| Morenci Safe Production Standard | 2.12.1 | |
|---|---|---|
| | OHSAS 18001:2007 | 4.4.6 |
| Below The Hook Lifting Devices | Revision # | 02 |
| | Revision Date | 06/24/2013 |
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| | Document Owner | Plant Engineering |
| **Approvals:** | | |
| *Senior VP Morenci Operations: 03/30/2012* | *Safety Steering Committee: 2/24/2012* | |

## 1.0 PURPOSE:

This standard has been established to ensure that below-the-hook lifting devices used at the Freeport-McMoRan Morenci Operation are fabricated, inspected, maintained, and used in a manner that effectively minimizes risks associated with their operation.

## 2.0 SCOPE:

All employees and contractors at the Freeport-McMoRan Morenci site that design, fabricate, purchase, maintain or use below-the-hook lifting devices must adhere to the requirements of this standard.

## 3.0 TERMS, DEFINITIONS AND ABBREVIATIONS

3.1 **Authorized:** Delegated specific functions by FMMO management or a qualified representative

3.2 **Below-The-Hook Lifting Device:** A device, other than slings, hooks, rigging, hardware and lifting attachments, used for attaching loads to a hoist.

3.3 **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.

3.4 **Crane:** A machine used for lifting and lowering a load vertically and moving it horizontally and that has a hoisting mechanism as an integral part of it.

3.5 **Critical Lift:** Defer to the FMMO *Equipment Rigging, Material Handling and Hoisting* Safe Production Standard for definition.

3.6 **Design:** An activity in which a qualified person creates devices, machines, structures or processes to satisfy a human need.

3.7 **Designated Person:** A person selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

3.8 **Mechanical or Structural Lifting Device:** A below-the-hook lifting device that is load supporting, friction-type pressure gripping, indentation-type gripping, or a cask lifting fixture.

3.9 **Vacuum Lifting Device:** A below-the-hook lifting device that generates suction onto a load in order to facilitate a lift.

3.10 **Magnetic Lifting Device**: A below-the-hook lifting device that uses electromagnetic energy to pick up a metallic load.
3.11 **Load:** The total weight superimposed on the lifting mechanism(s), load block, hook and/or lifting device.
3.12 **Proof Load:** A specific and pre-determined load applied in the performance of a proof load test.
3.13 **Proof Test:** A nondestructive tension test performed to verify construction and workmanship of below-the-hook lifting devices.
3.14 **Qualified Individual:** A person who, by possession of a recognized degree, certificate, or professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated an ability and competence to perform duties related to the subject matter at work.
3.15 **Rated Capacity (also known as "Rated Load" or "Working Load Limit"):** The maximum hook load that a piece of hoisting equipment is authorized to carry; also the maximum load that an industrial truck or a sling, hook, shackle, or other rigging tackle is authorized to carry.
3.16 **Shall:** Indicates that the rule is mandatory and must be followed independent of the particular situation or circumstance.
3.17 **Should:** Indicates that the rule is a recommendation, the advisability of which depends on the facts and circumstances of each situation.
3.18 **Side Loading:** Applying tension to a hoisting mechanism attached to a boom that is not in direct line vertically with the load. Side loading reduces capacity and can cause structural or stability failure. Crane booms and their supporting structures are normally designed to handle vertical loading and are not intended to withstand the same magnitude of forces in a sideways direction.
3.19 **Suspect Counterfeit Items(S/CI):** A suspect item is one in which visual inspection, testing, or other means indicate that it may not conform to established government or industry accepted specifications or national consensus standards. A counterfeit item is a suspect item that has been copied or substituted without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by the vendor, supplier, distributor, or manufacturer.

## 4.0 RESPONSIBILITIES:

4.1 **Supervisors** will ensure that their employees understand and follow this standard, including ascertaining training on the testing, use, and care of below-the-hook lifting devices. They will ensure this standard is implemented in their area of responsibility. This includes:

a. Ensuring that inspections and testing are conducted and appropriately documented in accordance with the proper interval requirements set for each device.
b. Ensuring that Designated Personnel are available for equipment inspection and use, and that a Qualified Person is available for testing.
c. Ensuring that devices are properly stored and, as far as is feasible, protected from damage when not in use.
d. Advising crews on the load limits of below-the-hook lifting devices used in their areas, and correcting unsafe conditions/practices when witnessed.

e. Ensuring that the damaged/defected below-the-hook lifting devices are taken out of service, and that proper testing takes place when they are repaired and put back into service.

