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Gallant Builders (Gallant) has implemented this safety program for the erection of steel and complies with Title 29 Code of Federal Regulations (CFR) §1926 Subpart R (Steel Erection) as referenced.

I. PURPOSE

The purpose of this program is to define the procedures and standards for the safe erection of steel on all Gallant work sites.

II. APPLICABILITY

This program applies to all Gallant projects where steel is erected.

III. DEFINITIONS

Anchored Bridging - means that the steel joist bridging is connected to a bridging terminus point.

Bolted Diagonal Bridging - means diagonal bridging that is bolted to a steel joist or joists.

Bridging Clip - means a device that is attached to the steel joist to allow the bolting of the bridging to the steel joist.

Bridging Terminus Point - means a wall, a beam, tandem joists (with all bridging installed and a horizontal truss in the plane of the top chord) or other element at an end or intermediate point(s) of a line of bridging that provides an anchor point for the steel joist bridging.

Choker - means a wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.

Cold Forming - means the process of using press brakes, rolls, or other methods to shape steel into desired cross sections at room temperature.

Column - means a load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.

Competent Person - means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Connector - means an employee who, working with hoisting equipment, is placing and connecting structural members and/or components.

Constructability - means the ability to erect structural steel members in accordance with subpart R without having to alter the over-all structural design.
Construction load (for joist erection) means any load other than the weight of the employee(s), the joists and the bridging bundle.

Controlled Decking Zone (CDZ) - means an area in which certain work (for example, initial installation and placement of metal decking) may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems and where access to the zone is controlled.

Controlled Load Lowering - means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling Contractor - means a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project -- its planning, quality and completion.

Critical Lift - means a lift that (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick.

Decking Hole - means a gap or void more than 2 inches in its least dimension and less than 12 inches in its greatest dimension in a floor, roof or other walking/working surface. Pre-engineered holes in cellular decking (for wires, cables, etc.) are not included in this definition.

Derrick Floor - means an elevated floor of a building or structure that has been designated to receive hoisted pieces of steel prior to final placement.

Double Connection - means an attachment method where the connection point is intended for two pieces of steel which share common bolts on either side of a central piece.

Double Connection Seat - means a structural attachment that, during the installation of a double connection, supports the first member while the second member is connected.

Erection Bridging - means the bolted diagonal bridging that is required to be installed prior to releasing the hoisting cables from the steel joists.

Fall Restraint System - means a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices.

Final Interior Perimeter - means the perimeter of a large permanent open space within a building such as an atrium or courtyard. This does not include openings for stairways, elevator shafts, etc.
Girt (in systems-engineered metal buildings) means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting wall material.

Headache Ball - means a weighted hook that is used to attach loads to the hoist load line of the crane.

Hoisting Equipment - means commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at some known elevation and horizontal distance from the equipment's center of

rotation. "Hoisting equipment" includes but is not limited to cranes, derricks, tower cranes, barge-mounted derricks or cranes, gin poles and gantry hoist systems. A "come-a-long" (a mechanical device, usually consisting of a chain or cable attached at each end, that is used to facilitate movement of materials through leverage) is not considered "hoisting equipment."

Leading Edge - means the unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

Metal Decking - means a commercially manufactured, structural grade, cold rolled metal panel formed into a series of parallel ribs; for this subpart, this includes metal floor and roof decks, standing seam metal roofs, other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels, and similar products.

After installation and proper fastening, these decking materials serve a combination of functions including but not limited to: a structural element designed in combination with the structure to resist, distribute and transfer loads, stiffen the structure and provide a diaphragm action; a walking/working surface; a form for concrete slabs; a support for roofing systems; and a finished floor or roof.

Multiple Lift Rigging - means a rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to five independent loads to the hoist rigging of a crane.

Opening Means - a gap or void 12 inches or more in its least dimension in a floor, roof or other walking/working surface. For the purposes of this subpart, skylights and smoke domes that do not meet the strength requirements of § 1926.754(e)(3) shall be regarded as openings.

Permanent Floor - means a structurally completed floor at any level or elevation (including slab on grade).

