



Crane and Rigging Policy

Health and Safety FCX-HS32 | Release Date 10/29/2020 | Version 2 7/25/24

POTENTIAL FATAL RISKS

Lifting Operations-Exposure to loss of control of a load suspended by a crane (fixed or mobile), hoist, forklift, boom, or other lifting equipment. Other fatal risks may apply depending on location of work and work being performed.

CRITICAL CONTROLS

- Barriers and Segregation
- Communication
- Lifting Execution
- Lifting Points
- Pre-lift Meeting
- Pre-shift Inspection

TRAINING REQUIREMENTS

General Awareness for all personnel working around cranes
Reference the Training Requirements Technical Supplement

ADDITIONAL RESOURCES

American Society of Mechanical Engineers (ASME)
Occupational Safety and Health Administration (OSHA)
National Commission for the Certification of Crane Operators (NCCCO)
Crane Institute of America (CIA)
Other local and national resources as required

POLICY

OVERVIEW

This policy applies to all contractors and employees at all locations that utilize cranes and rigging equipment for the movement or adjusting of objects by hoisting. Employees and contractors will not work around or with cranes unless they are properly trained for their level of interaction. This policy does not apply to personnel hoisting in shaft conveyances.

ACTIONS TO STAY SAFE

- Person in charge of lifting operations will have the knowledge to advise crews on load limits of lifting devices.
- One person will be deemed in charge when two or more cranes are used to lift a single load.
- Conduct and document inspections prior to use, including monthly/annually (rigging materials including ropes, chains, slings, etc. and crane components including outriggers, cables, blocks, hooks, etc.)
- Conduct pre-task risk assessments, identify lifting radius, and implement critical controls.
- Ensure anti two-block devices are installed and functioning.
- Use softeners when needed to protect slings from damage.
- Crane operators will not engage in distracting activities.
- Anyone can give the signal to **stop** operations.
- No crane will be loaded beyond its capacity or used for other than its designated purpose.
- Ensure all moving parts are guarded if they expose employees to hazards.
- Complete critical lift plans where necessary (see Technical Supplement).
- All crane activity will utilize a designated signalperson or radios on a designated channel.

Suspended Loads

- No one is permitted to ride the hook, ball, or any portion of a load.
- No one is allowed under a load unless it is effectively blocked from inadvertent movement.
- Use spotters, flagging or barricading to communicate the fall zone.
- Use push/pull sticks and/or tag lines whenever possible and use nonconductive materials near powerlines.
- Guiding a load into place by hand is only permitted when employees:
 - Have view of the height of the load.
 - Understand potential pinch points and trip hazards.
 - Understand the potential and actual swing hazards.
 - Not at risk of being struck should the load fall.
 - Maintain distance from the sling and load and between the sling and hook

OPERATOR EXPECTATIONS

- The operator has final responsibility and control over the crane operations.
- When two or more operators are required, one will be designated as the lead.
- Do not respond to unclear signals, or signals from anyone other than the designated signalperson (except for **STOP**).
- Never intentionally ignore signals.
- All loads will be attached to the hook with a sling or other approved device.
- Position the hook over the load to prevent load swing.
- Properly seat rope in the drum and sheaves, ensuring line is not kinked or twisted (multiple part lines).
- Do not suddenly accelerate or decelerate a load, allow load to contact obstructions, swing over personnel, or allowing side loading or load dragging.

Overhead and Gantry Cranes

- Overhead and gantry cranes includes: Top running bridge, Single or multiple girder, top running trolley hoist and fixed cranes (wall or floor mounted jibs).
- Control boxes will be labeled for button action and direction.
- If there are two or more remote control boxes, all but one must be removed from service and locked, or procedures in place communicate and transfer control between designated personnel.
When side pulling must occur, follow manufacturer recommendations and a written plan approved by a competent person.