4.2 **Employees** (Inspectors, Testers, Operators, etc.) will follow this standard and notify their supervisor of any situations that do not comply with this standard. This includes:

a. Only using devices that have proper identification, testing documentation, and markings.
b. Understanding the limits and hazards of the below-the-hook lifting device and what the appropriate loads are to lift.
c. Properly rigging the devices to the crane hook and any other necessary attachment, and utilizing good lifting techniques.
d. Visually inspecting below-the-hook lifting devices before use and ensuring that devices do not have any obvious defects that would affect safety.
e. Ensuring that all defects to devices are reported to the supervisor and/or relevant party immediately, and that the defective lifting devices are tagged out of service.
f. Understanding that the use of below-the-hook lifting devices can only be conducted by a trained Designated Person.

4.3 **Qualified Individuals** will be responsible for designing, overseeing fabrication, and proof testing of newly fabricated or modified below-the-hook lifting devices.

4.4 **Management** will provide resources and training for supervisors and employees to comply with this standard.

4.5 **Health and Safety Manager** will enforce safety in relation to activities utilizing below-the-hook lifting devices, and will audit in accordance with this standard.

4.6 **Training Department** will provide adequate training in accordance with the "Training & Qualifications" section of this document.

4.7 **Project Managers** will ensure that contractors and employees are informed of the standard and understand the requirements needed to comply with the standard. In addition they shall be responsible for the overall implementation of this standard as it relates to special projects under their immediate control.

## 5.0 STANDARDS OF PERFORMANCE

5.1 **Labeling** (see appendix 8.1 for additional labeling information)

a. All FMI designed below-the-hook lifting devices shall be assigned and marked with an FMI serial number. Those designed and fabricated by an external entity shall retain its OEM serial number when provided.

b. All FMI and contractor lifting devices must adhere to the labeling requirements in appendix 8.1 of this standard and the FMI Below-the-Hook Lifting Device Design Procedure.
c. The rated capacity of each mechanical/structural lifting device shall be marked on the main structure where it is visible and legible. If the lifting device comprises several items, each detachable from the assembly, each lifting device shall be marked with its current rated capacity.
d. For vacuum lifting devices the rated capacity, maximum width and length, and minimum thickness of load shall be marked on the main structure where it is visible and legible. A warning label shall be affixed to each vacuum lifting device and shall contain information provided in appendix 8.1.
e. Magnetic lifting devices shall be labeled with a capacity rating and it shall refer to the instruction manual for information relating to decreases in rating due to the load surface condition, thickness, percentage of contact with magnet, temperature, metallurgical composition, and deflection.
    - Battery-powered and external-powered magnets shall contain additional markings containing voltage of the battery or primary power supply.
    - A caution label shall be affixed to each lifting magnet in a readable position which contains the information provided in appendix 8.1.

5.2 **Guarding**

Exposed hazardous moving parts such as gearing, chain drives, and rotating shafts, that are components of a mechanical lifting device shall be guarded to prevent contact with pinch or nip points.

5.3 **Inspections** (see appendix 8.2 for additional inspection requirements)

a. Prior to their initial use, a Qualified Person shall record an inspection of all new, modified, or repaired below-the-hook lifting devices
b. The operator or other authorized person shall visually inspect each mechanical/structural lifting device, vacuum lifting device, or magnetic lifting device at the beginning of each shift or prior to use for the items listed in appendix 8.2 (records are not required unless defects are found).
    - All defects that affect safety shall be noted.
    - If defects are determined to constitute a hazard, they shall be corrected before the device is put back into service.
c. A Competent Person shall perform and document a complete inspection, at minimum, quarterly for all mechanical/structural lifting devices, vacuum lifting devices, or magnetic lifting devices, and shall perform inspection on the items listed in appendix 8.2.

