What are the Three Major Overhead Hazards?

QUESTION

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A. Overloading, fall protection, dropped from above.
B. Mechanical failure, electrical hazards, conduct risk assessment.
C. Electrical hazards, overloading, dropped from above.
D. Objects dropped from above, slings and attachments not secured properly, overloading.

ANSWER

C. Electrical hazards, overloading, dropped from above.

WHY IS IT RIGHT

The focus for all objects at heights should always be on preventing objects from falling rather than a catching object, or on limiting the damage after they fall.

Fewer than 25% of construction workers think that all accidents are preventable. What is clearer that workers often view themselves as victims of accidents and not as the cause of accidents?

Expect workers at height to wear a fall protection harness and be tied off because we’re trying to prevent people from falling.

But we need to stop things from falling in the same way we have worked diligently towards preventing people from falling.

To determine what kind of force an object falling from a certain height generates, calculations can be done around the physics of gravity. For example, an eight-pound wrench dropped 200 feet would hit with a force of 2,833 pounds per square inch – the equivalent of a small car hitting a one-square-inch area.

Most organizations have deployed a fall protection program for workers but have not deployed a drop prevention program for tools and equipment. Expanding a fall

protection program to include tools and equipment is far easier for companies and employees than creating a new program for drop prevention.

The difference between a fall protection program for humans and fall protection program for tools is only a matter of perspective: The first saves you; the second saves others.

While the most obvious person at risk when objects are dropped is the one underneath, the worker using the tool also can be at risk, as his knee-jerk reaction may be to catch or go after the falling object, which could cause him/her to lose balance and fall.

People are not designed to work at height. That's why they wear a fall protection harness. Tools are not designed for use at height either. That's why we also need to provide a fall protection harness and connection point for tools – so they easily can be tied off.

A harness for a person acts as the primary component of a personal fall protection system. However, for tools, we typically rely on secondary, passive systems, such as debris nets. We rarely deploy a primary system for tools and equipment.

Countless companies in the manufacturing and construction industries rely on overhead cranes to lift and transport materials. When installed and used properly, these systems make operations easier and safer. But, overhead crane accidents cause severe injuries and fatalities every year. Preventing these disasters requires workers to recognize certain hazards that occur during operation and follow safety procedures to avoid them.

There are multiple hazards that can arise regarding cranes in general. Many accidents involve large lift systems like tower cranes and mobile cranes. But hazards do exist with all types of cranes—including overhead cranes—and in all facets of crane operation. (Overhead cranes are defined by OSHA 1910.179(a)(8) as a crane with a movable bridge carrying a movable or fixed hoisting mechanism, and traveling on an overhead fixed runway structure.)

Analysis of overhead crane accidents reveals three common safety hazards that every company using overhead lift systems should be aware of to keep their workers safe. It's important to be familiar with these hazards and learn to recognize them in the workplace in order to avoid them. The three most common hazards involving overhead cranes include **electrical hazards, overloading, and materials falling/slipping from overhead hoists.**

Overhead Hazards

One of the most dangerous **overhead hazards** is also one of the most common: electrical wiring and power lines. If a ladder, pipe, or other object that can conduct electricity comes in contact with an energized power line (or even an improperly grounded light fixture), electric shock, serious burns, and fires can result.

OSHA's most recent list of the top ten most frequently cited violations, three of the ten (and two of the top three) have something in common: they involve injuries related to overhead work. Specifically, the #1 violation involves fall protection, #3 relates to scaffolding, and #7 involves ladders.

With overhead work, reference is to work that takes place above other workers and work that’s being performed with arms raised above a worker’s head.

Work being done above others.

In the best possible scenario, work would never take place in situations where someone else is working below. However, the reality is that it can happen on a worksite, whether deliberately or unknowingly.

Anytime someone is working above someone else, there is the possibility that objects may be dropped. That object may be a tool, something that is being worked on, or even debris. If the object falls on a vehicle or piece of equipment, it may cause significant damage. But if it falls on another worker, serious injury may be the result.

