Overview

Lesson: Concrete and Masonry

Lesson Objectives:

- Explain what concrete is and describe OSHA general provisions for concrete and masonry.
- Describe OSHA requirements for cast-in-place concrete.
- List the hazards associated with concrete and masonry use and discuss the various control methods.
- Explain why silica is hazardous and list good work practice for reducing silica exposure and preventing silicosis.

Topics:

- General Information
- Safety Requirements for Cast-In-Place Concrete
- Hazards and Controls
- Silica

Topic: General Information

This topic reviews the general safety provisions for concrete and masonry. Having completed this topic, you should be able to:

- Describe OSHA general safety requirements for concrete and masonry in these areas: construction loads, reinforcing steel, post-tensioning operations, concrete buckets, working under loads, personal protective equipment, and equipment and tools

Topic summary:

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

- Construction loads must not be placed on a concrete structure or portion of a concrete structure unless it has been determined by a qualified person (in structural design) that the structure or portion of the structure is capable of supporting the intended loads.
- If there is any protruding reinforcing steel that workers could either fall onto or into, it must be guarded to eliminate the hazard of impalement.
- Employees (except those essential to the post-tensioning operations) are not permitted to be behind the jack during tensioning operations.
- Employees must not be permitted to ride concrete buckets during work operations.
- Employees are not permitted to work under concrete buckets while the buckets are being elevated or lowered into position.
- Employees are not permitted to apply a cement, sand, and water mixture through a pneumatic hose unless they are wearing protective head and face equipment.

Topic: Safety Requirements for Cast-In-Place Concrete

This topic addresses the safety requirements for cast-in-place concrete. Having completed this topic, you should be able to:

- Describe safety requirements for shoring and reshoring

- Describe safety requirements for vertical slip forms
- Describe safety requirements for removal of formwork
- Describe safety requirements for precast concrete
- Describe safety requirements for lift-slab operations
- Describe safety requirements for masonry construction

Topic summary:

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

- Formwork must be designed, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting without failure all vertical and lateral loads that might be applied to the formwork.
- Drawings and plans, including all revisions for the jack layout, formwork (including shoring equipment), and working decks and scaffolds must be available at the job site.
- All shoring equipment (including equipment used in reshoring operations) must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings.
- Reshoring must be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity.
- All vertical slip forms must be provided with scaffolds or work platforms where employees are required to work or pass.
- Forms and shores (except those used for slabs on grade and slip forms) must not be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads.
- Only essential employees are permitted near precast concrete that is being lifted or tilted into position.
- Lift-slab operations must be designed and planned by a registered professional engineer who has experience in lift-slab construction.
- No employee, except those essential to the jacking operation, should be permitted in the building/structure while any jacking operation is taking place unless the building/structure has been reinforced sufficiently to ensure its integrity during erection.
- Whenever a masonry wall is being constructed, employers must establish a limited access zone prior to the start of construction.

Topic: Hazards and Controls

This topic examines the health hazards associated with concrete and masonry and the controls that should be implemented to protect workers. Having completed this topic, you should be able to:

- List the hazards associated with concrete and masonry
- Describe the engineering controls for concrete and masonry hazards
- Describe the administrative controls for concrete and masonry hazards
- Describe the PPE controls for concrete and masonry hazards

Topic summary:

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

- Common hazards associated with concrete and masonry include: chemicals, falls, noise, ergonomics, slips, crushing, struck-by, and electrical.
- Remember these good work practices to prevent concrete and masonry hazards:
    - Do not place construction loads on a concrete structure until a qualified person indicates that it can support the load.
    - Adequately shore or brace structures until permanent supporting elements are in place or concrete has been tested to assure sufficient strength.
    - Allow only those who are essential to and actively engaged in construction or lifting operations to enter the work area.
    - Take measures to prevent unrolled wire mesh from recoiling, such as securing each end or turning the roll over.
    - Do not load lifting devices beyond their capacities.
    - Use automatic holding devices to support forms in case a lifting mechanism fails.
- Protective equipment must be provided and used when working with or around concrete and masonry.

Topic: Silica

This topic reviews the common situations where construction workers are likely to be exposed to silica hazards, the deadly results of silicosis, and how to prevent it. Having completed this topic, you should be able to:

- Identify common situations where you could be exposed to silica
- List good work practices for reducing silica exposure and preventing silicosis

Topic summary:

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

- In construction, workers can be easily exposed to silica when using rock containing silica or concrete and masonry products containing silica sand. Even materials containing small amounts of crystalline silica may be hazardous if they are used in ways that produce high dust concentrations.
- Exposure to respirable crystalline silica dust during construction activities can cause silicosis — a scarring and hardening of lung tissue. The disease can be progressively debilitating and fatal.
- Employers and workers can take practical steps to reduce exposures and lower risks.
- Recognize when silica dust may be generated and plan ahead to eliminate or control the dust at the source. Awareness and planning are keys to preventing silicosis.