Accountability Starts With You

Today you will learn about the safe operation of mobile cranes, specifically articulated boom trucks (or knuckle boom trucks as we will refer to them). We will strive to provide information that will increase your knowledge and help to make you a better and safer operator.

In our highly mechanized world, cranes are the workhorses that have increased the economic growth and productivity in construction, mining, logging, maritime, production, and service facilities. While driving in urban areas, it is not uncommon to see mobile cranes, tower cranes, and stationary cranes in a short period of time performing a wide variety of jobs.

Mobile cranes are versatile machines that can be used for many job applications from loading and unloading materials to placing those materials or personnel up to heights hundreds of feet high. Many are mounted on truck beds and can move between job sites at highway speeds carrying payloads at excess of 15,000 pounds.

Mobile cranes come in all sizes. From large all terrain cranes used to lift loads in excess of 75 tons to small capacity utility truck cranes used for lifting much smaller loads, training is needed to ensure safe operation and productivity.

During this training we will cover the anatomy of the articulated boom truck crane, or knuckle booms as we will call it for the rest of this presentation. We will stress the importance of inspecting it each day before it is put into service.

We will look at the crane's stability and the importance of understanding and using the load chart for each lift.

We will discuss the safety considerations of properly setting up the crane and the importance of good communication on the job site and the hand signals for mobile cranes.

Pedestrians

Valuable Load

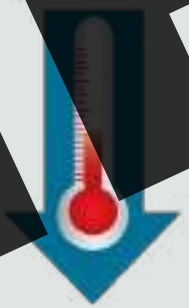
Wind Gusts Exceeding 20 MPH

Location Near Power Lines

Soft Soil

Unknown Load Weight

Below-Freezing Temperatures



Wet, Dark, Foggy Conditions

We will talk about lifts that are 'critical lifts' and the additional planning that is required.

Electrocution

Outrigger Hazards/Overloading

Riding the Load

Distractions

Maintenance Related

Poor Rigging

Lastly, we will introduce the most common hazards associated with crane operation and how to recognize and avoid them.

Upon completion of this training, you should be familiar with the knuckle boom truck used by your company. You should have an increased knowledge of how to set-up, safely operate them and be able to recognize the common hazards that surround their use.

Mobile Crane Types

Strictly defined, mobile cranes are any type of crane that is mounted on a chassis that can be transported to and from a worksite and maneuver around that worksite.

The smallest of these are utility boom trucks. They are mounted on work vehicles and are used by most utility and public works departments.

The more common boom truck has a straight boom and is usually mounted on the front or rear of a flatbed truck. They are often seen in the construction industry and are favorites for delivering trusses and construction materials to worksites.

Articulating boom trucks, also called knuckle boom trucks, have a boom that folds up when stowed. These are very versatile cranes that are especially effective on sites where there are overhead obstructions. Many of these have just a hook on the end of the boom rather than a hoist line and winch.

Trolley boom truck cranes are almost exclusively used for delivering concrete septic tanks and vaults to construction sites. Similar to a boom truck, the hook and block can trolley along the length of the boom and the boom can be lifted and swung.

Rough terrain cranes, also called RT's, are just that. They have huge balloon type tires that allow them to work in less than desirable terrain and are the only mobile crane that we will discuss in this training that are rated to do 'pick and carries.' Although RT's can be driven on city streets for short distances, they are usually delivered to the worksite on a trailer.