A simple approach is to say that those who are working above others should be careful with how they handle tools and equipment, so they’re less likely to drop anything. However, nobody intends to drop objects. That’s why we refer to those situations as accidents. It’s also why workers should take specific steps to reduce the potential for those accidents, and to limit the possible damage.

The first step is to ensure that people who are working below are aware of the work that’s happening above them and are taking adequate precautions. For example, the area beneath the work can be marked off with caution tape, barricades, and signs that alert workers to the potential for falling objects.

If a task that’s being performed overhead will take only a short time, the worker who is performing that task or that worker’s supervisor should personally inform those who will be working below so that they have a heightened sense of awareness.

Instead of carrying tools and materials up a ladder or in one’s pockets, it’s usually safer to place them in buckets or other containers attached to a lift line or winch. Make sure the items being raised are balanced properly and secured in such a way that they’re not likely to tip over or slip out on the journey.

While working, make sure that materials and tools are kept away from the edges of scaffolding or other raised surfaces, so they’re less likely to fall if bumped or dislodged. If prolonged work is being performed on a raised surface, toe boards, screens, or similar protection will reduce the chances of objects being knocked off. Tools or materials that are no longer needed should not be stored on the raised surface.

Falling objects don’t always fall from scaffolds or ladders. Poorly stacked materials such as pallets or boxes can easily tumble down if bumped. Items that are loaded improperly on a lift truck or other equipment can also fall. The best prevention is to follow proper stacking procedures and to avoid stacking beyond safe heights. In addition, anytime there is a potential for falling objects, even from a fairly low height, hardhats are a must.

Objects can also fall when they slip out of the hands of a worker carrying them, or when someone doesn’t realize how heavy the object may be and fails to lift it properly. That type of fall does not involve a great distance, but can easily cause severe injury to feet and toes. The same thing can happen if a worker

props a component or piece of equipment against the wall, but doesn't secure it. Another worker bumps into the object, and it falls on his feet. This type of injury underscores the value of safety shoes.

WHY IS EVERYTHING ELSE WRONG

OVERHEAD CRANE SAFETY—THREE MAJOR HAZARDS AND PREVENTATIVE MEASURES

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The following analysis of each **hazard** provides a description, potential risks, reasons why accidents occur, preventative measures to avoid them, and applicable OSHA requirements. One commonality that all three hazards share is the qualifications of crane operators. It is the responsibility of the crane owner and job supervisor to ensure that crane operators are competent and qualified to do the job.

ELECTRICAL HAZARDS

According to OSHA, nearly 50 percent of overhead crane accidents are the result of machinery coming into contact with a power source during operation. Power line contact is literally defined as the inadvertent contact of any metal part of a crane with a high-voltage power line. Power line contact most often occurs when the crane is moving materials nearby or under energized power lines and the hoist line or boom touches one of them. Usually, the person who is electrocuted is touching the crane when it comes into contact with the power line. But, the danger is not just limited to the operator. It extends to all personnel in the vicinity.

A single contact with power lines can result in multiple deaths and injuries. Each year nearly 200 people die from power line contact and about three times as many are seriously injured. Most victims are guiding the load at the time of contact, but risks extend to everyone present at a job site.

Power line contacts most often occur because safety planning isn't considered and preventative measures haven't been taken to avoid hazards. Planning is one of the biggest accident deterrents available. To start, it's important to establish who is in charge of prejob safety planning before any cranes arrive at a worksite. Furthermore, cranes should be kept away from unsafe working areas; OSHA and ANSI both outline safe distances operators must maintain from a power source when working at a job site. Areas that are considered hazardous are referred to as danger zones, and crane operators should be clearly notified of all potential danger zones. The area within a 10-foot radius of a power line is considered an unsafe work area—or danger zone—and it must be clearly marked on the ground by insulated barriers, fences, tape, etc. This will help create visual clues for workers to ensure that the crane is always positioned so that the boom and hoist line can't intrude in the danger zone.

OSHA also regulates that overhead crane operators use precautions when working near power lines—even outside of the 10-foot radius. This means, operators should consider all power lines as energized until the electric company tells him or her otherwise. Operators should also maintain a safe speed when operating near power lines. Crane booms or truck-mounted trolleys using an electrical remote control system for loading and unloading can also be very dangerous. If the boom contacts a power line, the operator holding the control box is usually electrocuted instantly. This type of equipment should never be used near power lines. A non-conductive, pneumatic or radio remote control system is a much safer choice when working near power lines.

