Section 16 Cranes and Hoisting Equipment

- MAJOR changes from 2003 version of EM 385-1-1.

Section 16.A General

- 16.A.01 and subsequent headings
  - OLD = Machinery and Mechanized Equipment
  - NEW = Crane and Hoisting Equipment

Rationale – Wanted a standout / stand alone section specifically for cranes . It is not intended to take away from the need to address machinery and mechanized equipment (we did)...we wanted a focused section for Cranes...

Section 16.A General

- 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…..

Section 16.A General

- 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

Section 16.A General

- 16.A.03 The employer shall comply with all manufacturer's instructions, procedures, and recommendations applicable to the operational functions of the equipment, including its use with attachments. The safe operating speeds or loads shall be exceeded. When they are not available, the employer shall develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments.
- And then we listed two procedures…

Section 16.A General

- 16.A.04 When the manufacturer's instructions or recommendations are more stringent the requirements of this manual... FOLLOW them.
- 16.A.05 The use of "electronic equipment" (my emphasis) ...while operating equipment is prohibited.
- 16.A.06 Mechanized equipment shall be shut down before and during fueling operations...

Section 16.A General

- 16.A.07 Inspections or determinations of road and shoulder conditions and structures shall be made in advance to assure clearances and load capacities...
- 16.A.08 Equipment requirements... a-j define a list of mandatories before we allow a piece of equipment to operate...
- 16.A.09 ROPS discussed

Section 16.A General

- 16.A.10 Discusses the specifications and operating manuals for hydraulic equipment and the attachments utilizing quick connect/disconnect systems and the requirements of the operator to verify the quick connect/disconnect system is positively engaged.
- 16.A.11 Discusses all guarding and safety devices that shall be used and maintained…
  - Belt, sprocket, gears, shafts, etc…
  - Hot surfaces
  - Platforms, foot walks, steps

Section 16.A General

- 16.A.12 Work Area Control.
  - Don’t get inside the radius of a rotating superstructure!
- 16.A.13 Discusses the controls of excavators or similar equipment with folding booms or lift arms shall not be operated from a ground position unless so designed.
- 16.A.14 Personnel shall not work in, pass under, or ride in buckets or booms of excavators in operation.

Section 16.A General

- 16.A.15 Maintenance and repair of cranes and hoisting equipment.
  - IAW the manufacturer's recommendations
  - Available to GDA upon request
  - Shut down and positive means taken to prevent operation during the maintenance process
  - Performed in an area that protects repair personnel from traffic
  - Blocking and cribbing requirements during maintenance and repair.

Section 16.A General

- 16.A.16 Parking.
  - Establishes requirements to ensure that:
    - The parking brake is set,
    - Wheels chocked or track mechanisms blocked,
    - Cranes, hoisting equipment, or parts thereof that are suspended or held apart by slings, hoists, or jacks shall also be substantially blocked or cribbed.

Section 16.B Personnel Qualifications

- 16.B.01 Emphasizes that all equipment shall be operated by qualified personnel.
  - It requires that personnel qualification shall be in writing.
  - It then discusses...Trainees, Maintenance personnel and Inspectors who may be authorized to operate the equipment under limited conditions.

Section 16.B Personnel Qualifications

- 16.B.02 Crane Operator Requirements
  - a. Discusses the effective communication by the Crane Operator.
  - b. Qualifications and/or certifications. Crane operators shall possess at least one of the following:

Section 16.B Personnel Qualifications

- 16.B.02 Crane Operator Requirements
  - Option 1...A current certification by an accredited (nationally recognized) crane/derrick operator testing organization. The organization shall....

    We then list a through f, identifying the requirements

Section 16.B Personnel Qualifications

- 16.B.02 Crane Operator Requirements
  - Option 2...Qualification by a professional source that qualifies crane operators (e.g., independent testing and qualifying company, a union, a qualified consultant who can be an IN-HOUSE resource..

