
Location of Operations:			Duration of Contract:		
Contracting Officer			Phone:		Contract #:

	YES	NO	N/A
1. Does the operator know the weight of the load? -- IAW ASME B30.5, 5-3.2.1.1 (c) & CAL OSHA Title 8 Article 98 4999 (a) & 29CFR 1926.1417 (o)(3)			
2. Are riggers and signal persons qualified by a third party evaluator or the employers in house qualified evaluator? Sept 08 EM 385, 16.B.07 a & b & 15.B.02 & 03 - 29 CFR 1926.1404(r)(1) & 1926.1428(a)(b)(c)			
3. Are ground conditions suitable for crane set up (Conditions means the ability of the ground to support the equipment, including slope, compaction and firmness)? —29 CFR 1926.1402 b			
4. Are outriggers required? -- IAW, Sept 08 EM 385 16.J. 03(a), & ASME B30.5, 5-3.2.1.5(h), & 29 CFR 1910.180 (h)(3)(ix) & CAL OSHA Title 8 Article 98 4994 (b)			
5. If outriggers are required, are they extended fully and are the wheels off of the ground? – IAW ASME B30.5, 5-3.2.1.5(h) & CAL OSHA Title 8 Article 98 4999 (c) (1) & Sept 08 EM 385 16.J.03 a & 29 CFR 1926.1404 (q) (1) (2)			
6. Is the crane level and blocked? -- IAW ASME B30.5, 5-3.2.1.5(a)(1), & 29 CFR 1910.180, (h)(3)(i)(a) & 1910.180(c)(1)(ii)(b) & CAL OSHA Title 8 Article 98 4999 (c) (1) & Sept 08 EM385 1-1, 16.G.04 b			
7. If blocking is required, is the entire surface of the outrigger pad supported and the blocking material of sufficient strength to support the outrigger pad? -- IAW 29 CFR 1910.180 (h)(3)(i)(a),(b),(c) & SEP. 08 EM 385, 16.J.03 d & 29 CFR 1926.1404 (q) (5) & (h)(2)-(h)(3)			
8. Is the crane configuration good for the intended load? -- IAW ASME B30.5, 5-3.2.1(b) & 29 CFR 1910.180, (h)(1)(i) & 29CFR 1926.1417 (o)(3)			
9. Are personnel kept clear of the swing radius of the counter weight? -- IAW Sept 08 EM 385 16.G.04.b.(4), & 16.G.09 b (2) , ASME B30.5, 5-3.2.1.5(a)(4) & CAL OSHA Title 8 Article 98 4999 (i) & 29CFR 1926.1424 (3)(i)(ii)			

CONTRACTOR CRANE OPERATION CHECKLIST

	YES	NO	N/A
10. Are adequate clearances maintained between moving and rotating structures of the crane and fixed objects (min. 24 inches)? – IAW Sept 08 EM 385 16.G.09(b) (1) & 29CFR 1926.1424 (a)(2)(ii)			
11. Is the hook centered over load to minimize swing? -- IAW ASME B30.5, 5-3.2.1.5(b)(3) & CAL OSHA Title 8 Article 98 4999 (d) (3) & CAL OSHA Title 8 Article 98 4999 (d) (3)			
12. Are the lift & swing paths clear of obstructions? -- IAW Sept 08 EM 385 16.G.04 b(3) & ASME B30.5, 5-3.2.1.5(a)(3) & 29 CFR 1910.180 (h)(3)(iii)(b) & CAL OSHA Title 8 Article 98 4999 (e)(2) & 29 CFR 1926.1417 (p)(q)			
13. Are personnel kept from standing or passing under the load? -- IAW ASME B30.5, 5-3.2.1.4(b) & 29 CFR 1028.1425 (a)&(b)(1)(2)(3)			
14. Is the operator responding properly to signals? -- IAW Sept 08 EM 385 16.G.04 a (4) & ASME B30.5, 5.3.1.3 (c) & CAL OSHA Title 8 Article 98 5008 (b) & 29 CFR 1926.1422			
15. Are radios used for blind lifts, have they been tested on site before operations to ensure a clear and effective signal is transmitted? IAW Sept 08 EM 385 16.G.05.a (1) & ASME B30.5, 5-3.3.2 v & 29CFR 1026.1420 (a)			
16. Is the load lifted a few inches to ensure it is secure and balanced? -- IAW Sept 08 EM 385 16 G.04 b (2) & ASME B30.5, 5-3.2.1.5(a)(2) & CAL OSHA Title 8 Article 98 4999 (c) (2)			
17. Are tag lines used to control the load? -- IAW Sept 08 EM 385 16.G.07 & ASME B30.5, 5-3.2.1.5(o), & 29 CFR 1910.180,(h)((3)(xvi) & CAL OSHA Title 8 Article 98 4993 (b)			
18. Does the operator avoid sudden acceleration or deceleration of the load? -- IAW, ASME B30.5, 5-3.2.1.5(c)(1) & 29 CFR 1910.180(h)(3)(iii)(a) & Cal OSHA Title 8 Article 98 4999 (e) (1)			
19. Is the operator's attention directed toward load while operating the crane? -- IAW Sept 08 EM 385 16.G.04 a (1) & ASME B30.5, 5-3.1.3(a) & 29CFR 1926.1417(d)			
20. Is the operator in control of the crane so as not to allow the load or other parts of the machine to contact any obstruction? -- IAW, ASME B30.5, 5-3.2.1.5 (c)(2) & CAL OSHA Title 8 Article 98 4999 (e) (2)			
21. Are personnel prohibited from riding the load? -- IAW Sept 08 EM 385 16.G.06 & ASME B30.5, 5-3.2.1.5 (r) & CAL OSHA Title 8 Article 98 4995			
22. Are empty hooks lashed during travel to prevent swinging? -- IAW ASME B30.5, 5-3.2.1.5 (l)(3) & 29 CFR 1910.180 (h)(3)(xiii)(c) & CAL OSHA Title 8 Article 98 4991 (b)(2)			
23. Is boom side loading limited to freely suspended loads? -- IAW ASME B30.5, 5-3.2.1.5 (d) & 29 CFR 1910.180 (h)(3)(iv) & CAL OSHA Title 8 Article 98 4999 (f)			

CONTRACTOR CRANE OPERATION CHECKLIST

	YES	NO	N/A
24. Are the rules for operations near power lines being followed? -- IAW ASME B30.5-53.4.5.1 through B30.5, 5-3.4.5.4 & CAL OSHA Title 8 Article 98 5003 & Sept. 08 EM 385, 16.G.04.(b)(3) & NAVFAC P-307 1.7.2 (g) (7) & 29 CFR 1926.1408(a)-(e)			
25. Is there a critical lift plan for lifts over 75% of capacity, personnel lifts, multiple crane lifts, lifts in the vicinity of power lines etc.? -- IAW NAVFAC P-307 1.7.2 (g), & Sept. 08 EM 385, 16.H.01 & NAVSEA Std Item 009-40			
26. Does the operator remain at the controls while the load is suspended? -- IAW ASME B30.5, 5-2.1.4.(a) & 29 CFR 1910.180 (h)(4)(i) & CAL OSHA Title 8 Article 98 4999 (h) (2) & 29CFR 1926.1417(e)(1)			
27. When the crane is left unattended, is it in a safe condition? IAW ASME B30.9,5-3.1.3 (e) & CAL OSHA Title 8 Article 98 4999 (i) (2)			

SIGNATURE:	Date:
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CONTRACTOR CRANE OPERATION CHECKLIST

Item

1. **ASME, B30.5, 5-3.2.1.1 (c)** When loads which are not accurately known are to be lifted; the designated person responsible for supervising the lifting operations shall ascertain that the weight of the load does not exceed the crane ratings at the maximum radius at which the load is to be handled.

CAL OSHA Title 98, 4999 (a) Size of Load. A crane, derrick, or hoist shall not be loaded beyond the rated capacity or safe working load whichever is smaller, except for test purposes. In all operations where the weight of the load being handled is unknown and may approach the rated capacity, there shall be a qualified person assigned to determine the magnitude of the load, unless the crane or derrick is equipped with a load weighing device. The operator shall not make any lift under these conditions until informed of such weight by the qualified person assigned to that operation.

29CFR 1926.1417 (o) (3) Load weight. The operator must verify that the load is within the rated capacity of the equipment by at least one of the following methods:

(i) The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. In addition, when requested by the operator, this information must be provided to the operator prior to the lift; or

(ii) The operator must begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator must not proceed with the lift until he/she verifies the weight of the load in accordance with paragraph (o)(3)(i) of this section.

2. September 2008 EM 385 1-1, 16.B.07 Signal Person Qualifications

a. The employer shall insure that the signal person is qualified either by a third party qualified evaluator or the employer's qualified evaluator.

b. The qualification means that the evaluator has assessed the individual's capabilities and knowledge and has determined that the individual meets the following qualification requirements:

(1) Know and understand the type of signals used (radio, cell, hand, etc). If hand signals are used, the signal person must know and understand the Standard Method for hand signals.

(2) Be competent in the application of the type of signals used.

(3) Have a basic understanding of crane operation and limitations, including crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.

(4) Demonstrate that he/she meets the requirements above through a practical test.

1926.1428 Signal person qualifications.(a) The employer of the signal person must ensure that each signal person meets the Qualification Requirements (paragraph (c) of this section) prior to giving any signals. This requirement must be met by using either Option (1) or Option (2) of this section.

(1) **Option (1)—Third party qualified evaluator.** The signal person has

CONTRACTOR CRANE OPERATION CHECKLIST REFERENCES

documentation from a third party qualified evaluator (see Qualified definition) showing that the signal person meets the Qualification Requirements (see paragraph (c) of this section).

(2) Option (2)—Employer’s qualified evaluator. The employer’s qualified (see Qualified Evaluator (not a third party), § 1926.1401 for definition) evaluator assesses the individual and determines that the individual meets the Qualification Requirements (see paragraph (c) of this section) and provides documentation of that determination. An assessment by an employer’s qualified evaluator under this option is not portable—other employers are not permitted to use it to meet the requirements of this section.