Overall, it's important for operators and workers to receive the appropriate training to avoid danger zones where electrocution can occur. Operators should have workers observing nearby to assist them whenever it is difficult to visually maintain the necessary clearance. Be sure that any ladders, tools, and systems are non-conductive, and ask the electric company to de-energize and ground power lines or install insulation whenever people are working near them.

OVERLOADING

According to OSHA, 80 percent of all crane upsets and structural failures can be attributed to exceeding the crane's operational capacity. When a crane is overloaded, it is subject to structural stresses that may cause irreversible damage. Swinging or sudden dropping of the load, using defective components, hoisting a load beyond capacity, dragging a load and side-loading a boom can all cause overloading.

OSHA estimates that one crane upset occurs for every 10,000 hours of crane use. Nearly 80 percent of these upsets can be attributed to predictable human error when the operator inadvertently exceeds the crane's lifting capacity. Overloading most often occurs when poorly trained personnel are allowed to operate cranes. Oftentimes, operators mistakenly believe they are able to rely on their instinct or experience to determine whether a load is too heavy. It's crucial that any crane operator know the weight of a load and the capacity of the crane. Using technologies such as load-measuring systems for training and planning can greatly reduce the hazard of overloading and operator incompetency.

OSHA requires workers to provide formal training for all crane operators, but operator certification is only required for operators using equipment with a maximum manufacturer-rated capacity greater than 2,000 pounds. Employees who are

not qualified are only permitted to operate equipment as operators-in-training with a certified trainer. Formal training should ensure a working knowledge of crane load charts, and on-the-job training is a great preventative measure if the trainer is qualified.

Overall, most crane safety programs outline competent personnel requirements, and it’s a good idea to become familiar with them. Cranes have become more sophisticated, with the ability to lift heavier loads further and faster than ever before. Today’s operator must be well trained and have a clear understanding of load dynamics, lifting capacities at various configurations, and the conditions under which such lifting capacities are valid.

MATERIALS FALLING

Falling materials is a major concern at any work place or job site using overhead cranes. Visual impairment, two-blocking, slipping, mechanical failure, or operator incompetency can all result in serious injuries or fatalities. If materials are not properly secured, for instance, the load can slip and land on workers in the vicinity or cause major damage to property. For larger or mobile cranes, undesired movement of material can pinch or crush workers involved in the rigging process.

Statistics show that nearly 20 people died in 2012 as a result of accidents with overhead hoists. That’s because the loads being lifted by overhead hoists tend to be fairly heavy and cause serious damage if dropped. Slings and attachments that aren’t secured properly can be a major safety hazard, and when objects begin to slip, they will eventually crash to the floor below.

One way to reduce the risk of falling materials is to perform regular maintenance of hoists. Load testing maintenance ensures that you know how many pounds the hoist can handle, and it helps to maintain good working condition. Maintenance should always be treated seriously when it comes to heavy machinery. If a moving part on an overhead crane wears out or breaks the hoist, it can cause serious damage. Performing regular maintenance ensures the hoist and overhead crane remain in good working order and that all operations run smoothly.

Aside from maintenance, improper securing of the load or the slings that carry the load is one of the leading causes of accidents with overhead hoists and cranes. If the load or sling holding the load isn’t properly secured, the objects can slip out, tip, and eventually crash to the ground below. Mechanical failure can also cause machinery to malfunction unexpectedly and drop a heavy load. To reduce the risk, OSHA mandates that operators make daily crane inspections. When mechanical problems do arise, operators should use the lockout/tagout procedure to prevent accidental startup or movement of the crane until the problem has been repaired.

Employees working around overhead cranes should always wear proper head, foot, hand, and eye protection. The crane operator and any workers below should also be aware of his/her surroundings and never walk under a lift. A crane operator must always lower a load to the ground before leaving the lift or during idle times. When moving items, he or she should never raise the load higher than required for clearance.