    We then list a through f, identifying the requirements

Section 16.B Personnel Qualifications

- 16.B.02
  - b. Qualifying Examination Procedures identified and references 16.B.04 and 16.C.05.
  - c. Physical Qualifications are discussed. Examinations are required every 2 years and any time a condition is observed that may impact the safe operation…

Section 16.B Personnel Qualifications

(3) **Option 3. Qualification by the U.S. Military**. Operator qualification is considered valid if he/she has a current operator qualification issued by the U.S. military for operation of the equipment. Qualification meets operator qualification requirements of this section for operation of equipment only within the jurisdiction of the government entity and is valid for the period stipulated but no longer than 5 years from issuance.

Section 16.B Personnel Qualifications

Option 4. Licensing by a Government Entity. An examiner that issues operator licenses for operating equipment is considered a government accredited crane/derrick operator examiner if the following criteria are met:

Section 16.B Personnel Qualifications

Option 4. Licensing by a Government Entity.

- (a) Licensing criteria.
- (i) The requirements for obtaining the license include an assessment by written and practical tests of the operator applicant regarding knowledge and skills.
- (ii) The testing meets industry recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel.
- (iii) The government authority that oversees the examiners has determined that the requirements in (i) and (ii) above have been met.
- (iv) The examiner has testing procedures for recertification designed to ensure that the operator continues to meet the technical knowledge and skills requirements.

Section 16.B Personnel Qualifications

- 16.B.03 USACE Examiner Qualifications
  - It is recommended that each USACE Command select in-house crane examiners and the individuals be designated in writing.
  - a thru c discusses the requirements of the examiner.

Section 16.B Personnel Qualifications

- 16.B.04 Operator Written Examination Requirements.
  - Crane operators shall pass a written examination that demonstrates their knowledge of the following as applicable to the specific type of equipment the individual will operate
  - a thru n discusses the requirements of the written test

Section 16.B Personnel Qualifications

- 16.B.05 Operator Practical Examination Requirements
  - Crane operators shall pass a practical operational test that demonstrates their ability to perform the following:
  - a thru h discusses the practical examination.

Section 16.B Personnel Qualifications

- 16.B.06 Operator Physical Examination Requirements
  - Pretty much what you saw in the 2003 version of the manual except additional mention of negative drug screening.
- 16.B.07 Signal Person Qualifications
  - The signal person must be qualified by either a third party qualified evaluator or the employer's qualified evaluator.

Section 16.C Classification of Equipment and Training of Operators

- This is for USACE-Owned and Operated Cranes and Hoists only....!
- 16.C.01 Class I : ...are mobile and locomotive cranes, hammerhead, portal, tower, derricks (post or stiff leg), floating or barge mounted cranes/derricks, overhead, gantry, bridge, underhung, monorail.

Section 16.C Classification of Equipment and Training of Operators

- This is for USACE-Owned and Operated Cranes and Hoists only….!
- 16.C.01 Class I…
  - May perform critical lifts, preventative maintenance and inspections as required on specific equipment as trained:

Section 16.C Classification of Equipment and Training of Operators

- 16.C.01 Class I...
  - Training must be, as a minimum:
    - Initial: 24-hour training with written exam
    - Annual: 8-hour refresher training

Section 16.C Classification of Equipment and Training of Operators

- 16.C.01 Class II cranes are overhead, bridge, and gantry cranes, underhung, monorail, pedestal and wall-mounted jib cranes and similar.
- Class II operators may perform only routine lifts in the performance of their duties, preventative maintenance and inspections.
- Class II operators may not perform critical lifts.

Section 16.C Classification of Equipment and Training of Operators

- 16.C.01 Class II...
  - Training must be, as a minimum:
    - Initial: 8-hour training with written exam
    - Annual: 1-hour refresher training

Section 16.C Classification of Equipment and Training of Operators

- 16.C.01 Class IIIA: Hoisting Equipment.
  - Greater than 10 Tons (rated capacity) and shop equipment used for lifting or lowering freely suspended (unguided) loads.
  - Training must be on the specific type(s) of hoist operated…
  - Initial: 4-hour training with written exam
  - Annual: 1-hour refresher training

Section 16.C Classification of Equipment and Training of Operators

- 16.C.01 Class IIIB: Hoisting Equipment.
  - Up to and including10 Tons (rated capacity) and shop equipment used for lifting or lowering freely suspended (unguided) loads.
  - Training must be on the specific type(s) of hoist operated…
  - Initial: 1-hour training with written exam
  - Annual: 1-hour refresher training

Section 16.C Classification of Equipment and Training of Operators

- 16.C.02 Discusses the re-issuance of qualification, crane and hoisting equipment operators mush have attended applicable training and passed an operational examination.
- 16.C.03 Each USACE activity or project will maintain a current list of operators, training records, and equipment for which they are qualified on.