(3) The employer must make the documentation for whichever option is used available at the site while the signal person is employed by the employer. The documentation must specify each type of signaling (e.g. hand signals, radio signals, etc.) for which the signal person meets the requirements of paragraph (c) of this section.

(b) If subsequent actions by the signal person indicate that the individual does not meet the Qualification Requirements (see paragraph (c) of this section), the employer must not allow the individual to continue working as a signal person until re-training is provided and a reassessment is made in accordance with paragraph (a) of this section that confirms that the individual meets the Qualification Requirements.

(c) Qualification Requirements. Each signal person must:

(1) Know and understand the type of signals used. If hand signals are used, the signal person must know and understand the Standard Method for hand signals.

(2) Be competent in the application of the type of signals used.

(3) Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.

(4) Know and understand the relevant requirements of § 1926.1419 through § 1926.1422 and § 1926.1428.

(5) Demonstrate that he/she meets the requirements in paragraphs (c)(1) through (4) of this section through an oral or written test, and through a practical test.

EM 385 1-1, 15.B.02 Any worker engaged in the duties and the performance of rigging shall be a **Qualified Rigger** and as such, shall meet the following requirements:

- a. Be at least 18 years of age;
- b. Be able to communicate effectively with the crane operator, the lift supervisor, flagman and affected employees on site;
- c. Have basic knowledge and understanding of equipment operating characteristics, capabilities, and limitations.

EM 385 1-1, 15.B.03 In addition, Qualified Riggers and Lift Supervisors shall be able to demonstrate knowledge and proficiency to appropriate management personnel in the following;

- a. Personnel roles and responsibilities;
- b. Site preparation (terrain, environment);
- c. Rigging equipment and materials;

CONTRACTOR CRANE OPERATION CHECKLIST REFERENCES

- d. Safe Operating procedures;
- e. Principles of safe rigging;
- f. Environmental hazards (overhead interferences);
- g. Rigging the load, handling the load, common causes of crane-related accidents.

1926.1404 (r) Rigging. In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/ disassembly, the employer must ensure that:

(1) The rigging work is done by a qualified rigger

3. 29 CFR 1926.1402 (b) The equipment must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met. The requirement for the ground to be drained does not apply to marshes/wetlands.

4. Sept. 08 EM 385, 16.J.03 (a) Anytime outriggers are required to be used, they shall be extended or deployed per the crane manufacturer's load/capacity chart specifications and set to remove the machine weight from the wheels at all settings, except for locomotive cranes.

29 CFR, 1910.180 (h) (3) (ix) Outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the manufacture for that crane. Where floats are used they shall be securely attached to the outriggers. Wood blocks used to support outriggers shall (a) be strong enough to prevent crushing (b) be free from defects (c) be sufficient width and length to prevent shifting or topping under load.

CAL OSHA Title 98, 4994 (b) Outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the certified agent for that crane

5. ASME, B30.5, 5-3.2.1.5 (h) Any time outriggers are used, the outriggers shall be extended or deployed per the crane manufacturer's load/capacity chart specifications and set to remove the machine weight from the wheels, except for locomotive cranes.[For locomotive cranes, refer to para.5-3.2.1.5(j).] When partially extended outriggers are used, the following requirements, when applicable, shall be met:

(1) Crane operation with partially extended outriggers shall only be undertaken if approved by the crane manufacturer.

(2) Outriggers shall be set at equal positions that correspond to the load/capacity charts supplied by the manufacturer for those positions. Only the load chart(s) corresponding to the outrigger positions shall be used for operation.

(3) When situations arise when outriggers must be set at unequal positions that correspond to the load/capacity charts supplied by the manufacturer (see fig. 16), the load/capacity charts corresponding with the individual quadrants of operation shall be used. The manufacturer or qualified person shall be consulted to determine if any capacity reductions, special operating procedures, or limitations are required.

CONTRACTOR CRANE OPERATION CHECKLIST REFERENCES

29CFR 1926.1404 (q) (1) The outriggers or stabilizers must be either fully extended or, if manufacturer procedures permit, deployed as specified in the load chart.

(2) The outriggers must be set to remove the equipment weight from the wheels, except for locomotive cranes (see paragraph (q)(6) of this section for use of outriggers on locomotive cranes). This provision does not apply to stabilizers.

CAL OSHA Title 8, Article 98, 4999 (c)(1) Moving the Load. The individual directing the lift shall see that: The crane is properly leveled for the work being performed and blocked, where necessary

Sept. 08 EM 385, 16.J.03

(a) Anytime outriggers are required to be used, they shall be extended or deployed per the crane manufacturer's load/capacity chart specifications and set to remove the machine weight from the wheels at all settings, except for locomotive cranes.

(b) When partially extended outriggers are used, the following requirements shall be met.

(1) Crane operation with partial extended outriggers shall only be undertaken if approved by the crane manufacturer.

(2) Outriggers shall be set at equal positions that correspond to the load/capacity charts by the manufacturer for those positions. Only the load chart(s) corresponding to the outrigger positions shall be used for operation

(3) When situations arise where outriggers must be set at unequal positions that correspond the load/capacity charts corresponding with the individual quadrants of operation. The manufacturer or qualified person shall be consulted to determine if the capacity reductions, special operating procedures, or limitations are required.

6. ASME, B30.5, 5-3.2.1.5 (a) The person directing the lift shall see that: **(1)** the crane is level and, where necessary, blocked.

29 CFR 1910.180(c)(1)(ii)(b) The crane shall be standing on track which is level within 1 percent grade.

29 CFR, 1910.180(h)(3)(i)(a) The crane is level and where necessary blocked properly.

Sept. 08 EM385 1-1, 16.G.04 Responsibilities, b. The operator, qualified supervisor and rigger shall jointly ensure that

(1) The crane is level and, where necessary blocked.

CONTRACTOR CRANE OPERATION CHECKLIST REFERENCES

7. **29 CFR, 1910.180 (h)(3)(ix)** Outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the manufacture for that crane. Where floats are used they shall be securely attached to the outriggers. Wood blocks

CONTRACTOR CRANE OPERATION CHECKLIST REFERENCES

used to support outriggers shall: **(a)** Be strong enough to prevent crushing, **(b)** Be free from defects, **(c)** Be of sufficient width and length to prevent shifting or toppling under load.

Sept. 08 EM 385, 16.J.03.d Blocking under outriggers floats shall meet the following requirements:

- (1)** Sufficient strength to prevent crushing, bending, or shear failure;
- (2)** Such thickness, width, and length as to completely support the float, transmit the load to the supporting surface, and prevent shifting, toppling, or excessive settlement under load;
- (3)** Use of blocking only under the outer bearing surface of the extended outrigger beam floats.

29 CFR 1926.1404 (q)(5) Outrigger and stabilizer blocking must:

- (i)** Meet the requirements in paragraphs (h)(2) and (h)(3) of this section.
- (ii)** Be placed only under the outrigger or stabilizer float/pad of the jack or, where the outrigger or stabilizer is designed without a jack, under the outer bearing surface of the extended outrigger or stabilizer beam.

29 CFR 1926.1404(h)(2) Blocking material. The size, amount, condition and method of stacking the blocking must be sufficient to sustain the loads and maintain stability.

(3) Proper location of blocking. When used to support lattice booms or components, blocking must be appropriately placed to:

- (i)** Protect the structural integrity of the equipment, and
- (ii)** Prevent dangerous movement and collapse.

8. ASME, B30.5, 5-3.2.1.1 (b) The load to be lifted shall be within the rated capacity of the crane in its existing configuration.

29 CFR, 1910.180 (h) (1) (i) No crane shall be loaded beyond the rated load, except for test purposes.

29CFR 1926.1417 (o)(3) Load weight. The operator must verify that the load is within the rated capacity of the equipment by at least one of the following methods:

- (i)** The weight of the load must be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. In addition, when requested by the operator, this information must be provided to the operator prior to the lift; or
- (ii)** The operator must begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator must not proceed with the lift

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until he/she verifies the weight of the load in accordance with paragraph (o)(3)(i) of this section.

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9. **ASME, B30.5, 5-3.2.1.5 (a)(4)** The person directing the load shall see: That all persons are clear of the swing radius of the crane counterweight.

Sept. 08 EM 385, 16.G.04, b (4) All persons are clear of the swing radius of the counterweight

Sept. 08 EM 385, 16.G.09 b. Physical clearances (2) Accessible areas within the swing radius of the rear of the crane's rotation superstructure, either permanently or temporarily mounted, shall be barricaded to prevent an employee from being struck or crushed by the crane and hoisting equipment.

CAL OSHA Title 8, Article 98 4999 (i) Where a rotating crane is positioned to operate in areas where persons may be caught between rotating parts of the crane and outside obstructions or parts of rotating machine deck and nonrotating parts of crane, those danger areas shall be barricaded or other positive means shall be taken to prevent traffic and workers, except the operator from entering such areas while the crane is operating.

29CFR 1926.1424 (3) *Protecting employees in the hazard area.*

(i) Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

(ii) Where the operator knows that an employee went to a location covered by paragraph (a)(1) of this section, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

29CFR 1926.1424 (a) *Swing radius hazards.* (1) The requirements in paragraph (a)(2) of this section apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

(i) Striking and injuring an employee; or

(ii) Pinching/crushing an employee against another part of the equipment or another object.

10. **Sept. 08 EM 385, 16.G.09 b. Physical clearances (1)** Adequate clearances shall be maintained between the moving and rotating structures of the crane and fixed objects to allow passage of employees without harm the minimum clearance is 24 in. (61 cm).

29CFR 1926.1424 (a) *Swing radius hazards.* (2) To prevent employees from entering these hazard areas, the employer must:

(ii) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas. *Exception:* When the employer can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as "Danger—Swing/Crush Zone") and high visibility markings on the equipment

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that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

11. ASME, B30.5, 5-3.2.1.5 (b) (3) The hook shall be brought over the load in such a manner as to minimize swinging.

CAL OSHA Title 8, Article 98, 4999 (d)(3) The hook shall be positioned over the load in such a manner as to prevent swinging of the load when lifted.

