

MAJOR PROGRAM POINTS

"SAFE RIGGING PRACTICES"

Part of the "GENERAL SAFETY SERIES"

Quality Safety and Health Products, for Today...and Tomorrow

Outline of Major Points Covered in the "Rigging Safety" Course

The following outline summarizes the major points of information presented in the course on "Rigging Safety". The outline can be used to survey the course before taking it on a computer, as well as to review the course when a computer is not available.

- **We have all heard the phrase... "A chain is only as strong as its weakest link".**
 - When it comes to crane operations, rigging can often be that "weak link".
 - How we attach a load to a crane can make the difference between a successful lift or an unfortunate accident.
- **Since over 90% of crane-related accidents are the result of human error:**
 - We must pay close attention to our work.
 - Poor judgement or overconfidence can lead to serious mistakes.
- **If you are not careful when rigging a load, you could:**
 - Damage the load.
 - Damage the lifting equipment.
 - Even injure a coworker.
- **If you get injured, you could face major medical bills and lost wages while you are away from work.**
- **Because of the hazards associated with working with cranes, OSHA has had "crane safety" regulations in force for some time.**
 - But until recently, they hadn't been changed for almost 40 years.
- **However, with the crane-related accidents in the construction industry increasing rapidly, in August of 2010 OSHA updated a number of provisions in the construction portions of the regulations.**
 - To be more in tune with today's sophisticated equipment and operating environments.

- **The crane regulations cover a number of areas, including:**
 - Ground conditions.
 - Assembly and disassembly.
 - Work around power lines
 - And inspections.

- **They also address:**
 - Signaling.
 - Fall protection.
 - Work area control.
 - Operator certification.
 - Qualifications for "signal persons" and maintenance personnel.
 - And training.

- **While you should be familiar with all of the provisions of the crane regulations that affect you and the people that you work with, some of the recent changes in the regulations are particularly notable.**

- **Before a crane is positioned or assembled, it must be verified that the "ground conditions" are firm, drained and graded so that the crane can set up safely.**

- **Crane assembly, disassembly and set-up must be overseen by personnel who are "competent" and "qualified".**

- **There are new restrictions as to how far a crane must be from power lines when it is being assembled, operating or traveling.**
 - Generally it must be at least 20 feet away at all times.
 - But this can vary depending on the amount of current going through the lines).

- **By November 10, 2014 all crane operators must be "certified" by either:**
 - An accredited testing organization.
 - A licensed government agency.
 - Or a qualified employer program.

- **"Signal persons" must be "qualified" based on the criteria OSHA has specified in the regulation, by either:**
 - A "third party qualified evaluator".
 - Or their employer's own "qualified evaluator".

- **Maintenance employees can only operate a crane as they work on it if:**
 - They're familiar with how that specific type of crane functions.
 - Or they're directly supervised by a qualified or certified crane operator.

- **When preparing to rig a load, the first step is to make sure you're wearing the appropriate protective clothing. The right clothes and gear can help protect you from:**
 - Cuts.
 - Bruises.
 - And other injuries.

- **For example, sleeveless shirts can expose arms to sharp objects and rough surfaces, so shirts with long sleeves are what's best.**
 - Tuck in loose or baggy shirts to prevent them from snagging on anything while you are rigging.

- **You can help prevent rigging-related accidents if you:**
 - Stay focused.
 - Take the proper precautions.
 - Learn how to rig a load safely.

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 - Shirts with long sleeves are best.
 - Tuck in loose or baggy shirts to prevent them from snagging on anything while you are rigging.

- **It is also important to wear leather gloves.**
 - They guard your hands against cuts and bruises while handling slings, crane hooks and the loads themselves.

- **Safety shoes with steel toes protect feet from:**
 - Dropped loads.
 - Heavy equipment.

- **A hard hat and safety glasses will help to protect your head and eyes from :**
 - Lowered hooks.
 - Anything that might accidentally fall from a load.

- **Once that you are dressed for the job, you need to consider your health and state of mind.**
 - Go over a "mental checklist" before you begin working.

- **Start by asking yourself... "Am I physically and mentally prepared to do my job?"**
 - For example, if you are taking medication, you should ask your doctor or pharmacist if it could affect how you work.

- **Some drugs cause:**
 - Drowsiness.
 - Dizziness.
 - Lack of coordination.

- **Another question you need to ask is... "Am I emotionally prepared?" When we are angry or upset:**
 - We can make hasty decisions which could jeopardize the safety of the people around us.
 - Someone could get hurt... even you.

- **You also need to make sure that the crane you are working with has been inspected.**
 - By catching problems, such as leaks, before they become serious, we can help to prevent breakdowns... and rigging accidents.
 - If the crane malfunctions while in operation, it could be dangerous to you and the people you work with.

- **When rigging a load, you should make sure that you inspect the Hook as well.**
 - Hooks are used to attach the load to the crane.
 - Never use a hook with a broken or bent safety latch.
 - The sling could slide off the hook and damage the load.

