

MAJOR PROGRAM POINTS

"CRANE SAFETY IN CONSTRUCTION ENVIRONMENTS"

Part of the "CONSTRUCTION SAFETY KIT" Series

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

OUTLINE OF MAJOR PROGRAM POINTS

The following outline summarizes the major points of information presented in the course on "Crane Safety in Construction Environments". 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.

- **Some of the questions that we ask when we operate industrial cranes include:**
 - What is the crane's "weight capacity"?
 - Is the "hoist rope" rated for the load?
 - Are we attaching the load correctly?

- **There are many types of cranes.**
 - Basic "rope and pulley" cranes can often be found in your backyard.
 - But industrial cranes are bigger, and more powerful.
 - With more power, comes danger.

- **Over 90% of crane-related accidents are caused by human error. If you are not careful, you could:**
 - Damage the equipment
 - Damage the load.
 - Even injure a coworker.

- **If you are injured, you could face:**
 - Major medical bills
 - Lost wages.
 - Even a loss of life.

- **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.

- **Fortunately, most crane-related accidents can be prevented. We can protect our equipment, jobs and coworkers with:**
 - The right attitude.
 - Hard work.
 - Some basic knowledge.

- **Most mistakes that occur when working with cranes are caused by:**
 - Poor judgement.
 - Lack of attention
 - Overconfidence.

- **Before working with a crane, you should run down a mental checklist to make sure that you are ready and able to do what is needed.**

- **Start with your health and state of mind.**
 - They are very important when operating cranes.
 - Ask yourself if you are physically and mentally prepared to work with the machine.

- **For example, if you are taking medication ask your doctor or pharmacist if it could affect your performance. Some drugs cause:**
 - Drowsiness.
 - Dizziness.
 - Problems with coordination.

- **The labels on the bottles usually warn you "not to operate heavy machinery."**
 - This includes cranes.

- **Another question that you should ask yourself is if you are emotionally prepared. We jeopardize the safety of our coworkers when we:**
 - Are angry.
 - Are upset.
 - Make hasty decisions.

- **Being prepared also means wearing protective clothing while working with cranes.**
 - Safety shoes with steel toes protect feet from dropped loads and heavy equipment.
 - A hard hat and safety glasses help protect your head and eyes from falling or hanging objects.

- **Shirts without sleeves can expose your arms to sharp objects and moving parts.**
 - Long sleeve shirts provide the most protection.
 - Tuck in shirttails if they are loose or baggy so they will not get caught in the machinery.

- **Once you have gone over your checklist, and are dressed properly for the job, inspect the crane and the area where you will be working.**
 - Identify potential problems, such as small leaks, before they become serious.
 - This can help to prevent breakdowns and accidents.

- **Begin with the space around the crane.**
 - Clear away boxes, tools or equipment.
 - This ensures nothing will be in the path of the crane when it is lifting or moving.

- **Once the area is clear, focus on the crane itself.**
 - Check the fluid levels to see if they are within acceptable limits.
 - Try out the controls to be certain that they work.
 - Test the brakes to make sure they are functioning properly.

- **Listen for unusual noises.**
 - They can direct you to leaks that could cause incorrect gauge readings or loss of power.

- **Another thing to check is the condition of "limit switches".**
 - A limit switch cuts off power at or near the end of a crane's range of motion.

- **While you are inspecting the crane, do not forget to include the hook.**
 - Hooks are needed to attach the load to the hoist rope.
 - Never use hooks with broken or bent safety latches on them.

- **Remember, a hook is not safe if the opening is:**
 - Stretched 15% or more from its original size.
 - Twisted more than 10 degrees.
 - If necessary get another hook before starting the job.

- **The bottom line when inspecting a crane is that if you are not sure that it is safe, do not use it.**

- **Once you are satisfied that the crane and the work area are safe:**
 - Make sure that you are familiar with how the crane works before you start using it.
 - This is not a situation where you should try to "learn as you go".