Mobile Cranes

- Mobile cranes includes: all boom trucks, service truck cranes, carry deck cranes, rough terrain, truck mounted, articulated boom trucks, and crawler mounted cranes.
- Use outriggers, with pads (when necessary), placed on a firm level surface, for all lifts unless manufacturer states otherwise in operating manual.
- Consider soil type per 29CFR 1926.1402 when designing crane pads.
- Install swing radius and boom clearance protection as needed.
- Position mobile cranes to obtain the best rated lift capacity relative to the load and landing area.
- Distance from high walls should be equal to the height of the high wall.
- Set crane back from leading edge of benches or excavations (non-sloped-distance equal to the height of the wall or bench). For sloped areas, controls approved by a qualified person must be implemented to verify stability of the crane pad.
- Lower mast and boom per manufacturer's recommendations while traveling (with no load).
- Use a spotter when traveling a crane within 20ft (9m) of an overhead power line while the boom and hoist can be operated from the driver's cab.
- Never use a rubber tire crane for pick and carry unless designed for this activity. Complete a risk assessment and follow manufacturer recommendations.
- Ensure load chart is legible and visible to mobile crane operators.
- Override/bypass keys or systems shall not be used as operating controls except for critical situations, emergencies, or as required for de-mobilize activities. If used, the activity will be documented and shared with the employee's supervisor.
- Data Logger shall be downloaded and reviewed by supervisor monthly.
- When weather conditions warrant, de-rate crane capacity per manufacturer's recommendations.
- Follow site specific procedures for lightning detection protocol.
- Measure wind speed prior to making a pick.
 - Max Speed is 15mph (24kph) for personnel lifting.
 - Max Speed is 30 mph(48kph) for all other operations unless manufacturer's recommendations are more stringent.
 - Crane Operator has the right to suspend all operations due to wind conditions based on load and placement of load.
- De-energize and visibly ground all overhead power lines before lifting over or under.

- Maintain minimum safe distances from overhead power lines following the encroachment procedures:

Table A (Minimum clearance)		Table T (While traveling with no load)	
Voltage (KV)	Minimum Clearance	Voltage (KV)	Minimum Clearance
Up to 50 KV	10 ft (3.3m)	Up to 0.75 KV	4 ft
50-200 KV	15 ft (4.6m)	Over 0.75 to 50 KV	6 ft
200-350 KV	20 ft (6.1m)	Over 50 to 345 KV	10 ft
350-500 KV	25 ft (7.6m)	Over 345 to 750 KV	16 ft
500-750 KV	35 ft (10.6m)	Over 750 to 1,000 KV	20 ft
750-1,000 KV	45 ft (13.7m)	Over 1,000 KV	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)		

Inspections

- Pre-use inspections of crane and rigging.
- Monthly inspections documented and retained for at least three (3) months.
- Periodic inspections are required, frequency based on severity of use. Normal operations require an annual inspection. Severe use (i.e., tank houses, corrosive environments) requires a quarterly per ASME B30.2 applicable to overhead and gantry cranes.
- Annual inspection documented and retained for at least twelve (12) months.
 - Reference 29CFR 1926.1412 for details for mobile cranes
 - Reference 29CFR 1910.179 for details for overhead cranes

Crane Certification, Repair

- Crane certifications must be current (within 12 months) and on-site, and a certification tag/label legible on equipment (mobile cranes only).
- Inspect all crane equipment prior to use.
- Remove any damaged/defective crane equipment immediately and tag as out of service. Report to supervisors immediately.
- All repairs must be to manufacturer specifications, by qualified individuals, and include load testing if required.
- Recertify any crane that has been damaged, involved in an incident, or structurally repaired in any way.



Technical Supplement

Cranes and Rigging Policy FCX-HS32 | Critical Lifts | Release Date 10/29/20 | Version 2 7/25/24

Critical Lifts- Anytime one of the below criteria are met, a critical lift permit must be completed.