Personal Fall Arrest System - means a system used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these. The use of a body belt for fall arrest is prohibited.

Positioning Device System - means a body belt or body harness rigged to allow an employee to be supported on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning.

Post - means a structural member with a longitudinal axis that is essentially vertical, that: (1) weighs 300 pounds or less and is axially loaded (a load presses down on the top end), or (2) is not axially loaded, but is laterally restrained by the above member. Posts typically support stair landings, wall framing, mezzanines and other substructures.

Project Structural Engineer of Record - means the registered, licensed professional responsible for the design of structural steel framing and whose seal appears on the structural contract documents.

Purlin (In Systems-Engineered Metal Buildings) - means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting roof material.

Qualified Person - means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

Safety Deck Attachment - means an initial attachment that is used to secure an initially placed sheet of decking to keep proper alignment and bearing with structural support members.

Shear Connector - means headed steel studs, steel bars, steel lugs, and similar devices which are attached to a structural member for the purpose of achieving composite action with concrete.

Steel Erection - means the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection.

Steel Joist - means an open web, secondary load-carrying member of 144 feet or less, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses or cold-formed joists.

Steel Joist Girder - means an open web, primary load-carrying member, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses.

Steel Truss - means an open web member designed of structural steel components by the project structural engineer of record. For the purposes of this subpart, a steel truss is considered equivalent to a solid web structural member.

Structural Steel - means a steel member, or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite members). These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building.

Systems-Engineered Metal Building - means a metal, field-assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold-formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the job site for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems-engineered metal building manufacturer.

Tank - means a container for holding gases, liquids or solids.

Unprotected Sides and Edges - means any side or edge (except at entrances to points of access) of a walking/working surface, for example a, floor, roof, ramp or runway, where there is no wall or guardrail system at least 39 inches high.

IV. CONTROLLING CONTRACTOR REQUIREMENTS

GENERAL

STEEL ERECTION APPROVAL

Gallant shall provide the steel erector with the following written notifications before authorizing the commencement of steel erection:

- The concrete in the footings, piers and walls and the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
- Any repairs, replacements and modifications to the anchor bolts were conducted in accordance with § 1926.755(b).
- Commencement of steel erection
- The contracted steel erector shall not erect steel unless it has received written notification that the concrete in the footings, piers and walls or the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
- Site layout
- Hess shall ensure that the following is provided and maintained:
- Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control.
- A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

PLANNING OF OVERHEAD HOISTING OPERATIONS

The steel erector shall plan all steel hoisting operations and provide Gallant with the following:

- Site-specific erection plan
- All site-specific steel erection plans shall be developed by a qualified person and shall be available at the work site.

Components include:

- Sequence of erection activity
- Material deliveries
- Material staging and storing
- Coordination with all trades

V. HOISTING AND RIGGING

GENERAL

All cranes used for steel erection shall be visually inspected prior to each shift by a competent person.

The crane inspection shall include observation for deficiencies during operation and should include the following:

- All control mechanisms for maladjustment

- Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter
- Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required
- Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation
- Hooks and latches for deformation, chemical damage, cracks, or wear
- Wire rope reeving for compliance with hoisting equipment manufacturer's specifications
- Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation
- Hydraulic system for proper fluid level
- Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions
- The hoisting equipment for level position; and
- The hoisting equipment for level position after each move and setup.

The operator shall be responsible for those operations under the operator's direct control.

Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

A qualified rigger (a rigger who is also a qualified person) shall inspect the rigging prior to each shift.

The headache ball, hook or load shall not be used to transport personnel.

Safety latches on hooks shall not be deactivated or made inoperable except:

- When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so.
- Working under loads.
- All routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for:
- Employees engaged in the initial connection of the steel; or
- Employees are necessary for the hooking or unhooking of the load.
- When working under suspended loads, the following criteria shall be met:
- Materials being hoisted shall be rigged to prevent unintentional displacement.
- Hooks with self-closing safety latches or their equivalent shall be used to prevent components from slipping out of the hook; and
- All loads shall be rigged by a qualified rigger

MULTIPLE LIFT RIGGING PROCEDURE

Multiple lifts shall only be performed when the following criteria are met:

- A multiple lift rigging assembly is used
- A maximum of five members are hoisted per lift
- Only beams and similar structural members are lifted
- All employees engaged in the multiple lift have been trained in these procedures in accordance with § 1926.761(c)(1).