12. ASME, B30.5, 5-3.2.1.5 (a) (3) The person directing the lift shall see that the lift and swing path is clear of obstructions.

29 CFR, 1910.180 (h) (3) (iii) (b) The load does not contact any obstructions.

29 CFR, 1926.1417 (p) The boom or other parts of the equipment must not contact any obstruction.

(q) The equipment must not be used to drag or pull loads sideways.

CAL OSHA Title 8 Article 98, 4999 (e) inadvertent contact with obstructions shall be prevented

Sept. 08 EM 385, 16.G.04.(b) (3) The lift and swing path is clear of obstructions and adequate clearance is maintained from electrical sources per table 16-3.

13. ASME, B30.5, 5-3.2.1.4 (b) No person shall be allowed to stand or pass under a suspended load.

1926.1425 Keeping clear of the load.

(a) Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used, to the extent consistent with public safety.

(b) While the operator is not moving a suspended load, no employee must be within the fall zone, except for employees:

(1) Engaged in hooking, unhooking or guiding a load;

(2) Engaged in the initial attachment of the load to a component or structure; or

(3) Operating a concrete hopper or concrete bucket.

14. 1926.1422 Signals—hand signal chart. Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations

ASME, B30.5, 5-3.1.3 (c) The operator shall understand the use of signals as given in Section 5-3.3 and shall respond to signals from the person who is directing the lift or an appointed signal person. When a signal person or a crane follower is not required as part of the crane operation, the operator is then responsible for the lifts. However, the operator shall obey a stop signal at all times, no matter who gives it.

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Sept. 08 EM 385, 16.G.04 a (4) The operator shall respond to signals from the person who is directing the lift or an appointed signal person. When a signal person is not used in the crane operation, the operator shall ensure he/she has full view of the load and the load travel paths at all times the load is rigged to the crane and hoisting equipment

15. ASME, B30.5, 5-3.3.2 Standard signals to the operator shall be in accordance with the standards prescribed in para. 5-3.3.4 or para. 5-3.3.5. Signals shall be discernible or audible at all times. No response shall be made unless signals are clearly understood.

Sept. 08 EM 385, 16.G.05.a

(1) Radio, telephone, or a visual and audible electrically-operated system shall be used when the distance between operator and signal person is more than 100 ft or when they cannot see each other.

29 CFR 1026.1420 (a) The device(s) used to transmit signals must be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

16. Sept 08 EM 385, 16.G.04 b The operator, qualified lift supervisor and rigger shall jointly ensure that;

(2) The load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches.

ASME, B30.5, 5-3.2.1.5 (a) (2) The person directing the lift shall see that: The load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches.

CAL OSHA Title 8, Article 98, 4999 (c) (2) The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches;

17. Sept. 08 EM 385, 16.G.07 When practical and when their use does not create a hazard, tag lines shall be used to control loads.

ASME, B30.5, 5-3.2.1.5, a The person directing the lift shall see that: **(o)** When rotating the crane, sudden starts and stops shall be avoided. Rotational speed shall be such that the load does not swing out beyond the radius at which it can be controlled. A tag or restraint line shall be used when rotation of the load is hazardous.

29 CFR, 1910.180 (h) (3) (xvi) When rotating a crane, sudden starts and stops shall be avoided. Rotational speed shall be such that the load does not swing out beyond the radii at which it can be controlled. A tag line or restraint line shall be used when rotation of the load is hazardous.**18. ASME, B30.5, 5-3.2.1.5 (c)** During lifting operations, care shall be taken that: **(1)** There is no sudden acceleration or deceleration of the moving load.

29 CFR,1910.180 (h)(3)(iii)(a) There is no sudden acceleration or deceleration of the moving load.

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CAL OSHA Title 8, Article 98, 4999 (e) (1) There shall be no sudden acceleration or deceleration of the moving load.

19. 1926.1417, Operation. (d) The operator must not engage in any practice or activity that diverts his/her attention while actually engaged in operating the equipment, such as the use of cellular phones (other than when used for signal communications).

Sept. 08 EM 385, 16.G.04 (a) The responsibilities of the operator shall include, but are not limited to the following requirements;

(1) The operator shall not engage in any activity that will divert his/her attention while operating the crane.

ASME, B30.5, 5-3.1.3 (a) The operator shall not engage in any practice which will divert his/her attention while operating the crane.

20. ASME, B30.5, 5-3.2.1.5 (c) (2) During lifting operation, care shall be taken that: The load, boom, or other parts of the machine do not contact any obstruction.

CAL OSHA Title 8, Article 98 4999 (e) (2) Inadvertent contact with obstructions shall be prevented

21. Sept. 08 EM 385, 16 G. 06 Riding on loads, hooks, hammers, buckets, material hoist, or other hoisting equipment not meant for personnel handling is prohibited.

ASME, B30.5, 5-3.2.1.5 (r) The person directing the lift shall see that: Personnel shall not be permitted to ride the bare hook or a load of material suspended from the hook.

CAL OSHA Title 8, Article 98 4995 No employee shall be permitted to ride on loads, hooks, or slings of any derrick, hoist, or crane.

22. ASME, B30.5, 5-3.2.1.5 (I) While in transit the following additional precautions shall be exercised.

(1) The boom should be carried in line with the direction of motion;

(2) The superstructure shall be secured against rotation (or the boom placed in a boom rack mounted on the carrier), except when negotiating turns when there is an operator in the cab or the boom is supported on a dolly;

(3) The empty hook shall be lashed or otherwise restrained so that it cannot swing freely.

29 CFR, 1910.180(h)(03)(xiii)(c) The hook shall be lashed or otherwise restrained so that it cannot swing freely.

CAL OSHA Title 8, Article 98, 4991 (b) (2) The empty hook, headache ball, or block shall be lashed or otherwise restrained so that it cannot swing freely.

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23. ASME, B30.5, 5-3.2.1.5 (d) & 29 CFR, 1910.180 (h) (3) (iv) Side loading of booms shall be limited to freely suspended loads. Cranes shall not be used for dragging loads sideways.

CAL OSHA Title 8, Article 98, 4999 (f) Side Loading. Side loading of booms shall be limited to freely suspended loads, and booms shall not be used for dragging loads sideways unless the boom is specifically designed and constructed to withstand such side loading.

24. ASME, B30.5, 5-3.4.5.1 through 5-3.4.5.4 Any overhead wire shall be considered to be an energized line unless and until the person owning such line or electrical utility authorities indicate that it is not an energized line. Crane operations shall not rely on the coverings of wires for their protection. Four conditions to consider when operating a mobile crane near electrical lines are: **(1)** Power lines de-energized and grounded para 5-3.4.2; **(2)** Power lines energized, crane operating less than the erected/fully extended boom length away as in para 5-3.4.5.3; **(3)** Power lines energized; crane within prohibited zone as in para. 5-3.4.5.4; **(4)** Crane in transit, no load and boom lowered as in para. 5-3.4.5.5.

CAL OSHA Title 8, Article 98, 5003 Provisions for preventing accidents due to overhead high-voltage lines shall be in conformance with the High-Voltage Electrical Safety Orders, Article 37.

Sept. 08 EM 385, 16.G.04.(b)(3) The lift and swing path is clear of obstructions and adequate clearance is maintained from electrical sources per table 16-3.

TABLE 16-3

**MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD
ELECTRIC LINES**

(All dimensions are distances from live part to employee)

<u>Voltage (nominal, kV, alternating current)</u>	<u>Minimum rated clearance</u>
Up to 50	10 ft (3 m)
51 – 200	15 ft (4.6 m)
201 – 350	20 ft (6 m)
351 to 500	25 ft (7.6 m)
501 - 650	30 ft (9.1 m)
651 – 800	35 ft (10.7 m)
801 – 950	40 ft (12.2 m)
951 – 1100	45 ft (13.7 m)
<u>Clearance values calculated using: (Initial kV-50kV) x (4 in/10 kV) x (1 ft/12 in) = increased distance (ft) over 10 ft. Add this value to 10 ft to yield minimum rated clearance</u>	

29 CFR 1926.1408 Power line safety (up to 350 kV)—equipment operations.

(a) Hazard assessments and precautions inside the work zone. Before beginning equipment operations, the employer must:

(1) Identify the work zone by either:

(i) Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or

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(ii) Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.

(2) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:

(i) **Option (1)**—*Deenergize and ground*. Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the worksite.

(ii) **Option (2)**—*20 foot clearance*. Ensure that no part of the equipment load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

(iii) **Option (3)**—*Table A clearance*.

(A) Determine the line's voltage and the minimum approach distance permitted under Table A (see § 1926.1408).

(B) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Table A (see § 1926.1408). If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance. (b) *Preventing encroachment/ electrocution*. Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

(1) Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/ electrocution.

(2) If tag lines are used, they must be non-conductive.

(3) Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option (2) of this section) or at the minimum approach distance under Table A (see § 1926.1408) (if using Option (3) of this section). If the operator is unable to see the elevated warning line, a dedicated spotter must be used as described in

§ 1926.1408(b)(4)(ii) in addition to implementing one of the measures described in §§ 1926.1408(b)(4)(i), (iii), (iv) and (v).

(4) Implement at least one of the following measures:

(i) A proximity alarm set to give the operator sufficient warning to prevent encroachment.

(ii) A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:

(A) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

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(B) Be positioned to effectively gauge the clearance distance.

(C) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(D) Give timely information to the operator so that the required clearance distance can be maintained.

(iii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

(iv) A device that automatically limits range of movement, set to prevent encroachment.

(v) An insulating link/device, as defined in § 1926.1401, installed at a point between the end of the load line (or below) and the load.

(5) The requirements of paragraph (b)(4) of this section do not apply to work covered by subpart V of this part.

(c) Voltage information. Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

(d) Operations below power lines.

(1) No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the employer has confirmed that the utility owner/ operator has deenergized and (at the worksite) visibly grounded the power line, except where one of the exceptions in paragraph (d)(2) of this section applies.

(2) Exceptions. Paragraph (d)(1) of this section is inapplicable where the employer demonstrates that one of the following applies:

(i) The work is covered by subpart V of this part.

