



Using Inspection Checklists to Improve Hoist Safety

A weights and measures inspector is unloading a 1000 pound block at a test site when the chain binds and the overhead hoist stops, leaving the block suspended in mid-air. An articulating crane (knuckle boom) is lifting 3000 pounds of weight when it snaps at the base. A metrologist is using the loading dock's overhead hoist to unload a 100 gallon stainless steel prover off the back of a flatbed trailer when the sling starts to give, causing the prover to shift and almost fall.

It is human nature to take the tools we use daily for granted until there is an accident or a breakdown. Fortunately, no one was hurt in the incidents described above, but the dangers presented by hoists as they are normally used in the weights and measures world are too great for that kind of complacency. It is not enough for hoist operators to look at the equipment they are using daily; they must register what they are seeing and then make a conscious decision about whether their equipment is safe before they start to use it. Inspection checklists can be a tool to train hoist operators to be more conscious of the state of their lifting equipment.

If you've never had a hoist inspection program, you may wish to start by researching your hoist manufacturer's recommendations. Many lifting products come from the factory with an inspection list and a preventative maintenance schedule which you can use as an initial template for your agency's program. Another useful resource is provided by Lab Safety Supply's EZ Facts® Safety Info Online. Much of the information below can be found in the article "Overhead Hoist (Underhung) Inspection" available at www.labsafety.com/refinfo/ezfacts/ezf328.htm.

The American Society of Mechanical Engineers (ASME) and the American National Standards Institute (ANSI) recommend both frequent and periodic

inspections of hoists, slings and rigging. It is a good idea for your organization to comply with these recommendations not only because they will improve safety, but also because the Occupational Safety and Health Administration (OSHA) requires businesses to comply with common industry safety practices in addition to OSHA's own regulations. Although state and local government agencies are generally exempt from federal OSHA oversight, states which operate their own state workplace safety and health programs under plans approved by the U.S. Department of Labor are required to extend that coverage to state and local government employees. They are also allowed to develop plans that cover only government employees. Check with your state's Department of Labor (or its equivalent) and at www.osha.gov/dcsp/osp/public_sector.html to determine what requirements apply to your agency.

The principal components of ANSI/ASME recommended hoist inspections are consistent regardless of the type of lifting mechanism involved. Inspections are categorized as Frequent (visual, unrecorded) and Periodic (may require more than visual inspection, recorded.) This article will focus on the inspection recommendations from ASME/ANSI consensus standard B30.16 Overhead Hoists (Underhung Hoists.) If your agency uses other lifting equipment, you can find specific inspection recommendations for all container, mobile and locomotive, monorails and underhung, overhead and gantry, stacker, portal, tower and pedestal cranes, as well as rigging and slings in ANSI/ASME B30. Construction Package. (Available for purchase at www.webstore.ansi.org)

Inspection intervals are determined by whether use of the hoist can be classified as Normal, Heavy, or Severe Service:

Normal Service — Service that involves operation with randomly distributed

loads within the rated load limit or uniform loads less than 65% of rated load for not more than 15% of the time for manually operated hoists and 25% of the time for electric or air-powered hoists.

Heavy Service — Service that involves operation within the rated load limit, which exceeds normal service.

Severe Service — Service that involves normal or heavy service with abnormal operating conditions. [Author's Note - Because of weather, humidity and dusty conditions, it is likely that most hoists used by weights and measures officials would be classified as being in severe service. See definition of Abnormal Operating Conditions below.]

Abnormal Operating Conditions — Environmental conditions that are unfavorable, harmful or detrimental to the operation of a hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust-laden or moisture-laden atmospheres and hazardous locations.

Frequent Inspections must be performed by the hoist operator (or other designated person) monthly if the hoist is in normal service; weekly if it is in heavy service; or daily if the hoist is in severe service.

