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Fly Form Manual

PREPARED BY:

ATLAS SCAFFOLDING LTD.

FLYING FORMS

Flying forms, or “fly forms” for short, are the most common formwork shoring system used to support typical cast-in-place concrete slabs in multi-level high-rise construction today.

A Fly Form System is composed of structural trusses with a horizontal deck attached on top. The common name for the entire assembly is a Fly Form Table. Tables are assembled in various shapes and sizes depending on the particular needs of each building.

TYPICAL FLY FORM CYCLE

After the typical concrete floor slab has been poured on the Fly Form Table and reached its specified strength, the table forms are lowered from the concrete slab and rolled outward from the building. The table is then “flown” by crane and placed on top of the previously poured slab to start the pre-pour setup process over again.

The typical Fly Form Cycle can take between 4 and 7 days to complete depending on the project’s requirements.

ATLAS ALUMINUM TRUSS

Atlas Scaffolding Ltd. has designed its aluminum truss system for simplicity and efficiency. The aluminum components provide a light-weight system which is easy to maneuver by hand and fly with the crane. Bolted connections and joints eliminate hairline fractures that can develop on welds due to the stresses the system endures throughout the project.

Atlas Trusses are available in 20’, 10’-6”, 6’-6”, and 3’-6” lengths which are preassembled to length at Atlas Scaffolding Ltd. prior to shipping.

ACCESSIBLE AND ADAPTABLE

The Atlas Aluminum Truss uses retractable legs that recess up into the vertical component of the truss making it easier to fly the table over obstructions such as upstand parapet walls. These retractable legs allow the truss table to achieve slab support working heights from 5’-6” to 12’-6”. Greater elevations can be accommodated by stacking trusses if necessary.

FLYFORM TABLE

Atlas Scaffolding Ltd. provides 4x6 timber joists for the deck table. These joists are secured to the truss by special connector. Guardrail posts holders which are secured to the table are also provided with the system.

SAFETY

WARNING

The sequence and description are illustrative only. Products must be used in conformity with safety rules, instructional information, and procedure appropriate to the job and explain it to all personnel who will be involved. The procedure should include the reading and understanding of ATLAS current safety Rules and instructions for this product.

1. Retain these safety rules in a known place and be sure that all persons who install, move or remove flying table forms have access to, and follow them.
2. Follow all requirement of federal, provincial and local law, WCB regulations, codes and standards pertaining to all uses of equipment
3. Inspect all equipment before use. Never use damaged equipment.
4. Do not assemble or use the equipment without a properly designed shoring layout being available and followed at all times.
5. Inspect installed shoring and formwork prior, during and after pouring until concrete is set.
6. Consult your ATLAS equipment supplier when in doubt. Shoring is their business. Never take chances or circumvent proper safe practice.
7. Do not exceed safe working loads and spacing shown on the layout drawings.
8. All table forms shall be installed, moved and removed in accordance with recommended instructions herein.
9. If motorized or mechanical means of concrete placement is used, be sure that the shoring layout has been designed for use with such equipment and such fact is noted on the layout.
10. Consult your equipment supplier before attaching weather proof coverings, tarpaulins. Etc., to the flying system; cranes may be adversely affected by such attachments.
11. The weight of the truss table and formwork must never exceed the rated crane capacity over its necessary working radius. Never use tables for storage of material.
12. Before flying, make a trial pickup of various table sizes to assure that the pick-up points and sling lengths are correct, the tables must always fly level.
13. Use deck form materials with properties at least equivalent to those staled on the layout. Never butt joists between trusses or other supports unless structural details are shown on the layout.
14. Assure that all components are in firm and secure contact with each other. When shoring and forming to or from sloping surfaces be sure that full-seat wedging is used to properly transfer the shoring loads between the system components, and to the building structure.
15. The formwork deck must be stabilized and laterally braced to previously poured elements of the building or otherwise supported to avoid the effects of lateral forces.
16. All slings and rigging used in moving and flying the system must have a Safety Factor of at least 5:1 and must comply with all safe practices and governmental regulations governing their use,
17. Lateral forces on crane booms must be avoided, such as pulling a table from the building. Lateral motive forces must be otherwise provided for.