(ii) For equipment with no extensible booms: The uppermost part of the equipment, with the boom at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance distance below the plane of the power line.

(iii) For equipment with articulating or extensible booms: The uppermost part of the equipment, with the boom in the fully extended position, at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance distance below the plane of the power line.

(iv) The employer demonstrates that compliance with paragraph (d)(1) of this section is infeasible and meets the requirements of § 1926.1410.

(e) Power lines presumed energized. The employer must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.

(f) When working near transmitter/ communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter must be deenergized or the following precautions must be taken:

(1) The equipment must be provided with an electrical ground.

(2) If tag lines are used, they must be non-conductive.

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TABLE A—MINIMUM CLEARANCE DISTANCES

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

December 2009 NAVFAC P-307 1.7.2 (g) (7) For lifts in the vicinity of overhead power lines (i.e., if any part of the crane or other machine, including the fully extended boom of a telescoping boom crane or machine, or the load could approach the distances noted in figure 10-3 during a proposed operation), the plan shall demonstrate compliance to

25. Sept.. 08 EM 385, Definition A non-routine crane lift requiring detail planning and additional or unusual safety precautions.

Sept. 08 EM 385, 16.H. Critical lifts.

- 16.H.01** when using cranes or hoist, the following are identified as critical lifts requiring detailed planning and additional or unusual safety precautions. Critical lifts are defined as:
- a. Lifts involving hazardous materials (e.g. explosives, highly volatile substances).
 - b. Hoisting personnel with a crane
 - c. Lifts made with more that one crane
 - d. Lifts where the center of gravity could change.
 - e. Lifts the operator believes should be considered critical
 - f. Lifts made when the load weight is 75% of he rated capacity of the crane load chart or more (not applicable to gantry overhead or bridge cranes).
 - g. Lifts without the use of outriggers using rubber tire load charts
 - h. Lifts using more than one hoist on the same crane or trolleys.
 - i. Lifts involving non-routine or technically difficult rigging impingement (to include lifts involving multiple lift rigging.
 - j. Lifts involving submerged loads (Exception: lifts that were engineered to travel in guided slots throughout the lift and have fixed rigging and/or lifting beams, i.e. intake gates, roller gates, tailgates/logs).
 - k. Lifts out of the operators view. (Exception: if hand signals via a signal person in view of the operator or radio communications are available and in use, load does not exceed two tons and is determined a routine lift by the lift supervisor.

Sept. 08 EM 385, 16.H.02 Critical Lift Plans. Before making a critical lift, a critical lift plan shall be developed: (a) By a qualified person and shall include the crane operator, lift supervisor, and the rigger and signed by all involved personnel prior to the lift:

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(b) For a series of lifts on one project or job, as long as the cranes, personnel, type loads and configuration do not differ;

(c) And documented with a copy provided to the GDA prior to the lift(s) being made. .

NAVFAC P-307, 1.7.2 (e) Require a critical lift plan for each of the following lifts: lifts over 75 percent of the capacity of the crane or hoist (lifts over 50 percent of the barge mounted mobile crane's hoist) at any radius of lift; lifts involving more

than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall include the following as applicable:

(1) The size and weight of the load to be lifted, including crane and rigging components that add to the weight. The OEM's maximum load capacities for the entire range of the lift shall also be provided.

(2) The lift geometry, including the crane position, boom length and angle, height of lift, and radius for the entire range of the lift. Applies to both single and tandem crane lifts.

(3) A rigging plan, showing the lift points, rigging gear, and rigging procedures.

(4) The environmental conditions under which lift operations are to be stopped.

(5) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.550(g).

(6) For barge mounted mobile cranes, barge stability calculations identifying crane placement/footprint; barge list and trim based on anticipated loading; and load charts based on calculated list and trim specific to the barge the crane is mounted on. The amount of list and trim shall be within the crane manufacturer's requirements.

(7) For lifts in the vicinity of overhead power lines (i.e., if any part of the crane or other machine, including the fully extended boom of a telescoping boom crane or machine, or the load could approach the distances noted in figure 10-3 during a proposed operation), the plan shall demonstrate compliance to 29 CFR 1926.550(a)(15)

26. ASME, 5-3.2.1.4 (a) The operator shall not leave the controls while the load is suspended.

29 CFR, 1910.180 (h) (4) (i) The operator shall not be permitted to leave his position at the controls while the load is suspended.

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CAL OSHA Title 8, Article 98 4999 (h) (2) Cranes, hoists, or derricks shall not be left unattended while the load is suspended unless the load is suspended over water, a barricaded area, or is blocked up or otherwise supported from below during repairs or emergency.

29 CFR 1926.117 (e) *Leaving the equipment unattended.*

(1) The operator must not leave the controls while the load is suspended, except where all of the following are met:

(i) The operator remains adjacent to the equipment and is not engaged in any other duties.

(ii) The load is to be held suspended for a period of time exceeding normal lifting operations.

(iii) The competent person determines that it is safe to do so and implements measures necessary to restrain the boom hoist and telescoping, load, swing, and outrigger or stabilizer functions.

(iv) Barricades or caution lines, and notices, are erected to prevent all employees from entering the fall zone. No employees, including those listed in §§ 1926.1425(b)(1) through (3), § 1926.1425(d) or § 1926.1425(e), are permitted in the fall zone. **27. ASME, B30.5,5-3.1.3 (e)** Before leaving the crane unattended, the operator shall:

- (1)** Land any load, bucket, lifting magnet, or other device;
- (2)** Disengage the Master clutch;
- (3)** Set travel, swing, boom brakes, and other locking devices;
- (4)** Put controls in the off or neutral position;
- (5)** Secure the crane against accidental travel;
- (6)** Stop the engine.

Cal OSHA, Title 8, Article 98, 4999 (i) Holding The Load

(2) Cranes, hoists, or derricks shall not be left unattended while the load is suspended unless the load is suspended over water, a barricaded area, or is blocked up or otherwise supported from below during repairs or emergency.

Complex / Critical Lift Plan Checklist Two Crane Lift / Multi-Purpose Equipment

From:

Subj: Contractor Crane Critical Lift Plan

Ref:

- a. December 09, NAVFAC P-307
- b. 15 September 2008, EM 385 1-1
- c. UFGS 01525
- d. NAVSEA Standard Item 009-40

Enclosure: 1 Complex / Critical Lift Plan Checklist

1. **Scope:** Identify Complex / Critical Lift Plan requirements for contractor cranes and multi-purpose equipment operating on Navy property

2. **Purpose:** Establish a Complex / Critical Lift Plan meeting the requirements of references a through d

3. Requirements

a. **NAVFAC P-307, 1.7.2 g.** Require a critical lift plan for each of the following lifts: lifts over 75 percent of the capacity of the crane, hoist, or other machine (lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane, hoist, or other machine; lifts of personnel (lifts of personnel suspended by rigging equipment from multi-purpose machines, material handling equipment, or construction equipment shall not be permitted); lifts made in the vicinity of overhead power lines; erection of cranes; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall include the following as applicable:

(1) The size and weight of the load to be lifted, including crane (or other machine) and rigging equipment that add to the weight. The OEM's maximum load capacities for the entire range of the lift shall also be provided.

(2) The lift geometry, including the crane (or other machine) position, boom length and angle, height of lift, and radius for the entire range of the lift. Applies to both single and multiple crane/machine lifts.

(3) A rigging plan, showing the lift points, rigging equipment, and rigging procedures.

(4) The environmental conditions under which lift operations are to be stopped.

(5) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.1400.

(6) For barge mounted mobile cranes, barge stability calculations identifying crane placement/footprint; barge list and trim based on anticipated loading; and load charts based on calculated list and trim specific to the barge the crane is mounted on. The amount of list and trim shall be within the crane manufacturer's requirements.

(7) For lifts in the vicinity of overhead power lines (i.e., if any part of the crane or other machine, including the fully extended boom of a telescoping boom crane or machine, or the load could approach the distances noted in figure 10-3 during a proposed operation), the plan will demonstrate compliance to 29 CFR 1926.1400

b. September 15th 2008, EM385,1-1, 16.H CRITICAL LIFTS

16.H.01 When using cranes or hoists, the following are identified as critical lifts requiring detailed planning and additional or unusual safety precautions. Critical lifts are defined as:

- a. Lifts involving hazardous materials (e.g., explosives, highly volatile substances);
- b. Hoisting personnel with a crane or hoist;
- c. Lifts made with more than one crane;
- d. Lifts where the center of gravity could change;
- e. Lifts the operator believes should be considered critical;
- f. Lifts made when the load weight is 75% of the rated capacity of the crane load chart or more (not applicable to gantry, overhead or bridge cranes);
- g. Lifts without the use of outriggers using rubber tire load charts;
- h. Lifts using more than one hoist on the same crane or trolleys;
- i. Lifts involving non-routine or technically difficult rigging arrangement (to include lifts involving Multiple Lift Rigging
- j. Lifts involving submerged loads (EXCEPTION: lifts that were engineered to travel guided slots throughout the lift and have fixed rigging and/or lifting beams, i.e., intake gates, roller gates, tailgates/logs,);
- k. Lifts out of the operator's view; **EXCEPTION: if hand signals via a signal person in view of the operator or radio communications are available and in use, load does not exceed two tons AND is determined a routine lift by the lift supervisor.**

16.H.02 Critical lift plans. Before making a critical lift, a critical lift plan shall be developed:

- a. By a qualified person and shall include the crane operator, lift supervisor, and the rigger and signed by all involved personnel prior to the lift;
- b. For a series of lifts on one project or job, as long as the cranes, personnel, type loads and configuration do not differ;
- c. And documented with a copy provided to the GDA prior to the lift(s) being made;
- d. And shall include, as a minimum:
 - (1) The specific make and model of the cranes, the line, boom, and swing speeds;
 - (2) The exact size and weight of the load to be lifted and all crane and rigging components that add to the weight. The manufacturer's maximum load limits for the entire range of the lift, as listed in the load charts, shall also be specified;
 - (3) The plan shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift;
 - (4) Site drawing shall be included to identify placement/location(s) of crane, adjacent equipment and/or facilities, etc.;
 - (5) The plan shall designate the crane operator, lift supervisor and rigger and include their qualifications;

(6) The plan will include a rigging plan that shows the lift points and describes rigging procedures and hardware requirements;

(7) The plan will describe the ground conditions, outrigger or crawler track requirements, and, if necessary, the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift;

(8) For floating crane or derricks, the plan shall describe the operating base (platform) condition and any potential maximum list / trim;

(9) The plan will list environmental conditions under which lift operations are to be stopped

(10) The plan will specify coordination and communication requirements for the lift operation;

(11) For tandem or tailing crane lifts, identify the requirements for an equalizer beam if applicable.

c. UFGS 01525, 1.7.1d Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall be submitted 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.C.18 and the following:

(1) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.1400.