5.4 **Testing**

All new, modified, or repaired below-the-hook lifting devices shall be tested prior to use. Tests shall be performed by a Qualified Person to ensure compliance with the requirements of this section, and it shall be documented in the equipment history file. Testing shall include the requirements listed in appendix 8.3.

a. Mechanical/structural and Vacuum lifting devices shall have an initial proof-load test of 125 percent of their rated capacity.
b. General-application and specified application magnets are required to satisfy the rated breakaway-force test. The breakaway force measured in this test must meet or exceed 200 percent of the rated load.
c. If proof-testing for any below-the-hook lifting device cannot be verified, the device shall be put out of service until proof testing is completed by a Qualified Person.

*(See Standard 2.13, Rigging Equipment, Material Handling, and Hoisting, for more information regarding critical lifts)*

5.5 **Maintenance**

a. A preventive maintenance program shall be established for all below-the-hook lifting devices and shall be based upon manufacturer's recommendations. If equipment maintenance procedures deviate from published manufacturer's recommendations, the alternate procedures shall be approved in advance by the manufacturer or another qualified person and be kept readily available.
b. Replacement parts shall be equivalent to the original specifications.
c. If the unit is manufactured on site, a preventative maintenance program shall be established based on a quarterly schedule.
d. For vacuum lifting devices the vacuum generator, vacuum pads, sealing rings, mufflers, and filters shall be maintained and cleaned according to the manufacturer's specifications. Before performing maintenance activities personnel shall take the following precautions:
    - If needed, ensure that all sources of vacuum power are disconnected, locked, and tagged out.
    - If critical items to the device are modified, adjusted, repaired or replaced, a qualified person must inspect and approve the change, and all pertinent testing must verify the unit to be safe.
    - Dated records of repairs and replacements shall be available.
e. Components of magnetic lifting devices shall be cleaned and maintained according to the manufacturer recommendations. Before adjustment and repairs are started on a lifting magnet or its controls, maintenance personnel shall take the following precautions:
    - Ensure that all sources of magnet power are disconnected, locked, and tagged out.
    - Ensure that a magnet removed for repair is tagged as defective.

- Only qualified personnel shall work on equipment when adjustments and tests are required (see appendix 8.3 for testing requirements).
- After adjustments and repairs have been made, the lifting magnet shall not be returned to service until it has been adequately inspected (see appendix 8.2).
- Dated records of repairs and replacements shall be available.
- Maintenance personnel shall ensure that any defective condition disclosed by the inspection is corrected before operation of the lifting magnet is resumed. Repairs shall be done only by designated and qualified persons.

5.6 **Training & Qualifications**

a. Competent and authorized employees may visually inspect below-the-hook lifting devices for basic defects and nonconformities. Only properly trained or qualified individuals will be able to operate, maintain, or perform technical inspections on such devices.

b. At minimum, training of Competent Persons and Designated Persons must include the following:
   - Application of the lifting device to the load and adjustments to the device, if any, that adapt it to various sizes or kinds of loads.
   - Any special operations or precautions.
   - Condition of the load itself required for operation of the lifting device such as balance, degree of order of stacked loads, surface cleanliness, bending, and load thickness.
   - Procedure for proper storage of the lifting device to protect it from damage.
   - Instructions for not exceeding the rated capacity of the lifting device or the capacity of the hoisting equipment by the combined weight of the load, the lifting device, and the rigging.
   - Charging of the battery (if required).
   - The purpose of indicators, meters, or alarms on specific lifting devices.
   - The proper attachment of adaptors for handling of special loads.

c. Operators shall demonstrate the ability and competence to operate the lifting device as instructed before assuming responsibility for using it.

5.7 **Operation**

a. Only the following personnel shall operate below-the-hook lifting devices:
   - Qualified operators or riggers
   - Trainees under the direct supervision of a qualified operator
   - Task trained maintenance and test personnel, when it is necessary in the performance of their duties

b. Consideration should be given to the safest, shortest and most efficient route when determining the path of a load while using a below-the-hook lifting device.

c. Side loading of below-the-hook lifting devices is prohibited due to the increased stress it puts on system components.

d. Below-the-hook lifting devices shall be operated in accordance with manufacturer instructions. For internally designed and fabricated lifting devices instructions and precautionary information shall be developed and given to the department or work group that will use the device if deemed necessary by professional judgment.
e. Original Equipment Manuals (OEMs) shall be maintained and available for reference by the persons operating, maintaining, or testing below-the-hook lifting devices.
f. Specific operation requirements for mechanical/structural lifting devices, vacuum lifting devices and magnetic lifting devices can be found in appendix 8.4.

