FACT SHEET: CRANE RULE

General Information

The Occupational Safety and Health Administration’s (OSHA) Cranes and Derricks in Construction regulation requires training and third-party certification for employees who operate cranes in construction.\(^1\) OSHA describes the circumstances that require compliance with the regulation through a Letter of Interpretation and a letter to Congress, which are included here.

NPGA continues to advocate to OSHA, Congress, and the Executive Office that propane tank deliveries/retrievals should not fall under the requirements of the regulation.

The Crane Rule requirements are detailed in the included White Paper. The below is intended to provide general information about the rule and is not intended to constitute legal advice. Please contact NPGA staff Mike Caldarera or Sarah Reboli with any questions.

Start Date

The training requirements are effective November 8, 2010.\(^2\) The compliance deadline for third-party certification of crane operators is November 10, 2018.\(^3\)

Regulatory Text

29 C.F.R. 1926 Subpart CC – Cranes and Derricks in Construction

Available online: https://www.ecfr.gov/cgi-bin/text-idx?SID=2fe97f76726e265277e8c57d53d2e251&mc=true&node=sp29.8.1926.cc&rgn=div6

Resources

OSHA Letter to Members of Congress (2017)
OSHA Letter of Interpretation (2016)
NPGA White Paper (2017)

Accredited Third-Party Certification Providers (non-exhaustive)\(^4\):
  - National Center for Construction Education & Research
  - Crane Institute Certification
  - Operating Engineers Certification Program
  - National Commission for the Certification of Crane Operators

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\(^2\) The May 21, 2018 Notice of Proposed Rulemaking by OSHA includes potentially amending the training requirement to be an on-going duty of employers.

\(^3\) On November 9, 2017 OSHA extended the compliance deadline for third-party certification from November 10, 2017 to November 10, 2018. OSHA’s extension notice is available here: https://www.osha.gov/news/newsreleases/trade/11092017

\(^4\) NPGA is not affiliated with, nor does NPGA endorse any crane operator certification provider.
The Honorable Robert E. Latta  
U.S. House of Representatives  
Washington, DC 20515

Dear Congressman Latta:

Thank you for your August 29, 2017, letter to Secretary of Labor R. Alexander Acosta expressing concerns about the possible adverse impacts of the *Crane and Derrick in Construction* standard (construction crane standard) on the propane industry. Your letter was referred to the Occupational Safety and Health Administration (OSHA) for a response. In your letter, you state that the National Propane Gas Association (NPGA) estimates that costs for employer compliance with OSHA's crane operator certification requirements would be burdensome. Therefore, you request that OSHA consider exempting routine propane tank deliveries from the scope of the crane rule.

OSHA notes that there are already two ways in which employers delivering propane would not be required to comply with OSHA's construction cranes standard. First, most propane tank handling activities, involving cranes as you describe, occur at worksites where no construction is performed. Therefore, these uses of cranes are not considered construction and are not covered by the construction cranes standard.

Second, NPGA raised this issue during the rulemaking and in a number of post-rulemaking meetings and correspondence, including a March 16, 2017, meeting with the NPGA, in a letter followed by OSHA's June 27, 2016, response to Mr. Robert Helminiak (NPGA), and in a letter followed by OSHA's June 29, 2017, response to Mr. Richard Roldan (NPGA). OSHA clarified, in the response to Mr. Helminiak, that transferring propane tanks from the equipment directly to the ground is considered "delivery" and covered by applicable requirements of general industry standards, not construction standards. OSHA's construction cranes standard does not apply to those deliveries.

To the extent that NPGA members bring propane tanks to active construction sites and also use their cranes to either specifically position the tanks, in excavations, on pads, or on/in other structures for installation, OSHA has long considered that extra step to be a construction activity. Under those scenarios, in general, crane operators must be trained to recognize hazards particular to construction worksites and how to avoid or protect themselves from those hazards. In addition, the operators must be able to competently make determinations regarding the safe operation of a crane under construction conditions which can affect the safety of the other workers at that site as well. For those reasons, that extra step is covered by requirements of the *Crane and Derrick in Construction* standard regardless of what type of employer brings the propane tanks to the pad for installation.¹

¹ OSHA has already implemented an enforcement policy to address the delivery of propane tanks via monorail hoists because that system does not present the same safety concerns. OSHA intends to exercise its enforcement
On August 30, 2017, OSHA proposed to extend the compliance date for crane operator certification to November 10, 2018. This action would maintain current operator competency requirements and give OSHA more time to engage the construction industry again and complete a revision of crane operator competency requirements. Thank you for providing more substantial statistical feedback regarding the propane industry’s estimated compliance costs-information like this from small companies will be considered when gauging the overall impact of crane operator competency requirements on the construction industry.

In closing, we assure you that completing this rulemaking is an OSHA priority. Future inquiries from your staff can be directed to the Office of Congressional and Intergovernmental Affairs at (202) 693-4600.

