Inspection and Maintenance of Tower Crane Major Components

NOTE
These recommendations are based on proven industry good practices. Non-destructive testing of some components may be required for a complete inspection. Manufacturers may also require the replacement of some components after a given time interval.

Periodic inspections of major structural, mechanical, and electrical components are important to ensure a tower crane can be operated safely and effectively. A comprehensive inspection of these critical components should be completed and documented in accordance with the frequency intervals specified by the manufacturer, or if this is not available, as determined by a competent person to meet the same minimum requirements established by relevant technical standards. If it is not reasonably practicable to inspect a crane according to either of these, you should inspect the crane at least every 10 years from the date the crane was first commissioned.

Disassembly and cleaning (such as the removal of grease, oil, corrosion, and paint) may be required to allow the necessary inspection of these components. Note that manufacturers may also require the replacement of certain components after a given time interval.

Disassembly and inspection of the following components is recommended as per manufacturers' specifications and good industry practices. Non-destructive testing (NDT) of some components may be required for a complete inspection.

Use the following checklist to document your inspections to demonstrate due diligence.

Crane Components	Date	Conducted by
Structural Components		
Slewing ring		
Slew ring fasteners		
Load hook assembly		
Mechanical Systems		
Hydraulic systems (motors, hoses, valve blocks, cylinders)		
Electric motors		
Braking systems		
Gearboxes		
Drums		
Bearings		
Electrical Systems and Components		
Electric panels		
Controls and remote		
Wiring		
Load limiting devices/limit switches		
Load Moment Indicator/load limiting devices		
Zoning/Anti-collision devices		
Operator aids (anemometer, load/radius indicator, etc.)		

It is essential to supplement your inspection with the make/model-specific instructions provided by the manufacturer. Please consider any specific requirements or notes relevant to the make/model during the inspection.

References/Sources

REMINDER

CSA Z248-04 Section 6.4.8 Special inspections: Special inspections are inspections conducted following shock loading, electrical contact, other misadventures, repairs, alterations, or prolonged shutdown.

CSA Z248-04

6.2.2 Owner's Crane Log

Tower crane owners are required to have and maintain logbooks for the complete history of the crane, transfer them to the next owner, and provide records for the inspectors on request.

6.2.2 Operator's Crane Log

The crane operators shall record all tests, inspections, maintenance, repairs, revisions, and modifications on his/her logbook.

6 4.8 Special inspections

The owners of tower cranes need to conduct special inspections for shock loading, electrical contact, other misadventures, repairs, alterations, or prolonged shutdowns. The structural alterations, repairs, replacement of parts to hoisting, or safety operation should be tested and approved by a professional engineer and under the requirements of the manufacturers' specifications and instructions. A load test should be done after those changes.

7.1 Maintenance personnel

The maintenance personnel shall be qualified and completely familiar with the manufacturer's instruction manual.

7.2 Preventive maintenance

The requirements of preventive maintenance should ensure that:

a) No hazard generated from the maintenance.
b) A preventive maintenance program shall be established under the recommendations of the manufacturer and the dated records of performance shall be kept.
c) Replacement parts shall meet or exceed the original manufacturer's specification.

References Sources

REMINDER

ASME B30.3-2016 Section 3-2.1.2 Inspection Classification: (3) Major Inspections shall be conducted at 60-mo intervals, or as recommended by the manufacturer or by a qualified person.

ASME B30.3-2016

3-2.1: Inspection

3-2.1.1 General

The inspection criteria shall be based on the Manufacturer's criteria, and the inspection shall be done by a designated qualified person.

3-2.1.2 Inspection Classification

(b) (3) Major inspections shall be conducted every 60 months or based on the manufacturer's requirements.

3-2.1.5 Major Inspection

(a) The inspections of items and conditions shall be conducted at the interval defined as 3-2.1.2 (b) (3) and follow the manufacturer's requirements. Observations during operation will help identify deficiencies and the deficiencies should be fixed before operations.

(1) Inspect items and conditions contained in 3.-2.1.3 and 3-2.1.4.
(2) Verify completion of safety upgrades based on recommendations of the manufacturer.
(3) Verify the latest applicable documents from the manufacturer.
(4) Verify the conditions of the fluid system.
(5) Nondestructive test of all tower and slewing ring connection materials or replacement based on the manufacturer's instructions.
(6) Inspect the problems in the crane structure.
(7) Disassemble and inspect drive systems, motors, and gear boxes based on the manufacturer's requirements.
(8) Inspect and test all electrical components.
(9) Inspect sheaves.
(10) Inspect the slewing ring.

(b) The Inspection shall be conducted annually for items and conditions listed in (a) for permanently mounted tower cranes with or over 10 years of service.

3-2.3: Maintenance

Parts for repair and maintenance should be obtained from the original manufacturer and at least meet specifications.

3-2.3.1 Preventive Maintenance

A preventive maintenance program should be established based on the

manufacturer's documentation and recommendations. The performance of maintenance should be dated and recorded.

3-2.3.2 Maintenance, Adjustments and Repair Procedure

Hazardous conditions during the inspection should be corrected by designated personnel before resuming the crane operation.

(a) Before maintenance, adjustments and repair, the procedure should be followed:

(1) Remove the crane to the maintenance area.

(2) Set all controllers to the off positions.

(3) Open and lock the main or emergency switch.

(4) Place warning signs and use lock-out/tag-out procedures.

(5) Provide precautions to prevent interference with other equipment.

(6) Proper PPE should be worn during the maintenance.

(b) Ensure all components adjust to proper functioning. For example:

(1) functional operation mechanisms

(2) limit devices

(3) control systems

(4) braking systems

(5) power plants

After maintenance, adjustments, or repairs, all guards should be reinstalled, limit and protective devices should be reactivated and removed before the crane is brought back to service.

