

(13) A runway, ramp, or scaffold, as prescribed in Scaffolds and Scaffold Platforms, Part 12., R 408.41201 et seq.; Rules 2143, 2150, and 2154 of Guarding of Walking and Working Areas, Part 21., R 408.42143, R 408.42150, and R 408.42154; and Fall Protection, Part 45., R 408.44501 et seq. shall be provided for placement of concrete in areas such as walls, piers, columns, and beams.

R 408.42521 Forms and shoring generally.

Rule 2521.

(3) An employee who is working on formwork 6 feet or more above the ground or floor shall use a personal fall arrest system as prescribed in Fall Protection, Part 45., R 408.44501 et seq. or shall be provided with scaffolding as prescribed in Scaffolds and Scaffold Platforms, Part 12., R 408.41201 et seq.

(4) Stripped forms and shoring shall be removed and stockpiled promptly after stripping in all areas in which an employee is required to work or pass. Protruding nails, wire ties, and other form accessories that are not necessary to subsequent work shall be pulled or cut or other means shall be employed to eliminate a hazard.

(5) No construction loads shall be placed on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.

R 408.42522 Placing and removing forms.

Rule 2522. (1) A tag line shall be used to control large panels or large sections.

(3) Built-up sections shall have lifting attachments that are capable of handling an imposed load.

(4) Vertical, horizontal, and overhead forms that are being raised or removed by lifting equipment shall be braced or secured before being released from the load line.

(5) When using metal pan deck forms, the placement of the pans shall follow a sequence. Planks shall be laid in a manner that reduces the hazard of falling or else solid decking shall be used.

R 408.42523 Vertical slip forms.

Rule 2523.

(2) A lift shall proceed steadily and uniformly and shall not exceed the predetermined rate of lift.

(3) The steel rods or pipe on which the jacks climb or by which the forms are lifted shall be specifically designed for such climbing or lifting. Such rods shall be adequately braced if they are not encased in concrete.

(4) Jacks and vertical supports shall be positioned so that the vertical loads are distributed equally and do not exceed the capacity of the jacks.

(5) The jacks or other lifting devices shall be provided with mechanical dogs or other automatic holding devices to prevent slippage due to the failure of the power supply of the lifting mechanism.

(6) Vertical lift forms shall be provided with scaffolding or work platforms that completely encircle the area of placement. The scaffolds shall be as prescribed in Scaffolds and Scaffold Platforms, Part 12., R 408.41201 et seq.

(7) Lateral and diagonal bracing of vertical slip forms shall be provided to prevent excessive distortion of the structure during the jacking operation.

No comparable OSHA provision.

No comparable OSHA provision.

No comparable OSHA provision.

(8) During a jacking operation, the form structure shall be maintained in line and plumb.

R 408.42524 Vertical shoring generally.

Rule 2524. (1) When temporary storage of reinforcing rods, material, or equipment on top of formwork becomes necessary, these areas shall be strengthened to support the intended loads.

(2) The sills for shoring shall be sound, rigid, and capable of carrying the maximum intended load.

(3) When shoring from soil, the soil shall be capable of supporting the load and the soil shall be inspected after each occurrence which could affect its load-bearing capacity. Soil weakened from any occurrence that reduces its load-bearing capacity to less than that required to support a specific load shall be strengthened by compacting or other equivalent means.

(4) Vertical shoring shall be plumb and shall be braced to give it lateral stability during erection and at the time of concrete placement.

(5) Baseplates, shore heads, extension devices, and adjustment screws shall be in firm contact with the footing sill and the form.

(6) Eccentric loads on shore heads and similar members or shoring are prohibited, unless the shore heads are designed for the loading.

(7) Shoring equipment shall be inspected by a qualified person before erection to determine that it is as specified in the shoring drawings or plans. Any equipment found to be damaged shall not be used for shoring.

(8) Before concrete is placed in the forms, all shoring equipment shall be inspected by a qualified person to determine whether it was erected as specified in the shoring drawings or plans.

(9) Erected shoring shall be inspected by a qualified person during and immediately after pouring concrete. Shoring that is found to be damaged or weakened shall be reinforced or reshored.

(10) Only designated employees shall be permitted on the first floor immediately under the forms during concrete placing work.

(11) Shoring equipment shall not be released or removed without the approval and assurance of a qualified person that the remaining equipment will support the load.

(12) Construction or superimposed loads shall not be placed on an uncured concrete pour unless either of the following provisions is complied with:

(a) The strength of the concrete in the previous pour has been determined by testing to be capable of withstanding the load.

(b) A qualified person indicates that the concrete has developed sufficient strength to support the load. This subrule does not apply to slip form operations and slabs built at grade elevation.

(13) Vertical shoring shall not be loosened or removed until the concrete has attained 70% of the design strength or as specified by the engineer or architect.

(14) Construction or superimposed loads shall not be permitted on any area where vertical forms have been loosened or removed before the concrete has attained 100% of the design strength.

(15) Reshoring shall be provided, when necessary, to support slabs and beams after stripping or where the members are subjected to superimposed loads due to the construction work done.

No comparable OSHA provision.

(16) Vertical shoring shall not be adjusted to raise formwork after concrete is in place, unless specifically provided for in the design specifications.

R 408.42525 Metal frame shoring.

Rule 2525. (1) Metal frames used for shoring shall not be loaded beyond the rated capacity.