## 6.0 REFERENCE DOCUMENTS

6.1 ASME B30.20
6.2 ASME BTH-1
6.3 Department of Energy standard: DOE-STD-1090-2007
6.4 FMMO Below-the-Hook Device Design Procedure P002-103
6.5 FMMO Safe Production Standard 2.13 (Rigging Equipment, Material Handling, and Hoisting)
6.6 Occupational Safety & Health Administration Regulation Section 1910.179

## 7.0 RECORDS

| Name of the Document | Responsible for Control | Records Retention |
|---|---|---|
| Original Document of this Standard | Health & Safety | Permanent |
| Manufacturer Instruction and Maintenance Manuals | Division / Area | Permanent |
| Engineering Design Prints (if fabricated or modified on site) | Engineering | Permanent |
| Equipment History File (Inspection and Testing Records) | Division / Area | Initial Use – Permanent<br>Post Modification – Permanent<br>Daily Inspection (if defects are found) – 10 years<br>Annual Inspection – 10 years |
| Training Certificates | Division / Area or Training Department | Duration of employment + 10 years |

## 8.0 APPENDICIES

8.1 **Labeling Requirements**
8.2 **Inspection Requirements**
8.3 **Testing Requirements**
8.4 **Correct Operation of Below-The-Hook Lifting Devices**
8.5 **HS-SPS-2.12.1-001 Below-the-Hook Lifting Device Inspection Form**

## 9.0 REVIEW AND CHANGE

**All changes, modifications and/or revisions must be documented on the table below:**

| ***Description of Changes to this Document*** |
|---|
| *Changed # from 2.13.1 to 2.12.1*<br>*Changed "FMMOP Safe Production Standard" to "Morenci Safe Production Standard". "MP" removed from OHSAS Reference Section –*<br>*These changes were made prior to the initial distribution of this document and do not affect the procedure/process. Therefore the Revision # remains 00*<br>*S. Elias 04/04/2012* |
| *Included form # & New Snapshot for Appendix 8.5 –* *S. Elias 08/20/2012* |
| *Updated records table – S. Elias 06/24/2013 Rev. 02* |
| |
| |

## Appendix 8.1 - Labeling Requirements

| Mechanical and Structural Lifting Devices | Vacuum Lifting Devices | Magnetic Lifting Devices |
|---|---|---|
| At a minimum, a nameplate, name tag, or other permanent marker shall be affixed displaying the following data:<br>• Manufacturer's name, or if the device has been repaired or modified, the name and address of the repairer/ modifier<br>• Serial number<br>• Rated capacity<br>• ASME BTH-1 Design Category<br>• ASME BTH-1 Service Class<br>In addition to the items above, in house fabricated devices shall include the following:<br>• Certificate of test<br>• Operating and maintenance procedures<br>• Applicable cautionary language<br>A re-rated lifting device shall be relabeled with the new rated capacity.<br>• Structural and mechanical lifting devices may be modified or re-rated if the changes are analyzed by a qualified engineer or the manufacturer of the lifting device. | At a minimum, a nameplate, name tag, or other permanent marker shall be affixed to each lifter displaying the following data:<br>• Manufacturer's name.<br>• Model number or unit identification.<br>• Weight of lifting-device.<br>• Electric power (when applicable).<br>• Pressure and volume of compressed air (when applicable).<br>• Rated capacity.<br><br>Manual shutoff valves on individual pads or groups of pads shall be marked to show operating position.<br><br>A warning label shall be affixed to each lifting device displaying critical information which may affect the safe working capacity of the unit. At a minimum, the following information shall be labeled on each unit or otherwise effectively communicated to users:<br>• Exceeding the rated capacity or lifting loads not specified in the manufacturer's instruction manual.<br>• Operating a damaged or malfunctioning unit or a unit with missing parts.<br>• Operating when vacuum indicators show insufficient vacuum.<br>• Operating the unit when vacuum pads are not spaced for equal loading.<br>• Incorrect positioning of the lifting device on the load.<br>• Lifting people.<br>• Moving loads above people.<br>• Removing/obscuring warning labels.<br>• Operating the lifting device when the rated capacity, lifting-device weight, or safety markings are missing (except in cases where the device cannot, for security or other reasons, be | At a minimum, a nameplate, name tag, or other permanent marker shall be affixed to each lifting magnet, and shall display the following data:<br>• Manufacturer's name, or if the magnet has been repaired or modified, the name and address of the repairer/modifier.<br>• Model or unit identification.<br>• Weight.<br>• Duty cycle, if applicable.<br>• Cold current<br>• Rated capacity<br><br>A caution label shall be affixed to each lifting magnet in a readable position and containing information cautioning against:<br>• Operating when the battery capacity is inadequate.<br>• Exceeding magnet duty cycle and disconnecting the magnet with the power on (for externally powered electromagnets).<br>• Operating if the internal control function indicator, where applicable, does not indicate a complete cycle (on electrically controlled permanent magnets).<br>• Operating with the control |