- **Hooks are designed to carry the load in the center, so never lift a load on the tip.**
 - This could cause the hook to stretch or weaken.
 - If the hook is stretched just 15 percent from the original size, or is twisted more than 10 degrees, do not use it.
 - Get another hook.

- **Faulty equipment is not the only potential danger that you need to be aware of. One of the most common hazards is electrocution.**

- **You should be careful around overhead power lines and electrical equipment. To avoid these hazards:**
 - Make sure that you know the height of any power lines near your work site.
 - Know the location of all electrical equipment.

- **Lightning can also be a problem.**
 - Always keep track of the weather.
 - Stop crane operations during a electrical storm.

- **Another potential hazard that a rigger can face is an "accidental drop".**
 - Accidental drops are usually caused by problems with the "angle of the load" (the angle between the load and the level ground).
 - Ideally, the angle of the load should be zero, with the load parallel to level ground.
 - Never let the angle exceed 10 degrees or the load could slip and fall, resulting in damage or injury.

- **Once the potential hazards have been identified, you are ready to start setting up for the lift.**
 - First, you need to choose a sling... the piece of equipment used to carry the load.

- **Slings can be made of a variety of materials, such as:**
 - Wire rope.
 - Chain.
 - Metal mesh.
 - Synthetic fabrics.

- **When choosing the type of sling to use, it is important to consider a number of things about the load:**
 - Size.
 - Shape.
 - Even the temperature (some slings may stretch, melt or break in extreme heat).

- **The wire rope sling is one of the most widely used types of slings, because of its strength and versatility.**
 - They can be used to lift almost anything, unless the load exceeds the sling's weight capacity.
 - Wire rope slings are commonly used in construction or other rugged environments.

- **Before using a wire sling, inspect it for:**
 - Broken or worn wires.
 - Check the end connections for corrosion or breakage as well.

- **Do not use the sling if it has:**
 - Kinks.
 - Crushed wires.
 - Unwinding strands.

- **The chain sling is used for lifting heavier loads.**
 - It is also used in very hot environments because it is less likely to be damaged by heat than a wire rope sling.

- **Before lifting a load with a chain sling, inspect it for cuts or worn links.**
 - While the chain may look good on the outside, it might not be in good shape on the inside.
 - Be sure to push the links together and check where metal rubs metal.

- **A metal mesh sling is the one to use when lifting objects that have sharp edges, such as bar stock or plate steel.**
 - The edges of the load usually cannot cut through the metal mesh.
 - Metal mesh slings also make it easier to balance a load due to their wide load-bearing surfaces.

- **The synthetic sling is the most flexible sling, and is often used when loads need to be protected from damage.**
 - Their light weight and flexibility can also reduce fatigue and stress on the rigger.
- **After you have picked out the proper sling, you are ready to attach the load.**
 - Start by determining which hitch to use.
 - A hitch is the way the sling is configured to connect the load to the hook.
- **There are three kinds of hitches:**
 - Basket hitch.
 - Choker hitch.
 - Vertical hitch.
- **The basket hitch is the most commonly used type of Hitch.**
 - To make a basket hitch, put the sling around the load.
 - Then put both ends of the sling over the hook, cradling the load.
- **To create a choker hitch:**
 - Wrap the sling around the load.
 - Place one end of the sling through the other.
 - Tighten it down, and secure the load.
- **Sometimes a regular choker hitch will not keep the load tight enough.**
 - In these cases, use a "double wrap" choker hitch.
 - Wrap the sling around the load twice.
 - Then loop the end through the opposite end shackle.
 - Attach the end to the hook.
- **"Vertical hitches" are used on loads equipped with lifting attachments, such as eyebolts.**
 - With a vertical hitch, the hoist hook is first connected to the sling.
 - The sling is then attached directly to a lifting attachment on the load.

- **Like slings, choosing which hitch to use is affected by the weight, size and shape of the load.**
 - For example, a long metal pole would need a double wrap choker hitch to keep it from slipping out of the sling.

- **Remember, you should always use some type of sling, no matter what type of job you are doing.**
 - Never wrap the hoist rope itself around a load.
 - This could damage the rope, the hook or the load.
 - The hoist rope should only be used to lift and lower the hook.

- **As you hitch the load to the hook, you may want to place padding around the load to protect the sling.**
 - You can also place wood or other "softeners" between the sling and the load, to prevent the sling from cutting into the load.

- **Sometimes more than one sling is required to secure a load that is extremely large or has an awkward center of gravity (the point at which the load is balanced).**
 - When two slings are needed to balance the load, you need to pay particularly close attention to the "sling angles" (the angles between the slings and the load itself).

- **A sling angle of 90 degrees is ideal because it puts the least stress on the load.**
 - As the sling angle decreases, the force exerted on the sling increases.
 - If this force exceeds the sling's weight capacity, the sling could break, dropping the load.

