Phosphate Program – Environmental, Health and Safety (EHS) Department

Overhead Cranes and Powered Hoists Program

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1. PURPOSE

This program is intended to

- Prevent or minimize injury to workers, and otherwise provide for the protection of life, limb, and property by prescribing safety requirements
- Provide direction to those responsible for its application
- Cranes and powered hoists included in this procedure are:
    - Overhead cranes, including:
        - Top and underhung cranes
        - Monorails
        - Gantry cranes
    - Overhead hoists, including:
        - Tripods
        - Gantry hoists
    - Jibs

2. SCOPE

2.1 This Program shall cover all Mosaic Fertilizer LLC Phosphate Business Unit operations.

3. DEFINITIONS

3.1 ANSI - the American National Standards Institute

3.2 CMAA - the Crane Manufacturers Association of America

3.3 Brake – a device other than a motor, used for retarding or stopping motion by friction or power means

3.4 Brake, holding – a friction brake for a hoist that is automatically applied and prevents motion when power to the brake is off

3.5 Breaking, emergency – a method of decelerating a drive when power is not available

3.6 Bumper – a device for reducing impact when a moving crane reaches the end of its permitted travel

3.7 Controller – a device or group of devices that serves to govern the power delivered to the apparatus to which it is connected

3.8 Crane – a machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism being an integral part of the machine

3.9 Crane, overhead – a crane with single or multiple girders, movable bridge carrying a movable or fixed hoisting mechanism and travelling on an overhead fixed runway structure

3.10 Crane, wall – a crane having a cantilever frame with or without a trolley supported from a wall or column of a building

3.11 Designated person – a person selected by an employer as being competent to perform specific duties

3.12 Drum – the cylindrical member around which the ropes are wound for lifting or lowering the load

3.13 Daily inspection - visual inspection and operational check performed by the operator prior to use on each shift

3.14 Frequent Inspection - inspections performed by maintenance on daily to monthly intervals

3.15 Gantry – similar to an overhead hoist or crane except the bridge for carrying the trolley is rigidly supported on two or more legs running on fixed rails or a runway

3.16 Hoist – a unit that is used for lifting or lowering a freely suspended load

3.17 Load - the total weight supported by the crane including the load block and hook

3.18 Overload – any load greater than the rated load

3.19 Periodic inspections - inspections performed by maintenance or outside inspectors on one to twelve-month intervals

3.20 Qualified person – a person by possession of a recognized degree or a certificate of professional standing or by extensive knowledge, training, and experience, has the ability to solve or resolve problems relating to the subject matter and work

3.21 Rated load - the maximum load designated by the manufacturer for which the crane or hoists is designed and built as shown on the equipment name plate

3.22 Rope – refers to wire rope/cable

3.23 Runway – an assembly of rails, beams, girders, brackets, and framework on which the crane travels

3.24 Sheave – a grooved wheel or pulley used with a rope to change direction and point of application of a pulling force

3.25 Stop – a device to limit the travel of a trolley or crane bridge

3.26 Switch, emergency stop – a manually actuated switch to disconnect power independently of the regular operating controls

3.27 Switch, main (crane disconnect) – a switch on the crane controlling the main power supply from the runway conductors

3.28 Switch, master – a switch that dominates the operation of contactors, relays, or other remotely operated devices

3.29 Standby crane - a crane not in regular service or which is used occasionally or intermittently as required

3.30 Tripod hoist – 3-legged framework used to vertically hoist materials or personnel

3.31 Trolley – the unit that travels on the bridge rails and supports the load block

3.32 Truck – a unit consisting of a frame, wheels, bearings, and axels that supports the overhead crane

3.33 Upper block – a fixed block located on a trolley that supports the load block and its load

4. MARKINGS/WARNINGSGUARDS

4.1 Markings

4.1.1 All overhead cranes and powered hoists and supporting structures shall be designed for the maximum load to be lifted by a Registered Structural Engineer.

a. The design shall accommodate a load test at 125% of rated capacity.

b. All overhead cranes installed or modified after August 30, 1971 shall meet the design specifications of The American National Standard Safety Code of Overhead and Gantry Cranes, ANSI B30.20.

c. The rated load of the crane shall be legible from the ground or floor.

4.1.2 All monorails shall be marked with the rated load capacity in lettering which is legible from the operating level.

4.1.3 Monorails which are not marked with the rated load capacity shall be rated by a Registered Structural Engineer unless the design load rating is noted on the original design drawings.

4.1.4 Manufacturer's Identification Markings

a. The crane shall be marked with the manufacturer's identification information on a plate or label attached to the crane.