| | | |
|---|---|---|
| • Re-rated or modified lift fixtures shall be load-tested as described in Appendix 8.3 | marked).<br>• Making alterations or modifications to the lifting device.<br>• Lifting loads higher than necessary and leaving suspended loads unattended.<br><br>A label shall be affixed to each unit that directs the user to consult the manufacturer's manual if the size or shape of the unit prohibits the inclusion of the above markings. | handle not fully in the "Lift" position (on manually controlled permanent magnets). |

## Appendix 8.2 Inspection Requirements

| INSPECTION REQUIREMENTS |
|---|
| <u>Mechanical/Structural Lifting Devices</u><br><br>Daily or before use inspections must, at minimum, consist of:<br>• Structural deformation, cracks, or excessive wear on any part.<br>• Loose or missing guards, fasteners, covers, stops, or nameplates.<br>• All operating mechanisms and automatic hold-and-release mechanisms for maladjustments interfering with operation.<br><br>Quarterly documented inspections must consist of all of the items listed above in addition to:<br>• Loose bolts or fasteners.<br>• Check for suspect/counterfeit parts (see Terms, Definitions and Abbreviations).<br>• Cracked or worn gears, pulleys, sheaves, sprockets, bearings, chains, and belts.<br>• Excessive wear of friction pads, linkages, and other mechanical parts.<br>• Excessive wear at hoist-attaching points and load-support shackles or pins.<br>• External evidence of damage to motors or controls. |
| <u>Vacuum Lifting Devices</u><br><br>Daily or before use inspections must, at minimum, consist of:<br>• Deformation, cracks, and excessive wear of load-bearing parts. |

- Adequate vacuum generator output.
- Cuts, tears, excessive wear, and foreign particles at vacuum pad seal rings.
- Leakage, cuts, kinks, and collapsed areas of vacuum lines/connections.
- Leaks or damage to the vacuum reservoir.
- Failure of the entire vacuum system to function properly by attaching a nonporous, clean test plate to the vacuum pads and then stopping the vacuum source. Vacuum levels in the system shall not decrease by more than the manufacturer's specified rate.

Quarterly documented inspections must consist of all of the items listed above in addition to:

- External evidence of looseness, wear, deformation, cracking, or corrosion.
- External evidence of damage to supporting structure, motors, controls, and other auxiliary components.
- Check for suspect/counterfeit parts (see Definitions)
- Presence of warning labels listed in appendix 8.1

Magnetic Lifting Devices

Daily or before use inspections must, at minimum, consist of:

- Lifting magnet face for freedom from foreign materials and for smoothness.
- Lifting bail or sling suspension for proper condition.
- Proper condition and operation of controls.
- Current indicator, where applicable, for proper condition and operation.
- Labels, markings, and indicators or meters for legibility.
- Electrical conductors, if applicable, for loose connections, continuity, corrosion, routing and damage to insulation.
- Battery for correct electrolyte level and lack of corrosion of battery posts or connectors, if applicable.