- **For example, if you are using two slings to lift a load that weighs 2,000 pounds, at sling angles of 90 degrees, each sling would have to support half of the weight.**
 - So each sling would have to have a weight capacity of at least 1,000 pounds.

- **Your supervisor can give you a chart which lists the "sling angle factor" for various sling angles.**
 - By multiplying the sling angle factor by half of the weight, you can determine what the weight capacity of each sling must be if you are using two slings to lift a load.

- **To continue the example, the sling angle factor for two slings that are attached to a load at 60 degrees is 1.155.**
 - For the 2,000 pound load, we would multiply 1,000 pounds (half the load's weight) by 1.155.
 - This would tell us that each sling would need to be rated for at least 1,155 pounds.

- **If the sling angles were 45 degrees, each sling would need to be able to hold 1,414 pounds, significantly more than slings attached at angles of 60 degrees.**
 - Sling angles of less than 45 degrees should be avoided altogether, because they put an unsafe amount of stress on the slings.

- **Something else to keep in mind when using multiple slings is that the shorter the slings, the sharper the sling angles.**
 - If you use slings that are very short, you could easily overload them.
 - This would cause the slings to break and drop the load.

- **Once the load has been rigged safely, it is ready for the lift.**
 - It is important that both the crane operator and the rigger know the standard hand signals.

- **To signal that you want to hoist a load:**
 - Raise one forearm upright.
 - Point your finger up.
 - Move your hand in a small horizontal circle.

- **To indicate that you want to lower a load:**
 - Extend one arm downward.
 - Point your forefinger down.
 - Again move your hand in small, horizontal circles.

- **To show that you want the crane to stop:**
 - Extend one arm out to the side with your palm facing down.
 - Move it back and forth horizontally.

- **To call for an "emergency stop":**
 - Extend both arms out with palms down.
 - Move your arms horizontally.

- **When you are using a boom crane, there are a few other hand signals that you need to know.**
 - To signal that you want to raise the boom, extend our arm and close your fist. Then raise your thumb up.
 - To show that you want to lower the boom, extend your arm and close your fist. Then point your thumb towards the ground.

- **Once you are comfortable that communications are clear, the load can be hoisted.**
 - Keep in mind that cranes are only intended to lift straight up and down.

- **If you lift a load diagonally, you could cause structural damage to the crane.**
 - If you are using a truck crane, you could even tip the whole crane over.
 - Make sure the crane is directly over the load before you lift.
 - Verify that the load is rigged above its center of gravity.

- **Make sure that the weight of the load plus all of the equipment you are using does not exceed the crane's weight capacity.**
 - Otherwise, you might overload the crane.
 - Remember to check the load chart or other documentation that will tell you the crane's limits.

- **As you lift, pay attention to the angle of the load.**
 - The angle should not exceed 10 degrees from horizontal.

- **The next step is to move the load.**
 - Moving the load can often be easier if you work with "taglines."
 - These ropes can be used to help control and position a load.

- **Put tension on the tagline to:**
 - Prevent the load from spinning while the crane is in motion.
 - Direct the load to its destination.
 - Maneuver the load into tight places.

- **Be sure to ask the crane operator to use very slow speeds when traveling with a load. This:**
 - Helps you safely guide it to its destination.
 - Helps the operator to see where he is going.
 - Makes it easier for you to keep an eye on the load.

- **Make sure that the crane operator stops periodically so that you can check that everything is still secure.**
 - Watch out for sudden stops and starts which could unbalance the load.

- **When directing the load while the crane is moving, be careful not to pass it over people or allow anyone to walk under it.**
 - This guards against the possibility of an injury occurring should the load slip and fall.

- **Never leave a suspended load unattended.**
 - This is an "accident waiting to happen".
 - Always have the crane operator "land" the load when it gets to a stopping point or its final destination.

- **Make sure to help the crane operator to lower the load slowly.**
 - Direct the operator to stop a few inches from the landing point (to verify that the load is secure and nothing is in its path).
 - Then have it lowered the rest of the way.

- **After the load has been landed:**
 - Remove the slings from the hook and return them to the proper storage place.
 - If they are left on the hook, they could snag on other objects when the crane is moved.
 - Make sure that the operator raises the hook high enough so that no one will hit their head.

* * * **SUMMARY** * * *

- **Rigging plays a very important role in crane operations.**
 - If you are careless, and the load is not rigged properly, someone could get hurt... even killed.
- **Know the OSHA crane regulations, and how they affect you and your coworkers.**
- **Be sure to wear the protective clothing and equipment needed for the job.**
- **Go over your "mental checklist" to make sure that you are ready to focus on what you are doing.**
- **Know what types of slings and hitches can be used to rig a load... and when to use them.**
- **Make sure that every load is secure and that sling angles are safe.**
- **Know the weight capacity of the crane you are using.**
- **Be sure to use proper hand signals so that your "message" is being understood.**
- **Working around cranes can be dangerous.**
 - By knowing how to rig properly, we will make our link in the "chain of safety" stronger.
 - Each of us can help to prevent crane-related accidents!