Sincerely,

[Signature]

Loren Sweatt
Deputy Assistant Secretary

cc: The Honorable Bob Gibbs
    The Honorable Bill Johnson
    The Honorable Barry Loudermilk
    The Honorable Paul Gosar
    The Honorable Scott Perry
    The Honorable Mike Rogers
    The Honorable Gregg Harper
    The Honorable Sean Duffy
    The Honorable John Shimkus
    The Honorable Trent Kelly
    The Honorable David Rouzer
    The Honorable Lynn Jenkins
    The Honorable Sam Graves
    The Honorable Walter Jones
    The Honorable Rod Blum
    The Honorable Collin C. Peterson
    The Honorable F. James Sensenbrenner, Jr.
    The Honorable Tim Walberg
    The Honorable Brad R. Wenstrup
    The Honorable H. Morgan Griffith
    The Honorable Richard Hudson
    The Honorable Glenn Grothman
    The Honorable Ryan Costello

Hoists are used, so long as they meet specific conditions set out in the policy (see June 20, 2017 memorandum to OSHA Regional Administrators, available on OSHA’s website at www.osha.gov).
JUN 27 2016

Mr. Robert F. Helminiak  
Director, Regulatory Affairs  
National Propane Gas Association  
1899 I. Street, NW, Suite 350  
Washington, DC 20036

Re: Cranes; 29 CFR 1926.1400(c)(17); delivery; Propane gas; articulating/knuckle-boom cranes

Dear Mr. Helminiak:

Thank you for your February 1, 2013, letter to the Occupational Safety and Health Administration (OSHA). In your letter, you ask OSHA to confirm your understanding of the Cranes and Derricks in Construction standard as it applies to articulating/knuckle-boom truck cranes. The questions in your request for interpretation have been paraphrased as follows.

**Q# 1:** Section 1926.1400(c)(17)(i) states that when articulating/knuckle-boom truck cranes (truck cranes) are used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting, this activity would not be considered construction and therefore requirements of 29 CFR Part 1926 do not apply. Does this exemption include the delivery of propane containers?

**Answer**

Yes, OSHA included this exemption in the regulatory text of the cranes standard to clarify that OSHA’s enforcement policy for materials delivered from articulating/knuckle-boom truck cranes is consistent with a broader enforcement policy that applies to materials delivered only to the ground at construction sites using any kind of equipment.

**Q# 2:** When propane containers are initially delivered by truck cranes to newly constructed structures, particularly containers of 2,000 gallons or less in liquid capacity, they are: lifted to only a height that is sufficient to clear the bed of the truck crane; set on the container’s steel legs on the ground or a concrete pad; and are not hoisted again by the delivery company’s truck crane. In addition, the truck crane operator does not connect the containers to any system nor hold the container in place in support of any further activity, including connecting the containers to a structure (including the concrete pad on which the tanks are set). Is this handling of propane tanks an activity covered by the exclusion described in Q# 1?

**Answer**
No. In a prior letter of interpretation, OSHA clarified that the positioning of burial vaults in an excavation (grave) is not a construction activity because the vaults are not part of, nor will be connected to, a system or structure being constructed/installed. Therefore, positioning the vault within the excavation is not essential to facilitate any construction work.¹

In contrast, as you described, truck cranes are used to position propane containers in a particular area and orientation on an active construction site to facilitate the initial connection of the containers by another employer to newly constructed/installed propane systems. This activity is similar to positioning precast components in a particular place and orientation within excavations to facilitate connection to, and the construction of, a septic, sewer, or water drainage system by another employer. Subsequently, initially placing propane containers on pads at a construction site as you describe is considered construction and when truck cranes are used for this purpose, employers must comply with requirements of the crane standard.

Please note that consideration of whether a work activity is covered by 29 CFR 1910 (OSHA’s General Industry Standards) or 29 CFR 1926 (OSHA’s Construction standards) is based on a case-specific factual analysis. An example of some of the factors used to determine whether a work activity is covered under OSHA’s Construction standards is discussed in a letter of interpretation that can be accessed from OSHA’s website at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=24789.

Thank you for your interest in occupational safety and health. We hope you find this information helpful. OSHA’s requirements are set by statute, standards, and regulations. Our letters of interpretation do not create new or additional requirements but rather explain these requirements and how they apply to particular circumstances. This letter constitutes OSHA’s interpretation of the requirements discussed. From time to time, letters are affected when the Agency updates a standard, a legal decision impacts a standard, or changes in technology affect the interpretation. To ensure that you are using the correct information and guidance, please consult OSHA’s website at http://www.osha.gov. If you have further questions, please feel free to contact the Directorate of Construction at (202) 693-2020.

