



**US Army Corps
of Engineers**



NATIONAL CRANE PDT

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WHAT DOES THE EM 385-1-1 SAY ...

About crane and hoist operator certifications, licenses or qualifications?

First, we all know by now that OSHA published their new crane/derrick regulation in August 2010 and it went into effect on 8 Nov 10 for most requirements, but allowed a 4-year phase-in period to accomplish required operator training and certification. BUT, the EM 385-1-1 went into effect in Jan 09 for USACE and if a contractor bid a contract on this EM, it went into effect when that contract was awarded. The EM did not have a phase-in period for any part of the new requirements. So, what DOES the EM say?

Let's look at paragraph 16.B: this section discusses personnel qualifications. 16.B.01 says that all personnel that are operators of cranes and/or hoists shall be designated (in writing) and qualified. The Command must know who is qualified to operate what cranes/hoists.

16.B.02 details criteria that operators must meet prior to being allowed to operate or be considered qualified and includes communication and comprehension ability, documented qualifications, knowledge of the EM and manufacturer requirements applicable to the **class, type and capacity of equipment** to be operated.

16.B.03 details 4 Options for becoming qualified or certified as an operator.

Option 1 is a certification by an ACCREDITED crane/derrick operator testing organization (CICB, NACB, NCCCO, etc) - if you don't know if they are accredited, look them up on-line and it will tell you.

Option 2 is qualification by a professional source (Operating Engineers, ASCE, in-house consultant, etc.) as long as the program is an audited one. Request proof of their audited program—it must meet certain criteria that OSHA details—more on that next time.

Option 3 is qualification by the U.S. Military, which means active duty (green suit) military.

Option 4 is licensing by a government entity. This means an examiner (in-house USACE is acceptable) can issue operator licenses if criteria in that paragraph are met.

Whichever option is chosen, most of the criteria are the same:

- Written and practical operating tests have been administered,
- Certification is provided at different levels based on equipment CAPACITY and TYPE—which means it MUST be specific to the piece of equipment that the operator will be operating.
- Procedures must be in place for re-testing/re-applying if an operator applicant does not pass the written and/or practical examination.
- Procedures for recertification

- License is generally issued for a 5-year time period.

The key to what the EM requires is in this statement: *Operators must be able to determine the crane configuration, size and shape of loads, and the crane's applicable capacity using the load chart for each type and capacity of crane to be operated.*

16.B.04 discusses criteria that a **USACE in-house examiner** must meet if it is determined that this is the manner in which we will qualify our operators.

16.B.05 and 06 discuss **physical qualifications** that must be met.

16.B.07 discusses **Signal Person** qualifications.

Rigger Training is in Section 15 and we will discuss that in the next issue!

So now, look at your jobsite, District or facility and determine if your operators meet these criteria (no phase-in).

- Ellen Stewart -



COUNTERWEIGHT -

WEIGHT HANDLING SAFETY

When you talk about Composite Risk Management, you think in terms of:

- What can go wrong?
- What can I do about it?
- If I cannot resolve or mitigate, who can?

Many of us are or have experienced the “throes of winter” even here in Atlanta, I have witnessed what a little snow and a little ice can do to normal operations.

Freezing temperatures, ice, and snow can create unique hazards in weight handling operations. Exercise increased care and diligence during your pre-use inspections. Frozen or damaged components can increase risks to equipment and personnel.

Pay close attention in recognizing and reacting to these potential hazards:

- Tracks, sheaves, hoist blocks or other crane components that can become iced up or frozen,
- Dislodged/falling ice hazards may exist from suspended loads, rigging or crane components,
- Ice on crane platforms or ladders and rail systems can create slip/fall hazards. Similar hazards may exist throughout the weight handling profile.
- Look for the presence of areas holding water and take applicable actions to clear water that
- may result in unsatisfactory equipment operation due to icing.
- Eliminate hazardous walking /working surfaces when possible

And...as winter is not yet through with us yet,

- Ensure visibility is not compromised due to ice build up
- Be aware that the load may be frozen to the ground or structure.

Thanks to Navy Crane Safety Center for this article (11-S-01)



LESSONS LEARNED - BUT ARE WE LEARNING?

One of the goals of the Crane PDT is to keep the community at large up to speed with respects to what is happening in the field. If within our Community of Practice we intend to take safety from “Good to Great,” it’s imperative that we share experiences and learn from each other. Where there are gaps...educate, where there are questions...discuss openly. It’s non-negotiable. To that extent, we need you all to know that since June 2010....there have been “29” accidents and incidents involving cranes (from sprained ankles to lost fingers to a fatality and lots of property damage). These accidents and incidents are occurring on...Civil Works, Milcon, and our Operational projects. I don’t think you’ll mind if we tell you. This is not acceptable.