4.1.5 The rated load shall be plainly marked on each side of the overhead crane and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on the side or its load block. The marking shall be clearly legible from the operating level.

4.2 Warnings

4.2.1 Floor operated and remote operated cranes shall have a safety label or labels attached to the pendant or portable operating station. Labels shall include, but not limited to, warnings for the following;

a. Lifting more than the rated load

b. Operating hoist when load in not centered under the hoist

c. Operating hoist with twisted, kinked, or damaged chain or rope

d. Operating damaged or malfunctioning crane

e. Lifting people

f. Lifting loads over people

g. Operating a rope hoist with a rope that is not properly seated in its groove

h. Removing or obscuring safety label

4.3 Clearances

4.3.1 Clearance from obstruction

a. Clearance shall be maintained between the crane and the building under all operating conditions.

4.4 Anchorages

4.4.1 Every outdoor gantry crane shall be provided with secure fastenings to hold a crane against a wind pressure of 30 lb. /ft^2.

4.4.2 A wind tracking device shall be provided for all outdoor cranes giving a visual and audible alarm.

4.5 Stops

4.5.1 Trolley Stops

a. Stops shall be provided at the limits of travel of the trolley.

b. Stops shall engage the bumpers or bumper pads mounted on the trolley.

c. Stops shall be designed to withstand the forces applied by the bumpers.

4.5.2 Guards

a. Exposed moving parts which constitute a hazard under normal operating conditions shall be guarded.

b. Each guard shall be capable of supporting without deformation the weight of a 200 lb. person.

4.6 Brakes

4.6.1 Hoist Holding Brakes

a. Each hoisting unit of the crane shall be equipped with at least one holding brake.

b. The rated load hoisting torque at the point where the brake is applied is as follows:

i. 125% of rated load hoisting torque when used with a control braking means other than mechanical.
ii. 100% of rated load hoisting torque when used with a mechanical control braking means.
iii. 100% of rated load hoisting torque for each brake if two holding brakes are provided.

4.6.2 Hoist Control Braking Means

a. Each hoisting unit of the crane shall be equipped with a control braking means that will control the load during lowering to a maximum speed of 120% if rates lowering speed for the load being handled.
b. Hoist control breaking means shall have thermal capacity for the frequency of operation required by the service.

4.6.3 Trolley Brakes and Braking Means

a. Each power-driven trolley unit of the crane shall be equipped with a braking means or have trolley drive frictional characteristics that will provide stopping power and holding functions.

4.7 Electrical equipment

4.7.1 General

a. Wiring and equipment shall comply with ANSI/NFPA No. 70, National Electrical Code
b. The control motor circuit voltage shall not exceed 600V for AC or DC. The control circuit voltage in pendant push buttons shall not exceed 150 V for AC or 300 V for DC.
c. Pendant control stations shall be constructed to prevent electrical shock.
d. The pushbutton enclosure shall be at ground potential and marked for identification of functions.

4.7.2 Equipment

a. Electrical equipment shall be located or enclosed when under normal operation energized parts will not be exposed to inadvertent contact.
b. Energized parts of electrical equipment shall be protected from exposure to grease, oil, moisture, and dirt.
c. If guards are provided for energized parts the guards shall be constructed so that they cannot be deformed.

4.7.3 Controllers

a. Cranes not equipped with spring-return controllers, spring-return master switches, or momentary contact push buttons, shall be provided with a device that will disconnect all motors from the line in the event of a power failure.
b. This disconnect device shall not permit any motor to be restarted until the controller or master switch handle is brought to the off position, or a reset switch or power-on button is operated.
c. For floor-operated cranes, the controller or controllers shall automatically return to the off position when released by the operator.

4.7.4 Switches

a. The power supply to the crane shall be controlled by a switch or breaker located on a fixed structure accessible from the floor and shall be arranged to be locked in the OPEN position.
b. Power driven hoists shall be designed so that the load block either loaded or empty shall not exceed the upper limit of travel.
c. An emergency off/shutdown push button shall be included on the pendant of all powered travel overhead cranes

4.8 Hoisting Equipment

4.8.1 Sheaves

a. Sheave grooves shall be free from surface defects which could cause rope damage.
b. Sheaves carrying ropes, which can be momentarily unloaded, shall be provided with close-fitting guards, or other devices, to guide the rope back into the groove when the load is reapplied.
c. The sheaves in the bottom block shall be equipped with close-fitting guards that will minimize the possibility of ropes becoming fouled when the block is lying on the ground with the ropes loose.
d. All running sheaves shall be equipped with means for lubrication.

e. Permanently lubricated, sealed, or shielded bearings shall be acceptable.

