EM 385-1-1, 2008
Change #6
Major Changes and Rationale

Sections 11, 18 and 16 (Cranes and Hoisting Equipment)

Appendices I, Q and S

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 11, Electrical)

- Table 11-1, **MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD ELECTRIC LINES:** Replace table with new.
  - **Rationale:** Change values due to OSHA changes effective Nov 2010; changes start in >500kV category and increase distances;
- Over 1,000 kV, can't calculate by just anyone, using formula. Instead "as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)."
- Table 11-2, Add new table: **MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD;**
  - **Rationale:** Again, due to OSHA changes effective Nov 2010 ;
- Existing Table 11-2, Re-title as Table 11-3;
- Existing Table 11-3, Re-title as Table 11-4;
- Section 11, various paragraphs, Change Table references;

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 18, Machinery, Mechanized Equipment, etc)

- Paragraph 18.G.29, change wording to Powered Industrial Trucks (PITs)/Forklifts and Telehandlers. All PITs and telehandlers shall….
  - Rationale: Specifically include telehandlers/rough terrain equipment that was never intended to be excluded (but sometimes was) from these requirements
- Add NOTE under 18.G.29: "*When PITs or Telehandlers are configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load, refer to Sections 16.A.01. > Exemptions and 16.V*"
  - Rationale: Deliberately sends reader to 16.A.01 and 16.V (new section) when PITs or telehandlers are adapted or used to hoist loads. This activity is then considered a hoisting activity and hence, sends you to Section 16.

Major Changes and Rationale, Change #6 (EM 385-1-1, Appendices I, Q and S)

- Appendix I, DELETE
  - Rationale: Crane Testing Requirements for Performance Tests was deleted because Appendix I charts were confusing and this material was clarified and brought up into Section 16.F Testing

- Appendix Q: Add 3 new definitions: Assembly/Disassembly director (A/D director); Qualified Evaluator of Signal Persons (not a third party); Qualified Evaluator of Signal Persons (third party).
  - Rationale: All 3 definitions were brought over from OSHA's Crane/Derrick and Hoist Regulation, 1926.1400

- Appendix S, Add 2 new references: ANSI/ASME B30.20 and 29 CFR Part 1926, Subpart CC- Cranes and Derricks in Construction
  - Rationale: OSHA's 1926.1400, Subpart CC was published in August of 2010 and is a major impetus behind many of the crane, derrick and hoisting equipment changes being made and ANSI/ASME B30.20 is Below-the-Hook Lifting Devices, 2010 and was not included in Appendix S originally.

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 16, Cranes and Hoisting Equipment

- Para 16.A.01 – general applicability used to list many. Changed to "all cranes, derricks, hoists and power-operated equipment that can be used to hoist, lower and/or horizontally move a suspended load" with exceptions listed.
  - Rationale: easier to read and interpret, follows OSHA more closely

- Para 16.A.01 – 16 exemptions include:
  - Anchor handling or dredge-related operations with a vessel or barge using an affixed A-frame
  - Base-mounted drum hoists used to hoist personnel, guided and non-guided, whether powered by internal combustion engine, electric motor or other prime mover, to include air tuggers). ***See Section 16.U for equipment-specific requirements***

  - Rationale: New section 16.U was developed for this equipment – only exempt when used to hoist personnel
  - Digger derricks used for utility/pole installation
  - Vehicle-mounted aerial devices (i.e., Bucket Trucks), ***See Section 22.M, and self-propelled elevating work platforms, See Section 22.L***

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 16, Cranes and Hoisting Equipment

- Para 16.A.01 – con'td
  - Hydraulic Excavators, Wheeled/Track/Backhoe loaders used to transport or hoist loads/personnel with rigging are exempt from the requirements in 16.B.02 through 16.B.06 only. ***See Section 16.S for equipment-specific requirements***
    - Rationale: Differs from OSHA but based on USACE accident experience, 16.S requirements were updated.
  - Powered Industrial Trucks (PIT's, i.e., Forklifts)/Telehandlers: when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load are exempt from the requirements in 16.B.02 through 16.B.06 only. ***See Section 16.V for equipment-specific requirements***
    - Rationale: Exempts these operators from having to have a Crane operator certification BUT remainder of requirements in Section 16 are applicable when this equipment is used in this manner. In addition, a new section 16.V was updated to address this equipment. Based on OSHA requirements and USACE accident experience and problem areas.

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 16, Cranes and Hoisting Equipment

- Para 16.A.01 – con't
  - Machinery that hoists by using a come-a-long or chain fall;
    - Rationale: Follows OSHA.
  - Equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less: Operators are exempt from the operator qualification or certification requirements in 16.B.02 through 16.B.06 only. In addition, this equipment may not be used to hoist personnel
    - Rationale: Same as OSHA, operators are exempt from operator training and physical certifications
  - Hoist Operators are exempt from 16.B.05, Physical Examination requirements UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. ***See also 16.C.01.c and Section 16.U***;
    - Rationale: Physical examinations are not required for operators of hoisting equipment as our accident experience has not indicated this is an area that is problematic.