(2) Locking devices on frames and braces shall be in good working order; coupling pins shall align the frame or panel legs; pivoted cross braces shall have their center pivot in place, and all components shall be without defects.

(3) The devices for attaching the external lateral stability bracing shall be securely fastened to the legs of the shoring frames.

No comparable OSHA provision.

R 408.42526 Tube and coupler shoring.

Rule 2526. (1) The couplers or clamps shall not be used if they are deformed, broken, have defective or missing threads on bolts, or have other defects.

(2) The interlocking of the tubular members and the tightness of the couplers shall be checked before pouring concrete.

(3) Couplers shall be made of drop-forge steel, malleable iron, or structural grade aluminum.

No comparable OSHA provision.

R 408.42527 Single-post shores.

Rule 2527.

(2) The top of single-post shores shall be restricted from movement by the use of retainers or other equivalent means.

(3) Devices for attaching the external lateral stability bracing shall be securely fastened to the single-post shores.

(4) Timber and fabricated single-post shores and the adjusting devices shall be inspected before erection. Timber for single-post shores shall not be used if it contains splits, cuts, rotting, or structural damage.

(5) A metal single-post shore and the adjusting devices shall not be used if the shore or devices are heavily rusted, bent, dented, or rewelded or have broken weldments or other defects.

(6) A nail that is used to secure bracing on adjustable timber single-post shores shall be driven home and the point bent over, if possible.

No comparable OSHA provision.

R 408.42528 Flying forms.

Rule 2528. (1) A qualified person shall inspect the formwork for flying forms before any movement to insure that all components are properly placed and adjusted.

(2) Allowable impact loads for flying forms shall not be exceeded during the rollout operation.

(3) A safety line shall be attached to the form during the rollout and flying operation.

(4) Nothing shall be allowed on the forms during movement unless it is securely fastened to the forms.

(5) No one, other than the rigger, shall be permitted on top of the deck form after rollout operations have been completed.

(6) Rigging of the deck form shall be completed before the line from the crane takes the total load of the form.

No comparable OSHA provision.

R 408.42531 Prestressed and poststressed concrete operations.

Rule 2531. (1) An expendable strand deflection device that is used to pretension concrete members shall have a designed safety factor of not less than 2. A

No comparable OSHA provision.

reusable device shall have a safety factor of not less than 3.

(2) Expendable and reusable strand deflection devices shall not be loaded in excess of their maximum intended load.

(3) An employer shall designate a qualified person to inspect all jacking and pulling equipment before each use and during use.

(4) Defective equipment shall be repaired or replaced before continued use.

(5) Tensioning strands that have kinks, bends, nicks, and other defects shall not be used.

(6) Welding or cutting is prohibited near strand that has been unrolled, strung, or tensioned or at any other location where strand is stored.

(7) During jacking operations of any tensioning element or group of tensioning elements, the anchor shall be kept turned up close to the anchor plate.

(8) An employee shall not stand in the line of, in back of, or over the jacking equipment during tensioning operations.

(9) Only an employee who is operating tensioning equipment shall be permitted in the immediate vicinity when tensioning is in progress.

(10) Stress members shall be lifted with the lifting devices at points specifically designed. An employee shall not be under stressed members during lifting and erection.

(11) Audible or visual signaling devices shall be operated to warn employees when tensioning operations are under way.

(12) All employees who are not directly involved in the tensioning operations shall be cleared from the area and shall remain clear until tensioning operations are completed and the signaling devices are turned off.

R 408.42532 Precast and tilt-up operations.

Rule 2532.

(2) An erection and procedure plan, including placement of connections, shall be prepared by a qualified employee knowledgeable in precast concrete erection and be kept available at the jobsite.

(5) When vacuum lifting concrete panels, slabs, or other structural members, the lifting surfaces shall be clean, well bonded, and monolithic before vacuum lifting is attempted.

No comparable OSHA provision.

R 408.42533 Lift-slab operations.

Rule 2533.

(11) An employer shall ensure that an employee is not permitted under a slab during jacking operations.

(17) Defective equipment shall be removed from service.

No comparable OSHA provision.

R 408.42534 Concrete paving machines; warning devices.

Rule 2534. A concrete paving machine that has a power reverse shall be equipped with an automatic audible warning device which operates when the paver is backing up.

No comparable OSHA provision.

R 408.42535 Concrete curing.

Rule 2535. (1) An employer shall ensure that all heating devices, including temporary heating devices, are located at a safe distance sufficient to prevent ignition of any materials in their proximity and in accordance with Fire Protection and Prevention, Part 18., R 408.41801 et seq. Rule 1884 of Part 18 covers

No comparable OSHA provision.

detailed safety provisions for heating devices.

(2) When salamanders or similar heating units are used to protect concrete from freezing, all of the following requirements shall be complied with:

- (a) All salamanders shall be covered and properly vented.
- (b) Salamanders shall not be refueled until extinguished and permitted to cool.
- (c) Where tarpaulins or other materials are used to form protective enclosures for winter protection, the material shall be fire resistant and installed to prevent contact with the heating unit.

Disclaimer:

Documents available from this server were prepared as a courtesy for informal guidance and assistance. This information is not intended to replace or supersede the actual MIOSHA standard or rule requirement. Please reference the specific MIOSHA standard or rule for the actual rule requirement language.

All information published online by MIOSHA is subject to change without notice. Every effort is made to ensure that the information provided at this site is accurate and up-to-date, but no legal responsibility is accepted for any errors, omissions, or misleading statement.