(2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.]

3.6.2 e Under no circumstances shall a Contractor make a lift at or above 90 % of the cranes rated capacity in any configuration.

d. NAVSEA Standard item 009-40, 3.8.1 Critical Lifts are:

3.8.1.1 Lifts over 75 percent of the capacity of the crane or hoist (lifts over 50 percent capacity of a barge-mounted mobile crane's hoist) at any radius

3.8.1.2 Lifts involving more that one crane or hoist

3.8.1.3 Lifts of personnel

3.8.1.4 Lifts involving non-routine rigging or operation

3.8.1.5 Lifts involving sensitive equipment

3.8.1.6 Lifts with unusual safety risk.

Critical / Complex Plan Checklist

Date: _____

1. Type of Lift (Check all that apply)

- Lift(s) over 75 percent of the capacity of the crane, hoist or other machine
- Lift (s) Over 50 percent of the capacity of a barge mounted mobile crane's hoists
- Lifts involving more than one crane or hoist / more than one multi-purpose machine
- Lifts of personnel (Multi-purpose machine with suspended rigging lifts of personnel are prohibited)
- Lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks
- Lifts that require the load to be lifted, swung, or placed out of the operator's view (FEAD)
- Lifts involving hazardous materials (e.g. explosives, highly volatile substances); (FEAD)
- Lifts involving submerged loads. (FEAD)
- Lifts without the use of outriggers using on rubber load charts (FEAD)
- Lifts where the center of gravity could change (FEAD)

2. Contractor: _____

3. Sub Contractor: _____

4. Crane Provider: _____

5. Location: _____

a. Crane: #1

- 1. Make: _____
- 2. Model: _____
- 3. ID / Ser. No _____

Crane: #2

- 1. Make: _____
- 2. Model: _____
- 3. ID / Ser. No. _____

b. Multi-Purpose Machine (1)

- 1. Make: _____
- 2. Model: _____
- 3. ID / Serial No. _____

Multi-Purpose Machine (2)

- 1. Make: _____
- 2. Model: _____
- 3. ID / Ser. No. _____

Note: Use Crane Configuration(s) section for Multi-Purpose Equipment where applicable.

6. Type of Communication

- Hand Signals Two Way Radio Other: Specify _____

7. Crane Configuration: Crane #1

a. Outrigger Positions

Zero Extension Mid Extension Full Extension On Rubber

b. Hook(s) used

Main Auxiliary Whip

c. Parts of Wire _____

d. Counter Weight _____

e. Boom Length _____

f. Boom Angle _____

g. Beginning Radius _____

Crane Capacity _____

h. Ending Radius (planned) _____

Crane Capacity _____

i. Ground Conditions _____

Crane Configuration: Crane #2

a. Outrigger Positions

Zero Extension Mid Extension Full Extension On Rubber

b. Hook(s) used

Main Auxiliary Whip

c. Parts of Wire _____

d. Counter Weight _____

e. Boom Length _____

f. Boom Angle _____

g. Beginning Radius _____

Crane Capacity _____

h. Ending Radius (planned) _____

Crane Capacity _____

i. Ground Conditions _____

8. Load Information

a. Complete description of the load

b. Height _____

c. Length _____

- d. Width _____
- e. Load Weight: Estimated _____ Actual: _____

(1) Method used to determine the load weight

9. Crane Deductions: Crane # 1

- a. Main hoist block _____
- b. Auxiliary Hoist Block _____
- c. Whip line overhaul ball _____
- d. Auxiliary Boom Head _____

- f. Jib Stowed Erected _____
- g. Parts of wire rope over required minimum _____
- i. Miscellaneous including rigging gear _____
- k. Percentage of load on crane #1 _____ Weight _____

Total Weight including load, rigging gear and all crane deductions _____
 Percentage of cranes rated capacity in current configuration _____

10. Crane Deductions: Crane # 2

- a. Main hoist block _____
- b. Auxiliary Hoist Block _____
- c. Whip line overhaul ball _____
- d. Auxiliary Boom Head _____
- f. Jib Stowed Erected _____
- g. Parts of wire rope over required minimum _____
- i. Miscellaneous including rigging gear _____
- k. Percentage of load on crane #1 _____ Weight _____

Total Weight including load, rigging gear and all crane deductions _____
 Percentage of cranes rated capacity in current configuration _____

11. Lift Participants

Print Name

Signature

Date

a. Supervisor

Qualifications:

b. Crane Operator

Qualifications:

c. Rigger in Charge

Qualifications:

d. Rigger(s)

Qualifications:

Qualifications:

e. Other participants'

12. Pre-lift briefing conducted by

13 The crane operator and rigger in charge has reviewed the lift plan and confirms all documented information is accurate and correct

Signatures:

Operator:

Rigger in Charge:

Supervisor:

**CONTRACTOR CRANE OVERSIGHT
DISCREPANCY RESPONSE FORM**

Date:	Control #	Contractor:	
Subcontractor:		Crane Owner:	
Location Of Operations:			
Contracting Official:		Phone:	Contract #
ROOT CAUSE			
CORRECTIVE / PREVENTIVE ACTION TAKEN TO PREVENT RECURRENCE			
Contracting Representatives Signature:			Date:

Note: The Contracting Official (or their designee) shall submit a written response to all discrepancies within ten (10) working days to the PWC Contractor Crane Oversight Office. Identify the root cause(s) and any actions taken by the contractor to prevent recurrence. Responses can be faxed to (619) 556-9244 or emailed to dubyap@pwcsd.navy.mil

CONTRACTOR MULTI PURPOSE MACHINE CHECKLIST

Contractor:		Sub:		Date:	
Equipment Owner:		Equipment Type:		Mfg:	
Model:		Serial/ID Number:		Rated Capacity	
Inspection Date;		Test Date:			
Location of Operations:			Duration of Contract:		
Contracting Officers Point of Contact			Phone:		Contract #:

	YES	NO	N/A
1. Is the equipment used to lift suspended loads by rigging equipment? If hydraulic excavating equipment is used, has an AHA specific to the hoisting and transporting operation been prepared? IAW, Dec 09, NAVFAC P-307, 1.7.2 & Sept 08, EM 385, 16.A.01 & 16.S.03 a & ANSI B56.6, 6.4.7			
2. Is there written authorization from the OEM or an operators manual indicating the machine is capable of performing lifts suspended from rigging gear? IAW – Dec. 09 NAVFAC P-307, 1.7.2 e & Sept 08, EM 385, 16.S.03, a-c & 29CFR 1910.178(a)(4)			
3. Has the equipment been inspected, tested and certified in writing by a by a competent person? IAW Sept 08, EM 385 16.A.02 & 16.D.01 & 16.F.03 & 18.G.29			
4. Is a certificate of compliance posted on the equipment? IAW Dec 09, NAVFAC P-307 1.7.2 (b),			
5. Are there copies of the OEM operator and safety manuals specific to the equipment make and model? IAW Sept 08 EM 385 16.G.01 a & ANSI B56.6, 8.2			
6. Is there a load rating chart specific to the equipment make and model? Dec 09 NAVFAC P-307 1.7.2 e & ANSI B56.6, 8.5,4 & 8.5.5 & Sept 08, EM 385 16.G.01 b & c & 18,G.29 b			
7. Is the equipment a telescopic boom rough terrain forklift? Is it equipped with a boom angle indicator and a method to determine boom extension? IAW- ANSI B56.6, 8.5.5(a)(b)			
8. Is the operator qualified in writing to operate this specific equipment type? IAW – Sept 08, EM 385 16.B.01 & 16.S.03 a (1) & Dec 09 NAVFAC P-307, 1.7.2 d & e			
9. Is a critical lift plan required? (Is the equipment used in close proximity to overhead power lines?) If so is does the plan demonstrate compliance with 29CFR 1926.550(a)(15)? IAW - Dec 09 NAVFAC P-307, 1.7.2 g 1-7			
10. Are personnel (i.e. riggers, signal persons etc) involved in the operation qualified in writing? Sept 08, EM 385, 16.S.03 a (1)			

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

	YES	NO	N/A
11. Is the machine transited to and from the job site correctly? Are OEM guidelines for travel followed? IAW - ANSI B56.6, 6.3 – 6.3.20			
12. Are front end attachments (rough terrain forklifts) used in accordance with ANSI/OEM guidelines? IAW-ANSI B56.6, 5.2.3 & 6.4.4			
13. Is the machine in a safe condition when left unattended? IAW – ANSI B56.6, 6.2.12 (a)-(g)			
14. Are operations conducted in accordance with OEM operator and equipment safety manuals? IAW ANSI B56.6, 5.17.1, 6.1, 6.1.4, 6.2, 6.3, 6.4 & Dec 09 NAVFAC P-307, 1.7.2 a			
15. Is the rigging gear in compliance with applicable ANSI, OSHA and EM 385 regulations for slings, below the hook lifting device and rigging hardware? Sept 08, EM 385, 15.A.01 a-d, ASME B30.9 for slings, B30.20 for below the hook lifting devices, B30.26 for rigging hardware, 29CFR 1910.184			
16. Are the rigging gear connection points on construction/material handling equipment approved by OEM or a registered professional engineer? IAW 29CFR, 1910.178, (a) (4) & Sept 08, EM 385, 16.S.02 c & 15.A.05			

Signature:	Date:
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CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

Item#

1. Dec 09, NAVFAC P-307 1.7.2 Contractor Operated Cranes (and Multi-Purpose Machines, Material Handling Equipment (Forklifts), and Construction Equipment When Used as Cranes to Lift Suspended Loads) and Rigging Equipment in Weight Handling Operations. In addition to cranes rented or leased for operation by an activity, other non-Navy owned cranes, multi-purpose machines, material handling equipment (forklifts), and construction equipment are used on Navy property to lift suspended loads. Rigging equipment may be used with these machines or by itself in weight handling operations. These cranes and equipment can be from a variety of sources and are generally incidental to construction contracts, ship repair contracts, demolition contracts, maintenance and other service contracts, deliveries of supplies and equipment, etc. Numerous organizations, including tenant activities, ships, supply departments, ROICCs, etc., have contracting authority and very often the need for cranes is not anticipated when contract documents are written. The following requirements apply to any contracted work utilizing cranes (and multi-purpose machines, material handling equipment, construction equipment used to lift loads suspended by rigging gear) and to all rigging equipment used in weight handling operations at a naval activity. These requirements do not apply to shipboard cranes or rigging equipment. Navy activity (i.e., host activity) commanding officers shall promulgate the following minimum requirements to tenants and contracting officers for inclusion in contracts, statements of work, purchase orders, etc. (These requirements do not apply to cranes that enter the activity but are not used for lifting, or other machines not used to lift loads suspended by rigging equipment.)