Major Changes and Rationale, Change #6
(EM 385-1-1, Section 16, Cranes and Hoisting Equipment

- Para 16.A.01 – con'td
  - Dedicated drilling rigs
  - Tree trimming and removal work
  - Gin poles when used for the erection of communication towers
  - Helicopter cranes
  - Roustabouts
  - Stacker cranes
  - Rationale: all in new OSHA crane/derrick standard.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Paragraph 16.A.02, add working: "Before any crane or hoisting equipment is INITIALLY installed OR placed on any USACE facility or project for the first time, it shall be inspected, 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.*** With respects to the intended use of the crane or hoisting equipment, take into account the age of the equipment, history of operation, testing and inspection, and anticipated future use."

  - Rationale: clarifies the intent of the requirement that this is an initial and one-time action. Not intended to be an ongoing action. If crane/hoist is moved to another project site or USACE facility location, the action shall be performed again.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.A.08, new requirements added:
  - k. Wind speed indicating device mounted on the crane, in a location where the maximum wind speed can be measured for the lifting activity;
  - l. Warning lights, attached to the equipment, used as collision avoidance measures for airfield operations/or in vicinity of airfield operations.

  - Rationale: problematic operations involving excessive winds have been incurred. Ground wind is not always max wind speed. Lighted equipment for operations on or in vicinity of airfields is required by FAA and this clarifies that this shall be considered when ID'ing hazards.

- Para 16.B.01, Added wording: Cranes and hoisting equipment shall be operated only by designated qualified personnel. Proof of qualification shall be provided by the employer and shall be in writing. In addition…"

  - Rationale: This clarifies the responsibility of the EMPLOYER to provide this information, not just the testing/training agency that issues the license. It is up to the employer to determine if an operator is deemed qualified to operate, based on training, testing, experience, familiarity with the equipment, etc.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.02, change title to: "Crane Operator Requirements – General."
  - Rationale: deleted all excluded equipment as they were identified in 16.A.01

- Para 16.B.02.b, change wording: "Prior to the start of a specific activity or task, documentation of operator qualifications shall be included in the AHA and provided to the GDA (contractor operators) or the supervisor/leader of the activity/task (government operators)."
  - Rationale: Clarifies that this information is not required at the start of a JOB or CONTRACT but instead is required prior to the actual start of the work when that operator will be used. In addition, the operator qualifications shall be in the applicable AHA(s) AND this requirement is intended to apply to both contractor and government operations and the GDA and/or leader shall receive this information for acceptance prior to start of work.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.02.c, change wording: "Qualification for all crane operators shall be by successful completion of written and operational testing and designation of all crane/hoist operators shall be by the employer after review of the qualification documents."

  - Rationale: Clarifies that operators must actually pass the testing component of licensing or qualification and that employer has a responsibility to review these documents to ensure the employee did indeed pass. Also allows the employer to identify weak areas that the operator may have , indicated by lower test scores, (even though passing), and to determine if additional practical supervised operation is needed prior to allowing them to operate solo.

- Para 16.B.02.e, change wording: "Crane operators shall demonstrate their ability to read, write and comprehend in the language of the crane manufacturer's operation and maintenance instruction materials, exhibit acceptable arithmetic skills and load/capacity chart usage and use written manufacturer procedures applicable to the class, type and capacity of equipment for which certification is being sought.

  - Rationale: Clarifies requirement.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03 and all subparagraphs: replace with new. 16.B.03 Crane Operator Qualifications and/or Certifications. The employer must ensure that, prior to operating any equipment covered under Section 16, the person operating the equipment is covered by paragraph 16.B.01, or is qualified or certified to operate the equipment in accordance with one of the following options:"

  - Rationale: Instead of simply requiring operators to have a license/qualification per the following option, places responsibility with employer to insure operator is either a trainee, inspector or maintenance person (16.B.01) which are allowed to operate under certain conditions, OR have a license/certification/qualification by one of the following options.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03.a. “Option 1. A current certification by an accredited crane operator testing organization. For a testing organization to be considered accredited to certify operators, it must:” then provides 7 requirements, some of which are the same as in 2008 EM, same paragraph (3 differences and a NOTE are presented here):

- (1) Be accredited by a nationally recognized accrediting agency based on that agency’s determination that industry recognized criteria for written and practical testing materials, conditions and administration are being met;

  - Rationale: Remember , this requirement speaks to the testing, not necessarily the training organization. Currently, there are 4 testing organizations that are transportable and that have been accredited: Nat’l Commission for the Certification of Crane Operators (NCCCO), The Operating Engineers Certification Program (OECP), National Center for Construction Education and Research (NCCER), and Crane Institute Certification (CIC). Obviously some of these are not available to all employers or crane operators. Each of these has a website that can be consulted for training organizations that then use these testing organizations for testing.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

Para 16.B.03.a ***(cont'd)***

- (2) Administer written and practical tests…and skills and that provided different levels of certification based on equipment capacity and type;
- (6) An operator is deemed qualified to operate a particular piece of equipment for that class, type, and capacity of equipment or for higher - capacity equipment of that type and class. The operator's certificate must state the type, class and capacity of equipment on which the operator was certified;
- ***NOTE: If no accredited testing agency offers certification examinations for a particular type and/or capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available.***

  – Rationale: Parallels OSHA 1926.1400, crane/derrick standard.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03.b. Option 2. Qualification by an audited employer program. The employer's qualification of its employee must meet the following requirements:

- *NOTE: This "audited" option is associated with a 4-year phase-in period which Industry is working to meet because the Certified Auditor program training and auditing criteria are not yet available. However, until the 14 Nov 2014 deadline, to meet this Option 2, in lieu of a "Certified auditor that is not an employee of the employer", the employer's qualification of its employees may be performed by a "Qualified Person that may be an employee of the employer". In addition, the following must be met:*
  - Rationale: Option 2 parallels OSHA requirements. Above NOTE was inserted because the OSHA requirement has a phase in period. By 14 Nov 14, employers must have met these requirements. In OSHA's preamble, it is noted that at the time of publication of the 1926.1400, this option **could not be** met as "Certified Auditor training and certification and auditing criteria" were not yet on the market. They anticipated that by 14 Nov 14, due to demand, these programs would be available and that employers could have them in place . **In the interim,** USACE has allowed the substitution of a "QP who may be an employee of the employer" to replace the "3rd party certified auditor" requirement**.**

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03.b. (1) Successful completion of written and practical tests that are either developed by an accredited crane operator testing organization (see Option 1 above) or approved by an auditor (Qualified Person) in accordance with the following:

- (a) The auditor (Qualified Person) is certified to evaluate such tests by an accredited crane operator testing organization (see Option 1 above);

- (b) The auditor is not an employee of the employer (see note above);

- (c) The approval must be based on the auditor's determination that the tests meet nationally recognized test development criteria and are valid and reliable in assessing the operator applicants' knowledge and skill needed;

- (d) The audit must be conducted in accordance with nationally recognized auditing standards.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

Para 16.B.03.b (cont'd)

- (2) The employer program shall be audited within 3 months of the beginning of the program and every 3 years thereafter;
- (3) The employer program shall have testing procedures for recertification;
- (4) Any significant deficiencies identified by the auditor shall be corrected prior to further qualification of any operators;
- (5) Records of audits shall be retained for 3 years and made available to the GDA upon request;
- (6) A qualification issued under this option is not portable and is valid for 5 years from date of issuance.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03.c: Option 3. Qualification by the U.S. Military. An operator who is an employee of the U.S. military is considered qualified if he/she has a current operator qualification issued by the U.S. Military for operation of the equipment. An employee of the U.S. Military is a federal employee of the Department of Defense or Armed Forces and does not include employees of private contractors (this option includes USACE crane/derrick and hoist operators) and is further detailed in 16.B.04.

  - Rationale: This is a big change from the EM 385-1-1, 2008 existing standards. This has been newly identified and clarified in OSHA's preamble. USACE operators, NAVFAC or any other DOD civilians may fall under this category. We give further programmatic details in 16.B.04, as referenced in this paragraph.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.03.d. Option 4. Licensing by a State or Local Government Entity. A government (state or local) licensing department/office that issues operator licenses for operating equipment covered by this section is considered a government accredited crane operator testing organization provided the following criteria are met:

  - NOTE: 5 new criteria are presented in detail under this option.

  - Rationale: This option is clarified and identified in OSHA's preamble. This is a big change from EM 385-1-1, 2008 requirements. This option is for state/local government licensing only, not Federal. Federal employees fall under Option 3, that is further defined in 16.B.04.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04, delete and replace with new: "USACE/U.S. Military Operator Qualification (to include DOD civilians)."
  - Rationale: In 16.B.03, Option 3 is US Military and this category includes DOD civilians, (hence USACE operators), per OSHA preamble, so 6.B.04 was rewritten so that USACE Commands can identify their options for qualifying their operators, and select the best method to do so based on budgetary constraints, number of operators, availability of sources, etc. as presented in this paragraph.

- a. Qualification of operators that fall under this option can be performed in several ways or by a combination of two more of the options below:

- (1) Each crane/derrick operator can be trained, tested and certified by a nationally accredited testing organization, see Option 1 above, OR
  - Rationale: See 16.B.03.a above to identify organizations that are accredited and the training vendors that use their testing programs.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.a (2) Each operator can be trained, tested and licensed/qualified by a professional source that qualifies crane operators as long as the program is an audited one (see Option 2 above – this requirement will remain until 14 Nov 2014 whereupon this option will be replaced by one that is required to be 3rd party audited by a certified auditor; OR

  – Rationale: As Option 2 in 16.B.03.b, this option grants an interim means of accomplishing qualified. A potential training source shall be asked to produce evidence of their audited program (can be audited in-house by a QP until 14 Nov 14) as long as the requirements in 16.B.03.b are met.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.a (3) Each operator can be trained, tested and licensed by a government accredited crane/derrick operator examiner. An examiner that issues operator licenses for operating equipment covered by Section 16 is considered a government accredited crane/derrick operator examiner if he/she meets the criteria below:

  - Rationale: If a Command chooses to train, test and license their operators via this option, the government-accredited examiner has to meet criteria. These are presented below.

- (a) The potential in-house examiner must be nominated in writing by the individual's Command, his/her qualifications submitted to, reviewed by and approved by the USACE National Crane/Rigging Working Group, whereupon he/she becomes a government-accredited examiner;

  - Rationale: The Crane/Rigging WG will review personnel qualifications, knowledge, skills and experience as well as the curriculum, training and testing materials used by the instructor to ensure consistency in teaching and testing materials, methods and instructor capabilities.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.a (3)(b) The examiner shall receive training by a training source for each type/class of crane he is responsible for testing others on, and shall then be licensed/certified by:

- (i) An accredited crane operator testing organization (see Option 1) for each type and class of crane he is responsible for testing others on; OR

- (ii) Qualified by a professional source that qualifies crane operators as long as the program is an audited one (see Option 2 above – this requirement will remain until 14 Nov 2014 whereupon this option will be replaced by one that is required to be 3rd party audited by a certified auditor.