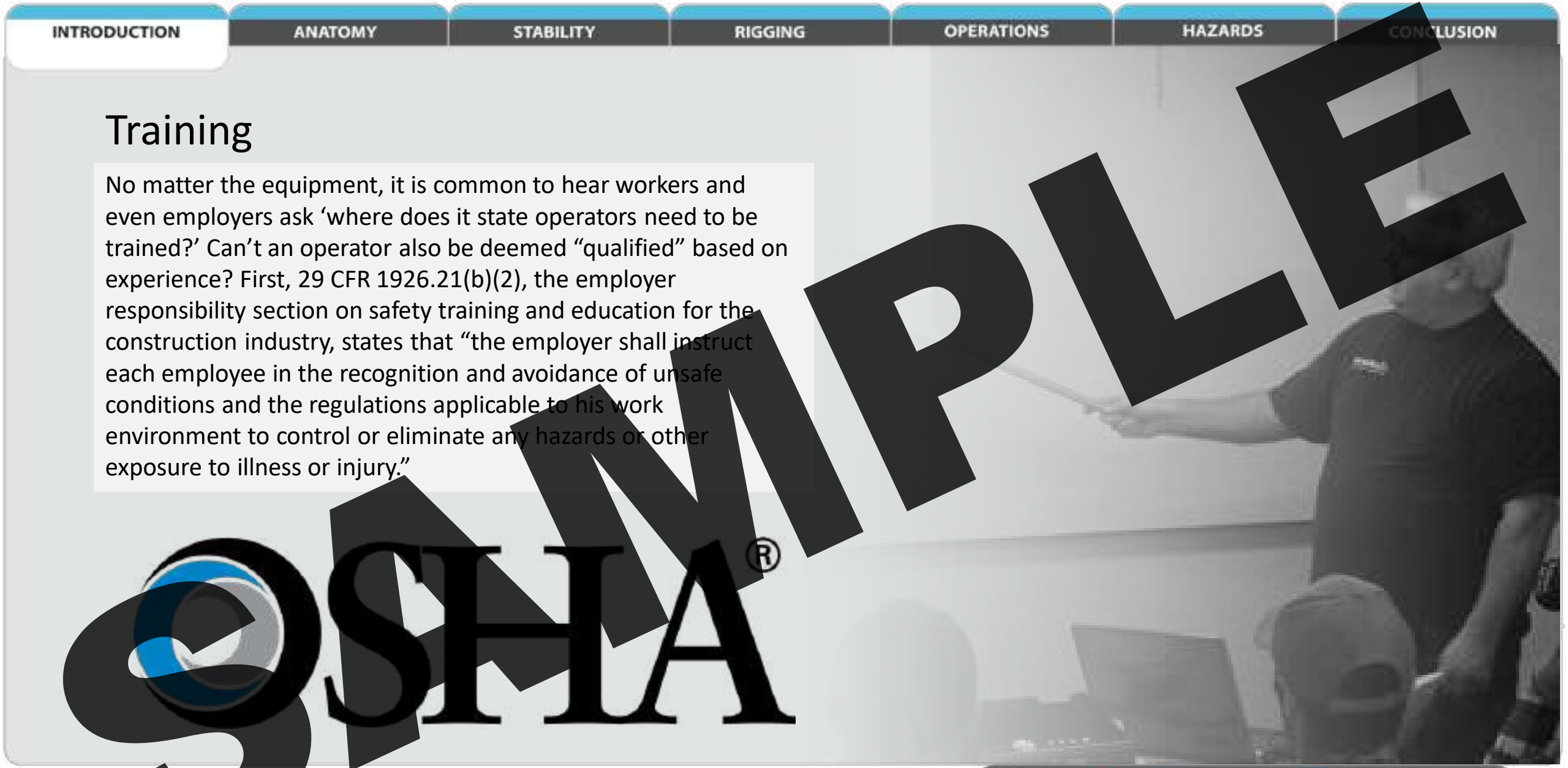
All terrain cranes (AT's) are a grand achievement of the hydraulic age. These cranes have many axles, larger than normal truck tires and can be driven over the highway and ready to go at the worksite in a relatively short period of time. Many have capacities that can exceed 100 tons.

Truck mounted cranes are mounted on a truck chassis and can have hydraulic or lattice booms. They also can be transported over the highway but are not as versatile nor can they achieve the same capacities as the all terrain cranes.

Crawler cranes are mounted on tracks and can be used in multiple configurations depending on the need. Some can be fitted with booms and jibs that will allow it to reach heights of over 300 feet! The majority of these have lattice booms and because they are mounted on tracks they can be set up and used in almost any environment. These cranes, unless transported on a barge, need to be disassembled for transportation to and from worksites.