- **Criteria for Mobile Cranes**

- Exceeds 75% capacity of the crane as configured.
- Requires more than one crane.
- Damage or upset of the load could release hazardous material in excess of PEL or could endanger personnel.
- The load is unique, irreplaceable, irreparable, and vital to system, facility or operation.
- Any lift involving personnel hoisting.
- All lifts with the boom length as configured (for the lift being performed), capable of entering the prohibited zone (i.e., 20ft/6.1m up to 350kv or 50 ft/15.2m above 350kv)
- Lifts where the center of gravity could change.
- Pick and Carry operations (other than carry deck cranes and track mounted crane)
- Lifts involving non-routine, high risk, or technically difficult rigging arrangements as determined by a qualified person.
- Any lift where the crane is set up over underground facilities (building, structure, transportation tunnel, etc.)
- Any lift deemed critical by site supervision, project management or other qualified person.

- **Criteria for Overhead Cranes**

- When lifting at 100% of crane capacity
 - Lifting over 100% of crane capacity is considered an engineered lift, refer to ASME B30.2-3.4 for details.
- Requires more than one hook (other than Converter aisle and tank house production lifts)
- Damage or upset of the load could release hazardous material in excess of PEL or could endanger personnel.
- The load is unique, irreplaceable, irreparable, and vital to system, facility, or operation.
- Any lift involving personnel hoisting/lifting.
- Lifts where the center of gravity could change.
- Lifts involving non-routine, high risk, or technically difficult rigging arrangements.
- Any lift deemed critical by site supervision, project management or other qualified person.

- **Critical Lift Plan and Permit**

- Complete the permit in its entirety.
- Conduct a pre-job risk assessment.
- All critical lifts require a lift director, separate from the crane operator, to be appointed.
- If the plan changes in any way, stop work, re-evaluate with documentation, and conduct another pre-lift meeting.
- Pre-lift meetings will include review of the critical lift plan, risk and controls, emergency procedures, project coordination, responsibilities, communication methods and any other questions or concerns.



Operator, Rigger and Signalperson Qualification (Training) – Technical Supplement

Cranes and Rigging Policy FCX-HS32 | Release Date 10/29/2020 | Ver.2 7/25/24

Overview

Mobile crane operators shall have qualified training as outlined below. Operators of any mobile crane rated for 2,000lbs/907kg and above shall also have NCCCO Certification. Sites where NCCCO Certification is not available, shall have equivalent certification available in their area as referenced throughout the policy (i.e., Peru equivalent is CICB).

Mobile Cranes by definition include all the following: all boom trucks, carry deck cranes, rough terrain, all terrain, truck mounted, articulated boom trucks, and crawler mounted cranes. Service truck crane operators that are using them exclusively for maintenance/repair activities are not required to be NCCCO certified. They are required to successfully complete the training requirements and qualification requirements for each make and model, they will operate. Operators of service trucks that are used for any purpose other than maintenance and repair activities, will require a NCCCO certification mobile crane operator.

NCCCO Certification is valid for five (5) years. Operators shall be required to successfully meet the qualifications for the specific type of crane which they are operating. Qualification by definition means you are qualified by training, degree and/or experience. As a qualified trainee, means a person has completed the classroom material but will need to complete the field testing, which is demonstration under the watchful eye of a qualified trainer or operator. National certification means that someone holds a certified document that is accredited by a certain accreditation. Operators will attend training to the level of cranes they operate (i.e., mechanic that only operates a service truck mounted crane will only need to attend the training for that crane and not larger). FMI Employee training will be certified by NCCCO and those certified with a different accreditation will be able to operate under their current accreditation until the expiration date, at which point they will need to receive NCCCO certification. Recertification will be required every five years. Contractor crane operators must be NCCCO certified or equivalent. Contractor initial and refresher training shall meet minimum requirements to comply with this policy.