- **Most cranes fall into three basic categories. Each has its own characteristics:**
 - Boom cranes.
 - Jib cranes.
 - Overhead cranes.
- **"Boom cranes", such as "tower cranes" and "truck cranes", are the most complicated type of crane.**
 - There are many important things to remember when operating them.
 - Operators usually have to go through a rigorous training and qualification process before using them.
 - While we don't cover "tower cranes" in this program, much of what we're discussing (including the OSHA crane regulations) applies to them as well.
- **Boom cranes have an arm which can be raised and lowered. This changes the "boom angle".**
 - Some booms are a fixed length.
 - Other booms are telescoping, so the length can be adjusted as needed.
 - Some booms also have extensions, which can make them longer.
- **Taking the time to set up a boom crane correctly can help prevent accidents.**
 - Most accidents involving boom cranes are the result of mistakes made during set-up.
 - Pay especially close attention at this point in the process.
- **The most important thing is to make sure that a boom crane is level.**
 - Operating a boom crane that is not level can result in severe structural damage to the crane.
 - It may cause the crane to tip over, injuring coworkers and damaging equipment.

- **Some boom cranes, such as a truck crane, have wheels and are equipped with "outriggers" (legs used to secure and level the crane).**
 - If you use one of these types of cranes, the outriggers must be placed on solid ground before lifting the boom.
 - Once the outriggers are extended, check the level inside the cab to see that the crane is even.
 - If the crane is not level, adjust the outriggers until it is.

- **Be careful, because the level inside the cab may not be accurate.**
 - To double-check that the crane is set up correctly, you might want to put a "bubble level" on the base of the boom.

- **When setting up for a lift, always use a "load chart".**
 - A load chart lists the weight capacity for the crane at various boom angles and lengths.
 - Every boom crane has its own load chart.
 - One copy is permanently attached to the crane.
 - Another copy is usually held by a supervisor.

- **Make sure to include all lifting accessories, such as rigging, the block and the hook when calculating the total weight of the load.**
 - The boom length and the angle of the boom arm also affect the weight capacity of the crane.
 - Take your time and make sure that you understand the load chart... before you make a lift.

- **"Jib cranes", such as a "wall crane" or "hammerhead crane", share some characteristics with boom cranes.**
 - Jib cranes have an arm which suspends the hoist rope, block and hook.
 - The arm can pivot to position their load.

- **However, unlike most boom cranes, a jib crane cannot be adjusted for angle.**
 - It is locked in a horizontal position.
 - But the hoist block can be moved horizontally along the jib arm.

- **Before starting a jib crane lift, inspect the crane for bent supports or misalignment.**
 - Make sure that you know the range of motion of the jib arm.
 - You do not want to put your hands, fingers or a coworker in jeopardy.

- **Another thing that you should check on the jib crane is the "hoist brake".**
 - You need to make sure that it can hold and lower the load.
 - Be sure that you know where the "emergency stop" button and the overload Indicators are located.

- **The third major type of crane is the "overhead crane".**
 - An overhead crane, such as a gantry crane, carries its load along a bridge.
 - It is attached to a building's walls, or to supports running up from the ground.

- **Before using an overhead crane, make sure that the "end stops" and "bumpers" are secure and functioning properly.**
 - The end stops prevent the crane from running off the end of its rails.
 - The bumper (also referred to as a buffer) is a device designed to reduce the impact when a crane reaches its end stops.

- **You should also test the "trolley" (the moving portion of the crane).**
 - Make sure that it can travel the full distance of the bridge without problems.
 - Try the brakes to be sure that they work as well.

- **Remember, you should always check the weight capacity limits on any crane, including an overhead crane, before you use it.**
- **Before operating any type of crane, be aware of the standard safety devices that all cranes have.**
 - There are two kinds of devices.
- **"General safety devices" include bells and warning lights.**
 - These will sound off or blink if the crane's sensors detect any problems.
 - Other devices, such as horns and warning tags, are used directly by the operator to tell other workers that there is a problem with the crane.
- **"Operational safety devices" monitor and control the handling capacity of the crane. These include:**
 - Overload indicators.
 - Emergency stop buttons.
 - Limit switches.
- **Once the crane has been inspected, and you are certain you know how to operate it safely, you are ready to "rig the load".**
 - First, make sure that the load (including rigging equipment) will not exceed the crane's weight capacity.
 - Remember to consult the crane's "load chart" if you are using a boom crane.
- **As you rig the load, 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 boom crane, you could tip the whole crane over.
 - Make sure that the crane is directly over the load, and the hoist rope is hanging straight down.

