

Lesson: Demolition

- Lesson Objectives:**
- Define the need for a survey prior to beginning any demolition job.
 - List particular areas of structures that are regulated by OSHA requirements when demolition is being done.
 - Describe demolition equipment used to bring down structures without explosives.
 - List some of the hazards that exist in special structures demolition.
 - Discuss safe blasting procedures and the hazards that exist on worksites.

- Topics:**
- Preparing for Demolition
 - Specific OSHA Requirements
 - Demolition Equipment
 - Special Structures Demolition
 - Safe Blasting Procedures

Topic: Preparing for Demolition

Beginning any type of demolition project without everyone involved knowing every aspect of the plan is an invitation for something to go wrong. Planning for a demolition job is more important than actually doing the demolition. Why? Because a good, thorough plan is necessary to achieve a safe, successful demolition project. For this reason, a **competent person** experienced in all phases of the demolition work to be performed should complete all planning work.

OSHA mandates that a **competent person** conduct an engineering survey prior to beginning a demolition project. This survey should determine the condition of the overall structure and the possibility of unplanned collapse of any portion of the structure. Safe floor loads should be determined to prevent overloading as demolition work progresses.

Before beginning every demolition job, the demolition contractor should take a number of steps to safeguard the health and safety of workers at the job site.

In this topic, you learned what these preparatory operations require including the:

- Overall planning of the demolition job, such as the methods to be used to bring down the structure
- Equipment necessary to do the job
- Measures to perform the work safely

The American National Standards Institute (ANSI), in its ANSI A10.6 - *Safety Requirements for Demolition Operations*, states:

"No employee shall be permitted in any area that can be adversely affected when demolition operations are being performed. Only those employees necessary for the performance of the operations shall be permitted in these areas."

Topic summary:

Please take a moment to review these key points before you continue with the next topic.

- An engineering survey should be performed before any demolition project begins, and a written copy must be maintained by the demolition contractor
- This survey should determine the condition of the framing, floors, and walls to take any measures necessary to prevent premature collapse of any portion of the structure.
- The contractor should plan for:
 - Wrecking the structure
 - Equipment to do the work
 - Manpower requirements
 - Safety of all workers on the job site
 - Safety equipment needs
 - Potential hazards such as fires, cave-ins, and injuries
 - Locating the nearest hospital, infirmary, clinic, or physician
 - Protecting the public
- Final preparations include locating and controlling all utility services and providing medical services and fire and police protection.

Topic: Specific OSHA Requirements

OSHA has specific requirements for the various members within a structure. This topic covers the requirements for stairwells and chutes when demolition work is planned in a structure. It also covers regulations that govern specialized removal of walls, chimneys, and masonry sections; the manual and mechanical removal of construction members in demolition work; as well as removal of materials through floor openings.

Having completed this topic, you should be able to:

- Describe important safety precautions for stairs and ladders in demolition work
- Define guidelines for removing materials through floor openings
- Describe hazards incurred in removing special structures
- Define hazards to avoid in mechanical demolition

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- During demolition operations, only the stairways, passageways, and ladders that have been designated as a means of access to the building can be used.
- Any openings cut in a floor to be used for material disposal cannot be larger than 25 percent of the total floor area, unless the lateral supports of the removed flooring remain in place.
- All walls should be left in a stable condition at the end of each shift.
- No material can be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.
- Chute openings cannot exceed 48 inches and must be kept closed when not in use.

- Chutes must be strong enough to eliminate the hazard of failure from the impact of materials or debris loaded into them.
- Employees must stand on 2 x 10 full-size undressed planks while breaking down floor arches between beams located in a way that provides safe support for the workmen if the arch between the beams were to collapse.

Topic: Demolition Equipment

Often buildings being demolished are very old, making it hard to predict precise reactions. Recently, demolition equipment such as shears, hammers, and crane attachments have become safer to use, but the fear of falling and flying debris still exists, thereby demanding workers to wear head and eye protection at all times.

This topic describes the equipment used in demolition work, applicable chemical agents, and proper protective clothing to ensure safety. Safety requirements and control of hazards involved in the use of this equipment are also covered.