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.01 Inspection criteria shall be IAW this section, applicable ASME standards, OSHA regulations and the manufacturer's recommendations
- 16.D.02 Recordkeeping requirements.
- 16.D.03 GDA notification for equipment entering the site.
- 16.D.04 Taking unsafe equipment out of service.

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.05 Cranes and Derricks in Regular Service. Breaks inspections procedures into three categories:
  - Periodic
  - Start Up
  - Frequent

- 16.D.06 thru 16.D.08 defines these classifications.

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.05 Cranes and Derricks in Regular Service. Breaks inspections procedures into three categories:
  - Periodic
  - Start Up
  - Frequent

- 16.D.06 thru 16.D.10 defines these classifications of inspections.

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- NOTE...All tables and appendices have been brought forward and inserted into their rightful place within the body of Section 16.

- For instance Table 16-1 Crane and Derrick Inspection Frequency follows 16.D.08

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.11 Inspection of Cranes, Derricks and other Hoisting Equipment not in regular use.
  - Frequent
  - Periodic
  - Exposed to adverse environmental conditions shall be inspected more frequently as determined by a qualified person (GDA for example or the contractor)

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.12 Wire Rope Inspection, Maintenance and Replacement
  - Competent person conducts the inspection
  - Visual inspection criteria
  - Broken down into Categories I thru III. Additionally references table 16-1 (subsections b thru d)
  - Critical Review items (subsection e) draws the inspection to pay particular attention to certain deficiencies in the wire rope

Section 16.D Inspection Criteria for Cranes and Hoisting Equipment

- 16.D.12 Wire Rope Inspection, Maintenance and Replacement
  - f. Removal from Service. Sets out criteria for the inspection by which wire rope can be removed from service.
  - Uses the same categories as defined earlier (I thru III) and provides the reader with Table 16-2 which is the ASME standard and identifies:
    - # of broken wires in running ropes
    - # of broken wires in standing ropes

Section 16.E Safety Devices and Operational Aids

- 16.E.01 Lists safety devices and operational aids such as:
  - Crane level indicator
  - Boom stops
  - Jib stops
  - Hydraulic Outrigger jacks
  - etc

Section 16.E Safety Devices and Operational Aids

- 16.E.02 Proper Operation of Safety Devices
  - Operations don't begin until this equipment has been checked and verified to be safe for operations

- 16.E.03 Operational Aids
  - This section breaks down by Category, those operational aids that shall be on ALL cranes and derricks covered by Section 16 unless otherwise specified.

Section 16.E Safety Devices and Operational Aids

- 16.E.03 – cont'd
  - EXCEPTION 1 – Duty Cycle: Lattice boom cranes that are used exclusively for duty cycle operations are exempted from A2B equipment requirements.
  - It goes on to discuss that when a lattice boom crane engaged in duty cycle work is required to make a non-duty cycle lift (lifting a piece of equipment), it will be exempt from the A2B requirements if the following procedures are implemented.
  - Listed….

Section 16.E Safety Devices and Operational Aids

- 16.E.03 – cont'd
  - 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.
  - Listed

Section 16.F Testing

- 16.F.01 Written reports of testing
- 16.F.02 Operational Testing
  - A qualified person shall conduct operational tests IAW ANSI/ASME and the manufacturer's recommendations. If the Manufacturer has no procedures, reference Appendix 1 (follows herein).

Section 16.F Testing

- 16.F.03 Load Testing
  - a. Performed IAW ANSI/ASME and 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 1.

Section 16.F Testing

- 16.F.03 Load Testing
  - 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 IAW ANSI/ASME standards B30.1 through B30.17, as appropriate…

Section 16.F Testing

- 16.F.03 Load Testing
  - 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
  - (3) When the manufacturer requires load testing.

