Chesapeake AIHA / ASSP/JHU PCD – April 15, 2021

Guy Campion, MS, CSP, CHST, Ctgroup EHS.
Objectives of Training:

1. Review a detailed crane use plan.

2. Ensure all activities and their direct and indirect hazards are identified; then determine appropriate controls for each.

3. Crane use day; verify the plan against the exact crane by Crane by type and serial number, along with inspection certificate, then re-check the operator, their certification, and medical exam.
Crane Plan must be complete with Lift Diagram, radius, and outrigger loads.

Crane Plan:

- Competent Assembly/Dis-Assembly Director.
- Lift Diagram with load, radius, weights, and distances.
- Hazard Analysis (AHA/JHA/SHA).
- Operator & Rigger Certifications.
- Crane Outrigger Projected Loads.
Activity Hazard Analysis (AHA)

Activity/Work Task: Assemble/set up & Remove Grove GMK5165-2 and lift load to the roof

Set up crane and lift and place mechanical units on the roof, breakdown the crane and depart site.

Notes: Finalize, Review Comments, etc.

General Notes: Personal Protective Equipment includes the following:

- Safety Glasses, Hard Hat, Task Specific or Cat Resistant: Work Gloves
- ANSI level 3, Safety Harness, Class/Electrician: Vest, hi/visibility luminous orange or yellow jacket, Safety Goggles, Earmuffs and Long Sleeve Shirts

Describe the type of work you are performing, where, and how, in a few sentences.

Step 2: Identify the “Hazard” (Probability) or “Severity” Matrix

Mapping: Catastrophic, Critical, Marginal or Negligible

Step 1: Review each “Hazard” with identified severity “Control” and determine RAC (see above)

The Correct order below:

1. Assembly & Disassembly Director
2. Lift Plan (narrative, lift plan, crane lift worksheet, and diagram)
3. Load Chart
4. Line pull (from manual)
5. Assemble/Disassemble of crane (section from manual)
6. Rigging & Hardware (manufacturer info)
7. AHA & Personnel documents
8. Monthly & Annual inspection
9. Cribbing calculations & Ground bearing pressure (working load below mats)
10. Weather /Wind speed (shut down from crane manual) Lightening procedure
11. Write or Experience Sheet for A/D Director & Certifications if any
12. Letter of Competency for A/D Director
13. Resume or Experience Sheet for A/D Director & Certifications if any

Cribbing calculations & Ground bearing pressure (working load below mats)

Cage & Hoist

Notes:

1. Weather /Wind speed (shut down from crane manual) Lightening procedure
2. Write or Experience Sheet for A/D Director & Certifications if any
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10. Weather /Wind speed (shut down from crane manual) Lightening procedure
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Checklist & Hazard Analysis

Cranes:

- Personal Protective Equipment
  - Safety Glasses, Hard Hat, Task Specific or Cat Resistant: Work Gloves
  - ANSI level 3, Safety Harness, Class/Electrician: Vest, hi/visibility luminous orange or yellow jacket, Safety Goggles, Earmuffs and Long Sleeve Shirts

Describe the type of work you are performing, where, and how, in a few sentences.

Set up crane and lift and place mechanical units on the roof, breakdown the crane and depart site.

Activity Hazard Analysis (AHA)

Overall Risk Assessment Code (RAC)  | (Use highest code)
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Risk Assessment Code (RAC) Matrix

<table>
<thead>
<tr>
<th>Severity</th>
<th>Probability</th>
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<tr>
<td>Catastrophic</td>
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<tr>
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Describe the type of work you are performing, where, and how, in a few sentences.
Common Issues creating Hazards with Cranes:

Hazards:
- Electrical hazards, power lines.
- Proximity to surrounding work.
- Setup location and suitability.
- Physical condition of the crane & rigging.
- Operator or Rigger suitability.
Examples of Common Maintenance Hazards with Cranes:

[Wear and tear on wire] retrieved from:

[Poor alignment] retrieved from:
[https://www.mazzellacompanies.com/resources/blog/5-common-problems-with-overhead-crane-end-how-to-avoid-them](https://www.mazzellacompanies.com/resources/blog/5-common-problems-with-overhead-crane-end-how-to-avoid-them)

[Bent and damaged hook] retrieved from:
Corrective Measures:

Overloading / Poor Weight Distribution / Load Slipping or Falling

• Most modern cranes have overload protection systems.
• Earlier models may have 4 types of switches that when a load exceeds a certain limit, the crane will only be able to be lowered. The 4 types are the following:
  • Mechanical.
  • Electric.
  • Mechanical/Electrical Hybrid.
  • Chain Hoist.
• When first rigging a load, the load should only be hoisted a few inches above the ground then checked for proper balance and insurance that the load is completely secured.
• Verifying the rigging should insure that the load will not slip or fall.
When setting up the crane to pick up the desired load, it is crucial to investigate the weather conditions for the area, are right for safe crane operation.

The most important weather conditions to keep in mind are the wind speed, lightning, even ice on the overhead boom.

Just remember that high winds = uncontrollable load which makes the job unsafe for everyone. The crane arm also acts like a lightning rod. (swing or side load hazards).
When setting up the crane prior to operating, the following must be ensured:

- The ground is level, and free from any obstructions.
- All outriggers are properly extended and the correct outrigger pads are used as detailed in the lift or crane plan. (Length, width, thickness)
- When checking the outriggers, there should be no float or space under, all tires should be above ground. Look for soil indentation around the edges.
- The crane’s area is large enough to satisfy the crane’s radii when rotated.
Crane Outrigger Pads - Correct Use:

- The image shown is the correct utilization of the outrigger pads. Note that the outrigger legs are centered directly in the middle of the pad.