Quarterly documented inspections must consist of all of the items listed above in addition to:

- Deformation, wear, and corrosion of all members, fasteners, locks, switches, warning labels, and lifting parts.
- Check for suspect/counterfeit parts (see Terms, Definitions and Abbreviations).
- Operation and condition of electrical components (i.e., meters, indicators, and alarms).
- Magnet coil tested for ground readings and readings compared to manufacturer's standards.

## Appendix 8.3 Testing Requirements

**Mechanical/Structural Lifting Devices**

All new, altered, modified, or repaired lifting devices shall be tested and inspected by qualified personnel before initial use. The results of the test and inspection shall be documented in the equipment history file.

- ✓ Lifting devices with moving parts shall be tested to confirm that the lifting device operates in accordance with manufacturer's instructions.
- ✓ Lifting devices with manually operated or automatic latches shall be tested to verify that the latches operate in accordance with manufacturer's instructions.
- ✓ The rated capacity shall not be more than 80 percent of the maximum load sustained during the test. Test loads shall be 125 percent of the rated capacity unless otherwise recommended by the manufacturer.
- ✓ The rated load test shall consist of the following:
    - Hoist the test load enough to ensure that it is supported by the lifting device, or apply the required load if the test is made using a testing machine. Preventative measures shall be established to ensure

personnel remain clear in case of suspended load failure or flying material from load breakage during the testing process.
- The test load should be lifted and held for two minutes.
- Visually inspect the lifting device for deformation, cracks, or other defects after the load test is completed.

**Vacuum Lifting Devices**

- ✓ Seals and connections shall be tested for leaks by attaching a nonporous, clean test plate to the vacuum pads and then stopping the vacuum source. Vacuum level in the system shall not decrease by more than the rate specified by the manufacturer.
- ✓ Indicator lights, gauges, horns, bells, pointers, or other warning devices and vacuum level indicators shall be tested for proper operation.
- ✓ The rated capacity shall not be more than 80 percent of the maximum load sustained during the test. Test loads shall be 120 percent of the rated capacity unless otherwise recommended by the manufacturer.
- ✓ The rated load test shall consist of the following steps at a minimum:
  - Attach pads to the designated test load.
  - Raise the test load a minimum distance to ensure that it is supported by the vacuum lifting device, and hold it for 2 minutes.
  - Remain clear of the suspended load.
  - Lower and release the load.
  - Visually inspect the vacuum lifting device for defects, and correct any deficiencies prior to returning the device to service

**Magnetic Lifting Devices**

- ✓ General-application and specified-application magnets are required to satisfy the rated breakaway-force test. The breakaway force measured in this test must exceed the rated load (capacity) by a factor of at least 2.
  - The rated breakaway-force test shall establish the breakaway force required to vertically remove the lifting magnet from a low-carbon rolled-steel plate of the minimum thickness stated by the magnet manufacturer. The portion of this plate in contact with the magnet shall have a 125-µin. (3.2 x 10-3 mm) finish and be flat within 0.002 in. /ft. (0.05 mm/m), but not exceeding 0.005 in. (0.127 mm) total. The full operating face of the lifting magnet shall be in contact with the steel plate, which shall be between 60 degrees F (15 degrees C). Battery-operated electromagnets and external-powered lifting electromagnets shall be operated at the manufacturer's recommended current.
  - The application breakaway-force test shall establish the application breakaway forces of the lifting magnet under the variety of loading conditions for which the magnet is specified. The details of this test should be supplied by the manufacturer of the lifting magnet.
- ✓ A check to ensure that the lifting magnet contains no visible defects.
- ✓ A check for proper operation of all electrical protective equipment, meters, indicators, alarms, etc.

## Appendix 8.4 Correct Operation of Below-The-Hook Lifting Devices

**Mechanical/Structural Lifting Device Operations**

1. Observe the condition of the lifting device before use and during operation. If you observe a defect that affects the continued safe use of the lifting device, remove it from service.
2. Place any attached load on the ground, stand or resting device and, after use, properly store the lifting device before leaving. Systems used to support lifting devices or loads shall be capable of holding, without failure, at least 2x the weight of the unit.