Section 16.G Operation

- 16.G.01 All cranes and hoisting equipment shall have the following documents with them (in the cab, if applicable) at all times when they are to be operated
  - List of documents in a thru e.
- 16.G.02 No modifications or additions that affect the capacity or safe operation of cranes or hoisting equipment shall be made without the manufacturer's written approval.

Section 16.G Operation

- 16.G.03 Hoisting wire ropes shall be installed IAW ANSI/ASME standards and the equipment manufacturer's recommendations.
- 16.G.04 Responsibilities of the Operator are identified…
  - Exception: When crane operation is frequently interrupted during a shift and the operator must leave the crane. Under these circumstances, the engine may remain running and the following conditions shall apply (listed).

Section 16.G Operation

- 16.G.05 Communications
  - a. Discusses the standard signaling system that shall be used (Figure 16-1)
  - b. Defines situations where a signal person MUST be used.
    - Point of Operation is out of view of the operator
    - When direction of travel is obstructed
    - When the operator or person handling the load deem it necessary

Section 16.G Operation

- 16.G.06 Riding on loads, hooks, hammers, buckets, material hoists, or other hoisting equipment not meant for personnel handling is prohibited
- Figure 16-1

- 16.G.07 Taglines
- 16.G.08 Slack line condition...properly seat the rope in the sheaves and on the drum...

Section 16.G Operation

- 16.G.09 Clearances
  - a. Power line clearance. Identifies the typical work zone clearance (360° around the crane). …If operated up to the crane's maximum working radius in the work zone could get within 20 ft of the powerline…one of the following options must be met:
    - Deenergize and ground
    - Use Table 16-3
    - Follow NFPA 70

Section 16.G Operation

- 16.G.09 Clearances
  - b. Physical Clearances
  - (1) Adequate clearance shall be maintained between moving and rotating structures of the crane and hoisting equipment (minimum = 24 inches)
  - (2) Accessible area within the swing radius…talks about barricades to prevent an employee from getting where they don't belong
  - (3) Nobody permitted to work under any suspended loads. EXCEPTION – initial connection/unhooking of steel…or employees unhooking a load.

Section 16.H Critical Lifts

- 16.H.01 Defines the following as critical lifts requiring detailed planning and additional or unusual safety precautions. Critical lifts are defined as:
- a. Lifts involving hazardous materials (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

Section 16.H Critical Lifts

- 16.H.01 k. Lifts out of the operator's view. EXCEPTION: if hand signals via a rigger in view of the operator and radio communications are available and in use, load does not exceed two tons AND is determined a routine lift by the lift supervisor.

Section 16.H Critical Lifts

- 16.H.02 Critical lift plans.
  - a. By a qualified person and shall include the crane operator, lift supervisor, and the rigger….
  - b. For a series of lifts on one project or job…
  - c. Documentation requirements
  - d. Minimum requirements of the plan shall include, as a minimum. Steps 1 thru 11 are identified.

Section 16.I Environmental Considerations

- 16.I.01 Projects shall have adequate means to monitor weather conditions, including a wind-indicating device
- 16.I.02 Cranes shall not be operated when wind speeds at the site attain the maximum wind velocity recommendations of the manufacturer. At winds greater than 20 mph...an evaluation shall occur to determine if the lift shall proceed. This decision shall be documented in the crane operator's logbook.

Section 16.I Environmental Considerations

- 16.I.03 Storm warning issuance and how to determine whether to continue or not.
- 16.I.04 Reducing operational and functional speeds during inclement (icing) weather.
- 16.I.05 When conditions such as lightning are observed....
- 16.I.06 For night operations...adequate lighting (see Section 7)

Section 16.J Lattice, Hydraulic, Crawler, Truck, Wheel and Ringer Mounted Cranes

- 16.J.02 Requirements for boom assembly and disassembly (no significant changes)
- 16.J.03 Outriggers (no significant changes)
- 16.J.04 Unless the manufacturer has specified an on-rubber rating, mobile cranes shall not pick or swing loads over the side of the crane unless the outriggers are down and fully extended.