- **When you attach the load, be sure to put the sling on the hook correctly.**
 - A hook is designed to take the load in its center.
 - Never put a sling on the tip of the hook.
 - The weight could stretch and weaken the hook significantly.

- **Once you have attached the load, you are almost ready for the lift.**
 - First, make sure that everyone knows the standard hand signals.

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

- **To signal that you want to lower a load:**
 - Extend your forearm downward.
 - Point your forefinger down.
 - Move your hand in a small, horizontal circle.

- **To indicate 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 are important to know.**
 - To signal that you want to raise the boom, extend your arm to the side and give the "thumb's up" sign.
 - To show that you want to lower the boom down, extend your arm to the side and give the "thumb's down" sign.

- **Once everyone is sure of the hand signals, you are ready to lift the load.**
 - But there are some precautions to take here too.

- **If you are not careful during a lift, you could cause an "accidental drop".**
 - Accidental drops are usually caused by problems with the load angle (the angle between the load and level ground).
- **Ideally, the load angle should be zero, with the load parallel to the ground.**
 - The load angle should never exceed 10 degrees.
 - Otherwise, the load could slip and fall, causing damage or injuries.
- **Remember to keep the hoist rope as close to straight up-and-down as possible.**
 - If your hoist rope is off center, it could start swinging the load around.
 - This could damage the crane and the load.
 - Even injure a coworker.
- **After the lift, you may need to "travel" with the load.**
 - If you have to move the crane, proceed at very low speeds.
 - This lets you see where you are going.
 - At the same time you can keep your eye on the load.
- **It is a good idea to stop periodically to make sure the load is stable.**
 - Avoid sudden stops and starts, which could unbalance the load.
- **Always watch where you are going.**
 - Never pass a load over people.
 - Never allow anyone to walk under a load.
 - The load could fall and hit someone.
- **Moving a load can often be easier if you use "taglines" to help control and position it.**
 - A tagline is a piece of rope that is attached to the hoist block or the load itself.

- **A rigger will hold onto the tagline while the operator runs the crane. As the crane moves, the rigger:**
 - Puts tension on the ropes to prevent the load from spinning.
 - Maneuvers the load into tight places.
 - Directs the load to the landing point.

- **Always "land" the load when you get it to the destination.**
 - Leaving a load suspended is creating an accident waiting to happen.

- **Lower the load slowly, stopping a few inches from the landing point.**
 - Make sure that the load is secure
 - Verify that nothing is in the load's path.
 - Then lower the load the rest of the way.

- **After landing the load:**
 - Remove the slings and put them back where they belong.
 - If they are left on the hook, they could snag on other objects when the crane is moved.
 - Raise the hoist block high enough so that people and vehicles can pass underneath.

* * * **SUMMARY** * * *

- **Cranes are powerful machines.**
 - If they are not used properly they can cause serious damage.
 - When we work with cranes we need to know how to do it safely.

- **Know the OSHA crane regulations, and how they affect you and your coworkers.**

- **Go over your mental checklist to make sure that you are prepared for the job at hand.**

- **Be sure to wear appropriate protective equipment.**

- **Know the different types of cranes and rigging equipment... and when each should be used.**
- **Inspect any crane you are about to use, and make sure it is functioning properly.**
- **Know the weight capacity of the crane you are using.**
 - Remember to consult the load chart for a boom crane.
- **Pay Attention! Don't get distracted during a lift.**
- **Never carry a load over people.**
 - Or let anyone walk under a load.
- **Land the load and secure the crane at the end of the job... do not leave anything "hanging".**
- **Remember, 90% of the accidents that occur with cranes are due to human error.**
 - Knowing how to rig, lift and land a load correctly is essential to working with cranes safely!