



Should Crane Inspections and Preventive Maintenance be Treated the Same?

BY RICHARD WEHRMEISTER

FOR MANY OVERHEAD crane inspection companies, performing OSHA inspections and preventive maintenance are considered two separate services for overhead cranes and hoists. Based on regulation criterion, I simply cannot ascertain how any experienced company or inspector might offer this limited service in good conscience.

Each OSHA inspection should include a complete preventive maintenance service. The OSHA CFR 1910.179 regulation, “Periodic Inspections,” provides the crane inspector with a simple 10-point checklist. However, the opening paragraph states that this inspection must include the requirements of a “Frequent Inspection.”

Two items listed in the “Frequent Inspection” checklist require more than just a visual inspection. They include checking all functional operating mechanisms for maladjustment interfering with proper operation, and checking all functional operating mechanisms for excessive wear of components. These two items alone tell us that a very thorough inspection will be required, meaning covers will be removed and, in many cases, components disassembled to confirm conditions and operations.

The inspection/preventive maintenance service also includes verifying that the equipment complies with ANSI B30.2 for top-riding double girder cranes, along with the inspection/maintenance requirements of the OEM. Additional requirements, such as NEC, CMAA specifications, and the ANSI standards for other material handling equipment, including monorails, single girder cranes, and hoists, have to be considered.

Inspection details

Like many inspection companies, Advanced Overhead Crane, Crosby, Texas, uses a basic checklist that covers components of the unit being inspected and also doubles as a condition monitoring report. Components are evaluated for degree of wear and assigned a value. In determining the proper value, the inspector must take into account the degree of wear and the duty cycle of the equipment, along with the frequency of inspection and service maintenance to determine the life of the component going forward. The report also addresses recommendations to improve reliability and enhance safety of the equipment.

Another important tool the inspector has on-site is a complete computerized history of each unit being inspected. Every crane or hoist serviced, inspected, or repaired – including any and all adjustments and corrections, no matter how small they may be – is incorporated in the computerized history file. The report helps recognize repetitious problems and allows the inspector to see exactly what has occurred with a particular unit over the years. It is invaluable when analyzed with the condition monitoring report.

While having computerized reports and fancy inspection checklists are fine, they are worthless if the inspector does not get into the equipment while inspecting it. This includes accessing the underside of the crane or hoist to inspect load-bearing components that are critical to the operation. Running a crane through an operational check and watching from the floor is not an inspection.

Compliance and education

The intent of all OSHA regulations and ANSI standards is to maintain a safe working environment, but the regulations and standards have not kept up with the new technology incorporated in the cranes and hoists of today. The inspector must know and understand the operations of the electronics and safety circuits incorporated in the new equipment being sold into the marketplace.

Continued education and training must be a major concern for all inspection companies. The Crane Certification Association of America, for example, offers the crane inspector’s licensing program, as well as continued education programs for overhead and mobile cranes. The chart at right details the maintenance techniques of the CCAA program. Additionally, many companies involved with CCAA offer inspector and operator training across the country.

Ensuring a degree of safety is the biggest challenge for overhead crane inspection companies. Continued training, a keen understanding of the equipment, and OSHA inspections and preventive maintenance performed as a single service makes certain your overhead cranes and hoists are working correctly. ♦

AUTHOR BIO Richard Wehrmeister is co-owner of Advanced Overhead Crane, Crosby, Texas, and has been inspecting, servicing, and repairing cranes since 1974. By trade, Wehrmeister is a licensed master electrician and electrical contractor in Texas. Additionally, he maintains a California overhead cranes inspector license (CA283) and CCS certification as a licensed crane surveyor with the Crane Certification Association of America. For more information, visit www.advancedoverheadcrane.com

CCAA Overhead Crane Inspection and Preventive Maintenance Checklist

Hoist

- Hoist duty classification. Circle one: H1, H2, H3, H4, H5, mill duty, molten metal, nuclear, or other_____. Is hoist used beyond designed duty cycle?
- Hoist frame and suspension (condition)
- Upper tackle (sheaves, pins*, and bearings*)
- Wire rope, drum, and anchorage (condition)
- Wire fittings and end attachments
- Load block, thrust bearing*, sheaves, load hook, and hook latch
- Gearing* and bearings*
- Hoist gearbox oil level
- Drive shaft and couplings
- Hoist load braking system. Circle one: regenerative, eddy current, dynamic braking (DC motor), mechanical load brake*, variable frequency drive (VFD), or other_____. Is system functioning as originally designed? Mechanical load brake can be tested with load while releasing holding brake to ensure proper operation.
- Hoist motor brake: shoe, disc, or conical (AC or DC). Is condition and adjustment correct?
- Hoist control panel condition
- Hoist wiring, magnetic controls, overloads, fusing, and electrical functions. Has OEM design been compromised?
- Hoist speed controls. VFD, magnetic, and wound rotor motor speed resistors. Are controls working as originally designed?
- Hoist upper and lower limit switches (gravity, geared, paddle, rope guide activated, over wrap limit, plugging limit, or other_____)
- Hoist overload limits (weight activated or slip clutch). Test with load.
- Hoist motors: AC squirrel cage, wound rotor, and DC motor (brushes, brush holders, slip rings, rotor*, and bearings*)