When operating a hoist, properly trained employees in the vicinity should

understand that they are working in a dangerous area. Installing “Hoist Danger” signs around the work area will help to alert employees that a hoist is operating over their heads. Workers should be trained to stay clear of the hoist, and they should never walk beneath loads suspended in the air. Likewise, suspended loads should never be moved over employees and personnel should never be lifted or transported on a hoist.

Careful operation of the hoist is another important safety factor to consider whenever overhead cranes are used. The person responsible for managing the hoist should be well trained and qualified. Moving the crane too quickly and jerking the hoist when it’s bearing a heavy load can be hazardous to the crane operator and workers nearby. Changing or reversing direction should be done slowly and carefully. Reversing direction can cause heavy loads to spill, and swinging the load is very risky. Operators and controllers must maintain 100 percent focus on the task at hand to avoid potentially dangerous situations.

DROPPED OBJETCS FROM ABOVE

The third largest cause of death in the workplace, behind transportation incidents and workplace violence, is contact with objects and equipment, the majority of which are being struck by a falling object.

There are more than 52,260 recorded incidents of people being struck by falling objects in the last recording period, according to OSHA. This number likely is much lower than the actual number, of course, but this would mean that, on average, nearly 143 objects strike people every day – including Saturdays and Sundays – in the United States alone.

Dropped Objects Prevention – Best Practices and Solutions

1. Expand fall protection programs to include tools and equipment.
2. Provide a competent person to manage the expanded program.
3. Raise awareness of drop hazard identification and mitigation techniques within the workforce.
4. Require risk assessments before performing work with drop hazards.
5. Consider regularly scheduled “hazard hunts” to drive awareness of drop hazards.
6. Consider using tethered tools. These tools either have built-in connection points placed by the manufacturer or can be retrofitted with connection points. Next, the tools are connected to a lanyard. This solution not only applies to small hand tools, but also can be used for tools and small pieces of equipment that weigh up to 80 pounds, such as rivet busters, portable generators, etc. Tethered tools mostly are used by larger construction companies and are not in wide use yet. But this may change, as younger workers tend to be more concerned with safety than veterans.
7. Consider using energy-absorbing lanyards, which will reduce the force associated with the dropped tool. Tools either can be connected to a worker through a tool belt, harness or wristband, or anchored to a fixed structure.
8. Tools that weigh more than five pounds should never be tied-off to a person. If a heavy object gets loose, the weight and force could dislocate a wrist or shoulder or even pull a worker over a ledge or scaffolding.
9. If a worker has a tool attached to him and needs to pass it off to a colleague, that colleague can connect to the tool before the passing worker

disconnects from it, ensuring the tool is 100 percent tied off and never has the opportunity to become a drop hazard.

10. Employees should be properly trained on how to use tethered tools. They must be taught how to attach a connection point to the tools, use the lanyards properly and respect the weight rating of the lanyards.
11. As a best practice, workers at height should only bring up the tools they need to do their job.
12. Hoist up items and then transfer them over with different lanyards to the workers themselves or to static anchor points. This can be done in a bucket, which can then house the extra tools. But many popular plastic buckets present other safety concerns, as they frequently fall over, spilling their contents.
13. There are many buckets, bags and pouches available on the market with closure systems to dramatically reduce the likelihood of items falling out. Some even close automatically when turned upside down.
14. A secondary solution to dropped objects are toe boards. Toe boards should be capable of withstanding a force of at least 50 pounds in any downward or outward motion.
15. Debris nets are another secondary solution and provides a way to catch dropped objects. Green netting that goes over buildings when they are being refaced in areas where there are a lot of pedestrians is the most recognized form, but there also is netting that is put up within the construction project, such as directly under work being done, to help stop objects from falling on workers below. However, nets can’t be the only solution, as objects often don’t fall straight down or are small enough to go right through the debris netting.

Preventive Procedures is necessary

OSHA can use the General Duty clause to cite companies when dropped objects have caused injuries or are a hazard, but OSHA rarely cites a company for dropped objects under the General Duty clause. The clause says there must be a hazard; the hazard must be recognized; the hazard causes or is likely to cause injury or death; and the hazard must be correctable.