- Image retrieved from https://dicausa.com/fibermax-crane-pads/
Crane Outrigger Pads - Incorrect Use:

- The image shown here is the incorrect use of wood blocks. There should be no gaps between the blocks and the ground should be level.

To reduce the risk of crane failure, inspections on each component of the crane is required.

Periodic or frequent are two crane usage classifications that determine the inspection intervals.

OSHA defines the intervals as:
- Frequent inspection - daily to monthly intervals.
- Periodic inspection - 1 to 12 month intervals or as specified by manufacturer.
Post Assembly inspection:

- OSHA 1926.1412 (c)
  - After completion of assembly, the equipment must be inspected by a qualified person to ensure it meets manufacture criteria.
  - (2)(i) Determine if a registered professional engineer (RPE) is familiar with the specific type of equipment needs to develop criteria for the equipment configuration. If the RPE is not needed, employer must ensure it is developed by a qualified person.
  - (c)(3) Equipment must not be used until an inspection under this paragraph demonstrates equipment is configured in accordance with criteria.
Severe Service Environment Inspections:

1926.1412(g) - 1926.1412(g)(3)

- Under conditions where significant damage via overloading, shock loading, or continuous usage in a corrosive environment, the crane must be brought down for mandatory inspection.
- A qualified person must determine if the equipment is still safe to use, and make sure it satisfies the criteria listed under 1926.1412(f).
- If an issue is discovered, the employer is required to satisfy the requirements found under 1926.1412(f)(4)-1926.1412(f)(6).
OSHA 1910.1809(d)(3) explains “frequent inspection” as:

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"Frequent inspection." Items such as the following shall be inspected for defects at intervals as defined in paragraph (d)(2)(i) of this section or as specifically indicated including observation during operation for any defects which might appear between regular inspections. Any deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard"
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1926.1412 (2)- If there are any deficiencies in inspection are found, a determination by a competent person must be made to decide if it is a safety hazard. If it is a safety hazard then equipment must be taken out of service until it is corrected.

1926.1412 (3)- If any deficiencies are found then action must be taken prior to using equipment.
Crane Inspections and Associated Hazards:

- OSHA 1926.1412 (d) (i)-(d) (xiv)
  - (i) Control mechanisms interfering with operation.
  - (ii) Control and drive mechanics with excessive wear and contamination by lubricants and other foreign matter.
  - (iii) Air, Hydraulic and other pressurized systems for deterioration or leakage.
  - (iv) Hydraulic system for proper fluid levels.
  - (v) Hooks and latches for: deformation, cracks, excessive wear, or chemical damage.
  - (vi) Wire rope in compliance with manufacturer.
  - (vii) wire rope in accordance with 1926.1413.
  - (viii) Electrical apparatus for: malfunctioning, deterioration, dirt, and moisture accumulation.
Crane Inspections and Associated Hazards continued:

- (ix) Tires for proper inflation and condition.
- (x) Ground conditions around equipment for support: ground settling under and around outriggers/stabilizers, and foundations, groundwater accumulation, does not include railroad tracks.
- (xi) Equipment for level position specified by manufacturers recommendation, both before and after each shift.
- (xii) Operator cab windows for: significant cracks, breaks or other deficiencies that can hinder operators view.
- (xiii) When equipment is rail traveling: Rails, Rail stops, and Rail clamps.
- (xiv) Safety devices and operational aids for proper operation.
Crane Inspection Checklist:

- A crane inspection must be performed prior to operating the crane. Any deficiencies located must be taken care of before the crane can be safely operated.
- Refer to OSHA 1926.1412(d)(2) and (3).

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Crane Operator Qualification:

- Operators of derricks, sideboom cranes, or equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 lbs. or less are not required to be certified/licensed but still must complete training.
- An employee that is not certified/licensed may work as an operator-in-training only under supervision. (Extreme Caution)
- An operator-in-training may not operate if any of the following circumstances:
  - If the work zone is closer than 20 feet of a power line up to 350kV, or within 50 feet of a power line over 350kV.
  - The equipment is being used to hoist personnel.
  - Multiple-equipment lifts.
  - If the equipment is used over a shaft, cofferdam, or in a tank farm.
Crane Operator Qualification:

The employer must ensure that each operator is qualified through an evaluation of skills and knowledge necessary to operate the equipment safely.

Certification is achieved when a written test is passed on all the knowledge as skills needed to operate equipment safely.

Audited Employer Program: The employer’s certification of its employee must meet the following requirements

- Written and practical tests must be either;
  - Developed by an accredited crane operator organization.
  - Approved by an auditor.
  - Internal Annual Assessment of the Operator Skills on all cranes they operate.

- The employer program must be audited within 3 months of the beginning of the program and at least every 3 years thereafter.
Verify Crane Operator (VCO) Certification through the National Commission for the Certification of Crane Operators’ (NCCCO’s) VCO Link (www.verifycco.org/login/aspx). This system plays a vital role and provides instant checking of CCO certification at no coast via a link on the NCCCO home page; this system has proven to be highly accurate and reliable.

Six Ways to Lose Your Operator Certification*

1. Operating a crane unsafely,
2. Using illicit drugs or not prescribed drugs,
3. Cheating on an exam,
4. Forging a CCO Certification Card,
5. Attempting to bribe an examiner,
6. Misrepresenting your certification status.

*Sanctions vary and are only imposed after thorough investigation
References:


References:


For copies of forms I use, please email me at gdcampion@hotmail.com