Qualification of Mobile Crane Operators

1. Operator and operator trainees will meet the physical qualifications defined in ASME B30.5 or other national/regional or local standard.
 - Evidence that an operator is subject to seizures or loss of physical control shall be sufficient reason for disqualification. Specialized medical tests may be required to determine these conditions.
2. Operator requirements include, but are not limited to:
 - Evidence of successfully passing a physical examination.
 - Satisfactory completion of a written examination covering operational characteristics, controls, and emergency control skills such as response to fire, power line contact, loss of stability, or control malfunction, as well as characteristic and performance questions appropriate to the crane type for which qualification is sought.
 - Demonstrated ability to read, write, comprehend, and exhibit arithmetic skills and load/capacity chart usage, in the language of the crane manufacturer's operation and maintenance instruction materials.
 - Satisfactory completion of a combination written and verbal test on load/capacity chart usage that covers a selection of the configurations (the crane may be equipped to handle) for the type of crane for which qualification is being sought.

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- Completing an operation test demonstrating proficiency in handling the specific type of crane, including both pre-start and post-start inspection, maneuvering skills, shutdown and securing procedures.
 - Demonstrated understanding of the applicable sections of the B30 Standard for federal, state, and local requirements.
3. Trainee qualification requirements shall include, but not be limited to the following:
 - Evidence of successfully passing a physical examination.
 - Satisfactory completion of a written examination covering safety, operational characteristics and limitation, and controls of the type of crane for which they are being qualified.
 - Operator trainees shall demonstrate their ability to read, write, comprehend, and exhibit arithmetic skills and load/capacity chart usage, in the language of the crane manufacturer's operations and maintenance instruction materials.
 - Satisfactory completion of a combination written and verbal test on load/capacity chart usage covering various crane configurations.
 4. Trainee qualification, operator qualification, and operator re-qualification shall be performed by a designated person who, by experience and training, fulfills the requirements of a qualified person.
 5. Operator physical examinations shall be required every three years, or more frequently if supervision or physician deems it necessary.
 6. If specialized medication is being used, physical re-qualification shall be required annually.

Crane Operator Development Process: Crane training, field assessments and training documentation/sign offs will be required on each crane based on the following Criteria:

Type including the following information make, model, and capacity. Cranes with significant differences in operational characteristics such as LMI operation, boom configurations, controls, counterweight configurations, or any other characteristics.

New Crane Operators shall progress by Crane Type (Telescopic Boom Fixed Cab progressing to Telescopic Boom Swing Cab, followed by Lattice Boom Truck Cranes and Lattice Boom Crawler Cranes) and from low capacity to high capacity for each type, and will be based on the cranes used at each individual site.

Mobile Crane Operator Progression should be determined by input from a certified mobile crane trainer, department supervision, field SME's, as Mobile Cranes increase in size, capacity, and maximum boom length, maximum working radius and height increase.

1. Telescopic Boom Cranes Fixed Cab

- Classroom Training - Selected employee must attend CRNMTI1001C Mobile crane operator training class and RIGFCX1001C Technical Rigging class. Passing of written examinations is required for both classes as well as successful completion of a Mobile Crane simulator program. Upon completion of these classes and simulator program, employee will be signed off as a Qualified Trainee on Telescopic Boom Cranes Fixed Cab. Completion of the above is required before field training may commence.
- Field Training – All field training must be conducted under the supervision of a Certified Crane Operator (Mentor) or Certified Trainer. When a Certified Crane Operator (Mentor) has determined that the Qualified Trainee is capable of operating the crane Safely, Smoothly, and Efficiently, the Training Department will be notified. Final sign off will be conducted by certified crane operator or certified trainers only after the qualified trainee successfully completes a documented field assessment.
- Certification – Upon completion of all classroom and field training and supervisor approval, employee is now eligible to test for Certification on Telescopic Boom Fixed Cab Mobile Crane. The certification process includes both a written and practical test. In final preparation for the test, a refresher course will be provided by the Training Dept.