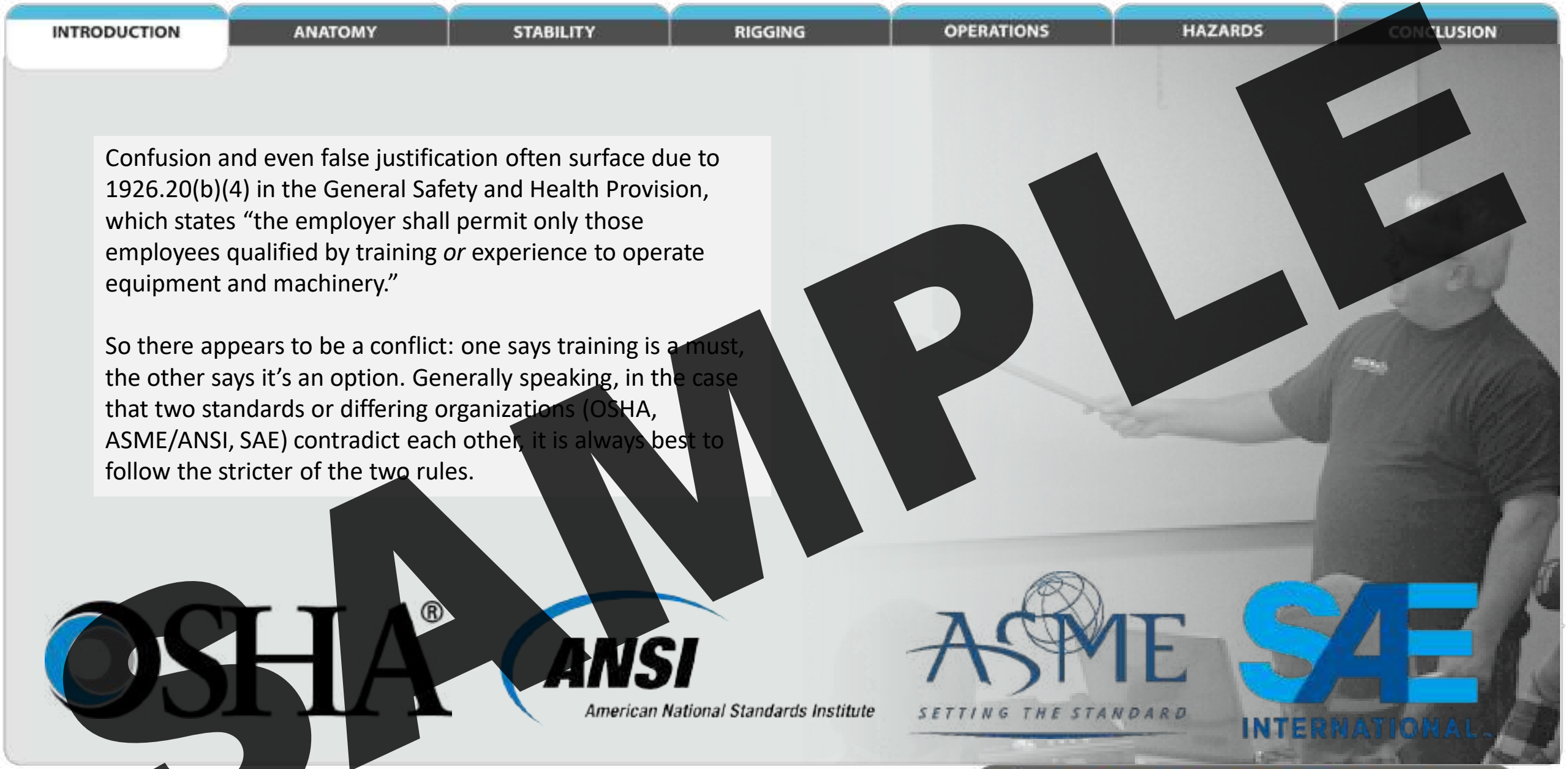
Training

No matter the equipment, it is common to hear workers and even employers ask 'where does it state operators need to be trained?' Can't an operator also be deemed "qualified" based on experience? First, 29 CFR 1926.21(b)(2), the employer responsibility section on safety training and education for the construction industry, states that "the employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury."



Confusion and even false justification often surface due to 1926.20(b)(4) in the General Safety and Health Provision, which states “the employer shall permit only those employees qualified by training *or* experience to operate equipment and machinery.”