- No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations
- Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.
- The total load shall not exceed:
- The rated capacity of the hoisting equipment specified in the hoisting equipment load charts
- The rigging capacity specified in the rigging rating chart

The multiple lift rigging assembly shall be rigged with members:

- Attached at their center of gravity and maintained reasonably level
- Rigged from top down
- Rigged at least 7 feet apart
- The members on the multiple lift rigging assembly shall be set from the bottom up
- Controlled load lowering shall be used whenever the load is over the connectors

VI. STRUCTURAL STEEL ASSEMBLY

Structural stability shall be maintained at all times during the erection process.

The following additional requirements shall apply for multi-story structures:

The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design.

At no time shall there be more than four floors or 48 feet, whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.

A fully planked or decked floor or nets shall be maintained within two stories or 30 feet, whichever is less, directly under any erection work being performed.

TRIPPING HAZARDS

Shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.

Installation of shear connectors on composite floors, roofs and bridge decks

When shear connectors are used in construction of composite floors, roofs and bridge decks, employees shall lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a

working platform. Shear connectors shall not be installed from within a controlled decking zone (CDZ), as specified in § 1926.760(c)(8).

PLUMBING-UP
When deemed necessary by a competent person, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure.

When used, plumbing-up equipment shall be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

Plumbing-up equipment shall be removed only with the approval of a competent person.

METAL DECKING
Hoisting, landing and placing of metal decking bundles

Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose.

All loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles.

Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be un-banded without dislodging the bundles from the supports.

At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement.

Roof and floor holes and openings

Metal decking at roof and floor holes and openings shall be installed as follows:

Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.

Roof and floor holes and openings shall be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stairwells, etc.) employees shall be protected.

Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets the strength requirements of paragraph (e)(3) of this section or shall be immediately covered.

Covering roof and floor openings

Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.
All covers shall be secured when installed to prevent accidental displacement by the wind, equipment or employees.

All covers shall be painted with high-visibility paint or shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

DECKING GAPS AROUND COLUMNS
Wire mesh, exterior plywood, or equivalent, shall be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.

INSTALLATION OF METAL DECKING
Metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement.

During initial placement, metal decking panels shall be placed to ensure full support by structural members.

DERRICK FLOORS
A derrick floor shall be fully decked and/or planked and the steel member connections completed to support the intended floor loading.

Temporary loads placed on a derrick floor shall be distributed over the underlying support members so as to prevent local overloading of the deck material.

VII. COLUMN ANCHORAGE

General requirements for erection stability:

- All columns shall be anchored by a minimum of 4 anchor rods (anchor bolts).
- Each column anchor rod (anchor bolt) assembly, including the column-to-base plate weld and the column foundation, shall be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.
- Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads.
- All columns shall be evaluated by a competent person to determine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed.
- Repair, replacement or field modification of anchor rods (anchor bolts)
- Anchor rods (anchor bolts) shall not be repaired, replaced or field-modified without the approval of the project structural engineer of record.
- Prior to the erection of a column, the controlling contractor shall provide written notification to the steel erector if there has been any repair, replacement or modification of the anchor rods (anchor bolts) of that column.

VIII. BEAMS and COLUMNS

GENERAL

During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with at least two bolts per connection, of the same size and strength as shown in the erection drawings, drawn up wrench-tight or the equivalent as specified by the project structural engineer of record, except as specified in paragraph (b) of this section.

A competent person shall determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they shall be installed.

DIAGONAL BRACING

Solid web structural members used as diagonal bracing shall be secured by at least one bolt per connection drawn up wrench-tight or the equivalent as specified by the project structural engineer of record.

Double connections at columns and/or at beam webs over a column

When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut shall remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced.