Section 16.J Lattice, Hydraulic, Crawler, Truck, Wheel and Ringer Mounted Cranes

- 16.J.05 Unless recommended against by the manufacturer, crane booms shall be lowered to ground level or secured against displacement by wind loads or other forces….
- 16.J.06 When pick and carry operations are required, the boom must be centered over the front of the crane, swing lock engaged….

Section 16.K Portal, Tower, and Pillar Cranes

- 16.K.01 Load and bearing analysis requirements
- 16.K.02 Erected/dismantled in accordance with manufacturer's recommendation
- 16.K.03 Pre-operational testing (IAW B30.3)
- 16.K.04 Climbing procedures identified
- 16.K.05 Safety devices and operational aids

Section 16.K Portal, Tower, and Pillar Cranes

- 16.K.06 Multiple tower crane jobsites.
  - Cranes shall be located such that no crane may come into contact with a structure or another crane.
  - Cranes permitted to pass over one another.
- 16.K.07 Weathervaning. Tower cranes required to weathervane when out-of-service shall be installed with clearance for boom and super tow swing through a full 360 degree arc with striking any fixed object or other weathervaning crane.

Section 16.L Floating Cranes/Derricks, Crane Barges, and Auxillary Shipboard Mounted Cranes

- 16.L.01 The requirements of this section are supplemental requirements....unless otherwise specified.
- 16.L.02 Discusses the load rating of a floating crane/derrick as determined by the manufacturer or qualified person.
  - (1) Naval Architect Notes: (defined)

Section 16.L Floating Cranes/Derricks, Crane Barges, and Auxiliary Shipboard Mounted Cranes

- 16.L.03 Floating cranes/derricks intended for permanent attachment to a barge, pontoon or other means of floatation shall be designed IAW 46 CFR 173.005 through 173.025.
  - List of requirements provided

Section 16.L Floating Cranes/Derricks, Crane Barges, and Auxiliary Shipboard Mounted Cranes

- 16.L.09 Operations
  - a thru e describe operational procedures to monitor and maintain during normal operations.
- 16.L.12 Anchor handling barge/vessel section is added to the manual

Section 16.M Overhead and Gantry Cranes

- 16.M No significant changes to this section

Section 16.N Monorails and Underhung Cranes

- 16.N No significant changes to this section

Section 16.O Derricks

- 16.O No significant changes to this section

Section 16.P Handling Loads Suspended from Rotorcraft

- 16.P This section re-tools the section in the 2003 version of the safety manual to more align with common terminology found in the ASME standards.

Section 16.Q Material Hoists

- 16.Q This section is moved to the back of Section 16 to better identify the requirement, roles and responsibilities of personnel engaged in the operation and maintenance of material hoists.

Section 16.R Pile Drivers

- 16.R.01 Discusses the requirements of other duty cycle operations and highlights the requirements of pile driving and extracting operations.

Section 16.S Hydraulic Excavators, Wheel/Truck/Backhoe Loaders Used to Transport or Hoist Loads with Rigging

- 16.S.01 Hydraulic excavating equipment shall not be used to hoist personnel. The riding of personnel on loads, hooks, hammers, buckets or any other hydraulic excavating equipment is prohibited.
- 16.S.02 Hydraulic excavating equipment may only be used to transport or hoist loads if allowed by the equipment manufacturer.

Section 16.S Hydraulic Excavators, Wheel/Truck/Backhoe Loaders Used to Transport or Hoist Loads with Rigging

- 16.S.03 through 16.S.06 describes the operations, testing procedures, rigging, and maintenance of the above-referenced equipment.

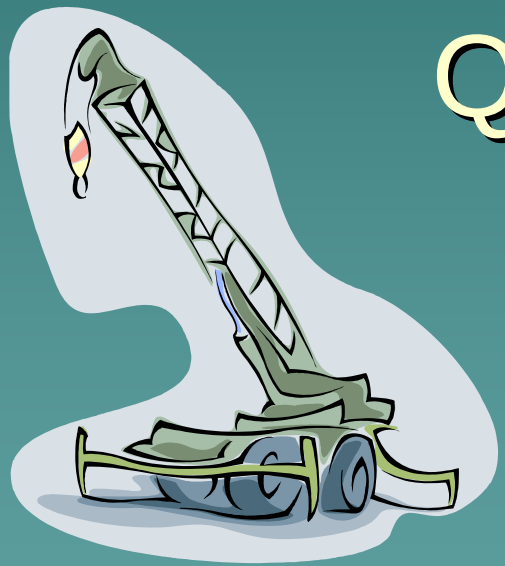
Section 16.T Crane-Supported Personnel (work) Platforms

- 16.T is another new section that has been moved into Section 16.
- This section was previously located in amongst the Fall Protection standards and the decision was made, because of the crane support aspect, to move here.