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- If the employee passes the certification process, they are a Certified to operate Telescopic Boom Fixed Cab Mobile Cranes. If the employee does not pass the process, they will be provided more training and allowed a second attempt. If the employee does not pass the second time, the employee will be disqualified unless they complete an individual training plan established by supervisor and training department. A third attempt for certification will be based on supervision and training department recommendation. [Note: Based on business need, the department leadership may decide to provide additional training and a third attempt to pass the certification process. Reasons shall be documented.]
2. Certification for Telescoping Boom Cranes Swing Cab, Lattice Boom Truck Cranes, and Lattice Boom Crawler Cranes requires the same process as Telescoping Boom Fixed Cab Cranes outlined above. Additional NCCCO Supplemental Written and Practical Examinations are required for each type of crane.
3. Additional Guidance:
- If an operator hasn't operated a crane for which they are certified to operate within the past twelve months, they must have a field assessment (task training checklist) completed prior to operating the crane.
 - Operators shall be evaluated by a qualified individual to determine if training is needed. They will attend remedial training if deemed necessary.
 - When deemed necessary, operators will complete remedial training prior to resuming crane and/or rigging activities.
 - Operators involved in an incident shall be subject to reevaluation and/or retraining.

Qualification of Overhead Crane Operators

- Overhead crane operators will be trained in handling and moving the load.
- Will successfully complete the Overhead Operator Training (CRN FCX1002C)
- Will successfully complete Technical Rigging class (RIGFCX1001C).
- Operators shall be evaluated annually by a qualified individual to determine if remedial training is needed.
 - Attending remedial training is necessary prior to resuming overhead crane and rigging activities.
- Operators will attend refresher training every two years (CRN FCX1002C)
- Operators will have until the end of the month to complete refresher that the last refresher (or initial training) was completed the prior year. If unable to complete refresher in this time frame, employee will attend the initial training (CRN FCX1002C) prior to resuming crane and/or rigging activities.

Qualification of Riggers

Based on qualified person definition. Need not be qualified for all loads, only the load they are actively rigging. Must attend and successfully complete Technical Rigging Training (RIG FCX1001C). Riggers will attend Computer Based Training (CBT 181) refresher annually (or equivalent if CBT is not available). If not successful in passing this course, they shall attend the Initial Technical Rigging Training Course (RIG FCX1001C).

Qualification of Signal Persons

Signal persons will be qualified through an oral or written test and a practical test by a Qualified Evaluator. Each signalperson must:

- Know and understand the types of signals used, including the Standard Method for hand signals.
- Be competent in the application of hand signals.
- Have a basic understanding of crane operations and limitations, including the dynamics of swinging and stopping loads and boom deflection from hoisting.
- Know and understand the requirements of radio, phone, other electronic and voice signals.

All signal persons will attend and successfully complete the Technical Rigging Training (RIG FCX1001C). The Signal person can be the same person as the rigger.

Qualifications of Lift Director

Lift directors are utilized in mobile crane operations and will have successfully completed the same training as a mobile equipment operator. The director can be the same person as the rigger.

Qualifications of Supervisors

Supervisors with employees performing crane and rigging activities will be required to attend Mobile Crane and/or Overhead/Rigging/Signal person Spv awareness class or have attended the same training required of a Mobile Crane Operator.



Technical Supplement

Cranes and Rigging Policy FCX-32 | Rigging Requirements | Release Date 10/29/20 | Version 2
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Rigging

- All rigging equipment will meet ANSI, ASME, or local equivalent requirements and not exceed designated working load limits (WLL).
- All rigging equipment will be rated. Capacity, material, and manufacturer will be indicated on the equipment.
- Rigging assemblies will never be used in excess of the rated capacity of the weakest component.
- Rigging equipment used for towing will be clearly marked for that purpose and not used as rigging.
 - It will be inspected prior use per manufacturer recommendations and not used beyond capacity.
 - Conduct and document inspections prior to use, including monthly/annually.
- Rigging equipment used as part of a fall protection system will be clearly marked for that purpose and not used as rigging.
 - It will be inspected prior use per manufacturer recommendations and not used beyond capacity.
 - Conduct and document inspections prior to use, including monthly.