3. Before they are used on each shift, test the lifting device controls. If any controls do not operate properly, adjust or repair them before operations begin.
4. Do not load the lifting device in excess of its rated capacity (except for test loads) or handle any load for which it is not designed.
5. Apply the lifting device to the load in accordance with the manufacturer recommendations.
6. Before lifting, ensure that lifting-device ropes or chains are not kinked and multiple-part lines are not interwoven.
7. Ensure the power source feeding the magnet is properly routed and not in danger of becoming damaged.
8. Ensure that the load is correctly distributed for the lifting device being used.
9. Do not use the lifting device for side pulls or sliding the load.
10. Do not use a lifting device that is tagged "Danger – Do Not Operate" or otherwise designated as nonfunctional.
11. Do not remove "Danger – Do Not Operate" tags from lifting devices until defects have been corrected.
12. Store the lifting device in a manner that minimizes potential for damage.
13. Ensure that markings or tags are not removed or defaced. Replace missing or defaced markings or tags.

**Vacuum Lifting Device Operations**

1. Before starting the lift, verify that the "vacuum on" indicator has reached the required level. Also, verify that the vacuum lifting device has been correctly applied and a stable vacuum level exists by lifting the load a few inches and observing conditions.
2. Observe the condition of the lifting device before use and during operation.
3. If you observe a defect that affects the continued safe use of the lifting device, remove it from service.
4. Place any attached load on the floor or ground and, after use, properly store the lifting device before leaving.
5. Before they are used on a shift, test the lifting device controls. If any do not operate properly, ensure they are adjusted or repaired before operations begin.
6. Do not load the lifting device in excess of its rated capacity (except for test loads) or handle any load for which it is not designed.
7. Apply the lifting device to the load in accordance with established procedures.
8. Before lifting, ensure that lifting-device ropes or chains are not kinked and multiple-part lines are not interwoven.
9. Ensure that the load is correctly distributed for the lifting device being used.
10. Do not use the lifting device for side pulls or sliding the load.
11. Warn all personnel in the vicinity of the lifting device and place the load on the floor or ground, if possible to do so, in case electrical power goes off while a load is being lifted.
12. Do not leave your position at the controls.
13. Do not use a lifting device that is tagged "Danger – Do Not Operate" or otherwise designated as nonfunctional.
14. Do not remove "Danger – Do Not Operate" tags from lifting devices until defects have been corrected.
15. Store the lifting device in a manner that minimizes potential for damage.
16. Ensure that markings or tags are not removed or defaced. Replace missing or defaced markings or tags.

**Magnetic Lifting Device Operations**

1. Place any attached load on the floor or ground and, after use, properly store the lifting device before leaving it.
2. Before they are used during a shift, test all controls. If any do not operate properly, adjust or repair them before operations begin.
3. Do not load the lifting device in excess of its rated capacity or handle any load for which it is not designed.
4. Apply the lifting device to the load in accordance with established procedures.
5. Before lifting, ensure that lifting-device ropes or chains are not kinked and that multiple-part lines are not interwoven.
6. Ensure that the load is correctly distributed for the lifting device being used.
7. Ensure that the temperature of the load does not exceed the maximum allowable limits of the lifting device.
8. Do not use the lifting device for side pulls or sliding the load.
9. Keep the lifting magnet face and the magnet contact area clean.
10. Ensure that the load to be lifted is within the magnet's rated capacity or application capacity and lifting equipment rated capacity.
11. Observe all meters and indicators on the lifting magnet to confirm proper operation prior to making a lift.
12. Before starting the lift, lift the load a few inches to establish that it is securely attached to the magnet.
13. Do not use a lifting magnet that is tagged "Danger – Do Not Operate" or otherwise designated as nonfunctional.
14. Do not remove "Danger – Do Not Operate" tags from lifting devices until defects have been corrected.
15. Store the lifting device in a manner that minimizes potential for damage.