Section 16 - Figures

- Some Figures, Pictograms, Tables have been moved from Appendices F, G, H, J, etc in 2003 EM385-1-1 and incorporated into the body of Section 16.
- All pictures from appendices not used – ASME/ANSI copyright

QUESTIONS?



EM 385-1-1 Section 17 Conveyors

17.A.02.a.The entire system shall be visually inspected daily before start up. **– ADDED**

17.A.03.b. Conveyor systems shall be equipped with a time-delay audible and visual warning signal to be sounded immediately before starting of the conveyor. - **ADDED**

EM 385-1-1 Section 17 Conveyors

17.A.03.d. The safety devices shall be designed to prevent the conveyor from restarting until the safety device is manually reset. **– ADDED**

17.A.04.i. The build up of excess material shall be removed from all points along the conveyor. **- NEW**

EM 385-1-1 Section 17 Conveyors

17.A.06.c. If a multi-conveyor system, the emergency stop shall stop all conveyors that are tied together. **- NEW**

EM 385-1-1 Section 17 Conveyors

17.A.13.b. Dump hoppers having the hopper flush with the floor and which by their use cannot be guarded shall be equipped with grating having a maximum opening of **4 in (10 cm)** and heavy enough to withstand any load which may be imposed on it. **– 4 in (10cm) ADDED**

Section 18

NEW TITLE: Motor Vehicles, Machinery And Mechanized Equipment, All Terrain Vehicles, Utility Vehicles, & Specialty Vehicles

Several Significant Changes

Section 18

Machinery And Mechanized Equipment moved from Section 16 to Section 18.G

Section 18

Added Sub-Sections for Utility Vehicles & Specialty Vehicles

Section 18

- Moved Section “18.E Aircraft” to Section “32.B Aircraft”
- Section 32 becomes Airfield and Aircraft Operations – logical sequence of topic material

Section 18.A

- 18.A.02 Every person operating a motor vehicle shall possess, at all times while operating such vehicle, a license/permit valid for the equipment being operated. Licensing will be as per Service regulation for military personnel and State regulations for civilian personnel, to include contractors. Operator must present the license/permit to the GDA upon request.

> USACE equipment/vehicle operators: In lieu of a license/permit, an operator equipment qualification record (DA Form 348) shall be maintained on file for all USACE vehicle/equipment operators.

Section 18.B

18.B.01.e. & f. Back-up Alarms (2 new paragraphs)

e. Commercial cargo vehicles such as pick-up trucks, utility cargo/tool trucks, and flat bed cargo trucks intended for use on public highways with a normally clear view through the rear window are not required to have backup alarms. If the view to the rear is temporarily obstructed by a load or permanently blocked by a utility/tool box body or other modification, then a signal person/observer to back up must be used or a backup alarm must be installed.

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

Section 18.C

- 18.C.01 Defines USACE Motor Vehicle

- b. The use of any portable headphones, earphones, or other listening devices (except for hands–free cellular phones) while operating USACE motor vehicles **or contractor** motor vehicles (being used on USACE projects) is prohibited.

- c. Operators of USACE motor vehicles **or contractor motor vehicles (being used on USACE projects)** shall not eat, drink, or smoke while the vehicle is in motion

Section 18.E

18.E.01 Defines motor vehicle as a sedan, van, SUV, truck, motorcycle, or other mode of conveyance intended for use on public roadways. This includes construction equipment that is driven on public highways. Other types of equipment such as machinery and mechanized equipment, all terrain vehicles, utility vehicles and other specialty vehicles are addressed later in this section.

