



**CF UREA WAREHOUSE
Sergeant Bluff, Iowa
February 3, 2014
Metal building
Erection narrative**

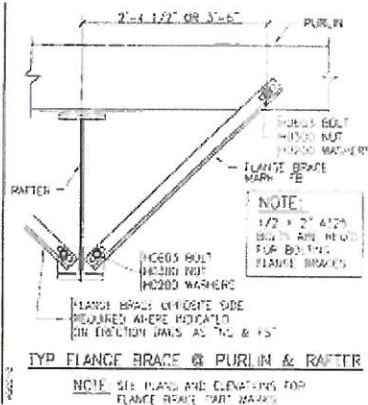
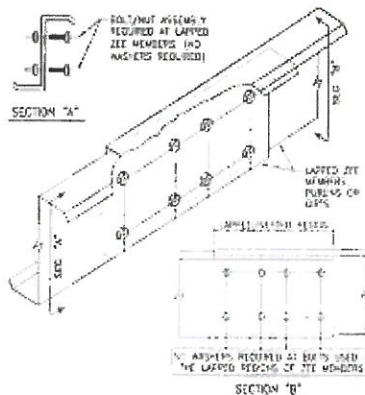
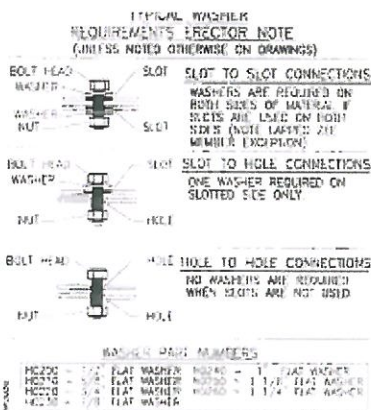
Step 1: Elevations and column layouts will be double checked prior to hoisting of any steel by the site foreman. Any irregularities will be noted and GC will be notified. **(Note: a copy of the anchor bolt survey as well GC's authorization to begin steel erection needs to be submitted and placed in the foreman's copy of the erection plan, prior to erection commencing).**

Step 2: Transfer of materials using approved 8,000 lb. or higher forklifts. Using only certified operators. Materials will be placed on wood in the approved lay down area. For the purposes of this narrative when forklifts are mentioned assume certified operators. For the purposes of this narrative when "ground erect" is mentioned assume this is erection operations that occur on the ground where fall protection is not required, when "fork lift attachment" is stated assume tag lines are utilized. **Prior to any forklift operation an inspection of the equipment as well as a safety meeting to review the JHA/AHA for unloading of materials must be completed and documented in the foreman's erection plan.** At any point that slings need to be utilized to unload material, an approved fork lift attachment will be used.

Step 3: Columns, girts, tie-in purlins, and brace rods will be transferred by forklift from lay down area to the primary erection site and placed on wood in the approximate location of the final erection point. All materials required for the modules will also be transferred by forklift and laid down in the designated area provided for ground modulation.

Step 4: Initial bolting of module components at ground level will be assisted with the use of forklifts. The steel connection plates will be matched together and the proper bolts will be inserted into the connections. (**all bolts** should be installed and tensioned to *snug tight per the drawings)

- snug tight is defined in the drawings “ as average ironworker exerting his maximum force with a wrench as to draw connection plates together”. See attachment “A” for proper inspection procedures.
- Modules will be built on the ground by standing rafters with approved fork lift attachment and the use of a 5/8” or greater choker (5 ton. beam clamp can also be used).
- Rafters will be temporally braced with dunnage (wood kickers) to keep in an up right position.
- Once the rafter of the second frame line is stood purlins will be bolted into position on the rafter lines in order to tie the frame lines together. All bolts will be installed hand tight and the flange braces will be installed to prevent roll over.



Step 5: primary steel erection will begin at frame lines 2 and 3 because it is a factory located brace bay.