  - Rationale: This ensures that the government examiner has been tested, certified or licensed by a reputable source, which promotes consistency of knowledge and training/testing of USACE examiners and ensures a high level of in-house resources.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.b. The examiner shall examine and license the Command's crane operators in accordance with the identified criteria in this section.

- c. The examiner and his program shall be audited by the USACE National Crane/Rigging Working Group at least every 3 years with documentation maintained.

- d. The requirements for obtaining the license include assessment and determination via written and operational tests of the operator applicant's knowledge regarding safe operation of the specific type of equipment the individual will operate, including, at a minimum, the knowledge and skills listed below:

  - Rationale: (1) – (18) identify specific knowledge/skills that must be taught.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.e. The testing meets employer-recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel.

- f. The government authority that oversees the examiners (USACE uses National Crane/Rigging Working Group) has determined that the requirements for licensing have been met;

  - Rationale: again, the crane/rigging WG will be able to provide nationally-applicable oversight of the USACE crane/hoist operator program which will lead to consistency of application and interpretation.

- g. The examiner has testing procedures for recertification designed to ensure that the operator continues to meet the technical knowledge and skills requirements;

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.04.h. An operator is deemed qualified to operate a particular piece of equipment for that specific class, type and capacity of equipment (or for any capacity equipment of that type and class tested on). The operator's qualification must state the type, class and capacity of equipment on which the operator was qualified (i.e., Mobile Crane, hydraulic boom, 30 T capacity);
  - Rationale: Parallels OSHA.
- i. Qualification under this option is:
- (1) Not portable. Such a qualification meets the requirements of this section only where the operator is employed by (and operating the equipment for) the government entity that issued the qualification; AND
- (2) Is valid for 5 years from date of issuance.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.05, Add Note under main paragraph: "Operator Physical Qualifications/Examination. All crane/derrick operators shall be physically qualified to operate the equipment…" ***Note: Operators of Hoisting Equipment are exempt from this requirement UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. See also 16.A.01.i and Section 16.U;***

  - Rationale: Not an OSHA requirement and because USACE has not experienced accident history/problems that pertain to this requirement, we wanted clarity on the fact that hoist operators are not required to participate in physical examinations/clearances UNLESS they are involved in using hoists to lift personnel.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.05.c, Add word: "All contractor crane/derrick operators shall participate in a drug testing program and have a negative result for a substance abuse test. The level of testing will be in accordance with standard practices for industry or by the agency's random drug testing program. This test will be confirmed by a recognized laboratory service."

  - Rationale: USACE cannot require our crane/derrick operators to participate in a drug testing program unless the positions are identified as by DOD as a Test Designated Position (TDP). Application to DOD is being made to consider and identify all positions that require operation of cranes/derricks, regardless of job title, as TDPs. When this happens, the word "contractor" will be removed from this requirement.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.B.06, Delete all.
  - Rationale: Material was moved to 16.B.04

- Para 16.B.07, renumber 16.B.06 and replace with new wording:

  16.B.06 Signal Person Qualifications.
- a. All signal persons must be qualified by either a third party Qualified Evaluator or the employer's Qualified Evaluator.
- b. Documentation must be provided by the Evaluator and must specify each type of signaling (e.g., hand signals, radio signals, etc.) for which the signal person meets the requirements of this section.
- c. If subsequent actions by the signal person indicate that the individual does not meet the qualification requirement of this section the employer must not allow the individual to continue working as a signal person until retraining is provided and a re-assessment is made.

  - Rationale: Parallels OSHA requirements.

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(Section 16, Cranes/Rigging)

- Para 16.B.06.d (cont'd)
- d. The qualification means that the Evaluator has assessed the individual's capabilities and has determined that the signal person has met the qualification requirements below:
- (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 written and practical test.
- e. An assessment by an employer's Qualified Evaluator is not portable other employers are not permitted to use it to meet these requirements.
  - Rationale: Parallels OSHA requirements.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.C and all subparagraphs, delete and replace:
- **16.C. CLASSIFICATION OF USACE EQUIPMENT AND TRAINING OF USACE OPERATORS**
- ***Note: Operator qualifications/licenses detailed below are only valid provided operator receives annual refresher training as required below.***
  - Rationale: USACE requires annual refresher training for various types/classes of cranes/hoists for USACE operators to maintain license/qualifications. Insures proficiency.

- 16.C.01 Designated personnel must be qualified to operate a particular Class (i.e., mobile, tower, overhead, etc.) and type (lattice boom, hydraulic boom, etc.) of crane or hoist and the training provided shall be applicable to that Class and type of crane or hoist. The USACE classification of cranes and hoisting equipment and their associated training requirements are identified here. All exams shall meet the applicable parts of Option 3, based on type of equipment.
  - Rationale: added wording to insure that qualifications must be based on more than just a class of crane. Type is extremely important to operational differences.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.C.01.a. Class I (and type): Class I cranes are fixed cab telescopic hydraulic mobile cranes; swing cab telescopic hydraulic mobile cranes; lattice boom, truck or crawler cranes; cab operated overhead, bridge, gantry and under hung monorail cranes under or over 100 tons; remote controlled overhead, bridge, gantry under hung monorail cranes; hammerhead cranes; portal cranes; tower cranes; derricks post or stiff leg type; floating or barge mounted cranes and derricks, temporarily or permanently mounted:
  - Rationale: Clarified more thoroughly the equipment that falls into this Class.
- (1) Class I operators are qualified to operate, perform preventive maintenance and inspection of this equipment as required;
- (2) Training must be, as a minimum:
- (a) Initial: 24-hour training with successful completion (passed) written and practical/operational examinations;
- (b) Annual: 8-hour refresher training, with successful completion (passed) of written and practical/operational examination.
  - Rationale: Clarifies that passing the exams are important.