Section 18.G

18.G.01

Defines machinery & mechanized equipment as equipment intended for use on construction sites or industrial sites and not intended for operations on public highways. Equipment such as dump trucks, cargo trucks, and other vehicles that may also travel on public roadways must also meet the requirements of 18.D above

Section 18.H.01

Provides statement of applicability. The requirements of this section are in addition to other requirements identified in Section 18 and are applicable to rock, soil, and concrete drilling operations.

Section 18.I **All Terrain Vehicles (ATVs)**

- Provides definition – distinguishes them from Utility and or other Service, Specialty vehicles
- Clarified training requirements
  - ATV Operator training/certification
  - Provides in-house trainer requirements for certification and maintenance of certification

Section 18.J Utility Vehicles

- New Section for these vehicles; definition; examples: Rangers, Rhino, M-Gators, Gators, Mules

- Provides training requirements, PPE, etc.

Section 18.K Specialty Vehicles

- New Section – better delineation between vehicle types and their individual requirements

- Specialty vehicles are defined as all other vehicles not meeting any of the definitions above and may include burden or personnel carriers or custom vehicles (i.e., Taylor-Dunn/Cushman), golf carts, Segway HT, and snow machines, etc.

- Provides training, PPE, other requirements

Section 19 Changes

Marine and Floating Plant

19.A.07 General
NEW REQUIREMENT

- m. When three or more floating plant are configured for stationary work, a competent person shall identify any openings between decks of stationary vessels or vessels and other structures that create fully enclosed water areas (duck ponds) into which personnel can fall. If such openings are detected, means shall be taken to protect personnel from the hazard.

19.A.07

- (1) When practical, duck pond protection will consist of guardrails, nets or other physical barriers to prevent employees from falling into the openings.

- (2) When physical barriers are not practical, ladders and life rings shall be installed in each enclosed water area to allow personnel to self-rescue. Ladders may be a rigid type or Jacob's ladder, and must be securely anchored to the vessel or structure. Life rings shall have a sufficient length of rope to allow them to float on the water surface and the rope shall be securely anchored to the vessel. The number and placement of ladders and life rings shall be sufficient so that the maximum swimming distance to them is no more than 25 feet. Ladders and life rings may be retracted during reconfiguration or movement of plant.

19.C MARINE FALL PROTECTION SYSTEMS

- 19.C.01 On all decks or work surfaces 6 ft (1.8 m) or more above the main deck or 6 ft or more above adjacent vessel decks, docks, or other hard surfaces, Railing Type A or Type B, as described in Section 19.E, or bulwarks, coamings, or other structures meeting the height and strength requirements of these railing systems shall be provided except as excluded in 19.C.03 and 19.C.04.

19.C MARINE FALL PROTECTION SYSTEMS

- 19.C.02 Deck edge toe boards not less than 3.5 in (8.75 cm) high for Type A and 2 in (5 cm) high for Type B railings shall be provided when the railings are used for fall protection. Toe boards shall meet the strength requirements in section 21.B.02.d. Scuppers and/ or drainage holes may be installed as needed as long as the top edge of the toeboard is intact and the strength requirements are retained.

19.C MARINE FALL PROTECTION SYSTEMS

- 19.C.03 Personal Fall Protection Systems meeting the requirements of Section 21.C. may be used when railing systems are not installed.
- 19.C.04 Railing Systems and Personal Fall Protection Systems are not considered feasible on the main deck of vessels that perform duty cycle material loading and unloading operations from barges, scows or other vessels alongside.

Section 19

- Unmanned vessels do not require perimeter protection, however, fall protection shall be provided where the vessel configuration and operation exposes personnel to falls onto a hard surface from vertical distances greater than 6 ft (1.8 m).

Section 19

- a. Manned vessels are vessels that operate with crews, or quartered personnel, or that have work areas that are occupied by assigned personnel during normal work activities.

- b. Unmanned vessels are typically those that carry cargo such as materials, supplies, equipment, or liquids, and do not have personnel on board except during loading and unloading and during short term operations such as tie-down, inspections, etc.

