Rigging Program (Slings, Wire Ropes)

Location/Applicability: Phosphate Business Unit			Document Identifier: 1093681
Document Owner: Director, EHS Services - Phosphate Business Unit			
Effective Date:	July 15, 2021	Review Due Date:	July 2028

TABLE OF CONTENTS

1. PURPOSE

To establish a program for operational guidelines and training for using rigging as defined by OSHA, MSHA and other regulatory or consensus standards.

2. SCOPE

This program shall cover all Mosaic Fertilizer LLC Phosphates Business Unit employees and contractors required to rig equipment for the purpose of lifting and or towing.

3. DEFINITIONS

3.1 Angle of Loading - The inclination of a leg or branch of a sling measured from the horizontal or vertical plane. Note: an Angle of Loading of five degrees or less from the vertical may be considered a vertical Angle of Loading.

3.2 Appointed - Employee assigned specific responsibilities by the employer or the employer's representative.

3.3 Below-the-Hook Lifting Devices - Structural and Mechanical Lifting Devices engineered for specific lifts and are categorized as supporting lifters. These include, but are not limited to, the following: Spreader Beams, pump lifting plates, impeller lifter, material handling bins, compressed gas bottle racks, plate dogs and fabricated pad eyes mounted on equipment. These must have a design factor of 3:1.

3.4 Designated - Selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

3.5 Equivalent Entity - Person or organization (including an employer) which, by possession of equipment, technical knowledge and skills, can perform with equal competence the same repairs and test as the person or organization with which it is equated.

3.6 Hitch - Sling configuration whereby the sling is fastened to an object or load, either directly to it or around it.

3.7 Job Made Slings - Any sling that is fabricated in-house and not made by a sling manufacturer.

3.8 Lifting Beam (Spreader Beam) - A load supporting lifter.

3.9 Link - Single ring of a chain.

3.10 Master Coupling Link - Alloy steel welded coupling link used as an intermediate link to join alloy steel chain to Master Links.

3.11 Master Link or Gathering Ring - Forged or welded steel link used to support all members (legs) of an alloy steel chain sling or wire rope sling.

3.12 Mechanical Lifting Device - Mechanism composed of two or more rigid parts that move with respect to each other for attaching a load to a hoisting device.

3.13 Proof Test - Non-destructive tension test performed by the sling manufacturer or an Equivalent Entity to verify construction and workmanship of a sling.

3.14 Qualified Person - Person who, by the possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

3.15 Qualified Rigger – A person who meets the criteria for a qualified person.

3.16 Rated Capacity or Working Load Limit - Maximum working load permitted by the provisions of this section.

3.17 Rated Load - Maximum load for which the equipment is Designated by the manufacturer.

3.18 Rigging Equipment - That which includes: hooks, slings, cables, ropes, chains and Below-the-Hook Lifting Devices, such as, Spreader Beams and pad eyes. It also includes eyebolts, shackles and any attachments that can be used for lifting between the load line hook and the object to be lifted.

3.19 Selvage Edge - Finished edge of synthetic webbing designed to prevent unraveling.

3.20 Shock Loading - Sudden loads introduced to the components by forces in motion (dynamic loading).

3.21 Sling - An assembly that connects the load to the material handling equipment.

3.22 Sling Manufacturer - Person or organization that assembles sling components into their final form for sale to users.

4. GENERAL REQUIRMENTS

4.1 General

4.1.1 A visual inspection will be done on all rigging equipment before each use.

4.1.2 All rigging hardware/equipment such as hooks, clevis', clamps, rings, chain, wire rope, etc. shall be from domestic manufacturers.

4.1.3 A safety factor of five (5) shall be used for rigging equipment with the exception of Below-the-Hook Lifting Devices (3:1) and Chain slings (4:1).

4.1.4 All rigging equipment not in use shall be stored in a dry, protected area.

4.1.5 Loads shall not be lifted by the tip of the hook.

4.1.6 Hooks should be centered over the load before lifting.

4.1.7 The load rope or chain shall not be used to encircle the load for lifting.

4.1.8 Slings shall not be shortened with knots, bolts or other makeshift devices.

4.1.9 A sling shall not be pulled from under the load when the load is resting on the sling.

4.1.10 Correct fall protection procedures shall be used when it is necessary to climb on a load for rigging. (Refer to Fall Protection Procedure.)