Sincerely,

Jeffrey A. Erskine, Acting Director
Directorate of Construction

Enclosure

¹ See February 26, 2013, OSHA interpretation letter issued to Mr. Thomas A. Monahan. This letter and others may be accessed from www.osha.gov.
OSHA Cranes and Derricks in Construction
NPGA White Paper
June 2017

I. INTRODUCTION

The purpose of this White Paper is to describe the requirements of the Occupational Safety and Health Administration (OSHA) Cranes and Derricks in Construction regulation and facilitate a better understanding of how the requirements affect the propane industry.¹

The Cranes and Derricks in Construction regulation applies when crane operation falls within a ‘construction activity’. The regulation is found in Title 29 of the Code of Federal Regulations (CFR), Part 1926, Subpart CC, Section 1400; i.e. 29 CFR 1926.1400. The use and operation of cranes in a ‘non-construction activity’ must follow General Industry regulations, which are found at 29 CFR 1910.180. The Propane Education & Research Council (PERC) offers crane operation training material that satisfies the requirements of the General Industry regulations (See below ADDITIONAL RESOURCES). The distinction between construction activity and non-construction, or maintenance, is found at 29 CFR 1926.32(g) and 29 CFR 1910.12(b). Generally, construction activity means work for construction, alteration, and/or repair, including painting and decorating at a residential or commercial location. Construction activity at a location that is unrelated to the delivery of a propane tank, may still trigger applicability of the Cranes and Derricks in Construction regulation.

See the DEADLINES & RENEWALS section below for a list of compliance deadlines and renewal or recertification deadlines.

II. BACKGROUND

In August 2010, OSHA published a final rule on Cranes and Derricks in Construction. The rule was initially developed through a Consensus Advisory Committee formed by OSHA to review and update safety standards for cranes and derricks, which were unchanged since 1971. The final rule followed a public comment period on the Notice of Proposed Rulemaking (NPRM) published by OSHA in 2008. Many stakeholders firmly argued that the third-party certification requirement for crane operators was at odds with general training practices, which are specific to products and work environment. In response, OSHA delayed the compliance deadline for crane operator certification by three years to provide time for the agency to review industry concerns and amend the regulation.

¹ This document is provided solely for informational purposes. It is not exhaustive of all regulatory requirements. It is not to be construed as legal advice or legal guidance. NPGA expressly disclaims any liability associated with the accuracy or content of the information contained in this document. Users should consult the OSHA website at https://www.osha.gov/cranes-derricks/index.html#compliance for the most complete and current information pertaining to the Crane and Derricks in Construction regulation or contact an attorney for any specific advice with respect to the regulation.
NPGA opposed the initial proposal by OSHA as inapplicable to the propane industry. NPGA argued that the use of a crane by a propane marketer is unrelated to construction activity at the location; and, therefore, crane operation within the propane industry should fall exclusively under the scope of the General Industry standards. OSHA disagreed, however, and distinguished that the Crane and Derricks in Construction regulation is activity-specific; not industry-specific. Therefore, a propane marketer’s use of a crane at one location may fall under the requirements of the Crane and Derricks in Construction regulation, but the same use of the same crane at another location may fall under the requirements of the General Industry regulations depending on the surrounding activity at the time the propane tank is delivered.

NPGA later submitted a request for a Letter of Interpretation to classify delivery of a propane tank within the Materials Delivery Exemption of the final rule (29 CFR 1926.1400(c)(17)). OSHA denied the request, however, on the basis that setting the propane tank and connecting it to a piping system is similar to setting and connecting a septic tank; which OSHA previously determined to be a construction activity that falls within the scope of the Cranes and Derricks in Construction regulation.

In September 2014, OSHA announced that the compliance deadline for crane operator certification of November 8, 2014 would be postponed to November 10, 2017. It was the intention of OSHA to address the outstanding criticisms of the third-party certification requirement for crane operators during the delay through another rulemaking. At the time of publication of this White Paper, OSHA has not yet published an additional rulemaking.

III. MAJOR COMPONENTS

This section lists and summarizes some of the major components of the Crane and Derricks in Construction regulation. Note, the summary is not exhaustive.

a. Scope (§1926.1400)

The Crane and Derricks in Construction regulation applies to “power-operated equipment, when used in construction, that can hoist, lower and horizontally move a suspended load,” including articulating, or knuckle-boom cranes, and mobile, or commercial vehicle-mounted, cranes.² OSHA distinguishes between ‘construction activity’ and ‘maintenance activity’. OSHA considers use of a crane to set a tank at a location that is under construction to be a construction activity that requires compliance with the Cranes and Derricks in Construction regulation; regardless of whether the construction activity directly involves the propane tank delivery. However, the use of a crane to simply replace a tank is considered a maintenance activity that requires compliance with the General Industry regulations.

The regulation details minimum conditions, standards, and procedures for, among other things, operation, inspection, and powerline safety, in addition to general training and certification or qualification of crane operators. The regulatory text is available online and NPGA strongly encourages members to review the regulatory text to completely familiarize themselves with the requirements of the regulation.