19.D.05 Areas where perimeter protection may be omitted/temporarily removed:

- a. Deck perimeter rails may be omitted from deck work areas specifically intended for line handling, working over the side of the vessel, load handling operations and designated boarding areas. Railings in these areas may obstruct work or access and present additional hazards such as pinch points against railings. Such deck edge areas may include those for line handling, fleeting scows, mooring vessels, towing, pile driving activities, and handling or placing of construction materials and equipment, pipelines, and anchors.

(cont'd)

- b. Deck perimeter rails may be omitted from main deck areas where the overall walkway width is less than 24 in (.6 m) between deck structures/ permanent equipment and the deck edge.

Cont'd

- c. Removable perimeter rail sections may be installed in areas where activities such as working over the side of the vessel or loading operations are not normally performed. These rails shall be maintained in place when vessel operations do not include activity in these areas or during periods of tie-up or inactivity

19.I NAVIGATION LOCKS AND LOCKING

- 19.I.01 Smoking, open flames , or other ignition sources shall be prohibited on lock structures within 50 ft (15.2 m) of vessels containing hazardous cargos of flammable or other hazardous materials (“Red Flag” vessels) during approach and lockage.
- a. When construction, maintenance, and other non-navigational related activities are taking place on or adjacent to the lock structure, the Lock Master will relay information to supervisory personnel in these activities regarding the approach and passage of Red Flag vessels.

- b. The Lock Master or Work Crew supervisor may suspend hot work at their discretion during the approach and passage of Red Flag vessels.

- c. Prior to the start of work on these activities, the Work Crew Supervisor will establish safe zones that maintain at least the minimum 50 ft (15.2 m) required distance between Red Flag vessels and sources of ignition such as hot work and smoking areas. The minimum distance shall be calculated vertically and horizontally throughout a lock chamber when the chamber is pumped out for maintenance. These zones shall be marked, barricaded, or otherwise designated so personnel can easily distinguish them. The location of and restricted activities within these zones shall be included in the activity AHA and discussed with workers prior to start of work.

Section 20 Pressurized Equipment and Systems-Major Changes

- 20.A.08 No safety appliance or device shall be removed or made ineffective, except for making immediate repairs or adjustments, and then only after the pressure has been relieved and the power shut off using proper lockout/tagout procedures.

Section 20

- 20.A.16 Except where automatic shutoff values are used, safety lashings or suitable double action locking devices shall be used at connections to machines of high pressure hose lines and between high pressure hose lines.

Section 20

- 20.B.05 Compressed air for cleaning.
- a. The use of compressed air for blowing dirt from hands, face, or clothing is prohibited.
- b. Compressed air shall not be used for other cleaning purposes except where reduced to less than 30 psi (206.8 kPa) and then only with effective chip guarding and PPE (face shield and safety glasses). This 30 psi (206.8 kPa) requirement does not apply for concrete forms, mill scale, and similar cleaning purposes.

Section 20

- 20.C.03 When any boiler is being placed in service or restored to service after repairs to control circuits or safety devices, an operator shall be in constant attendance until controls have functioned through several cycles or for a period of 24 hours whichever is greater. A report of the operating test shall be provided to the GDA and include the following specific information: time, date, and duration of test; water pressure at boiler; boiler make, type, and serial number; design pressure and rated capacity; gas pressure at burner; flue gas temperature at boiler outlet; and the surface temperature of the boiler jacket. All indicating instruments shall be read at half-hour intervals. .

Section 20

- 20.C.04 Fusible plugs shall be provided on all boilers, other than those of the water tube type.
- a. Replacement of fusible plugs shall coincide with the inspections recommended by the ASME *Boiler and Pressure Vessel Code.*

Section 20

- 20.D.15 If the movement can be accomplished safely, leaking cylinders shall be moved to an isolated location out of doors, the valve shall be cracked and the gas shall be allowed to escape slowly.
- a. Personnel and all sources of ignition shall be kept at least 100 feet away.
- b. Instrumentation should be used to assure protection of personnel from health and flammability hazards.
- c. The cylinder shall be tagged "**DEFECTIVE,**" after the gas has escaped.

Section 20

- 20.D.17 Bleeding of cylinders containing toxic gases shall be accomplished only in accordance with environmental regulations, and in accordance with a government accepted APP and AHA specifically addressing the bleeding of compressed gas cylinders, and only under the direct supervision of qualified personnel