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(Section 16, Cranes/Rigging)

- Para 16.C.01.b. Class II: Class II cranes are overhead, bridge and gantry cranes, under hung, monorail, pedestal, and wall-mounted jib cranes, and similar equipment used for lifting and lowering continually guided loads.
  - Rationale: Clarifies equipment. "Continually guided" means equipment like intake gates or spillway gates if they never leave the slot. If they leave the slot, to be moved to another slot, they then fall into Class I. This is because there is then more risk assumed and more skill and knowledge is needed by the operator.
- (1) Class II crane operators are qualified to operate, perform preventive maintenance and inspection as required.
- (2) Class II training, must be, as a minimum:
- (a) Initial: 2-hour training with successful completion (passed) of written and practical/operational examinations;
- (b) Annual: 1-hour refresher training with successful completion (passed) of written and practical/operational examination.
  - Rationale: Again, passing the exams is important and this wording clarifies that intent. Because "continually guided loads" and the other cranes included in this category are , generally speaking, less complex than those in Class I, the required amount of training directly reflects this fact.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.C.01.c. Class III Hoisting Equipment and shop equipment used for lifting or lowering a freely suspended (unguided) loads.

- *Note 1: Refer to Paragraph 16.A.01.h, for exemption of equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less (exempt from the requirements in 16.B.02 through 16.B.06 only). It is anticipated that operator of this equipment will review manufacturer's instructions for proper operation however. This equipment shall not be used for hoisting personnel.*
  - Rationale: Parallels OSHA.
- *Note 2: Note 2: Operators of Class III Hoisting Equipment are exempt from 16.B.05, Physical Examination requirements UNLESS this equipment is used to hoist/lift personnel. This activity is considered a Critical Lift and as such, requires a physical examination for the operator. See also 16.A.01.i, 16.B.05 and Section 16.U;*
  - Rationale: Accident experience does not indicate a need for hoist operators to be physically cleared. It is not an OSHA requirement.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.C.01.c. (1) Class III operators are qualified to operate, perform preventive maintenance and inspection of this equipment as required.
- (2) Class III training, must be on the specific type(s) of hoist operated and be, as a minimum:
- (a) Initial: 2-hour training with successful completion (passed) of written and practical/operational examinations;
- (b) Annual: 1-hour refresher training with successful completion (passed) of written and practical/operational examination.
  - Rationale: Training is required for this equipment but again, is commensurate with complexity of this equipment.
- 16.C.03 Each USACE activity or operating project will maintain a current list of operators, complete crane and hoisting equipment training records for each operator, and a list of each class and type of equipment that each operator is qualified to operate.
  - Rationale: Regardless of class, each project needs to maintain a list that identifies what an employee is designated to operate and applicable training records. Class, type and capacity on which worker was tested is all part of this documentation.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.D.02, add word: Records of <u>all</u> crane and hoisting equipment tests and inspections shall be maintained onsite.
  - Rationale: Clarifies intent.

- Para 16.D.08, add wording: Start-Up Inspections (Pre-Operational, Each shift). Before every crane or derrick operation…<u>The daily inspection must be documented and shall include the results of the inspection, name and signature of the person who conducted the inspection and the date of the inspection. Documentation shall be maintained for a minimum of 3 months, or the life of the contract, whichever is longer.</u>
  - Rationale: Identifies what shall be maintained in documentation and for what period of time.

- Para 16.D.08.m, add wording: m. The equipment for level position<u>: prior to each shift</u> and after each move and setup;
  - Rationale: clarifies original wording.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Table 16-1, move and insert after 16.D.08.t.; change 4th inspection (Monthly after initial use on a USACE project) from "Periodic" to Frequent inspection"
  - Rationale: Frequent inspection is equivalent to a monthly inspection. Corrected wording.
- Table 16-1, change note (c) under table to read: "*(c) Initial use refers to (1) the first time the USACE takes possession of a crane , or (2) whenever a Contractor brings a crane onto a job site".*
  - Rationale: We removed "the first time the USACE takes possession of and assembles a crane" and "whenever a Contractor brings a crane onto a job site and assembles the crane." This change clarified the requirement.
- Para 16.D.09.a and b, change wording:
- a. The inspection must be documented and shall include the results of the inspection, name and signature of the person who conducted the inspection and the date of the inspection. Documentation shall be maintained for a minimum12 months or the life of the contract, whichever is longer.
- b. Equipment shall not be used until this inspection demonstrates that no corrective action is required.
  - Rationale: More clearly identified what was to be included and clarified period of time which documentation must be kept.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Table 16-2, Wire Rope Removal and Replacement Criteria: deleted.
  - Rationale: Rather than maintaining this table, it's simpler to identify a standard that applies, that maintains this data and to reference that document instead. Too many variables involved.
- Para 16.D.12.c (1), Change reference: (1) Number, distribution and type of visible broken wires are as per IPT's Crane and Rigging training Manual;
  - Rationale: Replaced Reference to Table 16-2 (now deleted, see above) with the document that maintains this data and is considered a rigging resource.