4.8.2 Drums

a. Rope drums shall be grooved except for special applications.

b. The grooves shall be free from surface defects that could cause rope damage.

4.8.3 Ropes (Wire)

a. The hoisting ropes shall be of a recommended construction for crane service.

b. The total load (rated load plus weight of load block) divided by the number of parts of line shall not exceed 20% of the minimum breaking force of the rope.

c. Socketing shall be done in a manner recommended by the rope or fitting manufacturer or a qualified person.

d. Rope shall be secured to the drum as follows:

i. No less than two wraps of rope shall remain on the drum at each anchorage of the hoisting drum when the hook is in its extreme low position.

ii. The rope end shall be anchored by a clamp attached to the drum, or by a socket arrangement specified by the crane or rope manufacturer.

iii. The rope clamps shall be tightened evenly to the manufacturer's recommended torque.

iv. Eye splices shall be made in recommended manner.

v. Rope thimbles should be used in the eye.

e. Swaged or compressed fittings shall be applied as recommended by the rope, crane, or fitting manufacturer or a qualified person.

f. Replacement rope shall be the same size, grade, and construction as the original rope

4.8.4 Hooks

a. Hooks shall meet the manufacturer's recommendations and shall not be overloaded.

b. If hooks are of the swiveling type, they should rotate freely.

c. Latch equipped hooks shall be used unless the application makes the use of the latch impractical or unnecessary.

d. When required, a latch or mousing shall be provided to bridge the throat opening of the hook for the purpose of retaining slings, chains, or other similar parts, under slack conditions (see ASME B30.10).

4.9 Modifications

4.9.1 The supporting structure shall be thoroughly checked by a Registered Structural Engineer or equipment manufacturer for the new load rating before overhead cranes are modified.

4.9.2 The overhead crane shall be inspected and load tested at 125% of the rated load before the initial use.

4.9.3 The new rated load shall be marked on the crane and monorail.

4.10 Operation

4.10.1 Only designated and trained personnel shall be permitted to operate overhead cranes.

4.10.2 Daily Inspections

a. Overhead cranes and powered hoists shall be inspected by the operator prior to their first use on each shift.

i. After a visual inspection of the equipment, the operator shall perform a complete operational check using the Mosaic Fertilizer Overhead Crane and Powered Hoist Operating Checklist (Appendix A).

ii. The operator shall sign the checklist.

iii. If defects are found, then the supervisor must sign the daily inspection if it can be used until repairs are completed.

iv. The bottom copy of the checklist will be placed in a holder located in the vicinity of the crane.

4.10.3 Load Handling

a. Overhead cranes and powered hoists shall not be loaded beyond their rated load capacity except for test purposes.

b. When the weight of the load is unknown, the load shall not be lifted until the weight has been determined.
c. The Operator shall test the brakes each time a load of more than 50% of the rated load is lifted. The brakes shall be tested by raising the load a few inches and applying the brakes.
d. No loads shall be lifted with outdoor overhead cranes in high winds unless authorized by a responsible person. If the winds are higher than 25 MPH, all lifts shall be reviewed and approved by the maintenance superintendent.
e. Hoist chains and ropes shall be free from kinks or twists and shall not be wrapped around the load.
f. Loads shall be attached to the load block hook with slings or other approved devices.
g. All hooks shall have a safety latch or shall be "moused" with material of strength equal to a safety latch.
h. The load shall be secured and properly balanced prior to lifting then checked again by lifting a few inches and re-checking for balance and security prior to making the final lift.
i. The hook shall be brought over the load in a manner to prevent the load from swinging when lifted.
j. During hoisting, care should be taken that;
    i. There is no sudden acceleration or deceleration of the load.
    ii. That the load will not contact any objects.
k. Overhead cranes shall not be used for side pulls.
    i. Exceptions;
        A. When specifically authorized by the manufacturer and a competent person who has determined that the stability of the crane is not endangered.
        B. That parts of the crane will not be over stressed (1910.179 (n)(3)(vi)).
l. No employee is allowed on the load or hook.
    i. Exceptions;
        A. Unless such method eliminates a greater hazard and is specifically authorized by the maintenance superintendent and the production superintendent.
        B. While any employee is on the load or hook, there shall be no hoisting, lowering or traveling (1910.179 (n)(3)(v))
        C. When utilizing a tripod hoist as a mechanical retrieval system or anchor used for non-entry emergency rescue from confined spaces.
m. The operator shall not carry loads over personnel.
n. When the load or hook approaches personnel, the operator shall stop travel and warn the personnel in the area.
o. Tag lines shall be attached to loads that may require steadying or guidance while suspended.
p. When two or more cranes are used for the lift, only one responsible person designated and trained for the operation of overhead cranes and powered hoists shall be in charge of the operation.
    i. The use of two overhead cranes to perform one lift requires a detailed Lift Plan and shall be approved by the Maintenance Superintendent prior to commencing the lift.
q. The operator shall not leave his position at the controls while the load is suspended.
r. When not in use, hooks shall be kept 8' above floor level or be moved to an area out of work areas and walkways.
s. In locations where equipment movement (Draglines), vibration or weather conditions will cause the load block to swing, the load block shall be tied off.