² 29 C.F.R. 1926.1400(a). The regulation lists activities excluded from the requirements, such as forklift operation, in 1926.1400(c).
b. **Key Definitions** (§1926.1401)

- *Articulating crane*: A crane whose boom consists of a series of folding, pin connected structural members, typically manipulated to extend or retract by power from hydraulic cylinders.
- *Competent person*: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- *Controlling entity*: An employer that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project – its planning, quality and completion.
- *Dedicated spotter (power lines)*: To be considered a dedicated spotter, the requirements of §1926.1428 (Signal person qualifications) must be met and his/her sole responsibility is to watch the separation between the power line and the equipment, load line and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.
- *Operator*: Means a person who is operating the equipment.
- *Operational Aids*: Devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function. These include, but are not limited to, the devices listed in §1926.1416 ("listed operational aids").
- *Mobile crane*: A lifting device incorporating a cable suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.
- *Nationally recognized accrediting agency*: An organization that, due to its independence and expertise, is widely recognized as competent to accredit testing organizations. Examples of such accrediting agencies include, but are not limited to, the National Commission for Certifying Agencies and the American National Standards Institute.
- *Qualified evaluator (not a third party)*: A person employed by the signal person’s employer who has demonstrated that he/she is competent in accurately assessing whether individuals meet the Qualification Requirements in this subpart for a signal person.
- *Qualified evaluator (third party)*: An entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the Qualification Requirements in this subpart for a signal person.
- *Qualified person*: A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.
- *Rated Capacity*: Means the maximum working load permitted by the manufacturer under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.
c. **Ground Conditions** (§1926.1402)

The controlling entity must ensure that the ground conditions are firm, drained, and graded, if appropriate. The crane operator should review the ground conditions and communicate with the controlling entity if any measures must be taken to improve the area. If there is no controlling entity, the responsibility of adequate ground conditions falls on the employer who is able to improve the ground conditions, if necessary.

d. **Powerline Safety** (§1926.1408-1411)

All employees must receive training on potential electrical contact, as outlined in Section 1926.1408(g). Before crane operation begins, the employer must mark off the work zone or the crane’s maximum working radius. The employer must evaluate if the work zone places equipment within 20 feet of powerlines. If so, the employer must take safety precautions as detailed in Section 1926.1408 and Section 1926.1410.

When moving crane equipment without a load while near a powerline, the employer must ensure that the crane and support equipment are lowered to maintain clearances defined in Table T of Section 1926.1411. A dedicated spotter must be used if the crane equipment gets within 20 feet of a powerline.

e. **Inspections** (§1926.1412)

*Shift inspections.* At every shift, a competent employee must conduct a visual inspection of the equipment. The visual inspection must at least review items (i) – (xiv) listed in Section 1926.1412(d)(1). If any deficiencies are identified, correction must be made according to 1926.1415 and 1416. The equipment must be removed from service until the corrections are made.

*Monthly inspections.* Equipment must receive an inspection each month. The employer must document the inspection including items reviewed, results, and date, name, and signature of the person who performs the inspection. These records must be maintained for a minimum of three months.

*Yearly inspections.* At least every 12 months, the equipment must undergo a more comprehensive inspection by a qualified person, ensuring items listed in 1926.1412(f)(2) are inspected. The inspection must also include a functional test of the equipment. If any deficiencies are identified, a qualified person must determine if it is a safety hazard or potential safety hazard that necessitates removal from service or monitoring during monthly inspections. Section 1926.1412(g) defines severe use or conditions of equipment and necessary inspection procedures. The employer must document the inspection, items reviewed, results, and date, name and signature of the person who conducted the inspection. These records must be retained for at least 12 months.

*Modifications or repairs.* Crane equipment that has had modifications or additions that affect operation, such as safety devices, braking systems, or load capacity, must be inspected by a qualified person before initial use of the equipment. The inspection must ensure that modifications were made in accordance with Section 1926.1434, and the inspection must include a functional test of the equipment. Also, crane equipment that has had repair or adjustment must be inspected by a qualified person before initial use. The inspection must ensure that the repair or adjustment is in accordance with applicable criteria.
f. **Wire Rope** (§1926.1413-1414)

Section 1926.1413 lists specific criteria for inspection of wire ropes and connected components of crane equipment. Inspections are required at each shift as well as more comprehensive inspections each month and every 12 months. Section 1926.1414 prescribes installation and replacement requirements.

g. **Safety Devices** (§1926.1415)

The below safety devices are required on crane equipment covered by this regulation. If any of the listed equipment is not functioning properly, the crane must be removed from service until the equipment is functioning properly.
- Crane level indicator, either built into the equipment or on the equipment;
- Boom stops;
- Jib stops, if a jib is attached;
- Locks on equipment with foot pedal brakes;
- An integral holding device/check valve on hydraulic outrigger jacks and hydraulic stabilizer jacks;
- A horn either built into the equipment or immediately available to the crane operator.

h. **Operational aids** (§1926.1416)

The regulation divides operational aids into *Category I* and *Category II*, and lists requirements of condition, repair, and use, accordingly. If an operational aid fails during operation, the operator must stop until it is repaired, or utilize one of the alternatives in this section. Examples of *Category I* aids include boom hoist limiting device, luffing jib limiting device and anti-two blocking device, among others. Examples of *Category II* aids include boom angle or radius indicator, boom length indicator and jib angle indicator, among others.