Having completed this topic, you should be able to:

- Describe the equipment used in demolition
- Explain how various devices function in demolition activities

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- PPE safety precautions for working with demolition equipment include:
 - Not wearing loose clothing that can get caught in machinery
 - Pulling back long hair to secure it and removing any jewelry that can interfere with safe machinery operation
 - Wearing safety goggles or glasses with side protection
 - Using a facemask in dusty applications and earplugs when the site is especially noisy or for extended periods of work
 - Wearing heavy work gloves to protect against the steady vibration of power tools and the heat that can be generated, especially in the bit
 - Wearing steel-toed shoes or boots
- OSHA standards require:
 - Operating cranes only if you have been trained in safe operating procedures and the OSHA safety requirements
 - Participating in all crane safety programs offered by your employer or labor organization
 - Knowing the location and voltage of all overhead power lines at the job site before operating or working with any crane
 - Assuming that all power lines are energized and maintaining the minimum clearance required by OSHA at all times
- Power line standards require:
 - At least ten feet for lines rated 50 kilovolts or below
 - At least ten feet plus 0.4 inch for each kilovolt above 50 kilovolts (or maintaining twice the length of the line insulator, but never less than ten feet)

- Cranes must comply with noise regulations that may include noise-suppressors fitted with silencers.
- Use mats when necessary to provide support for machines on soft ground. When employing cranes with outriggers, take care to ensure that the outriggers cannot sink into the ground during load handling.
- The force applied by steel wire ropes attached to structural members to be demolished must never exceed the permissible load for the rope.

Topic: Special Structures Demolition

This topic reviews procedures for ensuring safety when demolishing various types of special structures such as towers, pre-stressed concrete construction, and confined spaces. Having completed this topic, you should be able to:

- Describe safe practices for demolishing special structures
- Explain the hazards in special structure demolition

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- Requirements for deliberate collapse include providing adequate space, posting lookouts and using warning signals to protect workers and others, and verifying that no sewers or underground services are on the line of the fall because of the considerable vibration that may occur when the chimney falls.
- The foreman should determine when debris is to be removed, halt all demolition during debris removal, and make sure the area is clear of cleanup workers before continuing demolition.
- Remove debris dropped inside the shaft through an opening in the chimney at grade level.
- Excess weight of the debris might cause a shaft to collapse.
- If the stack has been banded with steel straps, remove these bands as the work progresses from the top down.
- Pay special attention to weather conditions when working on a chimney.

Topic: Safe Blasting Procedures

This topic introduces safe blasting procedures in demolition.

Having completed this topic, you should be able to:

- Explain the fire precautions required near explosives
- Define the measures to ensure vehicle safety when transporting explosives
- Describe required record maintenance for stored explosives
- Describe safety precautions for use and follow-up after blasting

Topic summary:

Please take a moment to review these major points before you continue with the next topic. A complete blasting survey by a qualified person of all adjacent improvements and underground utilities is required, and if excessive vibration is possible, tests should be made to determine safety limits to prevent damage to nearby property.

- Use explosives to demolish tower-like structures only if there is a minimum of 90 feet of open space for at least 150 percent of the height of the structure or the explosives specialist can demonstrate consistent previous performance with tighter constraints at the site.
- A blaster must be qualified in the field of transporting, storing, handling, and using explosives as well as be familiar with state and local explosives regulations.
- Every effort should be made to ensure that fires and sparks do not occur near explosive materials.
- Vehicles for transporting explosives must carry at least a ten-pound-rated serviceable ABC fire extinguisher, and drivers must be trained in its use.
- Never leave a motor vehicle transporting explosives unattended.
- Rotate explosives in stock to minimize deterioration.
- Any loose, broken, defective, or leaking packages of explosives should be segregated and disposed of according to manufacturer's instructions because of the hazards involved.
- Providing a dry, well-ventilated place for storing explosives is one of the most important and effective safety measures.
- Blasting should be suspended during the approach and progress of an electrical storm, and all people should be removed from the area.
- Signs warning against the use of mobile radio transmitters and cell phones should be posted on all roads within 1,000 feet of blasting operations.
- Standard signals should be established to indicate before the start of blasting and when blasting is completed, and personnel in the area should be familiar with these signals.