- Para 16.E.01.g: add new wording: g. Horn.
  - Rationale: A horn is considered a mandatory safety device per OSHA, 1926.1400.
- Para 16.E.03.d(4), Add new paragraph: (4) Wind speed indicating device mounted on the crane, in a location where the maximum wind speed can be measured for the lifting activity. Temporary alternative measure: a hand-held anemometer used where the maximum wind speed can be measured using this device.
  - Rationale: Based on wind-related accident data, this equipment is now being required in a location that directly reflects the wind speed that would affect the boom, load and crane.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.E.03.e (1), Add wording: Boom angle or radius indicator. The equipment (does not apply to articulating cranes or digger derricks manufactured before November 8, 2011) shall…

- Para 16.E.03.e(2), Add wording: Jib angle indicator (if equipment has luffing jib; does not apply to articulating cranes). Temporary alternative…

- Para 16.E.03.e(3), Add wording: Boom length indicator (does not apply to articulating cranes) if the equipment has a telescopic boom, except…

- Para 16.E.03.e(4), Add wording: Load weighing and similar devices. Equipment, (does not apply to digger derricks manufactured prior to November 8, 2011), shall have…

Rationale for all 4 changes: clarified requirement by noting excluded equipment, directly reflects OSHA requirements.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.F.02, Operational Testing, deleted and replaced with new wording.
  - Rationale: all changes in this section were made as a result of deleting Appendix I and bringing this information into Section 16.F so that all testing requirements are easy to find and reference. They reflect ASME, OSHA and USACE requirements.
- a. A qualified person shall conduct operational tests in accordance with ANSI/ASME and the manufacturer's recommendations. If the manufacturer has no procedures, the requirements in this section, as a minimum, must be performed.
  - Rationale: this used to reference Appendix I (now deleted) and brought to 16.F.
- b. Operational testing shall be performed: (1) through (4) remain unchanged.
- c. Operational testing after replacement of wire rope is not required (did not change required, only paragraph).
- d. Operational Testing, as a minimum, shall include the following:
  - Rationale: Identifies 7 items/areas that operational testing shall include. Again, from OSHA, ASME and Appendix I.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.F.03, Add wording: "Load Testing. Load testing is considered a Critical Lift."
  - Rationale: To be specific about the fact that this IS a critical lift.
- Para 16.F.03.a, change wording:
- a. Load tests shall be performed under the direction of a qualified person in accordance with appropriate ANSI/ASME standards and the manufacturer's recommendations. At a minimum, the load test procedures shall include the following:
  - Rationale: Clearer wording. Then lists the 4 criteria/actions required to be tested. Taken from Appendix I, OSHA and ASMEs.