As Boards of Investigations are completed and abstracts sent out for dissemination to the field, we want to share with you at least a few of those 29 accidents and ask you to take a serious look at your Project’s day-to-day crane operations. There is one fatality associated with these accidents and several millions of dollars of equipment and property damage. For example....

June 2010 - Contractor (Milcon). Worker was shaking out steel. Tag line and sling were removed from steel with the intent of placing onto the hook. One end of the sling was on the ground and under the steel. As operator raised the hook, the ring on the loose end of the sling caught the edge of the steel causing it to tip over, landing on a worker’s foot. Worker’s foot was caught between beam and concrete pad. Result - Class B accident (foot crushed, amputation of 3 toes).

Sep 2010 - Contractor (Civil). 350 JD Excavator becomes stuck in the mud/sand. A determination is made to use a Manitowoc 4000 barge-mounted crane w/100-ft of boom as a winch to recover the excavator. During the recovery effort the boom fails, landing on the cab of the excavator (without warning). Based on the facts gathered, this operation met the criteria of a “critical” lift due to the fact that the excavator exceeded the maximum load capacity of the barge mounted crane. Result - No injuries. Damage estimates were reported at <\$500k.

Oct 2010 - Contractor (Civil). Preparing to move pile driving operation across a pipeline crossing. Crane Operator positioned a Manitowoc 999 at the edge of the crane mats and lowered leads a 2:1 batter in a position where the ends of the leads were touching the ground. The Manitowoc proceeded forward off of the crane mats with leads raised and partially suspended. As the crane tracks rotated off of the crane mats and onto the ground, the load concentrated on the toe of the right track causing the crane to tip over. Result - No injuries, Class A Accident investigation (\$2.4 mil)

Nov 2010 - Contractor (Civil). Employee navigating a 45-ton Grove crane (no load on the crane) on a spillway deck of a dam, when the crane flipped over backwards and became “stuck” on the parapet wall. The crane was secured to prevent the crane from falling into the forebay (behind the dam). Crane was eventually righted and placed back onto the deck. Result - No injuries, \$250k in damage. Commander directed Board of Investigation.

Dec 2010 - Contractor (Civil). While de-rigging a load a 5,300# UPS Battery Rack became unstable and shifted, crushing the employee. Result - Fatality. Board of Investigation conducted.

Please.....take some time this week to review your crane policies, procedures, inspection reports and discuss this article. WE are on the brink of collectively needing to call a timeout to evaluate our program. I should have couched the number of accidents by saying...these are the ones we “know” about....Thank you



Cranes on the Columbia



Which is the Swan and which is the Crane? It is only by his Glance of Grace.... Sri Guru Granth Sahib.

There is a certain element of grace and harmony when you plan your work and work your plan. These elements of planning and executing your work have been vital in ensuring the continued reliability of the critical transportation route in the Pacific Northwest. The following is a snapshot of some unique crane operations taking place at The Dalles and John Day Lock and Dam.



The Dalles Lock and Dam - Completed over 50 years ago, both of the 350-ton downstream gates have suffered cracks and other metal stress in the past 5 years that caused the gate to vibrate and not close properly. In February 2010, the Portland District contracted with Dix Corporation (Spokane, WA) to replace the two gates and their associated components.

Dix Corporation brought in a Lampson Transi-Lift LTL-1100 crane to facilitate the removal and replacement of the gates. Lampson builds the largest cranes in the United States and this job required the biggest and the best to ensure that all went as planned.



Part of the team that provided input, planning and coordination of this effort, were Crane PDT Members, Dave Stanton (Ch, Safety—NWP), John Cannon (NWP-Safety) as well as Art Kunigel (TDD— Structural Crew Team Lead). The photos in this article are courtesy of Messrs. Stanton and Kunigel.

In discussion with Art, I asked him to tell me what the keys were to a successful and safe lift were...Art stated:

First and foremost having the district safety officer involved in the pre-work meetings sent the CORRECT message "LOUD and CLEAR" to all those involved in the project; also having knowledgeable, experienced USACE heavy lift crane and rigging personnel with load chart and lift planning experience involved in this process were the reasons this first phase has been done safely and correctly to this point.



The weather and all unknown factors were discussed and really didn't hinder gate removal operations.

Lesson learned: checking numbers/weights is critical but preparing for the unknown is VITAL. The estimated gate weight was 780-790,000lbs but in the end the true weight was 850,000lbs. The vital part is in the crane capacity and by having a larger crane you can overcome these unknown factors when they occur. "When things go in the wrong direction they multiply fast and you can't go back, so always use the 6 P's".