## Appendix 8.5 Snapshot of Below the Hook Lifting Device Inspection Form

*HS-SPS-2.12.1-001*

### Below the Hook Lifting Device Inspection Form

| | | | | | |
|---|---|---|---|---|---|
| Date of Inspection: | | Division: | | Department: | |
| Reason For Inspection (circle one): Initial Use / Post Modification or Repair / Mandatory Quarterly Inspection / Other<br>If other please explain: | | | | | |
| Type of Device Being Inspected (circle one): Mechanical / Structural / Vacuum / Magnet | | | Name of Inspector: | | |

| ALL DEVICES (circle findings) | | | |
|---|---|---|---|
| Are all guards in place and in good condition? | Yes | No | N/A |
| Are all bolts and fasteners functioning, in place, and in good conditions? | Yes | No | N/A |
| Are all covers in place and in good condition? | Yes | No | N/A |
| Are all stops labeled and functional? | Yes | No | N/A |
| Are all nameplates and labels in place, appropriate, and legible? *(Refer to Appendix 8.1 - Labeling Requirements in STD 2.12.1)* | Yes | No | |
| Are all operating mechanisms and automatic hold and release mechanisms functioning appropriately? | Yes | No | N/A |
| Are all gears, pulleys, sheaves, sprockets, bearings, chains and belts free of cracks or wearing? | Yes | No | N/A |
| Are friction pads, linkages, or any other mechanical parts free of excessive wearing or damage? | Yes | No | N/A |
| Are all hoist-attaching points free of excessive wearing or damage? | Yes | No | |
| Are all load-support shackles or pins free of excessive wearing or damage? | Yes | No | |
| Is the device motor free of external damage? | Yes | No | N/A |
| Are all device controls free of external damage? | Yes | No | N/A |
| Are all electrical conductors and connections in good condition? | Yes | No | N/A |
| Did you check for suspect/counterfeit parts? (All suspect/counterfeit parts must be removed and the component replaced before the device is placed back into service) | Yes | No | |
| **VACUUM DEVICES ONLY : check if section does not apply** | | | |
| Is there adequate vacuum generator output in accordance with the manufacturer? | Yes | No | |
| Are seal ring(s) adequate? (check for cuts, tears, or foreign particles) | Yes | No | |
| Are vacuum lines and connections adequate? (check for leaks, kinks, cuts, and collapses) | Yes | No | |
| Is the vacuum reservoir free of leaks or damage? | Yes | No | |
| Has the vacuum system been tested? (Tests are conducted by attaching a nonporous, clean test plate to the energized vacuum device and then stopping the vacuum source to ensure the vacuum levels do not decrease by more than the manufacturer's specifications.) | Yes | No | |
| **MAGNETIC DEVICES ONLY: check if section does not apply** | | | |
| Has the magnet face been cleaned? | Yes | No | |
| Are all magnet device lifting bails or slings in good condition? | Yes | No | |
| Are electrical current indicators working appropriately? | Yes | No | N/A |
| Is there appropriate continuity resistance for the conductors? | Yes | No | |
| Are all electrical conductors free from being damaged due to routing issues or exposure to mechanical damage during a lift? | Yes | No | |
| Are the electrical conductors free of any visible corrosion or safety defect? | Yes | No | |
| Do the batteries contain appropriate levels of electrolyte? | Yes | No | N/A |
| Are battery posts and connections free of corrosion? | Yes | No | N/A |
| Have the magnet coils been tested for ground readings that comply with manufacturer standards? | Yes | No | |
| **FINDINGS** | | | |
| If any answers to the above questions are no, please give an explanation: | | | |
| Based on any negative findings, will the lifting device be taken out of service? | Yes | No | N/A |
| If no, explain: | | | |
| Inspector's Signature Upon Completion of Initial Inspection: | | | |

***Note: This inspection form may be continued after repairs to the device have been made and the above items are re-checked. If repairs are made, please complete page 2 of this form.***

*Intranet Posted Document is Controlled Copy. Verify Printed Version is Current Prior to Use. Page 1 of 2*

## Below the Hook Lifting Device Inspection Form - Repairs

| | |
|---|---|
| Date of Repair:<br><br>Repairer's Name:<br><br>Repairer's Company:<br><br>Repairer's Contact Information: | |
| Give a brief description of the repair: | |
| Has the device been tested by a qualified person after being repaired? If no, the device may not be placed back into service until the testing is complete. | Yes No |
| ***Replacement of certain system components may require re-certification of the lifting device (defer to the OEM and plant engineering department for guidance)*** | |
| Has a re-check of all items listed above been done? | Yes No |
| Inspector's Signature: Date: | |