i. **Operation** (§1926.1417-1418)

The employer must comply with the manufacturer’s operating procedures and the procedures must be readily available in the cab for use by the crane operator at all times. Some of the requirements of this section are that the:
- crane operator must not leave the controls while a load is suspended unless certain provisions are met;
- employer must tag out-of-service crane equipment; and
- crane equipment must not be operated in excess of its rated capacity.

j. **Signals** (§1926.1419-1422)

A signal person must assist crane operation when the point of operation is not in full view of the operator, when the direction of travel is obstructed, or if there are site specific safety concerns raised by the operator or person handling the load. Only one signal person may provide signals to the crane operator, except that any person must give the emergency stop signal to the operator or signal person if a safety problem is evident.
The signal person must meet the qualification standards detailed in Section 1926.1428. Signals must be by hand, voice, or audible; whichever is most appropriate for the site conditions. Hand signals must follow the Standard Method, detailed in Appendix A.

k. **Fall protection** (§1926.1423)

The employer must provide training on this section to all employees who are exposed to a fall hazard. Any personal fall arrest or fall restraint systems must conform to the criteria detailed in section 1926.502(d).

l. **Work area control, clear of the load, and load lowering** (§1926.1424-1426)

To prevent employees from entering swing radius hazard areas, the employer must train employees in how to recognize struck-by and pinch/crush hazard areas and maintain barriers or mark the hazard area. Before an employee enters a hazard area that is out of the view of the operator, the employee must inform the operator. Thereafter, the operator must not rotate the equipment until the employee is in a safe position.

m. **Operator Qualification and Certification** (§1926.1427)

Employers must ensure that a crane operator is qualified or certified without cost to the employee. Operator qualification or certification under this section is not required for operators of equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less.

There are four options by which to qualify or certify a crane operator employee:

1. Certification by an accredited crane operator testing organization;
2. Qualification by an audited employer program;
3. Qualification by the U.S. military;
4. License by a government entity.

**Option 1: Certification by an accredited crane operator testing organization**

The operator must receive certification for the type and capacity of the crane equipment that the operator intends to operate. In the propane industry, many businesses utilize an articulating crane and mobile crane. In these circumstances, the crane operator must obtain two certifications: one to operate the articulating crane, and one for the mobile crane. The certification is valid for 5 years and must be renewed by an accredited crane operator testing organization, or by one of the other qualification methods.

**Option 2: Qualification by an audited employer program**

The employer must administer written and practical tests that are developed by an accredited crane operator testing organization, or approved by an auditor, who is not employed by the employer, as meeting nationally recognized test criteria. A crane operator’s qualification by an employer is not portable; it is valid only while employed with the employer. The employer program must be audited within 3 months of the program beginning and every 3 years, thereafter. The audit must include review of the employer’s procedures for re-qualification of employees.

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3 The White Paper does not detail the requirements for qualification by the U.S. military or license by a government entity because these are not common in the propane industry.
If an auditor identifies a deficiency in the employer program, the program cannot qualify an employee until the deficiency is corrected. The auditor must file a report on the deficiency with the regional OSHA office within 15 days of identifying the deficiency. Following correction of the deficiency, the auditor must audit the program within 180 days. Auditors must retain audits for 3 years and make them available to OSHA upon request.

**Operator-in-training.** Prior to qualification or certification, an operator-in-training may operate crane equipment under the following conditions:

- The operator-in-training receives sufficient training prior to handling the equipment;
- Tasks are within the abilities of the operator-in-training; and
- The operator-in-training is continuously monitored by a trainer.

The operator-in-training must not operate the equipment in any of the following circumstances:

- Any part of the equipment, load, or load line could be within 20 feet of a power line;
- The equipment is hoisting an employee; or
- The equipment is used over a shaft, cofferdam, or tank farm.

The trainer of the operator-in-training:

- Must be an employee or agent of the employer;
- Must share a direct line of sight with the operator-in-training; and
- Must not perform any other tasks while monitoring the operator-in-training.

**Certification Criteria.** To receive certification, a crane operator must pass a written test and a practical test. The practical test must demonstrate the operator’s ability to recognize requirements of shift inspections, as detailed in Section 1926.1412(d) as well as perform operation and maneuvering skills, application of load chart information, and application of safe shut-down and securing procedures. The written test must cover:

- Controls and operational/performance characteristics;
- Use of an ability to calculate load/capacity information of equipment;
- Procedures to prevent and respond to power line contact;
- Read and locate the equipment manual; and
- Technical knowledge of equipment, including suitability of supporting ground and surface to handle loads, site hazards, and site access. For example, the technical knowledge criteria listed in Appendix C.

**n. Employee qualifications (§1926.1428-1429)**

**Signal person qualifications.** A signal person must satisfy the qualification requirements by either a third-party qualified evaluator, or an employer’s qualified evaluator. Qualification by an employer’s qualified evaluator is not portable; it is only valid while employed by the employer. Documentation of the signal person’s qualification must be available at the site and must specify the type of signal, e.g. hand, radio, etc., that the person is qualified to perform. Qualification requirements must be met by an oral or written test and a practical test.