The lift for the first gate started at approximately 1040 hrs and the laying down of the gate was completed at or around 1700 hrs—slow, precise movements with great communication for the three crane operators and lift director were key to the success of this phase of work.



John Day Lock and Dam - The guillotine gate on the downstream navigation lock has been in place since the 1960's. Replacing this gate and all associate equipment to include two 150,000 pound each friction drums, has taken a great deal of planning and preparation from Corps of Engineers and Contractor employees. The old navigational lock gate was taken out in 4 pieces with each piece weighing up to 550,000 pounds, making every lift a critical lift. After all the sections were cut, the contractor lifted each section using a Manitowoc 888 Ringer crane with 250 foot of boom, mounted on a 286' X 76' flat deck barge. Due to the floating bulkhead that keeps the water out of the lock area during repairs, the floating crane could only get within 100 feet of the picking location. This caused some concern as the margins for safety are small due to all high winds, water chop, etc that are present at John Day this time of year.

Installation of the new gate is underway. Just like the old sections, the new gate sections are being put back into place as 4 sections with the 1st section weighing the most at over 572,000 pounds. As of January 28th, all 4 sections of the old gate have been removed and two new sections have been re-installed. Both the south and north friction drums are in place. A Manitowoc 2250 crawler crane is being used to place these friction drums into the north and south towers.

Cranes on the Columbia - cont'd

The Portland District safety office Dave Stanton and John Cannon, who are also Crane PDT members have been involved in the planning and review of submittals since the test picks took place back in November of 2010.

Lesson Learned: You can always prepare for the worst, but you also need to take your time on these extremely heavy picks to ensure the entire crew is on the same page. The Manitowoc 888 ringer crane and barge configuration was load tested in Vancouver per ASME B30.8 standard, which states the crane will be tested at 100% of the capacity while putting the crane thru the full range of motion that will be utilized for the picks. Due to the naval architect engineer's calculations, the barge has to be ballasted during picking, swinging, and placement of the gate sections. The crane only has a half of degree load chart, so when ballasting, it is crucial to have great communication to ensure the pick goes as planned. The crane operator

has to continuously monitor the list and trim indicator while the crew ballast from side to side to ensure the crane does not exceed the 1/2 degree load chart. Also to achieve the height needed to get the new and old sections of gates in and out, the Bonneville Power Administration (BPA) was asked to hold the tailrace elevation at 161 feet (msl) to facilitate the radius of the pick during the critical lift. Once again this highlights the high level of communication not only from the contractor, but from the Corps of engineer's project engineer and the BPA.

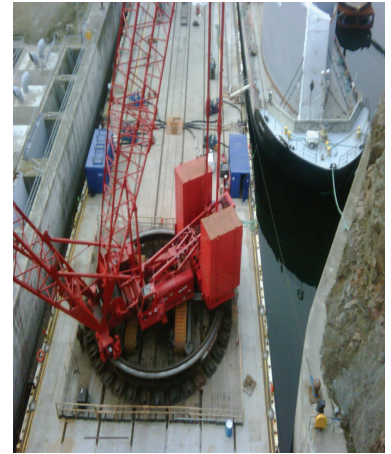
The first pick at John Day started at approximately 0900 hours on January 5, 2011 by removing the first old gate section. The lift cycle was completed approximately 1800 hours when the gate section was placed on the barge and secured.

Ultimately it would have been preferred to utilize a land base crane on top of the dam, but due to limited space a floating crane is being utilized. There are a lot more challenges with utilizing a floating crane such as space for all the barges that assist the crane for

placement of the new and old cranes. Also after picking a gate section the crane barge has to be positioned into place while the crane is holding the load, this takes approximately 30 minutes which allows more time with the load suspended that could ultimately increases risk.

(Photos courtesy of the Portland District Safety Office and The Dalles Lock and Dam).

Thanks to Art Kunigel and John Cannon for article contributions)



I'LL NEVER FORGET THAT DAY (Robert Wild)

August 26, 1986, a day when two fellow Corps of Engineer employees and friends were killed in two separate crane-related accidents within a 5-hour time span. As the District dealt with the loss of two employees, a Board of Investigation (BOI) was convened to determine what had caused these tragic accidents. One of the fatalities was the result of massive crushing injuries, the other was a result of drowning when the bridge crane being operated was pulled off of the dam and into the water. Both employees had worked on their respective pieces of equipment for many years, they knew their job and they knew their work environment...perhaps too much so.