Inspection, Storage and Repair

- A qualified person will inspect all equipment and hoisting materials prior to use.
- Remove any damaged/defective lifting equipment immediately and tag as out of service or destroy. Other than replacement of components of equal kind, repairs must be repaired by the manufacturer.
- Maintain documented inspection logs. Inspect all hoisting equipment annually, and equipment used to hoist personnel every 6 months.
- Store in clean, orderly location, per manufacturer recommendations, and away from incompatible material and conditions.
- Do not store equipment on the floor, with liquids, or in direct sunlight.

Load Rating Determination

- Conducted by a qualified rigger prior to a lift.
- Will account for:
 - Weight, shape, and center of gravity of load to be lifted.
 - Sling configuration while rigged.
 - Stability of the load
 - Weight of all equipment including hoist blocks, headache balls, hooks and rigging and any other items added.

Locally Installed Lifting Points

- All lifting points must meet ASME or equivalent standards.
- Use positive connection points (eyes, D-rings, shackles, etc.) in place of lifting lugs whenever possible.
- Only qualified welders can attach lifting eyes.
- A qualified person will determine eye location.
- When lifting points are welded, contact item manufacturer to determine the type of material and proper method for attaching the lifting points.
- All lifting points must be visually inspected prior to each use to ensure that it can handle tension applied.
- Prior to attaching rigging to loads, verify the attachment points are designed for lifting purposes.

General Inspection Criteria

*NOTE: Consult manufacturer recommendations for complete inspection criteria.

<p>Slings (synthetic and wire rope)</p> <ul style="list-style-type: none">• Never modify slings, including shortening by knotting, with bolts or using other makeshift devices.• Load ratings must be clearly indicated on the sling.• Shock-loaded slings will be removed from service immediately.• Do not use slings assembled with wire rope clips.• Remove fiber core wire rope slings from service and destroy if they are exposed to temperatures over 200F (93C).• Remove non-fiber core wire rope slings from service and destroy if they are exposed to temperatures over 400F (204C) or below -60F (-51C).• Polyester and nylon slings will be not be used at greater than 180F (82C).• Do not use polypropylene slings at greater than 200F (93C).• Protect from corrosive environments.• Never expose slings to welding splatter. <p>Chains</p> <ul style="list-style-type: none">• All chains and come-alongs will be made of alloy steel (grade 8 or above)• Inspect per manufacturer specifications by a qualified person.• Conduct and document inspections prior to use, including monthly/annually. <p>Come-Alongs, Pulleys, Snatch blocks, etc.</p> <ul style="list-style-type: none">• Conduct and document inspections prior to use, including monthly/annually	<p>Hooks</p> <ul style="list-style-type: none">• Must have functional safety latches (unless designed otherwise).• Never apply heat or repair hooks.• Inspected per manufacturer specifications by a qualified person.• Conduct and document inspections prior to use, including monthly/annually• Shake out hooks are only for shaking out materials.• Use shackles or hoist rings when included sling angles are greater than 90 degrees. <p>Below the Hook Devices</p> <ul style="list-style-type: none">• Identification tags/plates/markings must be permanent and include rated capacity, manufacturers name, device weight, serial/drawing number. NOTE: if the lifting devices can be disassembled, each component must be so marked.• No substitution of attachment. <p>Taglines, Push/Pull Sticks</p> <ul style="list-style-type: none">• Must be non-conductive.• Will be of sufficient strength to restrain the load.• Must be long enough so that people can control the load without being under it or in the line of fire.• Of a length so as not to become entangled in nearby equipment/obstacles in the flight path. <p>Lifting Eyes</p> <ul style="list-style-type: none">• Inspect prior to each lift.
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