**Maintenance & repair employee qualifications.** Maintenance and repair personnel must meet the definition of ‘qualified person’ with respect to the equipment and maintenance/repair tasks performed. Maintenance, inspection and repair personnel may operate equipment only if the operation is limited to those functions necessary to maintenance, inspection, or performance; and, the personnel is under direction supervision of an operator, or is familiar with the operation, limitations, characteristics, and hazards of the equipment.
o. Training ($1926.1430)

In addition to training requirements detailed in each part of the regulation, the employer must train crane operators on the manufacturer’s emergency procedures for halting unintended equipment movement. The employer must also provide refresher training to employees as necessary; based on employee conduct, or evaluation of employee’s knowledge.

p. Appendices

- **Appendix A – Standard Hand Signals:** [https://www.ecfr.gov/cgi-bin/text-idx?SID=a460ab7561c211630cea0ee8d8d43e62&mc=true&node=ap29.8.1926_1144_2.a&rgn=div9](https://www.ecfr.gov/cgi-bin/text-idx?SID=a460ab7561c211630cea0ee8d8d43e62&mc=true&node=ap29.8.1926_1144_2.a&rgn=div9)

- **Appendix C – Operator Certification: Written Examination: Technical Knowledge Criteria:** [https://www.ecfr.gov/cgi-bin/text-idx?SID=a460ab7561c211630cea0ee8d8d43e62&mc=true&node=ap29.8.1926_1144_2.c&rgn=div9](https://www.ecfr.gov/cgi-bin/text-idx?SID=a460ab7561c211630cea0ee8d8d43e62&mc=true&node=ap29.8.1926_1144_2.c&rgn=div9)

IV. ADDITIONAL RESOURCES

- U.S. Department of Labor, OSHA, Cranes and Derricks in Construction, 29 C.F.R 1926.1400 regulatory text: [https://www.ecfr.gov/cgi-bin/text-idx?SID=d3a4a3b423db7862da170b2f033f5fc2&mc=true&node=sp29.8.1926.cc&rgn=div6](https://www.ecfr.gov/cgi-bin/text-idx?SID=d3a4a3b423db7862da170b2f033f5fc2&mc=true&node=sp29.8.1926.cc&rgn=div6)

- U.S. Department of Labor, OSHA, Cranes & Derricks in Construction: [https://www.osha.gov/](https://www.osha.gov/)


- The most common OSHA regulations with jurisdiction over the propane industry include, but are not limited to:
  - 29 CFR 1910.110 Storage and Handling of Liquefied Petroleum Gases
  - 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
  - 29 CFR 1910.132 Personal Protective Equipment
  - 29 CFR 1910.180 Crawler, Locomotive and Truck Cranes

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V. DEADLINES & RENEWALS

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<tr>
<th>Requirement</th>
<th>Deadline</th>
<th>Who</th>
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<tbody>
<tr>
<td>All training, certification, and qualification for crane operators.</td>
<td>November 10, 2017</td>
<td>Applicable Employees</td>
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<tr>
<td>Crane operator certification renewal by an accredited crane operator testing organization.</td>
<td>Every 5 years</td>
<td>Crane Operators</td>
</tr>
<tr>
<td>Initial audit by an accredited auditor for an employer program to qualify crane operator employees.</td>
<td>Within first 3 months of program initiation</td>
<td>Employers</td>
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<tr>
<td>Audit by an accredited auditor for renewal of an auditor program to qualify crane operator employees.</td>
<td>Every 3 years</td>
<td>Employers</td>
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<tr>
<td>Crane operator qualification renewal by an employer program.</td>
<td>Every 5 years</td>
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Appendix A – Standard Hand Signals
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STOP</strong></td>
<td>With arm extended horizontally to the side, palm down, arm is swung back and forth.</td>
</tr>
<tr>
<td><strong>EMERGENCY STOP</strong></td>
<td>With both arms extended horizontally to the side, palms down, arms are swung back and forth.</td>
</tr>
<tr>
<td><strong>HOIST</strong></td>
<td>With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.</td>
</tr>
<tr>
<td><strong>RAISE BOOM</strong></td>
<td>With arm extended horizontally to the side, thumb points up with other fingers closed.</td>
</tr>
<tr>
<td><strong>SWING</strong></td>
<td>With arm extended horizontally, index finger points in direction that boom is to swing.</td>
</tr>
<tr>
<td><strong>RETRACT TELESCOPING BOOM</strong></td>
<td>With hands to the front at waist level, thumbs point at each other with other fingers closed.</td>
</tr>
<tr>
<td><strong>RAISE THE BOOM AND LOWER THE LOAD</strong></td>
<td>With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.</td>
</tr>
<tr>
<td><strong>DOG EVERYTHING</strong></td>
<td>Hands held together at waist level.</td>
</tr>
<tr>
<td><strong>LOWER</strong></td>
<td>With arm and index finger pointing down, hand and finger make small circles.</td>
</tr>
<tr>
<td><strong>LOWER BOOM</strong></td>
<td>With arm extended horizontally to the side, thumb points down with other fingers closed.</td>
</tr>
<tr>
<td><strong>EXTEND TELESCOPING BOOM</strong></td>
<td>With hands to the front at waist level, thumbs point outward with other fingers closed.</td>
</tr>
<tr>
<td><strong>TRAVEL/TOWER TRAVEL</strong></td>
<td>With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.</td>
</tr>
<tr>
<td><strong>LOWER THE BOOM AND RAISE THE LOAD</strong> – With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.</td>
<td></td>
</tr>
<tr>
<td><strong>MOVE SLOWLY</strong> – A hand is placed in front of the hand that is giving the action signal.</td>
<td></td>
</tr>
<tr>
<td><strong>USE AUXILIARY HOIST</strong> (whipline) – With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.</td>
<td></td>
</tr>
</tbody>
</table>