- ***NOTE: If the manufacturer is no longer in business and procedures are unavailable, a qualified person familiar with the type of equipment involved shall develop and approve procedures, which as a minimum, shall include those listed above.***
  - Rationale: Note covers a condition we experience. Clarifies requirements.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.F.03.b, replace current paragraph with the following: Load Testing shall be performed at 100 to 110% of the anticipated load for the specified configuration, not to exceed 100% of the manufacturer's structural load rating chart at the configuration of the test.
  - Rationale: changed from "at 110%" to "at 100 to 100%" because periodically a load heavier than the anticipated load is difficult to find/perform.
- Para 16.G.01.a (2), add sentence at end of paragraph: (2) … capacities (in electronic or other form) are available. A printed copy of the load capacities shall be maintained and available.
  - Rationale: Clarifies that load capacities cannon be available only in electronic form – that a printed copy must be available on site.
- Para 16.G.01.c, change wording: A durable load chart with legible letters and figures shall be readily available to the operator at the control station;
  - Rationale: changed from "fixed at a location visible to the operator while seated at the controls" to allow an alternative should it not be possible/practical to affix them to a location visible to the operator.
- Para 16.G.05.a , change figure number: …must be used per Figure 16-1.
  - Rationale: Number was not printed when book was. It said "Figure 16- " so this clarifies.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.G.09, formerly "Clearances": delete entire section and replace with the following paragraphs 16.G.09, 16.G.10, 16.G.11 and 16.G.12:
  - Rationale: OSHA's #1 crane accident type was contact with electricity…hence they have made significant changes to these requirements. Additional requirements added in 16.G.10, 11 and 12
- 16.G.09 **Power line clearance- assembly/disassembly (up to 350 kV).**
- Before assembling or disassembling equipment, the employer must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get closer than 20 feet (6 m) to a power line during this process. If so, one of the following requirements must be met:
- a. De-energize and ground. Confirm from the utility owner/operator that the line has been de-energized and visibly grounded at the worksite.
- b. 20 foot (6 m) clearance. Ensure no part of the equipment, load line or load gets closer than 20 ft (6 m) to the power line by implementing the following:
- (1) Conduct a planning meeting with the assembly/disassembly (A/D) director, operator, A/D crew and the other workers who will be in the area. Review location of the power line)s) and the control measures to prevent encroachment/or electrocution.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- 16.G.09 **Power line clearance- assembly/disassembly (up to 350 kV).**
- b(2) If tag lines are used, they must be non-conductive;
- (3) In addition, at least one of the following must be in place:
- (a) Use of a dedicated spotter who is in continuous contact with the operator;
- (b) A proximity alarm set to give operator sufficient warning
- (c) A device that automatically limits range of movement, set to prevent encroachment.
- (d) An elevated warning line, barricade or line of signs in view of the operator, equipped with flags or similar high-visibility markings.
- c. Table 16-2 clearance…same as before, was Table 16-3 but voltages and distances have changed and table # did too.
  - Rationale: Clarifies this section and options available, per new OSHA standard.
- d. A/D below power lines is prohibited unless employer has confirmed that lines are de-energized and visibly grounded.
- e. A/D inside Table 16-2 clearance is prohibited unless employer has confirmed that lines are de-energized and visibly grounded.
- f. At least one electrocution hazard warning conspicuously posted in the cab, in view of the operator and at least two on the outside of the equipment.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.G.10, Power line clearance – equipment operations (all voltages).
- Para 16.G.11, Power line safety - (over 350 kV).
- Para 16.G.12, Power Line Safety While Traveling Under or Near Power Lines with NO Load.
  - Rationale: Per 1926.1400 requirements; identifies specific training, assembly/disassembly, site preparation and assessment and personnel requirements.
- Table 16-2, Minimum Clearance From Energized Overhead Electric Lines: Change values, Move placement;
  - Rationale: Table values changed per 1926.1400; table is logically placed now.
- Table 16-3, Insert new Table 16-3: MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD
  - Rationale: New Clearance distances mandated by 1926.1400
- Para 16.H.01, Critical lifts defined as: add 2 new conditions:
  - l. Load Tests.
  - m. When land cranes/derricks mounted on barges, pontoons or other means of flotation are required to travel while lifting the load. ***See paragraphs 16.L.03 and 16.L.04.***
  - Rationale: Identified 2 more specific types of critical lifts based on high hazard activity and the need to better control the hazards involved.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.H.02.a, added NOTE at end of paragraph: "NOTE: Any worker acting in the capacity of Rigging Lift Supervisor shall meet the requirements of this section;"
  - Rationale: Clarifies that a Rigging Lift Supervisor is also to be considered a "Qualified Rigger".
- Para 16.I.01, change wording: "…including a wind speed device located where it can measure maximum wind speed for the area.
  - Rationale: Same as discussed previously, 16.E.03.d(4).
- Para 16.I.02, change wording: Cranes shall not be operated when wind speeds at the site attain the maximum wind velocity based on the surface/load ratio recommendations of the manufacturer.
  - Rationale: Based on accident experience, this ratio is developed and provided by the manufacturer and this data shall be identified an known prior to operating in windy conditions.
- Para 16.I.02.a, change wording: 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. This determination shall be based on wind calculations per manufacturer's recommendations.
- Rationale: Again, forces the operator, rigger and lift supervisor to investigate, identify and know this limitation for operating safely.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.J.04, change wording: change "fully" to "properly".
  - Rationale: Outriggers should be properly extended when picking loads over the side: "fully" extended is not always needed/desired. Again, investigate, identify and KNOW this data, per manufacturer's data/load chart, etc.
- Section 16.L, Floating Crane/Derricks: replace in entirety with 16.L.01-15:
  - Rationale: more clearly written, more logical requirements;

- Section 16.R, Pile Drivers: insert 3 new paragraphs:
- **1**6.R.01 Pile drivers shall be equipped with a positive and negative restraint device to prevent accidental hammer disengagement (i.e., preventing the hammer from falling or uncontrolled rising out of the lead, as well as preventing contact with head block or sheaves).
  - Rationale: The hammer should not be allowed to accidentally disengage and this requires equipment to be designed accordingly (based on accident investigation).

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.R.02 Prior to initiating pile driving or extraction operations, the contractor shall develop a site-specific safety plan. The plan shall identify specific steps for the intended operations, list of hazards, and procedures to minimize or eliminate those hazards. Plans shall include, as a minimum:

- (a) location of utilities both above and below grade;
- (b) designated areas for equipment operations and material storage;
- (c) assembly and disassembly sequences for pile driving equipment;
- (d) operation of pile driving equipment and handling of pile materials;
- (e) a geotechnical report identifying subsurface and surface ground conditions;
- (f) a documented daily inspection requirement to include the hammer, cushion blocks, rigging, fuel lines, pressurized hoses, clamps, welds, hardware, and all other pile driving associated equipment;
- (g) establishment of a controlled access zone to prevent access by persons not directly involved in the operation.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.R.03 With the exception of the pile driver equipment operator (crane/track hoe/forklift), personnel shall not stand under the kicker/spotter or directly under, in front of, or closer than 12 ft (4 m) or greater if manufacturer specifies, of the pile hammer or pile when the pile is being driven. The crane/track hoe/forklift operator station shall be protected with falling object protective structures. ***> See 18.B.12***
  - *Rationale: a "safe/exclusion zone" is established in an effort to keep limited number of personnel from being exposed to hazards involved in operation – pile breaking, equipment failing, hammer falling, etc.*
- Para 16.S.02, Add wording: Hydraulic excavating equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer**.** If these procedures are unavailable, you are prohibited from performing this function. **> *See Figure 16-3.***
  - Rationale: Clarifies when/if this equipment may be used in this capacity. Causes this operation to be a more thought-out one.
- Para 16.S.03.a (2) and 16.S.03.d, Change reference: Operational testing shall be performed as described in 16.S.03.b."
  - Rationale: Changes Reference from Crane testing section (16.F) to excavator-specific section.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.R.03 With the exception of the pile driver equipment operator (crane/track hoe/forklift), personnel shall not stand under the kicker/spotter or directly under, in front of, or closer than 12 ft (4 m) or greater if manufacturer specifies, of the pile hammer or pile when the pile is being driven. The crane/track hoe/forklift operator station shall be protected with falling object protective structures. ***> See 18.B.12***
  - *Rationale: a "safe/exclusion zone" is established in an effort to keep limited number of personnel from being exposed to hazards involved in operation – pile breaking, equipment failing, hammer falling, etc.*
- Para 16.S.02, Add wording: Hydraulic excavating equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer**.** If these procedures are unavailable, you are prohibited from performing this function. **> *See Figure 16-3.***
  - Rationale: Clarifies when/if this equipment may be used in this capacity. Causes this operation to be a more thought-out one.
- Para 16.S.03.a (2) and 16.S.03.d, Change reference: Operational testing shall be performed as described in 16.S.03.b."
  - Rationale: Changes Reference from Crane testing section (16.F) to excavator-specific section.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.T.01, change wording: Crane supported personnel platforms are only allowed to be used if the crane manufacturer allows personnel lifting to occur on that equipment. In addition, provisions must be made for emergency lowering of the personnel platform in the event of a (crane) power failure.
  - Rationale: Ensures that operator/crew is researching manufacturer prohibitions and data to identify what exactly the equipment is recommended to be used for. Rescue of stranded personnel is necessary but normally not considered.
- Para 16.T.06.l, change wording: change "…engine crane running…" to" …crane engine running…"
  - Rationale: Word correction.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Para 16.T.10, Add new sub-paragraphs (4) and (4)(a), (4)(b) and (4)(c):

  (4) Anchoring to the load line. A personal fall arrest system is permitted to be anchored to the crane/derrick's hook (or other part of the load line) where the following requirements are met:
- (a) A Qualified Person has determined that the set-up and rated capacity of the crane/derrick (including the hook, load line and rigging) meets or exceeds the requirements in Section 21.H. This information shall be placed in/attached to the AHA developed for the activity.
- (b) The equipment operator shall be located in or adjacent to the crane cab, has been informed that the equipment is being used for this purpose, shall remain in contact (verbal, radio, hand signals) with the flagman for the operation and shall remain in direct control of any intended movement of the load line. If the operator is not in the cab, the controls shall be locked/tagged out so that no movement of the load line can occur without his knowledge.
- (c) No load is suspended from the load line when the personal fall arrest system is anchored to the crane/derrick's hook (or other part of the load line).
  - Rationale: This clarifies the allowance of this activity and defines the criteria that have to be met for this to be allowed.

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- Section U: Add a completely new section: 16.U Base-mounted Drum Hoists Used To Hoist Personnel, Guided And Non-guided Worker's Hoists [Whether Powered By Internal Combustion Engine, Electric Motor Or Other Prime Mover (Air Tuggers)]
  - Rationale: Based on the fact that air tuggers are used to hoist personnel (and are permitted to be used in his fashion), this section details the testing, inspection, design, maintenance and operating procedures for this equipment to be used safely.

- 16.U.01 The use of this equipment to hoist personnel requires the development of a written Standard Operating Procedure (SOP). All personnel involved with the use of this equipment shall assist in the development of this SOP. The SOP shall be maintained for a period of 12 months, at which time it shall be reviewed and changed as necessary.

- 16.U.02 This equipment shall meet the applicable requirements for design, construction, installation, testing, inspection, maintenance and operations as required by the manufacturer, to include an 8:1 safety factor for the hoist rope. ***See ANSI A10.22.***

- 16.U.03 – 16.U.12

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(Section 16, Cranes/Rigging)

- Section 16.V, Add new section: Powered Industrial Trucks (Pit's) /Telehandlers

  This equipment shall not be used to hoist personnel unless allowed by the manufacturer with an approved hoisting attachment.

- 16.V.01. PIT's may only be used to transport or hoist loads if allowed by the equipment manufacturer. If these procedures are unavailable, you are prohibited from performing this function.

- 16.V.02. Operations involving the use of PIT's and rigging to transport or hoist loads require different operator skills and considerations than the standard PIT operations performed with this equipment. When PIT's are to be used to transport or hoist loads utilizing hooks, eyes, slings, chains, or other rigging the following requirements shall apply:

- (a) Proper operating procedures in accordance with the equipment manufacturer's operating manual ;
-
- (b) Written proof of qualifications of equipment operators, riggers, and others involved in the transporting and hoisting operations;
-

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

- 16.V.02. (cont'd)
- (c) Proper use and on site availability of manufacturer's load rating capacities or charts as related to approved attachments;
-
- (d) Proper use of rigging, including positive latching devices to secure the load and rigging;
-
- (e) Inspection of rigging;
-
- (f) Use of tag lines to control the load;
-
- (g) Adequate communications and
-
- (h) An AHA specific to the transporting or hoisting operation must be developed and provided to GDA."

EM 385-1-1, Change #6
(Section 16, Cranes/Rigging)

End of Presentation