Frequent inspections of hand-operated chain hoists must include visual checks of:

- All functional operating mechanisms for maladjustment and unusual sounds
- Hoist braking system for proper operation
- Hooks in accordance with ASME B30.10
- Hook latch operation, if used
- Load chain in accordance with para. 16-2.5.1 or 16-2.6.1
- Load chain reeving for compliance with hoist manufacturer's recommendations

Frequent inspections of electric or air-powered hoists must include visual checks of:

- ☑ All functional operating mechanisms for maladjustment and unusual sounds
- ☑ Limit devices for operation
- ☑ Hoist braking system for proper operation
- ☑ Air lines, valves, and other parts for leakage
- ☑ Hooks in accordance with ASME B30.10
- ☑ Hook latch operation, if used
- ☑ Hook rope in accordance with para. 16-2.4.1 (a)
- ☑ Load chain in accordance with para. 16-2.5.1 or 16-2.6.1
- ☑ Rope or load chain reeving for compliance with hoist manufacturer's recommendations

Many of these components must be checked while the hoist is in static condition. Operating mechanisms, brakes and limits should be checked with the hoist in motion under zero load. The standard does not require that frequent inspections be recorded but state regulations may.

Periodic Inspections are conducted by a designated (qualified) person who may be an agency employee or may be an outside contractor. Such a person would typically be a hoist company employee with the skills and tools to test the structural integrity of the beam. If the periodic inspection is performed by a weights and measures employee, it is a good idea to have it done by a different employee than the normal hoist operator. A second set of eyes may see something the normal operator has overlooked. Or something the normal operator is reluctant to bring to management's attention!

Periodic inspections are done yearly if the hoist is in normal service; semi-annually if it is in heavy service; and quarterly if the hoist is in severe service.

Periodic inspections of hand-operated chain hoists must include checks of everything checked during a frequent inspection plus:

- ☑ Requirements of frequent inspections
- ☑ Evidence of loose bolts, nuts, or rivets
- ☑ Evidence of worn, corroded, cracked, or distorted parts such as load blocks, suspension housing, hand chain wheels, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings, pins, rollers, and locking

and clamping devices

- ☑ Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining numbers
- ☑ Evidence of damage or excessive wear of load sprockets, idler sprockets, or hand chain wheel
- ☑ Evidence of worn, glazed, or oil-contaminated friction discs; worn pawls, cams or ratchet; corroded, stretched, or broken pawl springs in brake mechanism
- ☑ Evidence of damage of supporting structure or trolley, if used
- ☑ Label or labels required by para. 16-1.1.4 for legibility
- ☑ End connections of load chain

Periodic inspections of electric or air-powered hoists must include checks of everything checked during a frequent inspection plus:

- ☑ Hoist rope in accordance with para. 16-2.4.1 (a)
- ☑ Evidence of loose bolts, nuts, or rivets
- ☑ Evidence of worn, corroded, cracked, or distorted parts such as load blocks, suspension housing, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings, pins, rollers, and locking and clamping devices
- ☑ Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining numbers
- ☑ Evidence of damage or excessive wear of load sprockets, idler sprockets, and drums or sheaves
- ☑ Evidence of excessive wear on motor or load brake
- ☑ Electrical apparatus for signs of pitting or any deterioration of visible controller contacts
- ☑ Evidence of damage of supporting structure or trolley, if used
- ☑ Function labels on pendant control stations for legibility
- ☑ Label or labels required by para. 16-1.1.4 for legibility
- ☑ End connections of rope or load chain

Records of periodic inspections must be created by the individual performing the inspection. Check your state workplace safety and health program's requirements to determine how long your agency should retain those records.

Checklists can make it easier for your

employees to remember to look at all required components when conducting either frequent or periodic inspections. The inspection requirements for rigging and slings (not covered in this article but available in ANSI/ASME B30 Construction Package) can be combined with those for hoists to create one master checklist. The lists might be written into your agency policies or included in your safety manual. Or you might decide to post a checklist where the hoist operator will see it before using the hoist. You might also choose to create a log where the hoist operator or other designated person signs and dates the completed inspection checklist after each inspection. Such a log could remind the operator to perform inspections at the required intervals, document compliance with your agency's safety policies, and possibly even meet your state workplace safety and health program's records requirements.

Whatever approach your agency chooses to take, performing hoist inspections does not have to be onerous or excessively time-consuming. Aim to make the inspections routine enough that they get performed regularly, but not so routine that your employees sleep-walk through them. Conscious assessment of lifting equipment before it is used is what will keep your employees alive and safe!

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