Sept 08 EM 385 1-1, 16.A.01 Unless otherwise specified, the requirements of this Section are applicable to all cranes and hoisting equipment, to include, but not limited to, articulating cranes (knuckle-boom cranes), floating cranes, cranes on barges, locomotive cranes, mobile cranes (i.e., wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted and boom truck cranes, etc.), multipurpose machines when configured to hoist and lower by means of a winch or hook and horizontally move a suspended load, industrial cranes, dedicated pile drivers, service/mechanic trucks with a hoisting device, cranes on a monorail, tower cranes (i.e., fixed jib/hammerhead boom, luffing boom and self-erecting), pedestal cranes, portal cranes, overhead and gantry cranes, straddle cranes, side-boom tractors, all derricks, hydraulic excavators and other such equipment when used with chains, slings or other rigging to lift suspended loads, and variations of such equipment.

Sept 08 EM 385 1-1, 16.S.03 When hydraulic excavating equipment is to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

a. Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to:

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

- (1) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations;
- (2) Performance of the operational test described in 16.F;
- (3) Proper operating procedures in accordance with the equipment manufacturer's operating manual;
- (4) Proper use and on site availability of manufacturer's load rating capacities or charts;
- (5) Proper use of rigging, including positive latching devices to secure the load and rigging;
- (6) Inspection of rigging;
- (7) Use of tag lines to control the load;
- (8) Adequate communications;
- (9) Establishment of a sufficient swing radius (equipment, rigging and load) and
- (10) Stability of surfaces beneath the hydraulic excavating equipment.

ANSI B56.6, 6.4.7 The handling of suspended loads by means of a crane arm (boom) or other device can introduce dynamic forces affecting the stability of a rough terrain forklift truck that are not considered in the stability criteria of para. 8.6. Grades and sudden starts, stops, and turns can cause the load to swing and create a hazard if not externally stabilized [see para. 6.4.7(a) (5)].

- (a) When handling suspended loads:
 - (1) Do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads;
 - (2) Only lift the load vertically and never drag it horizontally;
 - (3) transport the load with the bottom of the load and the mast as low as possible;
 - (4) With load elevated, maneuver the rough terrain forklift truck slowly and cautiously, and only to the extent necessary to permit lowering to the transport Position;
 - (5) Use guy lines to restrain load swing whenever possible

2. Dec 09, NAVFAC P-307, 1.7.2 e. For multi-purpose machines, material handling equipment, and construction equipment used to lift loads suspended by rigging equipment, require proof or authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Require the contractor to demonstrate that the equipment is properly configured to make such lifts and is equipped with a load chart

Sept 08, EM 385 16.S.03

a. Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to:

- (1) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations;

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

(2) Performance of the operational test described in 16.F;

(3) Proper operating procedures in accordance with the equipment manufacturer's operating manual;

(4) Proper use and on site availability of manufacturer's load rating capacities or charts;

(5) Proper use of rigging, including positive latching devices to secure the load and rigging;

(6) Inspection of rigging;

(7) Use of tag lines to control the load;

(8) Adequate communications;

(9) Establishment of a sufficient swing radius (equipment, rigging load) and

(10) Stability of surfaces beneath the hydraulic excavating equipment.

b. An operational test with the selected hydraulic excavating equipment will be performed in the presence of the GDA.

(1) The operational test shall consist of a demonstration that the test load and selected rigging can be safely lifted, maneuvered, controlled, stopped, and landed.

(2) The operational test shall be representative of the complete cycle of the proposed transporting or hoisting operation, including configuration, orientation and positioning of the excavating equipment and the use of identical rigging.

(3) The test load shall be equivalent to the maximum anticipated load, but shall not exceed 100% of the manufacturer's load rating capacity for the excavating equipment as configured. Written documentation of the performance of the operational test outlining test procedures and results shall be maintained at the on-site project office.

c. All rigging and rigging operations shall comply with the requirements of Section 15. Hooks, eyes, slings, chains or other rigging shall not be attached to or hung from the teeth of a bucket during the transporting or hoisting of a load by hydraulic excavating equipment.

3. Sept 08, EM 385 16.A.02 Before any crane or hoisting equipment is placed in use, it shall be inspected and tested and certified in writing by a competent person to be in accordance with the manufacturer's recommendations and the requirements of this manual. > See 16.D, E and F.

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

Sept 08, EM 385 16.D.01 Inspections of cranes and hoisting equipment shall be in accordance with this section, applicable ASME standards, OSHA regulations and the manufacturer's recommendations.

Sept 08, EM 385 16.F.03

a. Load tests shall be performed in accordance with ANSI/ASME and the manufacturer's recommendations by, or under the direction of, a qualified person. If the manufacturer has no procedures, a Registered Professional Engineer familiar with the type of equipment involved must approve procedures and frequency of testing using as a minimum, Appendix I for procedures and taking into account age of equipment, history of use, testing and inspection, anticipated future use, and other such factors.

b. Test loads shall be made at 110% of the anticipated load for the specified configuration, not to exceed 100% of the manufacturer's load rating at the configuration of the test, except for manufacturer testing of new crane and hoisting equipment, which shall be conducted in accordance with the ANSI/ASME standards B30.1 through B30.17 as appropriate for the crane and hoisting equipment.

c. Load testing shall be performed:

(1) Before initial use of crane or hoisting equipment in which a load bearing or load controlling part or component, brake, travel component, or clutch has been altered, replaced, or repaired.

(2) Every time the crane or hoisting equipment is reconfigured or reassembled after disassembly (to include booms); and

(3) When the manufacturer requires load testing.

(a) The employer shall specifically research, identify and document manufacturer required load-testing frequency for each USACE-owned/operated and/or Contractor- owned/operated crane or hoisting equipment and maintain and/or provide this information to the GDA;

(b) Under conditions (1) and (2) above, a selective load test (testing only those components that have or may have been affected by the alteration, replacement, or repaired) may be performed;

(c) The replacement of the rope is specifically excluded from this requirement. However, a functional test of the crane or hoisting equipment under a normal operating load shall be made prior to putting the crane back in service.

(d) The manufacturer's specifications and limitations applicable to the operation of any crane and hoisting equipment shall be followed. At no time shall a crane or hoisting equipment be loaded in excess of the manufacturer's rating, except overhead and gantry cranes in accordance with ANSI/ASME B30.2. Loads shall not exceed 125% of the rated load for test purposes or planned engineered lifts for overhead and gantry cranes. > **See 16.H, Critical Lifts**

(1) Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a registered

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

engineer competent in this field, and such determinations will be documented and recorded.

(2) Attachments used with crane and hoisting equipment shall not exceed the capacity, rating, or scope recommended by the manufacturer.

(e) Written reports that show test procedures and confirm the adequacy of repairs or alterations shall be maintained and provided upon request.

Sept 08, EM 385 18.G.29 Powered Industrial Trucks (PITs)/Forklifts. All PITs shall meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation (as defined in ANSI/ASME B56.1).

4. Dec 09, NAVFAC P-307 1.7.2 b. Require a certificate of compliance from the contractor (appendix P, figure P-1) that the crane (or other machine if used to lift suspended loads) and the rigging equipment meet applicable OSHA and ANSI/ASME regulations (with the contractor citing which OSHA and ANSI/ASME regulations are applicable, e.g., cranes/multipurpose machines used in cargo transfer shall comply with 29 CFR 1917; cranes/multi-purpose machines used in construction, demolition, or maintenance shall comply with 29 CFR 1926; cranes/multi-purpose machines used in shipbuilding,

5. Sept 08 EM 385 16.G.01 a All cranes and hoisting equipment shall have the following documents with them (in the cab, if applicable) at all times they are to be operated:

a. A copy of the operating manual developed by the manufacturer for the specific make and model of the crane or hoist.

(1) When not available from a manufacturer, a qualified person shall establish the ratings and operating limitations (load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, maintenance, testing, and inspection requirements that apply during the use.

(2) Where load capacities are available only in electronic form: in the event of a failure which makes the load capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the load capacities (in electronic or other form) are available.

b. A copy of the load-rating chart (separate or included in the operating manual), shall include:

(1) The crane/hoist make and model, serial number, and year of manufacturer;

(2) Load ratings for all operating configurations, including optional equipment;

(3) Recommended reeving for the hoist line; and

(4) Operating limits in windy or cold weather conditions.

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

c. A durable load chart with legible letters and figures shall be fixed at a location visible to the operator while seated at the control station;

d. The crane log book shall be used to record operating hours and all crane inspections, tests, maintenance, and repair. The log shall be updated daily as the crane is used and shall be signed by the operator and supervisor. Service mechanics shall sign the log after conducting maintenance or repairs on the crane.

e All inspections, test, maintenance and repairs for hoisting equipment shall be maintained in the log, the O&M records or equivalent for that piece of equipment.