- Cranes will be inspected per the site requirements and site plan.
- Cranes will be set in pre-determined areas ensuring that loads and travel paths will be done safely within the limits of the cranes and the site requirements. (see crane set points drawing).
- Hoisting areas will be safeguarded by installing tear resistant red danger tape, a monitor, or both whichever is sufficient for the task at hand. A barrier of 1.5 times the crane tip height must be maintained around the erection area at all times. (Note; any areas where over head work is in progress but is outside the primary steel erection zone must maintain a 1.5 times the steel height .)
- This steel erection zone will encompass the roadway that is adjacent to the building. The road will need to be shut down to prevent traffic from entering the erection zone. It is estimated that this shutdown will only last from between a half hour to an hour. When this becomes necessary CF Industries as well as the G.C. will be notified in advance.
- Rigging will be certified and inspected per the site safety plan.
- Rigging sizes will be pre determined and utilized per the attached rigging plans.
- Tag lines will be used at all times during hoisting operations on all loads!!!

Step 6: Hoisting and placement of columns at grids Z.9 - 2 and 3 will be the first columns set, infill of wall girts between columns will be utilized for support; temporary or permanent wall brace cables or rods will be prepped for installation. Columns on line J.1 will be set in the same manor as line Z.9. (Note; see rigging configuration drawing for rigging of columns)

Step 7: Erection of roof module/ individual rafter line. (Note; See rigging configuration drawings for specifics on rigging to be used as well as placement.) (Note; Foreman is to have a JHA/AHA review and safety meeting concerning placement of modules as well as working around overhead loads) (Note: a review of the emergency procedures to be included in safety meeting regarding rescue from heights which will be achieved by utilizing boom lifts)

- A) Ensure crane placement is per plan and load / radiuses are correct.

- B) Verify rigging has been inspected and verified to be the right rigging listed in the configuration.
- C) Review communications (hand signals, or radios, WHO-WHAT-WHERE)
- D) Review bolting procedures (snug tight = All bolts)
- E) Verify crane path is clear of obstructions. (lift path)
- F) Assign qualified personnel that will be connecting, tag line operators etc.
- G) Review tie off in all man lifts and scissor lifts (6' shock absorbing double lanyards)
- H) All non-essential employees must leave erection zone.
- I) Notify GC of start of erection
- J) Begin lift by bringing modules off of the ground, once it is completely off the ground determine any final adjustments that may need to be completed before load is swung into place. Physically verify with operators that load is within the planned radius and load percentages.
- K) Start by swinging the load as close to the ground as site conditions allow towards the building, bring load to desired elevation centering each rafter over its designated column.
- L) Once connectors have gained control they will manipulate load to desired location and begin connection at the columns, in conjunction with the lead signal person insuring the load is not caught up on anything.
- M) Lowest connection points to be made first with highest being made last.
- N) Once the columns are connected, both cranes will cable their individual modules down until the peak is able to be connected.
- O) Once the outside of the ridge connection are bolted, connectors (personnel) will need to go under the partially suspended load to make final connections at the interior bolt locations of the peak. (Every effort will be made to ensure that the time personnel are required to work under a partially suspended load is kept to an absolute minimum.)
- P) Foreman to verify that all connections have been bolted to snug tight.

These principle steps will be followed for ALL picks.

Step 8: Install x-bracing in walls and roof. Roof rods will be installed in the module prior to lifting but will need to be tensioned to keep the steel square and stable (at this point of the process the cranes will still be attached to the load with all bolts completed; connectors at some point will need to be under the fully connected and partially suspended load to adjust the X-bracing rods). Wall rods or temporary cables will be installed and tensioned. (Note: At brace bays that will not be incorporated in the modules, 100' man lift and 2 men – one man on each rafter with tag lines attached to each end of the rod- will be utilized to install the brace rod).

Step 9: Once all bracing has been installed and verified by the foreman, the crane can be detached from the module.

- A) Clear all non essential equipment and personnel. Verify escape routes.
- B) Begin a slow reduction of weight transfer from the cranes to the structure in 2,000 lb. increments.
- C) Once load has been reduced to 2500 lbs. connectors can complete detachment of crane from rigging.

Step 10: Repeat steps 6 -9 to set next module sections.

Step 11: Installing purlins between 2 completed modules. Utilizing 2 man lifts (one at each rafter line) and a crane (set between the existing standing modules) will set single purlins at a minimum of every X-bracing termination. Bundled purlins will be set in between tie-in purlins and installed.

