# Overhead Crane & Powered Hoist Program
## Appendix D

# Inspection and Testing

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## 1. INSPECTION

1.1 General

*(a)* This chapter on Inspection and Testing establishes and defines the criteria for determining whether cranes can be expected to perform as intended.

*(b)* Five types of inspections are defined, each with the common purpose of keeping equipment performing as intended. Each inspection is directed toward a different set of circumstances. The five types of inspection are:

*(1)* Initial inspection

*(2)* Functional test inspection

*(3)* Frequent inspection

*(4)* Periodic inspection

*(5)* Inspection of equipment not in regular use

*(c)* In addition to the five types of inspection listed in 1.1.a(1), the inspection provisions found in manuals supplied by the manufacturer(s) of the crane and the crane components shall be followed

*(d)* All inspections shall be performed by a designated person. Any deficiencies identified shall be examined and a determination made by a qualified person as to whether they constitute a hazard and if a more detailed inspection is required.

1.2 Initial Inspection

*(a)* An initial inspection is a visual and audible examination of the crane.

*(b)* New, reinstalled, altered, repaired, and modified equipment shall be inspected prior to initial use to verify compliance with the applicable provisions of Mosaic's Overhead Crane Policy.

*(c)* Inspection of altered, repaired, and modified cranes may be limited to the parts of the crane affected by the alteration, repair, or modification, as determined by a qualified person.

*(d)* The cranes shall be tested in accordance with the requirements of Section 2 – Testing

*(e)* Adjustments, repairs, or replacements necessary to satisfy requirements shall be made in accordance with Appendix C, Section 2.4 prior to initial use if the inspection and test reveal that there are items and conditions that do not comply with the provisions.

*(f)* Records of the inspection and test shall be made.

1.3 Functional Test Inspection

*(a)* A functional test inspection is a visual and audible operational examination of the crane and shall be conducted at the beginning of each shift or before the crane is first used during each shift. In special applications, where the suspended load is transferred from operator

to operator at shift change, the functional test inspection shall be performed when that lift is completed.

*(b)* Items that shall be inspected during performance of the functional test inspection are the following:

*(1)* Operational controls

*(2)* Upper limit device in accordance with Appendix B, Section 5(a)

*(3)* Rope in accordance with Section 2.2

*(c)* Adjustments, repairs, or replacements necessary to satisfy requirements shall be made in accordance with Appendix C, Section 2.4 prior to initial use if the functional test inspection reveals that there are items and conditions that do not comply with the provisions.

*(d)* Records of the inspection should be made.

1.4 Frequent Test Inspection

*(a)* *A frequent inspection is a visual and audible examination of the crane.*

*(b)* *Equipment shall be inspected at intervals dependent on the use of the equipment as follows:*

*a.* Normal service – monthly

*b.* Heavy service – weekly to monthly

*c.* Severe service – daily to weekly

*(c)* The following items shall be inspected:

*(1)* Operating mechanisms for proper operation, proper adjustment, and unusual sounds, such as, but not limited to, squeaking grinding, grating, etc.

*(2)* Upper limit device(s) in accordance with Appendix B, Section 3.5 – Hoist Limit Devices (Switches)

*(3)* Tanks, valves, pumps, lines, and other parts of air or hydraulic systems for leakage

*(4)* Hooks and latches, if used, in accordance with the provisions of ASME B30.10

*(5)* Hook attachment and securing means

*(6)* Rope for proper spooling on the drum(s) and sheave(s)

*(7)* Warning device(s) for proper operation

*(8)* Rope in accordance with Section 2.2.

*(d)* Adjustments, repairs, or replacements shall be made, as necessary, in accordance with Appendix C, Section 2.4.

*(e)* Records of the inspection should be made.

1.5 Periodic Inspection

*(a)* A periodic inspection is a visual and audible examination of the crane.

*(b)* Equipment shall be inspected at intervals dependent on the use of the equipment as follows:

a. Normal service – yearly

b. Heavy service – yearly

c. Severe service – quarterly

*(c)* The inspection shall include the items listed in Section 1.4(c) and the following items, as applicable:

*(1)* Deformed, cracked, or corroded members.

*(2)* Loose or missing fasteners, such as, but not limited to, bolts, nuts, pins, or rivets.

*(3)* Cracked or worn sheaves and drums.

*(4)* Worn, cracked, or distorted parts such as pins, bearings, wheels, shafts, gears, rollers, locking and clamping devices, bumpers, and stops.

*(5)* Hooks, in accordance with the provisions of ASME B30.10.

*(6)* Excessive wear of brake system parts.

*(7)* Excessive wear of drive chain sprockets and excessive drive chain stretch.

*(8)* Deterioration of controllers, master switches, contacts, limit switches, and push-button stations, but not limited to those items.

*(9)* Wind indicators for proper operation.

*(10)* Gasoline, diesel, electric, or other power plants for proper operation.

*(11)* Motion limit devices that interrupt power or cause a warning to be activated for proper performance. Each motion shall be inched or operated at low speed into the limit device with no load on the crane.

*(12)* Rope reeving for compliance with crane manufacturer's design.

*(13)* Function, instruction, and safety information signs, labels, or plates for legibility and replacement.

*(14)* Rope and end connections in accordance with Section 2.3.

*(d)* Adjustments, repairs, or replacement shall be made, as necessary, in accordance with Appendix C – Section 2.4.

*(e)* Dated records shall be made of apparent external conditions fund in Section 1.5(c) to provide a basis for a continuing evaluation and placed on file.