| **CRAWLER CRANE TRAVEL, BOTH TRACKS** – Rotate fists around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward. |
| **USE MAIN HOIST** – A hand taps on top of the head. Then regular signal is given to indicate desired action. |
| **CRAWLER CRANE TRAVEL, ONE TRACK** – Indicate track to be locked by raising fist on that side. Rotate other fist in front of body in direction that other track is to travel. |

| **TROLLEY TRAVEL** – With palm up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel. |
APPENDIX B TO SUBPART CC OF PART 1926—ASSEMBLY/DISASSEMBLY: SAMPLE PROCEDURES FOR MINIMIZING THE RISK OF UNINTENDED DANGEROUS BOOM MOVEMENT

1. Section 1926.1404(f)(1) provides that when pins (or similar devices) are being removed, employees must not be under the boom, jib, or other components, except where the requirements of §1926.1404(f)(2) are met. The exception in §1926.1404(f)(2) applies when the employer demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed. In such a situation, the A/D director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom.

The following scenario is an example of how the exception applies: A boom cannot be disassembled on the ground because of aboveground piping (as might be found, for example, in an oil refinery) that precludes lowering the boom to the ground. The boom must therefore be disassembled in the air, and the employees who remove the pins must perform that work from an aerial lift whose base is positioned on one side (the near side) of the boom. To gain access to the pins on the far side, the aerial lift basket must move under the boom, since, due to lack of room, the aerial lift cannot be repositioned on the far side. Due to lack of room, the aerial lift cannot be repositioned on the far side, so the aerial basket must move under the boom to gain access to the pins on the far side.

To minimize the risk of unintended dangerous movement while the pins are removed, the A/D director uses an assist crane that is rigged to support the boom section that is being detached, using particular care to ensure that the section end that is near the employee(s) removing the pins is well supported. The duration and extent of exposure is minimized by removing the far side pins first, moving the aerial lift basket as soon as possible to the near side so that the employees are no longer under the boom, and then removing the near side pins.

2. Section 1926.1404(h)(6)(i) provides that, during assembly/disassembly, the center of gravity of the load must be identified if that is necessary for the method used for maintaining stability. Section 1926.1404(h)(6)(ii) states that, where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity must be used.

An example of the application of §1926.1404(h)(6)(ii) is as follows: The boom is assembled by lowering boom sections sequentially into place using an assist crane. The A/D director's plan is to keep the boom sections stable while they are lowered into place by attaching the assist crane hoist line above the center of gravity of each section. However, in assembling the non-symmetrical top section of the boom, the A/D director is not able to determine where to attach the assist crane hoist line so that it is above the center of gravity. In this situation, before raising the section, all personnel are kept clear of the section and the section is first raised a few inches to determine whether it tips when raised (if it did tip, it would indicate it is not rigged over the center of gravity). If this occurs, the hoist line is repositioned and the procedure is repeated (with employees kept clear of the section while it is raised) until the A/D director determines that it is rigged over the center of gravity and can be moved into place without dangerous movement.
APPENDIX C TO SUBPART CC OF PART 1926—OPERATOR CERTIFICATION: WRITTEN EXAMINATION: TECHNICAL KNOWLEDGE CRITERIA

This appendix contains information for employers, accredited testing organizations, auditors and government entities developing criteria for a written examination to test an individual's technical knowledge relating to the operation of cranes.

(a) General technical information.

(1) The functions and limitations of the crane and attachments.

(2) Wire rope:

(i) Background information necessary to understand the inspection and removal from service criteria in §1926.1413 and §1926.1414.

(ii) Capacity and when multi-part rope is needed.

(iii) Relationship between line pull and safe working load.

(iv) How to determine the manufacturer's recommended rope for the crane.

(3) Rigging devices and their use, such as:

(i) Slings.

(ii) Spreadsers.

(iii) Lifting beams.

(iv) Wire rope fittings, such as clips, shackles and wedge sockets.