So there appears to be a conflict: one says training is a must, the other says it’s an option. Generally speaking, in the case that two standards or differing organizations (OSHA, ASME/ANSI, SAE) contradict each other, it is always best to follow the stricter of the two rules.



OSHA®

ANSI American National Standards Institute

ASME SETTING THE STANDARD

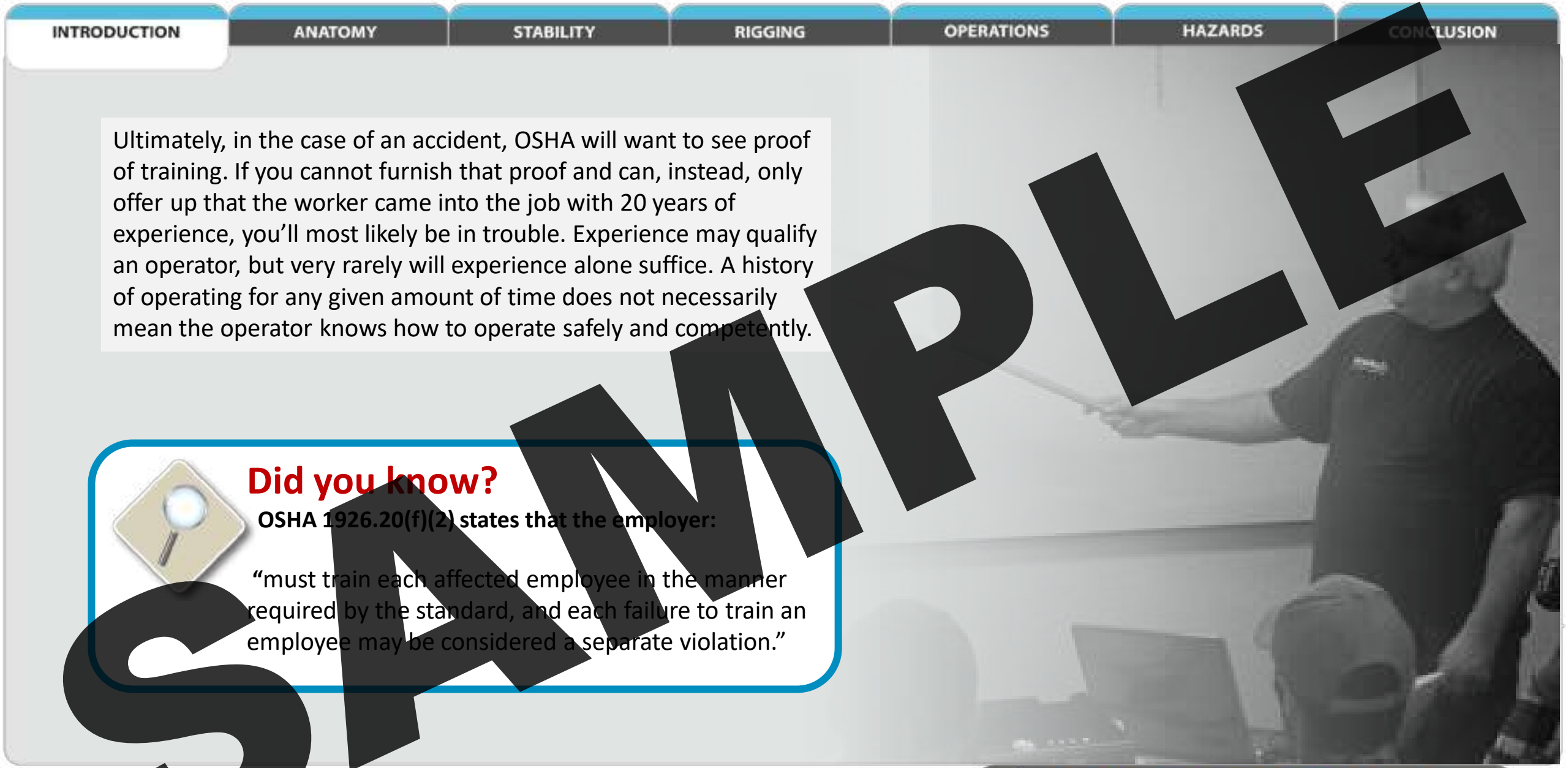
SAE INTERNATIONAL

HARD HAT TRAINING SERIES

SAFETY PROVISIONS, inc.