Bridge

- Bridge duty classification. Circle one: Class A1, A2, B, C, D, E, F, mill duty, molten metal, nuclear, or other_____. Is bridge used beyond designed duty cycle?
- Bridge end trucks (welds, bolts, connections, and sweep plates)
- Bridge girders (condition). Cracks, welds, etc.
- Bridge girder to end truck using proper fasteners
- Bridge capacity signs
- Bridge wheels (treads, flanges, alignment, and condition)
- Bridge wheel gears and pinions (condition)
- Bridge axles* and bearings*
- Bridge line shaft, couplings, bearings*, and alignment
- Bridge reducer bearings*, gears*, and oil level

- Bridge brake: shoe, disc, or conical (AC, DC, or hydraulic). Is condition and adjustment correct?
- Bridge wiring, magnetic controls, lockable disconnect, overloads, fusing, and electrical functions. Are controls working as originally designed?
- Bridge speed control (ballast resistors, electronic soft-start, fluid coupling, wound rotor motor speed resistors, or VFD). Has OEM design been compromised?
- Bridge motors: AC squirrel cage, wound rotor, and DC motor (brushes slip rings, brush holders, rotor*, and bearings*)
- Bridge travel limits or anti-collision
- Bridge end stops and shock-absorbing bumpers (condition)

Trolley

- Trolley frame (welds, bolts, connections, and sweep plates)
- Trolley rails or running surface (condition)
- Trolley wheels (treads, flanges, alignment and condition), wheel gears, and pinions (condition)
- Trolley axles* and bearings*
- Trolley line shaft, couplings bearings*, and alignment
- Trolley reducer bearings*, gears*, and oil level
- Trolley brake: shoe, disc, or conical (AC, DC, or hydraulic). Is condition and adjustment correct?
- Trolley control panel condition
- Trolley wiring, magnetic controls, disconnect, overloads, fusing, and electrical functions. Are controls working as originally designed?
- Trolley speed control (ballast resistors, electronic soft-start, fluid coupling, wound rotor motor speed resistors, or VFD). Has OEM design been compromised?
- Trolley motors: AC squirrel cage, wound rotor, and DC motor (brushes, slip rings, rotor*, and bearings*)
- Trolley travel limits or anti-collision
- Trolley end stops (condition)
- Trolley shock-absorbing bumpers (condition)

Cab and Catwalks

- Clearance cab (7' above the working floor)
- Is cab located to afford a minimum of 3" from all fixed objects?
- Access to cab or catwalk (no gap exceeding 12")
- Do walkways have a minimum of 48" headroom, toe boards a minimum of 4" high, and hand rails at 42" high?
- Does cab-operated crane have a fire extinguisher of at least 10 BC?
- Are runway conductors guarded to prevent contact when entering or leaving cab?
- Does cab-operated crane have a warning device?
- Foot-operated brakes shall not exceed 70 pounds of force when depressed.
- Cab disconnect switch

- Note on cab controls: Cabs 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 power failure. 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.

General Electrical

- Pendant (directional labels, functions, and condition)
- Radio (directional compass, functions, and condition)
- Radio-operated warning device (visual or audible)
- Pendant cord and strain relief (condition)
- Control and power conductors (cross bridge electrification condition)
- Runway conductors (condition)
- Busbar collector shoes and alignment (condition)
- Festoon track and trolleys (condition)
- Roving pendant track and trolleys (condition)
- Bridge and runway conductors guarded against contact from hoisting ropes during normal operations
- Lockable runway disconnect switch
- Safety labels (operator warning tag, runway disconnect ID tag)
- Operational test all functions

General Structural/Mechanical

- Bridge rails or running surface (condition) – straight, level and in span
- Clearances bridge and hoist (3" overhead, 2" side)
- Runway to column connection using proper fasteners.
- Bridge and trolley truck frames have means to prevent 1" of drop (safety drop lugs)?
- Runway stops (condition)
- Runway, support columns or hangers (condition)
- Runway foundation and anchors (condition)
- Deterioration due to rust, oxidation, chemicals, etc. Explain_____.

Miscellaneous

- Does inspection include the requirements of any local city, state, or other government specifications?
- Crane manufactured per CMAA or other specification. Specify_____.
- New crane systems wired per NEC 2005 or NEC 2008
- Engineers stamp on crane supporting structure and footings available
- Maintenance and proof testing records available
- OEM operational and repair manuals available
- Does inspection follow manufacturer's specifications?
- Does inspection include below the hook attachment?

* Items checked through operational observation only.