Step 12: Once the erection of the building is completed secondary will be completed per the PEMB plans.

Attachment "A"

Source: Structural Bolting Handbook 2006 – Page 43 (Verbatim)

Compiled by the Steel Structures Technology Center ISBN 0-9707400-1-8

RE: Inspection Procedures Snug-Tightened Joints

Prior to Installation

- 1.) Inspect the materials to verify that they are readily identifiable, have proper documentation in accordance with the project specifications.
- 2.) Inspect the storage methods to ensure that fastener lots are kept separate and identifiable, have proper markings, and have proper documentation in accordance with the project specifications.
- 3.) Verify that adequate lubrication is present on all fasteners to be used. Black bolts, nut and washers that are dry or rusty should be cleaned, re-lubricated and, when required, retested as an assembly. Galvanized nuts must be lubricated with the manufacturers' lubricant, or re-lubricated at the site and retested with the provided bolts as an assembly. F1852 and F2280 fastener assemblies, even if used in snug-tightened joints, should not be re-lubricated except by the manufacturer.

After Installation

- 4.) Inspect the joints to verify that the snug tight condition has been achieved. The snug tight condition is defined as the tightness that is attained with a few impacts of an impact wrench or the full effort of an Ironworker using an ordinary spud wrench to bring the connected plies into firm contact. The definition of firm contact is the condition that exists on a faying surface when the plies are solidly seated against each other, but not necessarily in continuous contact.

Note: There is no need to verify the level of tension on the bolts as installed. It is inappropriate for inspection to include physical verification of bolt tightness by application of an inspector's spud wrench.

Systems Contractors, Inc.

CERTIFICATION TO BEGIN STEEL ERECTION

The Steel Erector is required to have this documentation to insure that all written certifications required by OSHA are completed before starting steel erection.

_____ (General Contractor) hereby gives Systems Contractors, Inc. this written approval to begin steel erection in the following areas: (List all areas that steel erection may begin - if whole job state "whole job")

(If not all areas are included on initial start of job, get additional written certifications for additional work areas as they are released for steel erection)

By signature below, the General Contractor confirms and certifies that following is true.

A. In all the areas noted above, all the concrete in the footings, piers, walls (and/or other concrete supporting structures) and/or all the mortar in all the masonry walls, masonry piers (and/or other masonry supporting structures) has attained 75% of the intended minimum compressive strength based on ASTM test method(s), or;

B. It has been determined, in all the areas noted above, that all the concrete, in the footings, piers, walls (and other supporting structures) and/or all the mortar in all the masonry walls, masonry piers (and/or other masonry supporting structures) has attained sufficient strength to support the loads imposed during steel erection based on ASTM test method(s). The qualified or competent person for the General Contractor that made that determination is:

_____ (enter name) _____ (title)

C. All columns and their anchor bolts meet the engineers design requirements for minimum 4 anchor bolts, 300 lb. eccentric load applied at the top of the column, and have not been repaired, replaced or field modified, or;

D. All columns and their anchor bolts that have been repaired, replaced, or field modified still meet the engineers design requirements for minimum 4 anchor bolts, 300 lb. eccentric load applied at the top of the column, and have only been repaired, replaced or field modified in accordance with the approval of the Project Structural Engineer of Record. Such approval(s) was/were specific for the columns that were repaired, replaced or field modified. *(Check one below)*

- _____ 1. The engineers approval was written and is _____ is not _____ attached; or
_____ 2. The approval was verbal.

E. The general contractor has ensured that the following has/have been provided and will be maintained.

- a. Adequate access roads for the movement of steel erection cranes trucks and other equipment, the steel erector's material, and means and methods for pedestrian and vehicular control around the steel erection activities.
- b. A firm properly graded and drained area readily accessible to the steel erection work with adequate space for safe storage of materials and safe operation of erector's equipment.
- c. Proper planning of the other trade's work and coordination to insure no unprotected workers are below the steel erection activities, and d. Overhead hoisting activities by the steel erector have been evaluated and preplanned to ensure that the requirements of OSHA 1926.753(d) are met.

SIGNATURE: _____ Date: _____
Authorized Representative of General Contractor