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Gallant Builders (Gallant) has implemented this program for the safety of the workers involved in concrete and masonry construction

I. Purpose

The purpose of this program is to define the procedures and standards for the workers involved in concrete and masonry construction activities on Gallant projects.

II. Scope

This procedure applies in its entirety to all Gallant projects unless a variance is granted by the Gallant Safety Director.

III. General

All equipment and materials used in concrete construction work shall meet the applicable requirements for design, construction, inspection, testing, maintenance and operations as prescribed in ANSI A1O.9 - 1983, Safety Requirements for Concrete Construction and Masonry
Work.

When placing concrete, one must be aware of and protect against the following hazards:

- Traffic hazards
- Exposures to heat or cold
- Moving equipment hazards
- Chemical hazards / Silica
- Slip, trip and fall hazards
- Eye injuries
- Electrical exposures
- Overhead hazards / cranes

IV. Equipment and Tools

All gear, chains, and rollers of concrete equipment shall be properly guarded.

Concrete buckets positioned by cranes are to be suspended by deep-throated hooks, equipped with a swivel and safety latch. (A signalman, shall be in communication with operator.) All concrete buckets will be equipped with a tagline.

Conveyors shall be designed, installed, operated, and maintained in accordance with the provision of the ANSI Code for Conveyors, Cableways, and Related
Equipment. All pinch points must be completely guarded.

Concrete pumps or similar systems using discharge pipes shall be provided with pipe supports designed for 100 percent over-load. Where men are required to work from the pipe supports, the supports shall have minimum safety factor of four (4).

Compressed air hoses in such systems shall be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized.

All personnel involved in concrete operations shall wear the appropriate personal protective equipment.

V. Formwork

Formwork shall be designed, erected, supported, braced, and maintained so that it will safely support all vertical and lateral loads that may be applied until such loads can be supported by the concrete structure.

Good housekeeping shall be maintained at all times, stripped lumber and materials intended for reuse shall be cleaned of nails and wire and neatly stacked.

Form supports and wedges shall be checked during concrete placement to prevent distortion or failure.

Forms intended for use where there is a fall potential of six (6) feet or more shall be equipped with adequate scaffolding and guardrails, or required fall protection devices shall be worn by personnel during forming and stripping operations.

Vertical forms being raised or removed in sections shall not be released until adequately braced or secured. Likewise, overhead forms shall not be released until adequately braced and secured.

Only approved hoisting hardware and equipment (wire rope, slings, chokers, shackle, eye bolts, etc.,) shall be used for lifting. Load shall be double slung and tag lines shall be used.

Gang forms shall only be lifted from approved fastening points.

Form pour rates should never be exceeded.

Any deviations from form work drawings must be reviewed and approved by a design engineer.

Formwork shall be inspected prior to and during placement of concrete.

Stripped forms and shoring should be removed and stockpiled promptly after stripping

Protruding nails, wire ties and other form accessories should be pulled, cut or other means taken to eliminate the hazard.

Formwork scaffold shall be erected in accordance with Subpart L.

Employees involved in constructing walls and columns must be provided with and required to use appropriate fall protection equipment.

Employees actively involved in the construction of the leading edge of formwork shall be protected by personal fall arrest systems or by compliance with a written fall protection plan.

The formwork drawing is an important step to safety. By preparing adequate working drawings, the contractor can foresee problems, eliminate hazards on paper, and make corrections with an eraser, not a wrecking bar. The working drawings give the carpenter in the field a clear picture of what is required and how to achieve it. The following checklist indicates necessary information on safe limits of form design and sufficient detail to eliminate on-site improvising.

VI. Concrete Placement

Adequate light shall be available at all times during concrete placement.

Employees shall not ride concrete buckets.

When discharging on a slope, the wheels of ready mix trucks should be chocked and the brakes set to prevent movement.

When backing ready mix trucks down a slope, care should be taken to prevent injury or damage should the brakes slip.

Employees directing trucks should be familiar with standard hand signals.

VII. Mixing, Cutting, Finishing

All employees involved in finishing operations including grinding, sand blasting, etching, etc., shall wear proper personal protective equipment.

When cutting or mixing, dusts shall be controlled (indoors and out) by wetting the work surface (if possible), ventilating by opening windows or providing fans, or using grinding and sanding equipment equipped with dust collectors.

Whenever possible, concrete and mortar should be mixed outdoors. When mixing, employees should stand upwind so that dusts are blown away from them.

VIII. Concrete Pumping

Operational procedures and equipment control programs should include the following considerations:

The pumping unit shall be placed on a firm, level base allowing sufficient unrestricted access and maneuvering space for ready-mix trucks. Operating vehicles in reverse should be avoided, if possible.

If boom-equipped, the unit shall be so placed to allow maximum rotation and extension of the boom. Outriggers should be properly set and the manufacturer's operating instructions adhered to.

All boom equipment and units shall not be operated within 10 feet of any energized conductors.

All pipes shall be properly connected, supported, restrained and provided with washers, 0 rings or gaskets to prevent leakage.

Pipes shall be provided with retainer wires, cables or chains across all joints and between the pipeline and boom.

If it is necessary to use a discharge pipe of two or more different diameters, the larger diameters should be placed farther away from the pump and the smaller diameters closer to the pump end. This will prevent pressure build-up

The pipeline should be laid as straight as possible. Vertical runs should be supported and restrained at predetermined intervals.