4.1.11 Blocks shall not be placed under a load that is in motion.

4.1.12 Padding (softeners) shall be used on all loads that could cut or damage slings or chokers.

4.1.13 Shock loading is not permitted.

4.1.14 Job Made Slings are not permitted.

4.1.15 Cable-laid-cables shall not be used.

4.1.16 Rigging equipment shall not be repainted, welded or otherwise modified.

4.1.17 Cast iron rigging equipment shall not be used.

4.1.18 Rigging equipment for material handling shall be inspected prior to use, and as necessary during its use, to insure that it is safe.

4.1.19 Defective rigging shall be removed from service immediately, evaluated and destroyed if not repairable. It may not be removed from Mosaic facilities for use off site.

4.1.20 Rigging equipment shall not be loaded in excess of its recommended safe working load.

4.1.21 Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

4.1.22 Loads shall be lifted a few inches and the rigging checked before allowing the lift to continue.

4.1.23 Non-essential personnel shall be kept clear of the lift zone and lift zone shall be barricaded..

4.1.24 Tag lines shall be attached prior to lift if required.

4.2 Shackles (Clevis)

4.2.1 The “running” section of the rope or sling shall be on the curve of the shackle and not over the shackle pin when using shackles.

4.2.2 The curve part of the shackle must be hanging down Below-the-Hook when placing a shackle on a hook.

4.2.3 A shackle should always be used with a weld on lug, pad eye.

4.3 Rigging Hooks

4.3.1 If the manufacturer’s hook is designed for a safety latch, the latch must be maintained.

4.3.2 The safety latch, if so equipped, must be closed after attaching the hook to the load.

4.3.3 Hooks opened more than 15% of the normal throat opening or bent more than 100 from the plane of the hook shall be replaced.

a. The deformed hooks shall be destroyed and not removed from Mosaic facilities for off site use.

4.3.4 When more than 2 choker eyes are placed on a hook a shackle must be used.

4.4 Wire Rope

4.4.1 Wire rope clips shall be attached to wire rope according to manufacturer’s recommendations. If used for lifting the clips shall be non-malleable.

4.4.2 Wire rope shall be lubricated according to the manufacturer’s specifications.

4.4.3 Wire rope slings shall be replaced if any of the following conditions are found:

a. Ten randomly distributed broken wires in one rope lay.

b. Five broken wires in one strand in one rope lay

c. Kinking, crushing, bird-caging or other damage resulting in deterioration of the wire rope structure

d. Evidence of heat damage

e. Damaged end connections

f. Severe corrosion or pitting of the wires.

4.4.4 Bending of a sling near splice or fitting shall not be permitted.

4.4.5 All welded end attachments shall not be used unless Proof Tested by the manufacturer or Equivalent Entity at twice their Rated Capacity prior to initial use. The employer shall retain a certificate of Proof Test, and make it available for examination.

4.5 Synthetic Webbing

4.5.1 Nylon slings shall not be used.

4.5.2 Each synthetic web sling shall be permanently marked to show:

a. Name or trademark of manufacturer
b. Manufacturer's code or stock number
c. Rated Loads (Rated Capacity) for the types of Hitches used
d. Type of synthetic web material

4.5.3 Synthetic webbing shall be of uniform thickness and width and selvedge edges shall not be split from the webbing's width.

4.5.4 Polyester and polypropylene web slings shall not be used where caustic fumes, vapors, sprays, mists or liquids are present.

4.5.5 Polyester web slings shall not be used in temperatures in excess of 180^0. Polypropylene web slings shall not be used in temperatures in excess of 200^0.

4.5.6 Synthetic web slings shall be immediately removed from service if any of the following conditions are present:

a. Acid or caustic burns
b. Melting or charring of any part of the sling
c. Snags, punctures, tears or cuts
d. Broken or worn stitches
e. Excessive abrasive wear
f. Knots in any parts of the sling
g. Excessive pitting or corrosion, or cracked, distorted, or broken fittings
h. Other visible signs that cause doubt as to the strength of the sling

4.6 Below-the-Hook Lifting Devices

4.6.1 Below-the-Hook Lifting Devices shall be designed with a safety factor of 3:1.

4.6.2 Existing Below-the-Hook Lifting Devices shall be inspected by a qualified engineer for cracked welds and structural damage no greater than 12-month intervals. The engineer shall determine the capacity of the lifting device.