KNUCKLE BOOM OPERATOR SAFETY TRAINING

Ultimately, in the case of an accident, OSHA will want to see proof of training. If you cannot furnish that proof and can, instead, only offer up that the worker came into the job with 20 years of experience, you'll most likely be in trouble. Experience may qualify an operator, but very rarely will experience alone suffice. A history of operating for any given amount of time does not necessarily mean the operator knows how to operate safely and competently.



Did you know?

OSHA 1926.20(f)(2) states that the employer:

"must train each affected employee in the manner required by the standard, and each failure to train an employee may be considered a separate violation."

Bad habits are easily passed from one worker and one site to another, all in the name of “experience.” Can you think of a particular time—in or outside of construction—where you did something a certain way for years only to discover that you had been doing it wrong the whole time? In this case, as in all cases, in our experience, training will only help. It can reinforce and enhance the good experience while addressing and correcting the bad habits from misguided experience.

Have you heard?

The story of the woman who got in a fight with her husband because she believed “you” were supposed to cut the ends of the ham off before cooking it. Her mom had done it that way for years. Her husband argued it was a waste. Turns out her mom cut the ends off only so it would fit into their smaller pan.

Did you know?

OSHA Regulations specify that an operator *must* take a refresher course if any of the following apply:

- The operator is observed operating the equipment in an **unsafe** manner (e.g., no seat belt, reckless driving, etc.)
- The operator is involved in an **accident *or*** a **near miss**
- The operator received a **poor evaluation** for performance
- The operator is required to **use a different type of machine *or* attachment**
- Workplace conditions have changed

Additionally, 1926.64(g)(2) states that "The employer…shall determine the appropriate frequency of refresher training."

In line with OSHA requirements, anyone who operates heavy equipment must receive training prior to operating the machine on their own. As noted above, OSHA requirements for refresher training are also very specific.

Did you know?

29 CFR 1910.178 specifies that an operator *must* take a refresher course if any of the following apply:

- The operator is observed operating the equipment in an **unsafe** manner (e.g., no seat belt, reckless driving, etc.)
- The operator is involved in an **accident *or*** a **near miss**
- The operator received a **poor evaluation** for performance
- The operator is required to **use a different type of machine *or* attachment**
- Workplace conditions have changed

Additionally, outside of that, 1926.64(g)(2) states that "The employer shall determine the appropriate frequency of refresher training.

It's important to note the last two conditions for refresher training. This term "type" also causes a lot of confusion. Generally speaking, by "type" OSHA means boom truck vs. knuckle boom vs. RT vs AT vs. crawler, etc.; they do not necessarily mean size, although size can play a factor.

Can you think of any differences that might make an articulated crane a different type, thus requiring additional training?

Controls for cranes can vary widely from brand to brand and the same goes for attachments. Work site conditions also consistently change. If you've never used a jib, a suspended man-basket attachment or drywall forks but the need arises, you will need to be instructed on safe use and the potential hazards.

Additionally, if you've always operated on a construction site, but are asked to operate in a warehouse or on a dock over water, these changes, too, will require some additional training.

OSHA®

OSHA's standard says that each operator must be re-evaluated every three years to see if they are still competent to operate the equipment. A so-called "free-pass" cannot be awarded based on experience, age, or time on the job. The extent of the evaluation is to be determined by the employer but should include a written and practical examination that prove continued competency.

Initial training, as well as any evaluations or refresher courses must be documented with the name of the person or persons who taught the class or conducted the evaluation. Although OSHA doesn't require wallet cards as proof of training, many companies and worksites do require onsite proof that you have been trained. At the very least, in the case of an investigation, OSHA will want to see proof of proper and consistent training (in the way of training outlines, class lists, training goals, tests, certificates, etc.)