1.6 Inspection of Cranes Not in Regular Use

*(a)* A crane that has been idle for a period of one month or more, but less than one year, shall be inspected before being placed in service in accordance with the requirements listed in Section 1.4.

*(b)* A crane that has been idle for a period of one year or more shall be inspected before being placed in service in accordance with the requirements listed in Section 1.5.

## 2. ROPE INSPECTION

2.1 General

All inspections shall be performed by a designated person. Any deficiencies identified shall be examined and a determination made by a qualified person as to whether they constitute a hazard and if a more detailed inspection is required.

2.2 Frequent Rope Inspections

*(a)* All ropes should be visually inspected at the start of each shift. These visual observations should be concerned with discovering gross damage, such as listed below, that may be a hazard.

a. Distortion of the rope, such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion

b. General corrosion

c. Broken or cut strands

d. Number, distribution, and type of visible broken wires (see Appendix C – Section 3.1(b) and (2) for further guidance)

*(b)* When damage as described in Section 2.2(a)(1) through (a)(4) is discovered, the rope shall either be removed from service or inspected as detailed in Section 2.3(b).

2.3 Periodic Rope Inspection

*(a)* The inspection frequency shall be determined by a qualified person and shall be based on such factors as:

a. Expected rope life as determined by experience on the particular installation or similar installations

b. Severity of environment

c. Percent of capacity lifts
d. Frequency rates of operation
e. Exposure to shock loads

Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life.

*(b)* This inspection shall cover the entire length of rope. The individual outer wires in the strands of the rope shall be visible to the person during the inspection. Any deterioration resulting in appreciable loss of original strength, such as described below, shall be noted and determination shall be made as to whether further use of the rope would constitute a hazard.

*(1)* Points listed in Section 2.2(a)

*(2)* Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires. See Appendix C, Section 3.1(b)(5).

*(3)* Severely corroded or broken wires at end connections.

*(4)* Severely corroded, cracked, bent, worn, or improperly applied end connections.

*(c)* Special care should be taken when inspecting sections of rapid deterioration, such as the following:

*(1)* Sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited

*(2)* Sections of the rope at or near terminal ends where corroded or broken wires may protrude

*(3)* Sections subject to reverse bends

*(4)* Sections of rope that are normally hidden during visual inspection, such as parts passing over sheaves

*(d)* In order to establish data as a basis of judging the proper time for replacement, a continuing inspection record should be maintained. This record should cover points of deterioration listed.

## 3. TESTING

3.1 Operational Tests

*(a)* New, reinstalled, altered, repaired, and modified cranes shall be tested by a designated person prior to initial use to confirm that the crane performs in compliance with the provisions of this policy.

*(b)* Tests shall include, as applicable, the following functions:

*(1)* Lifting and lowering

*(2)* Trolley travel

*(3)* Bridge travel

*(4)* Hoist-limit devices

*(a)* The trip setting of hoist-limit devices shall be determined by tests with an empty hook comprising a series of runs, each at increasing hook speed up the maximum speed, unless the hoist has only a single speed.

*(b)* The actuating mechanism of the upper-limit device shall be located or adjusted so that it will trip the device in sufficient time to prevent contact of the load block or load with any part of the trolley or bridge.

*(5)* Travel-limiting devices

*(6)* Locking and indicating devices, if provided

*(c)* Operational testing of altered, repaired, and modified cranes may be limited to the functions affected by the alteration, repair, or modification, as determined by a qualified person.

3.2 Operational Load Tests

*(a)* New, reinstalled, altered, repaired, and modified cranes should be load tested prior to initial use, as determined by a qualified person.

*(b)* Load testing of altered, repaired, and modified cranes may be limited to the functions affected by the alteration, repair, or modification, as determined by a qualified person.

*(c)* The replacement of load chain and rope is specifically excluded from this local rest; however, an operational test of the hoist shall be made in accordance with Section 3.1 prior to putting the crane back in service.

*(d)* If a load test is conducted, the load shall be not less than 100% of the rated load of the crane or hoist(s), whichever governs or more than 125% of the rated load of the crane or hoist(s), whichever governs; unless otherwise recommended by the manufacturer or a qualified person.

*(e)* If a load test is conducted, the person conducting the load test shall prepare a written report of the load sustained during the test and the operations performed during the test. Reports shall be placed on file.

*(f)* If a load test is conducted, operations shall be performed as outlined below or as modified by a qualified person.

a. Hoist the test load a distance to ensure that the load is supported by the crane and held by the hoist brake(s).

b. Transport the test load by means of the trolley for the full length of the bridge.

c. Transport the test load by means of the bridge for the full length of the runway in one direction with the trolley as close to the extreme right-hand end of the crane as practical, and in the other direction with the trolley as close to the extreme left-hand end of the crane as practical.

d. Lower the test load, and stop and hold the load with the brake(s).

**REVISION LOG**

| Revision Log | | | | |
|---|---|---|---|---|
| Rev.No. | Requested By | Approved By | Revised By | Rev.Date |
| 0 | Initial Issue for Mosaic | Safety Dept. | Safety Dept. | 11/16/2011 |
| 1 | Safety Department | | Safety Dept. | 5/11/2012 |
| | Reformat for ISO | | R. Withers | 6/12/2012 |
| 2 | Corrected App Number | Gerald Lasseigne | R. Withers | 3/20/2013 |
| 3 | PMO | PMO | PMO | 9/30/2021 |

Contact Subject Matter Expert for additional information on this program.