4.6.3 All new Below-the-Hook Lifting Devices shall be designed by a qualified engineer or a qualified engineer shall check the design and determine the safe lifting capacity.

4.6.4 The lifting capacity, the weight of the Below-the-Hook Lifting Devices and the date of the last annual inspection shall be marked on the device.

4.6.5 All Below-the-Hook rigging equipment shall be load tested initially or after modification to 125% of the Rated Capacity. This shall be documented in writing and signed by the engineer and the person performing the test.

4.6.6 Any unloaded distortion or deflection from the original design of the Below-the-Hook Lifting Devices, before or after load test, shall require that the device be removed from service, re-evaluated for reparability, and re-certified before use.

4.7 Chain Slings

4.7.1 Chain slings shall be designed with a (4:1) safety factor.

4.7.2 Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chain slings, shall have a Rated Capacity at least equal to that of the chain.

4.7.3 Pear links 9/32" and smaller shall not be used.

4.7.4 Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, Rated Capacity, and sling manufacturer.

4.7.5 The employer shall make and maintain a record of the most recent month in which each alloy steel chain sling was thoroughly inspected, and shall make such record available for examination.

4.7.6 Alloy steel chain slings shall be replaced if any of the following:

a. Missing or illegible tag;
b. Excessive wear; twisted, bent or cut links;
c. Cracks in the weld area or other areas of the links;
d. Severe nicks or gouges;
e. Excessively stretched links;
f. Severe corrosion; or
g. Worn or damaged Master Links.

4.7.7 Use only alloy chain (grade 8(t) or grade 100) when chain sling is used.

4.8 Eyebolts

4.8.1 Shouldered eyebolts must be used when lifting.

4.8.2 Loads shall be applied to the eyebolt in the plane of the eye not at an angle.

4.8.3 The capacity of the eyebolt shall not be exceeded.

4.8.4 Eyebolts with bent or elongated eyes or shanks shall not be used.

4.8.5 Eyebolt shall not be cut or machine ground.

4.8.6 Eyebolts shall be screwed down completely for proper seating of shoulder.

4.9 Pad Eye

4.9.1 Loads should always be applied to the plane of the lug or pad eye to keep the bending of the lug or pad eye to a minimum.

4.9.2 Engineering will design pad eyes with a safety factor of 3:1.

5. TRAINING

5.1 All management associated, either directly or indirectly, with rigging operations shall attend a one-time formal management awareness class.

5.2 Any person, operations or maintenance, who performs rigging shall be required to attend a qualified rigger class.

6. PROGRAM REVIEW/PERIODIC INSPECTIONS

6.1 A visual inspection will be done on all rigging equipment before each use.

6.2 Quarterly inspections are as follows:

6.2.1 Chain slings, wire rope, wire mesh, synthetic slings and rigging hooks shall be inspected quarterly and documented.

6.2.2 All slings shall be marked to show the latest quarter in which they were inspected. The color coding for sling inspections is:

January through March	YELLOW wire tie
April through June	GREEN wire tie
July through September	GRAY wire tie
October through December	BLUE wire tie

6.3 Inspections on all rigging equipment will be required at no greater than 12-month intervals.

7. APPENDICES

7.1 Appendix A – Wire Rope Inspection Report
7.2 Appendix B – Synthetic Web Sling Inspection Report
7.3 Appendix C – Metal Mesh Sling Inspection Report
7.4 Appendix D – Alloy Steel Chain Sling Inspection Report

8. REFERENCES

8.1 ANSI
  8.1.1 B30.9
  8.1.2 B30.10
  8.1.3 B30.20
8.2 MSHA
  8.2.1 30 CFR 56.14209
  8.2.2 30 CFR 56.16007
8.3 OSHA
  8.3.1 CFR 1910.184
  8.3.2 CFR 1926.251
  8.3.3 CFR 1926 subpart cc
8.4 Bob's Rigging and Crane Handbook, 5th addition, January 2000

9. 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
1	Purchasing – Greg Spooner	Safety Dept.	Safety Dept.	10/29/08
2		Safety Dept.	Lex Dixon	2/22/2012
3	Corrections	Mike Neal	Lex Dixon	6/5/2012
4	Review Cycle	HSS Director – Phosphates	SME Review	12/3/15
5	Overdue on review date	PMO	PMO	06/30/2021

Contact the Subject Matter Expert for additional information on this program.