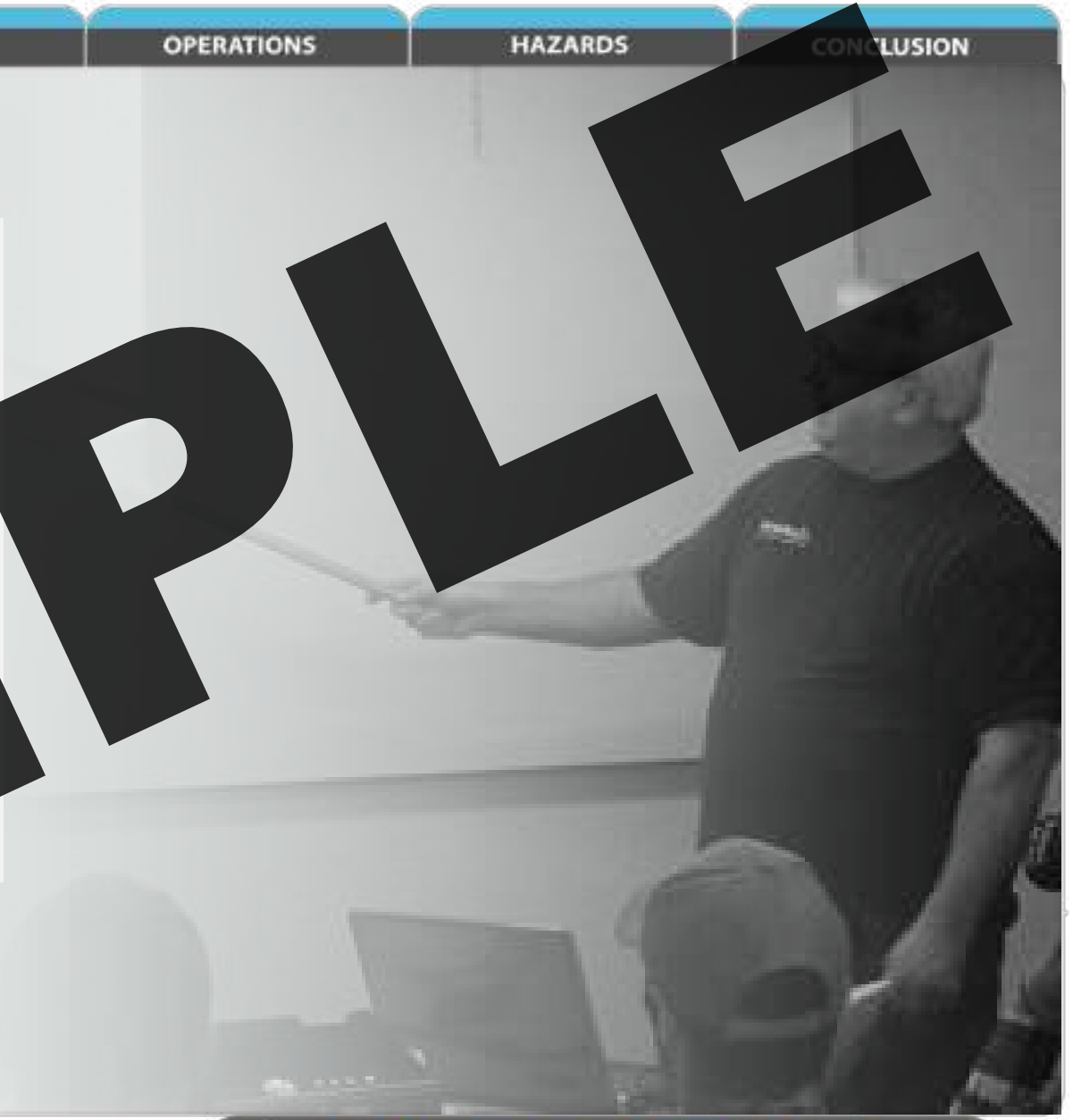
Standards

These are the main standards concerning mobile cranes. Of course, states and cities have additional standards, as do some industries such as maritime, mining and offshore platforms.

We have provided these as a guide, but it's your responsibility to know all federal, state, local and company rules that apply to your machine and job site.

Equipment operators also share in the responsibility to ensure they and their co-workers have:

- Received training by a qualified person.
- Read and understood the manufacturer's operating instructions and safety rules as found in the operator's manual.
- Read and understood all decals, warnings, and capacity plates on the machine and attachments.
- Performed a thorough pre-shift inspection each day prior to operating the machine.



ANATOMY & COMPONENTS