ANSI B.56.6, 8.2 The manufacturer shall provide an operator's manual covering the operation of the specific type of rough terrain forklift truck. A location to store manual(s) shall be provided on the truck.

6. Dec 09 NAVFAC P-307 1.7.2 e For multi-purpose machines, material handling equipment, and construction equipment used to lift loads suspended by rigging equipment, require proof or authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Require the contractor to demonstrate that the equipment is properly configured to make such lifts and is equipped with a load chart.

ANSI B 56.6 8.5.4 Vertical mast rough terrain forklift trucks shall be provided with a clearly legible chart, visible to the operator, in his operating position, giving load handling capacities in conformance with paras. 8.3 and 8.4. In addition, the rated capacity and capacities at other load centers and load elevations may be shown.

ANSI B 56.6 8.5.5 Rough terrain forklift trucks equipped with a telescopic boom that provides variable reach at variable elevations shall be provided with a clearly legible chart, visible to the operator in his operating position, giving load handling capacities in conformance with paras. 8.3 and 8.4 of this Standard. The load capacity chart shall show, as a minimum, the information shown in Figs. 1 and 2. Information shall be given with or without manually operated stabilizers and/or axle locks, if so equipped. Additional information may be included, if desired.

(a) A method of indicating boom angle in degrees shall be provided using 0 deg at the horizontal position of the boom and shall be visible to the operator in his operating position.

(b) A method of indicating boom extension shall be provided starting at minimum extension, and shall be clearly visible to the operator in his operating position.

(c) The load capacity chart shall have the above reference information included in such a manner that the position and capacity of the load carrying device(s) may be determined by the operator.

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

Sept 08 EM 385 16.G.01 b & c

b. A copy of the load-rating chart (separate or included in the operating manual), shall include:

- (1) The crane/hoist make and model, serial number, and year of manufacturer;
- (2) Load ratings for all operating configurations, including optional equipment;
- (3) Recommended reeving for the hoist line; and
- (4) Operating limits in windy or cold weather conditions.

c. A durable load chart with legible letters and figures shall be fixed at a location visible to the operator while seated at the control station;

7. **ANSI B56.6, 8.5.5 (a) (b)** Rough terrain forklift trucks equipped with a telescopic boom that provides variable reach at variable elevations shall be provided with a clearly legible chart, visible to the operator in his operating position, giving load handling capacities in conformance with paras. 8.3 and 8.4 of this Standard. The load capacity chart shall show, as a minimum, the information shown in Figs. 1 and 2. Information shall be given with or without manually operated stabilizers and/or axle locks, if so equipped. Additional information may be included, if desired.

(a) A method of indicating boom angle in degrees shall be provided using 0 deg at the horizontal position of the boom and shall be visible to the operator in his operating position.

(b) A method of indicating boom extension shall be provided starting at minimum extension, and shall be clearly visible to the operator in his operating position

8. **Sept 08 EM 385, 16.B.01** Cranes and hoisting equipment shall be operated only by designated qualified personnel. Proof of qualification shall be in writing. In addition to fully qualified crane and hoisting equipment operators, the following personnel may be designated to operate cranes and hoisting equipment under limited conditions (may not perform critical lifts).

Sept 08 EM 385, 16.S.03 When hydraulic excavating equipment is to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

a. Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to:

(1) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations.

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

Dec 09 NAVFAC P-307, 1.7.2 d. Require the contractor to certify (appendix P, figure P-1) that the operator is qualified and trained for the operation of the crane or machine to be used.

e. For multi-purpose machines, material handling equipment, and construction equipment used to lift loads suspended by rigging equipment, require proof or authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Require the contractor to demonstrate that the equipment is properly configured to make such lifts and is equipped with a load chart.

Sept 08 EM 385 18.G.29 b. Only trained and authorized operators shall be permitted to Operate a PIT.

(1) Training must be both classroom and practical operation and in accordance with OSHA Standard 29 CFR 1910.178. It must be on the same type of truck the student uses on the job.

(2) The employer must certify that the operator has been trained and evaluated as required by the standard. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation. Refresher training shall be provided as indicated by the standard.

9. Dec 09 NAVFAC P-307, 1.7.2 g. Require a critical lift plan for each of the following lifts: lifts over 75 percent of the capacity of the crane, hoist, or other machine (lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane, hoist, or other machine; lifts of personnel (lifts of personnel suspended by rigging equipment from multi-purpose machines, material handling equipment, or construction equipment shall not be permitted); lifts made in the vicinity of overhead power lines; erection of cranes; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall include the following as applicable:

(1) The size and weight of the load to be lifted, including crane (or other machine) and rigging equipment that add to the weight. The OEM's maximum load capacities for the entire range of the lift shall also be provided.

(2) The lift geometry, including the crane (or other machine) position, boom length and angle, height of lift, and radius for the entire range of the lift. Applies to both single and multiple crane/machine lifts.

(3) A rigging plan, showing the lift points, rigging equipment, and rigging procedures.

(4) The environmental conditions under which lift operations are to be stopped.

(5) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.550(g).

(6) For barge mounted mobile cranes, barge stability calculations identifying crane placement/footprint; barge list and trim based on anticipated loading; and load charts based on calculated list and trim specific to the barge the crane is mounted on. The amount of list and trim shall be within the crane manufacturer's requirements.

CONTRACTOR MULTI PURPOSE MACHINE REFERENCES

(7) For lifts in the vicinity of overhead power lines (i.e., if any part of the crane or other machine, including the fully extended boom of a telescoping boom crane or machine, or the load could approach the distances noted in figure 10-3 during a proposed operation), the plan shall demonstrate compliance to 29 CFR 1926.550(a)(15)

29 CFR 1926.550 (a) (15) Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

1926.550(a) (15) (i) For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;

1926.550(a)(15)(ii) For lines rated over 50 kV., minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV., or twice the length of the line insulator, but never less than 10 feet;

1926.550(a)(15)(iii) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV., and 10 feet for voltages over 50 kV., up to and including 345 kV., and 16 feet for voltages up to and including 750 kV.

1926.550(a)(15)(iv) A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means;

1926.550(a)(15)(v) Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other regulation of this part even if such device is required by law or regulation;

1926.550(a)(15)(vi) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded;

1926.550(a)(15)(vii) Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:

1926.550(a) (15) (vii) (a) The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

1926.550(a)(15)(vii)(b) Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near

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energized transmitters. Crews shall be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

1926.550(a) (15) (vii) (c) Combustible and flammable materials shall be removed from the immediate area prior to operations.

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10. Sept 08, EM 385, 16.S.03 When hydraulic excavating equipment is to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

a. Operations involving the use of hydraulic excavating equipment and rigging to transport or hoist loads require different operator skills and considerations than the standard excavating operations routinely performed with hydraulic excavating equipment. An AHA specific to the transporting or hoisting operation shall be prepared. The AHA shall include, but not be limited to:

(1) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations.

11. ANSI B56.6, 6.3 Traveling

6.3.1 On rough terrain forklift trucks equipped with individual wheel brake pedals, lock pedals together for simultaneous operation before travel on public roads or when changing job sites.

6.3.2 For rough terrain forklift trucks equipped with a differential lock, the lock should not be engaged when driving on the road or at high speeds or when turning. If the lock is engaged when turning, there could be loss of steering control.

6.3.3 Observe all traffic regulations including authorized speed limits. Under normal traffic conditions, keep to the right. Maintain a safe distance, based on speed of travel, from the truck ahead; and keep the truck under control at all times.

6.3.4 Yield the right of way to pedestrians and emergency vehicles such as ambulances and fire trucks.

6.3.5 Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.

6.3.6 Slow down and sound the audible warning device(s) at cross aisles and other locations where vision is obstructed.

6.3.7 Cross railroad tracks at an angle wherever possible. Do not park closer than 6 ft (1.8 m) to the nearest rail of a railroad track.

6.3.8 Keep a clear view of the path of travel and observe for other traffic, personnel, and safe clearances.

6.3.9 If the load being carried obstructs forward view, travel with the load trailing.

6.3.10 Ascend or descend grades slowly, and with caution.

(a) When ascending or descending grades in excess of 5%, loaded rough terrain forklift trucks shall be driven with the load upgrade.

(b) Unloaded rough terrain forklift trucks should be operated on all grades with the load-engaging means downgrade.

(c) On all grades, the load and load-engaging means shall be tilted back, if applicable, and raised only as far as necessary to clear the road surface.

(d) Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines; normally travel straight up and down.

6.3.11 Under all travel conditions, operate the rough terrain forklift truck at a speed that will permit it to be brought to a stop in a safe manner.

6.3.12 Travel with load-engaging means or load low and, where possible, tilted back. Do not elevate the load except during stacking.

6.3.13 Make starts, stops, turns, or direction reversals in a smooth manner so as not to shift load and/or overturn the rough terrain forklift truck.

6.3.14 Do not indulge in stunt driving or horseplay.

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6.3.15 Slow down for wet and slippery floors.

6.3.16 Before driving over a dock board or bridge plate, be sure that it is properly secured. Drive carefully and slowly across the dock board or bridge plate, and never exceed its rated capacity.

6.3.17 Do not drive rough terrain forklift trucks onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off engine, and set brakes. It is advisable that all other personnel leave the elevator before truck is allowed to enter or leave.

6.3.18 Avoid running over loose objects on the roadway surface.

6.3.19 When negotiating turns, reduce speed to a safe level, and turn steering hand wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the steering hand wheel at a moderate, even rate.

6.3.20 Use special care when traveling without load, as the risk of lateral overturning is greater.

12. ANSI B56.6, 5.2.3 If the rough terrain forklift truck is equipped with front end attachment(s) or optional forks, the user shall see that the truck is marked to identify the forks or attachment(s), show the approximate weight of the truck and fork or attachment combination, and show the capacity of the truck with forks or attachment(s) at maximum elevation with load laterally centered.