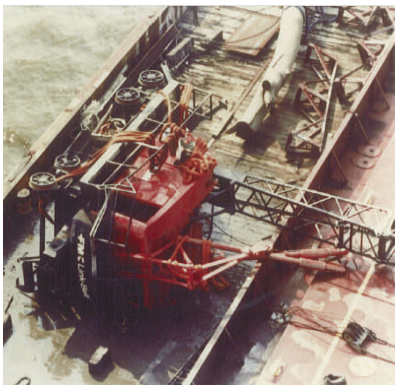
Whether you are a Government Contractor or a Government employee, the message shared here is...do NOT become complacent in your organization or on the job, the consequences are too high! In fact, I believe there is a challenge to be issued here...Recognize that complacency IS an issue, always has been and always will be, its human nature. DON'T however, see this as an acceptable way of doing business.

Education and training must be kept at the forefront of our mission with respects to crane and rigging operations. It's not enough to assume that repetition and routine is an acceptable form of education, strive to review operating manuals, practice rigging techniques, learn from others yes, but make sure you're adhering to an acceptable standard of practice in doing such.

Being qualified to operate a crane you have been trained to operate...paramount. Ensuring that riggers and signal persons are properly trained...essential.

In the 2001 article, I made the following statement....make it a priority today to see that cranes, the operators, and associated work crews...all go home safe today.

That statement was true 25 years ago...make it your priority today!



CHANGE 5 UPDATE -

Change #5 (EM 385-1-1) is in final draft and should be published by mid-February. There are a lot of significant changes to Sections 15 and 16—Rigging, Cranes/Hoists that are necessary because of the recently published OSHA Crane/Derrick Standard and because we received a lot of questions and requests for clarifications and interpretations concerning these areas.

When the Change is published, there will also be clarifications of these requirements and a Frequently Asked Questions (FAQs) section on the CESO website: <http://www.usace.army.mil/CESO/Pages/Home.aspx>.

We want everyone to be able to understand the requirement and what it means...if it's not clear, we haven't done our work. So let us know what you are having trouble with.

Check the site periodically for new additions.

WHAT'S UP WITH THAT?

In our 1st edition, we showed you a picture and asked you to identify either the:

- A. Safety deficiency that has occurred. We'll ask you to then look up the correct reference in EM 385-1-1 and identify...

...And then...

- B. Ask you what you believe was the "direct" cause of the incident identified.

THE ANSWER— Unstable soil conditions. The direct cause of this accident...

In our EM, Section 16.D.08 (Start-up Inspections), 8(k) denotes to inspect, "ground conditions around the equipment for proper support, including ground settling under and around outriggers and supporting foundations, ground water accumulation, or similar conditions;

Congratulations' to the first two correct responders:

- Jeffrey Kelly, LRE, and
- Louis Audi, NWW

A token of congratulations is "in the mail"... Thanks for the nearly 2 dozen people who responded!



This month's "WHAT'S UP WITH THAT" question is....

In the article, "Cranes on the Columbia", Art Kunigel stated..."When things go in the wrong direction they multiple fast and you can't go back, so always use the 6 P's".

What ARE those 6 P's with respects to crane planning ?

DID YOU KNOW ?

Causes of Construction Worker Crane-Related Deaths and Injuries (2008 - BLS)

	<u>Incidents</u>	<u>Deaths</u>	<u>Injuries</u>
Crane Collapse	34	25	9
OH Power line Contact	12	10	8
Struck by Load	12	6	10
Struck by Crane parts	10	6	7
Other Causes	20	7	16

Information taken from Electronic Library of Construction Occupational Safety & Health

INTERESTING CRANE LINKS..

[Navy Crane Center](https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_ncc_pp) - https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_ncc_pp

[OSHA \[crane, derrick and hoist safety\]](http://osha.gov/SLTC/cranehoistsafety/index.html) - <http://osha.gov/SLTC/cranehoistsafety/index.html>

[Understanding Crane Failures](http://www.elcosh.org/en/document/1118/d001029/understanding-crane-accident-failures%253A-a-report-on-the-causes-of-death-in-crane-related-accidents.html) - <http://www.elcosh.org/en/document/1118/d001029/understanding-crane-accident-failures%253A-a-report-on-the-causes-of-death-in-crane-related-accidents.html>

UPCOMING EVENT.

March 22nd thru 26th in Las Vegas, NV, CONEXPO-CON/AGG has a comprehensive schedule planned—a total of 126 sessions covering an expansive range of topics, including a new focus on education for:

- Equipment manager exams
- Crane operator certification programs
- Site development

COUNTERWEIGHT

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