5. TRAINING

5.1 All designated overhead crane operators are to be given training in the safe operation and daily inspection of overhead cranes

5.2 Training shall cover;

5.2.1 Proper use of overhead cranes
5.2.2 Material handling
5.2.3 Daily inspection
5.2.4 Functional operation checks
5.2.5 Standard hand signals
5.2.6 Rigging

5.3 Designated maintenance employees are to be given training for
5.3.1 Performing the monthly Frequent Inspection of Overhead Cranes and Powered Hoists.
5.3.2 The training shall cover the inspection criteria for all components to be inspected.

6. INSPECTIONS

6.1 Inspection and Testing
6.1.1 Prior to initial use, all new or altered overhead cranes and powered hoists shall be inspected for compliance with 29 CFR 1910.179.
6.1.2 Daily Inspections
a. All functional operating mechanisms shall be checked by the operator prior to use on each shift.
6.1.1 Frequent Inspections
a. All overhead cranes are to be given monthly Inspections by the Maintenance Department.
b. Overhead cranes idle for a period of one to six months shall be inspected prior to use.
c. All inspection records will be kept in accordance with the Mosaic Records Retention Policy.
6.1.2 Periodic Inspections
a. Periodic Inspections are to be performed in intervals no more than twelve months.
b. Overhead cranes idle for six or more months shall be given a Periodic Inspection prior to use.
c. The inspections are to be performed by a qualified outside inspector who meets the requirements for inspection and repairs to overhead cranes and powered hoists by the CMAA.
d. The frequency of inspections shall be determined by use and environment in which the overhead crane operates.
i. If unsafe conditions are found in two consecutive inspections, the frequency of inspections shall be increased.
e. Standby Cranes shall be inspected prior to use and a Periodic Inspection semi-annually.
f. If violations of any standards or unsafe conditions are found during the inspection, the overhead crane shall be immediately removed and tagged out of service until all repairs are completed.

6.2 Annual Certification
6.2.1 All overhead cranes shall be inspected and certified annually by a qualified outside inspector who meets the requirements for inspection and repairs to overhead cranes and powered hoists by the CMAA.
6.2.2 The Annual Certification may be performed in conjunction with the Periodic Inspections.

6.3 Testing
6.3.1 Prior to initial use, all new and altered cranes shall be given a full functional test including a load test to ensure compliance with 29 CFR 1910.179 (k).
6.3.2 Test loads shall not be more than 125% of the rated load.

7. MARINE TERMINALS MODULE

7.1 The Shiploader (Gantry) and tractor hoist shall be operated, inspected and maintained as per the Marine Terminals Operations Procedure.

8. CONTRACTORS

8.1 Contractors and subcontractors are required to follow all Mosaic safety and health programs and procedures

9. APPENDICES

9.1 Appendix A – Daily Prior-To-Use Checklist

9.2 Appendix B – Operator Training and Operation

9.3 Appendix C – Maintenance Training and Maintenance

9.4 Appendix D – Inspection and Testing

10. REFERENCES

10.1 ANSI

10.1.1 B30.2 - Overhead and Gantry Cranes

10.1.2 B30.16 - Overhead Hoists (Underhung)

10.1.3 B30.17 – Cranes and Monorail (with Underhung Trolley or Bridge)

10.2 MSHA

10.2.1 30 CFR 56.16007, 16009, 16010, 16011, 16014, and 16015

10.3 OSHA

10.3.1 29 1910.179 to 181

10.3.2 29 CFR 1926.550 to 554

10.3.3 29 CFR 1917.45 to 47

11. REVISION LOG

Revision Log				
Rev.No.	Requested By	Approved By	Revised By	Rev.Date
0	Initial Issue for Mosaic	Safety Dept.	Safety Dept.	5/14/07
	Reformat for ISO		D. Allen	6/20/2011
1	Steve Hughes	Gerald Lasseigne	R. Withers	4/30/2012
2	Danielle Weiszhaar	Gerald Lasseigne	R. Withers	3/20/2013
3	PMO	PMO	PMO	9/30/2021