ANSI B56.6, 6.4.4 When attachments are used, extra care shall be taken in securing, manipulating, positioning, and transporting the load. Operate rough terrain forklift trucks equipped with attachments as partially loaded trucks when not handling a load.

13. ANSI B56.6, 6.2.12 Before leaving the operator's position:

(a) Bring rough terrain forklift truck to a complete stop;

(b) Place directional controls in neutral;

(c) Apply the parking brake;

(d) Lower load-engaging means fully, unless supporting an elevated platform; In addition, when leaving the rough terrain forklift truck unattended:

(e) Stop the engine;

(f) If the rough terrain forklift truck must be left on an incline, block the wheels;

(g) Fully lower the load-engaging means.

14. ANSI B56.6, 5.17.1 The user shall ensure that operators understand that the safe operation is the operator's responsibility. The user shall ensure that operators are knowledgeable of, and observe, the safety rules and practices in paras. 6.1, 6.2, 6.3, 6.4, and 6.5.

6.1 Operator Responsibility

6.1.1 Safe operation is the responsibility of the operator.

6.1.2 The equipment can be dangerous if not used properly. The operator shall develop safe working habits and also be aware of hazardous conditions in order to protect himself, other personnel, the rough terrain forklift truck, and other material.

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6.1.3 The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the rough terrain forklift truck.

6.1.4 Before operating any rough terrain forklift truck, truck operators shall have read and be familiar with the operator's manual for the particular truck being operated; they shall also abide by the safety rules and practices in paras. 6.1, 6.2, 6.3, 6.4, and 6.5.

6.2 General

6.2.1 Before starting to operate the rough terrain forklift truck:

- (a) Be in operating position and fasten seat belt, if so equipped;
- (b) Place directional controls in neutral;
- (c) Disengage clutch on manual transmission equipped rough terrain forklift trucks, or apply brake on power shift or automatic transmission-equipped trucks;
- (d) Start engine.

6.2.2 Do not start or operate the rough terrain forklift truck, any of its functions or attachments, from any place other than from the designated operator's position.

6.2.3 Keep hands and feet inside the operator's designated area or compartment. Do not put any part of the body outside the operator compartment of the rough terrain forklift truck.

6.2.4 Never put any part of the body into the mast structure or between the mast and the rough terrain forklift truck.

6.2.5 Never put any part of the body within the reach mechanism of the rough terrain forklift truck or other attachments.

6.2.6 Understand rough terrain forklift truck limitations and operate the truck in a safe manner so as not to cause injury to personnel. Safeguard pedestrians at all times. Do not drive a rough terrain forklift truck up to anyone standing in front of an object. Exercise particular care during backing and other operations where pedestrians may step into the path of travel of the truck.

6.2.7 Do not allow anyone to stand or pass under the elevated portion of any rough terrain forklift truck, whether empty or loaded.

6.2.8 Do not permit passengers to ride on rough terrain forklift trucks unless a safe place has been provided by the manufacturer that complies with para. 8.27. The passenger shall:

- (a) Remain seated at all times except when entering and exiting;
- (b) Fasten the seat belt;
- (c) Keep all parts of the body, including hands and feet, inside the passenger compartment;
- (d) Keep clear of, and make no contact with, the operating controls of the rough terrain forklift truck. The operator shall only operate the rough terrain forklift truck in a manner that ensures the passenger's safety.

6.2.9 Check clearance carefully before driving under electrical lines, bridges, etc.

6.2.10 A rough terrain forklift truck is attended when the operator is less than 25 ft (7.6 m) from the truck, which remains in his view.

6.2.11 A rough terrain forklift truck is unattended when the operator is 25 ft (7.6 m) or more from the truck, which remains in his view, or whenever the operator leaves the truck and it is not in his view.

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6.2.12 Before leaving the operator's position:

- (a) Bring rough terrain forklift truck to a complete stop;
- (b) Place directional controls in neutral;
- (c) Apply the parking brake;
- (d) Lower load-engaging means fully, unless supporting an elevated platform; In addition, when leaving the rough terrain forklift truck unattended:
- (e) Stop the engine;
- (f) If the rough terrain forklift truck must be left on an incline, block the wheels;
- (g) Fully lower the load-engaging means.

6.2.13 Maintain a safe distance from the edge of ramps, platforms, and other similar working surfaces.

6.2.14 Do not move railroad cars or trailers with a rough terrain forklift truck unless the truck is properly designed and equipped for that operation.

6.2.15 Do not use a rough terrain forklift truck for opening or closing railroad car doors, unless the truck utilizes a device specifically designed for opening and closing railroad car doors and the operator is trained in its use. The design of the door-opening device shall require the rough terrain forklift truck to travel parallel to the railroad car, with the force applied in a direction parallel with the door travel. Care should be exercised when engaging the door-opening device with the railroad car door in order to prevent damage to the doors and/or the rough terrain forklift truck by heavy impact forces. The entire door opening operation shall be in full view of the operator. The rough terrain forklift truck shall always be positioned to safeguard the dock attendant while removing the door lock pin. Whenever a railroad car door requires an abnormal force to open, the truck operator shall report the condition to his supervisor or as instructed.

6.2.16 In areas classified as hazardous, use only rough terrain forklift trucks approved for use in those areas.

6.2.17 Report all accidents involving personnel, building structures, and equipment to the supervisor or as directed.

6.2.18 Do not add to, or modify, the rough terrain forklift truck.

6.2.19 Do not block access to fire aisles, stairways, or fire equipment.

6.4 Loading

6.4.1 Improper use of stabilizer controls (if so equipped) could cause rough terrain forklift truck upset. Always lower the carriage before operating stabilizer controls.

6.4.2 For rough terrain forklift trucks equipped with lateral leveling:

(a) Always level the frame before raising the boom or mast, with or without load.

(b) Lateral leveling should not be used to position an elevated load; instead, lower the load and reposition the rough terrain forklift truck.

6.4.3 Handle only stable or safely arranged loads.

(a) When handling off-center loads that cannot be centered, operate with extra caution.

(b) Handle only loads within the capacity of the rough terrain forklift truck.

(c) Handle loads exceeding the dimensions used to establish rough terrain forklift truck capacity with extra caution. Stability and maneuverability may be adversely affected.

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6.4.4 When attachments are used, extra care shall be taken in securing, manipulating, positioning, and transporting the load. Operate rough terrain forklift trucks equipped with attachments as partially loaded trucks when not handling a load.

6.4.5 Completely engage the load with the load engaging means. Fork length should be at least two thirds of load length. Where tilt is provided, carefully tilt the load backward to stabilize the load. Caution should be used in tilting backward with high or segmented loads (see paras. 5.3.3 and 6.4.6).

6.4.6 Use extreme care when tilting load forward or backward, particularly when high tiering. Do not tilt forward with load-engaging means elevated except to pick up or deposit a load over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

6.4.7 The handling of suspended loads by means of a crane arm (boom) or other device can introduce dynamic forces affecting the stability of a rough terrain forklift truck that are not considered in the stability criteria of para. 8.6. Grades and sudden starts, stops, and turns can cause the load to swing and create a hazard if not externally stabilized [see para. 6.4.7(a)(5)].

(a) When handling suspended loads:

(1) Do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads;

(2) Only lift the load vertically and never drag it horizontally;

(3) Transport the load with the bottom of the load and the mast as low as possible;

(4) With load elevated, maneuver the rough terrain forklift truck slowly and cautiously, and only to the extent necessary to permit lowering to the transport position;

(5) Use guy lines to restrain load swing whenever possible.

Dec 09 NAVFAC P-307, 1.7.2 a. Require the contractor to comply with specific activity regulations pertaining to crane safety and operation (including allowable access routes and ground loading limitations), and to notify the contracting officer, in advance, of any cranes entering the activity or of any multi-purpose machines, material handling equipment, or construction equipment that may be used in a crane-like application to lift suspended loads. Require the contractor to comply with applicable ANSI or ASME standards (e.g., ASME B30.5 for mobile cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices, and ASME B30.26 for rigging hardware, ANSI/ITSDF B56.6 for rough terrain forklifts). For cranes, machines and rigging equipment at naval activities in foreign countries, the cranes, machines and rigging equipment shall comply with the appropriate host country safety standards. For barge-mounted mobile cranes, require a third party certification from an OSHA accredited organization (or a third party certification from a state accredited organization for those states with OSHA approved state plans), a load indicating device, a wind indicating device, and a marine type list and trim indicator readable in one-half degree increments. Third party certification is not required for barge-mounted mobile cranes at naval activities in foreign countries.

b. Require a certificate of compliance from the contractor (appendix P, figure P-1

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- 15. Sept 08, EM 385, 15.A.01** Inspection and use.
- a. Rigging equipment shall be inspected as specified by the manufacturer, by a Competent Person, before use on each shift and as necessary during its use to ensure that it is safe.
 - b. Defective rigging shall be removed from service.
 - c. The use and maintenance of rigging equipment shall be in accordance with recommendations of the rigging manufacturer and the equipment manufacturer. Rigging equipment shall not be loaded in excess of its recommended safe working load.
 - d. Rigging equipment, when not in use, shall be removed from the immediate work area and properly stored and maintained in a safe condition

Note: See Contractor Crane Rigging Gear Oversight Guideline Reference Sheet for rigging gear rejection criteria,

- 16. 29 CFR 1910.178 (a) (4)** Modifications and additions which affect capacity and safe operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

29 CFR 1910.178 (a)(5) If the truck is equipped with front-end attachments other than factory installed attachments, the user shall request that the truck be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

Sept 08, EM 38515, 16.S.02 Hydraulic excavating equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer.

c. All rigging and rigging operations shall comply with the requirements of Section 15. Hooks, eyes, slings, chains or other rigging shall not be attached to or hung from the teeth of a bucket during the transporting or hoisting of a load by hydraulic excavating equipment.

Sept 08, EM 38515.A.05 When hoisting loads, a positive latching device shall be used to secure the load and rigging (i.e., self-closing safety latches, hook with a spring-loaded gate, an alloy anchor type shackle with a bolt, nut and retaining pin.