The lubricating mortar mix used to "wet" the pump and pipeline shall not be used as part of the construction and shall be properly disposed.

All equipment should be inspected on a regular basis to assure that it is in good operating condition; the piping should be inspected and/or monitored to assure that there is no excess wear which could cause high pressure leaks, ruptures and, ultimately, interruption of the pumping operation.

The workers handling the delivery end of the piping should be properly trained in the handling of the piping. If the line diameter is 4 inches or less, it can be handled by one person. A line with a diameter of 5 inches requires two people. Lines of 6 inches or more in diameter are very difficult to handle without the proper mechanical equipment.

The pump operator should be in constant communication with the individual in charge at the pour site, so that the pump may be stopped in an emergency such as a form collapse or broken line.

IX. Hoisting

All hoisting should be directed by a competent signal person. Signals shall be given by only one person at a time.
Swing routes should be planned so as to minimize overhead hazards by the traveling load.
Hoisting equipment (buckets, bull ropes and slings) must be in good repair with all safety latches operable.
A designated channel shall be utilized when using radios to prevent interference from other conversations.
Hoisting should stop when:

- Improper or conflicting signals are given.
- Signal person detects a problem.
- Visual contact with signal person is poor or lost.
- An undesirable condition develops.
- Voice contact is lost when using two-way radios.
- A stop signal is given, regardless of who gives it.

X. Post Tensioned Concrete

Only authorized personnel should be in the stressing area, including above and below the stressed area and in the vicinity of the jack.

Assure the concrete has reached design strength prior to stressing.

Employees should be protected from falls over 6 feet by guardrails, personal fall arrest systems, or other acceptable means.

Re-shores below slab edges may loosen during stressing. Periodic inspections shall be made to prevent their falling off the edge of the building.

Jacks and gripping devices should be inspected on a regular basis to ensure safe operation.

XI. Wall Form Safety

Wall forms should be constructed in accordance with the working drawings, with attention given to the points listed below:

- Lateral bracing provided as shown on the drawings, firmly attached to the forms and to points of support.
- Blockouts braced to resist vertical and lateral loads; bulkheads braced to resist lateral pressure and spreading of walls.
- Offsets, pilasters, edge forms and single-faced forms checked to see that they are adequately tied and braced.
- Exterior corners of forms tied to prevent spreading.
- All wall ties checked for proper strength, spacing and length.
- Wales checked for proper spacing, with joints staggered from one tier to the next.
- In double-member wales, one member left continues across from ties at splices.
- Adequate lap provided between forms and previous construction, and any connecting hardware not carefully secured.
- The rate of pour not to exceed that shown on working drawings.
- Experienced form watchers at work during the concrete placement.
- Care in vibrating when penetrating an earlier lift.

XII. Reinforcing Steel

All protruding rebar that employees can fall into or onto shall be guarded to eliminate the hazard of impalement. This includes stubbed up conduit and pins driven into the ground for braces.

Employees placing rebar at elevation over 6 feet above the ground, slab, or other working surface will be provided and required to use appropriate positioning and/or fall arrest equipment.

Reinforcing should not be loaded onto the framework (or an adjacent deck) that is not designed for the additional weight.

Reinforcing may not be hoisted overhead by #9 wire -- properly rigged chokers must be used (tied bundles may be shaken out from truck to ground by #9 wire so that choker may be installed). No overhead hoisting with shake out hooks.

All tie wire shall be bent back so not to cause cuts or eye injuries.

Dropped tractor trailers shall be supported/blocked so that they cannot shift or slide during unloading, punchdown into the ground or overturn. Safe access should be provided to the trailer.

XIII. Masonry

Walk-ways and scaffolding equipped with guardrails shall be provided along the access and point of placement in walls, piers, columns, etc., located over six (6) feet above the floor or ground levels.

A Limited Access Zone shall be established (L.A.Z.) prior to starting the construction of a masonry wall.

Subcontractor shall provide written evidence that the design and/or construction method utilized for temporary bracing is adequate.

XIV. Precast Assembly

Precast wall units, structural framing, and tilt-up wall panels should be adequately supported to prevent overturning and/or collapse. This applies both to panels stored on site and pieces during and after erection.

Employees involved in precast erections should be protected from falls over 6 feet.

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

The lifting attachments in the precast concrete shall provide sufficient strength, and be properly designed by a registered civil engineer, for the maximum anticipated loads, including impact. Bent bars of concrete reinforcing steel shall not be used as lifting attachments.

Precast concrete wall units and vertical panels shall be braced to prevent collapse. A permanent connection may be used instead of bracing if it is capable of withstanding all loads imposed during erection.

Except for the erection crew, employees shall not be permitted under a precast section, wall or panel during lifting and tilting operations.

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

Each lift-slab project shall be planned in advance to determine whether or not temporary supports of bracing is required during the erection stage.

Conclusions reached shall be:

- Justified by calculations and described in sketches or written instructions approved by a professional engineer or architect.

A jack shall not be loaded beyond its rated load and the thread rods or other members that transmit loads to the jacks shall have a safety factor of 2.5 to 1.

Formwork and falsework or shoring for the support of concrete or other materials shall be designed, erected, supported, braced, and maintained so as to assure its ability to safely withstand all intended loads during erection, construction, usage and removal.

Lifting devices, other than jacks, shall be of sufficient strength and design to provide a safety factor not less than 5 times the working load.

Defective equipment shall be removed from service.