If a seat or equivalent device is used, the seat (or device) shall be designed to support the load during the double connection process. It shall be adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection.

COLUMN SPLICES

Each column splice shall be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.

PERIMETER COLUMNS

Perimeter columns shall not be erected unless:

- The perimeter columns extend to a minimum of 48 inches above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow
- The perimeter columns have holes or other devices in or attached to perimeter columns at 42-45 inches above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables.

IX. FALLING OBJECT PROTECTION

Securing loose items aloft

- All materials, equipment, and tools shall be secured against accidental displacement when not in use.
- Protection from falling objects other than materials being hoisted
- Overhead protection shall be provided for other construction activities while steel erection is taking place.

X. FALL PROTECTION

GENERAL REQUIREMENTS

Workers engaged in a steel erection activity on a walking/working surface with an unprotected side or edge more than 6 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

PERIMETER SAFETY CABLES

On multi-story structures, perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.
Connectors and employees working in controlled decking zones shall be protected from fall hazards.

CONNECTORS

Each worker involved in connecting activities shall:

- Be protected in accordance with fall hazards of 6 feet above a lower level
- Have completed the required connector training and
- Be provided, at heights over 6 feet above a lower level, with a personal fall arrest system, positioning device system or fall restraint system and wear the equipment necessary to be able to be tied off; or be provided with other means of protection from fall hazards

CONTROLLED DECKING ZONE (CDZ)

A controlled decking zone may be established in that area of the structure over 15 feet and up to 30 feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following shall apply:

- Each employee working at the leading edge in a CDZ shall be protected from fall hazards of 6 feet or more.
- Access to a CDZ shall be limited to only those employees engaged in leading edge work.
- The boundaries of a CDZ shall be designated and clearly marked. The CDZ shall not be more than 90 feet wide and 90 feet deep from any leading edge. The CDZ shall be marked by the use of control lines or the equivalent. Examples of acceptable procedures for demarcating CDZ's can be found in Appendix D to this subpart.
- Each employee working in a CDZ shall have completed CDZ training
- Unsecured decking in a CDZ shall not exceed 3,000 square feet
- Safety deck attachments shall be performed in the CDZ from the leading edge back to the control line and shall have at least two attachments for each metal decking panel.
- Final deck attachments and installation of shear connectors shall not be performed in the CDZ.

CRITERIA FOR FALL PROTECTION EQUIPMENT

Guardrail systems, safety net systems, personal fall arrest systems, positioning device systems and their components shall conform to the criteria in § 1926.502 (Subpart M).

Fall arrest system components shall be used in fall restraint systems and shall conform to the criteria in § 1926.502 (Subpart M). Full body harnesses shall be used in fall restraint systems.

Perimeter safety cables shall meet the criteria for guardrail systems in § 1926.502 (Subpart M).

Custody of Fall Protection:

- Fall protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative:
- Has directed the steel erector to leave the fall protection in place; and
- Has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.

XI. TRAINING

TRAINING PERSONNEL
All steel erection workers shall be trained by a qualified person(s).

FALL HAZARD TRAINING
The steel erection employer shall provide a training program for all employees exposed to fall hazards.

- The program shall include training and instruction in the following areas:
- The recognition and identification of fall hazards in the work area
- The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device systems, fall restraint systems, safety net systems, and other protection to be used
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used
- The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and
- The fall protection requirements of this subpart.
- Special training programs
- The steel erection employer shall provide special training to employees engaged in the following activities.

MULTIPLE LIFT RIGGING PROCEDURE

The employer shall ensure that each employee who performs multiple lift rigging has been provided training in the following areas:

- The nature of the hazards associated with multiple lifts
- The proper procedures and equipment to perform multiple lifts

CONNECTOR PROCEDURES
The steel erection employer shall ensure that each connector has been provided training in the following areas:

- The nature of the hazards associated with connecting; and
- The establishment, access, proper connecting techniques and proper work practices
- Controlled Decking Zone Procedures
- Where CDZs are being used, the steel erection employer shall assure that each employee has been provided training in the nature of the hazards associated with work within a controlled decking zone.