(v) Saddles (softeners).

(vi) Clamps (beams).

(4) The technical limitations of protective measures against electrical hazards:

(i) Grounding.

(ii) Proximity warning devices.

(iii) Insulated links.

(iv) Boom cages.

(v) Proximity to electric power lines, radii, and microwave structures.

(5) The effects of load share and load transfer in multi-crane lifts.

(6) Basic crane terms.
(7) The basics of machine power flow systems.
   (i) Mechanical.
   (ii) Electrical.
   (iii) Pneumatic.
   (iv) Hydraulic.
   (v) Combination.

(8) The significance of the instruments and gauge readings.

(9) The effects of thermal expansion and contraction in hydraulic cylinders.

(10) Background information necessary to understand the requirements of pre-operation and inspection.

(11) How to use the safety devices and operational aids required under §1926.1415 and §1926.1416.

(12) The difference between duty-cycle and lifting operations.

(13) How to calculate net capacity for every possible configuration of the equipment using the manufacturer's load chart.

(14) How to use manufacturer-approved attachments and their effect on the equipment.

(15) How to obtain dimensions, weight, and center of gravity of the load.

(16) The effects of dynamic loading from:
   (i) Wind.
   (ii) Stopping and starting.
   (iii) Impact loading.
   (iv) Moving with the load.

(17) The effect of side loading.

(18) The principles of backward stability.

(b) Site information.

(1) How to identify the suitability of the supporting ground/surface to support the expected loads of the operation. Elements include:
   (i) Weaknesses below the surface (such as voids, tanks, loose fill).
   (ii) Weaknesses on the surface (such as retaining walls, slopes, excavations, depressions).

(2) Proper use of mats, blocking/cribbing, outriggers, stabilizers, or crawlers.

(3) Identification of site hazards such as power lines, piping, and traffic.

(4) How to review operation plans with supervisors and other workers (such as the signal person), including how to determine working height, boom length, load radius, and travel clearance.

(5) How to determine if there is adequate room for extension of crawlers or outriggers/stabilizers and counterweights.

(c) Operations.

(1) How to pick, carry, swing and place the load smoothly and safely on rubber tires and on outriggers/stabilizers or crawlers (where applicable).

(2) How to communicate at the site with supervisors, the crew and the signal person.
(3) Proper procedures and methods of reeving wire ropes and methods of reeving multiple-part lines and selecting the proper load block and/or ball.

(4) How to react to changes in conditions that affect the safe operation of the equipment.

(5) How to shut down and secure the equipment properly when leaving it unattended.

(6) Know how to apply the manufacturer's specifications for operating in various weather conditions, and understand how environmental conditions affect the safe operation of the equipment.

(7) How to properly level the equipment.

(8) How to verify the weight of the load and rigging prior to initiating the lift.

(9) How to determine where the load is to be picked up and placed and how to verify the radii.

(10) Know basic rigging procedures.

(11) How to carry out the shift inspection required in this subpart.

(12) Know that the following operations require specific procedures and skill levels:

(i) Multi-crane lifts.

(ii) Hoisting personnel.

(iii) Clamshell/dragline operations.

(iv) Pile driving and extracting.

(v) Concrete operations, including poured-in-place and tilt-up.

(vi) Demolition operations.

(vii) Operations on water.

(viii) Magnet operations.

(ix) Multi-drum operations.

(13) Know the proper procedures for operating safely under the following conditions:

(i) Traveling with suspended loads.

(ii) Approaching a two-block condition.

(iii) Operating near power lines.

(iv) Hoisting personnel.

(v) Using other than full outrigger/crawler or stabilizer extensions.

(vi) Lifting loads from beneath the surface of the water.

(vii) Using various approved counterweight configurations.

(viii) Handling loads out of the operator's vision ("operating in the blind").

(ix) Using electronic communication systems for signal communication.

(14) Know the proper procedures for load control and the use of hand-held tag lines.

(15) Know the emergency response procedure for:

(i) Fires.

(ii) Power line contact.
(iii) Loss of stability.

(iv) Control malfunction.

(v) Two-blocking.

(vi) Overload.

(vii) Carrier or travel malfunction.

(16) Know how to properly use outriggers and stabilizers in accordance with manufacturer specifications.

(d) Use of load charts.

(1) Know the terminology necessary to use load charts.

(2) Know how to ensure that the load chart is the appropriate chart for the equipment in its particular configuration and application.

(3) Know how to use load charts. This includes knowing:

(i) The operational limitations of load charts and footnotes.

(ii) How to relate the chart to the configuration of the crane, crawlers, or outriggers/stabilizers extended or retracted, jib erected or offset, and various counterweight configurations.

(iii) The difference between structural capacity and capacity limited by stability.

(iv) What is included in capacity ratings.

(v) The range diagram and its relationship to the load chart.

(vi) The work area chart and its relationship to the load chart.

(vii) Where to find and how to use the “parts-of-line” information.

(4) Know how to use the load chart together with the load indicators and/or load moment devices.