18. Make certain that a positively controlled method of tieback or other effective braking method is used when moving the table forms; the system must never be allowed to have free or uncontrolled horizontal movement.
19. Proper guardrails, midrails and toeboards must be installed on open sides and ends of tables.
20. Take proper safety precautions to protect all personnel involved in the rigging, movement, and positioning of the flying forms. Other personnel in the vicinity must be properly warned and protected.
21. No personnel are allowed to "ride" on a moving or flying table. Secure or remove all loose components on a table before moving or flying it.
22. Never store any materials on the cantilevered ends of tables.
23. Personnel must be restricted from freely assembling at a cantilevered end of a table. Precautions must be taken to avoid tipping of tables due to personnel loading, such as by rear anchorage tie-downs, front shores or other suitable methods.
24. Never release or strip forms until proper authority is obtained.
25. All reshoring operations must be approved by the appropriate engineer for the project and care must be taken to place reshores directly below the load carrying truss legs to avoid punch through, stress reversals or other undesirable forces on the poured concrete.
26. All field operations shall be under the direct control of a supervisor who is qualified and familiar with procedures for installation, horizontal movement, flying and landing of the table form system.
27. Never make unauthorized changes or substitutions of equipment; always consult your supplier prior to making any changes from the layout necessitated by job-site conditions.
28. To assure proper fit; safety and compliance with governmental regulations, cedes, and ordinances, never intermingle equipment of different manufacturers.
29. Fall impacts:
    Any component subjected to a fall must be immediately removed from service until a competent person determines it is undamaged and can be used again.

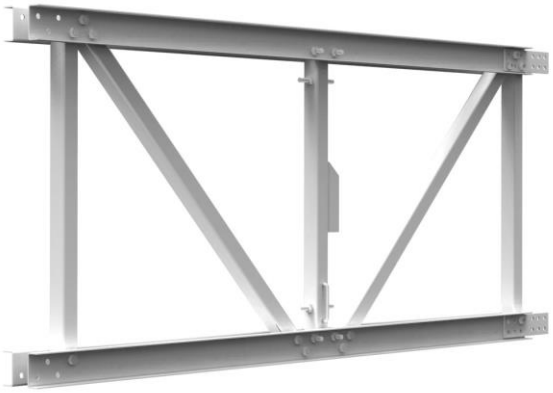
PARTS

ATLAS truss sections are delivered pre-assembled in the following lengths:

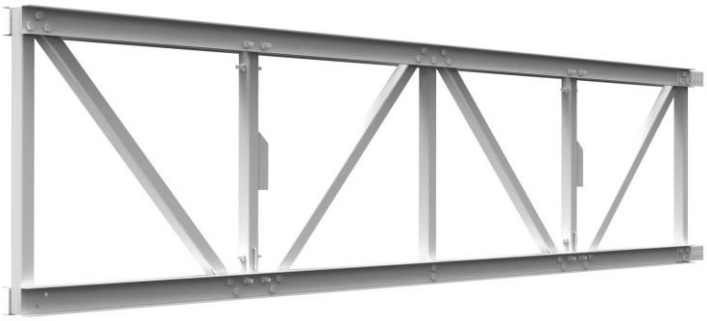
2’-0” (600mm) Extension

3’-6” (1067mm)

6’-6” (1981mm)



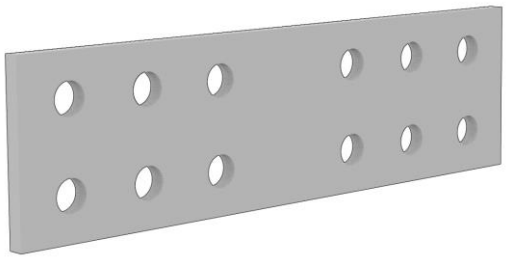
10’-6” (3200mm)



20’ (6096mm)

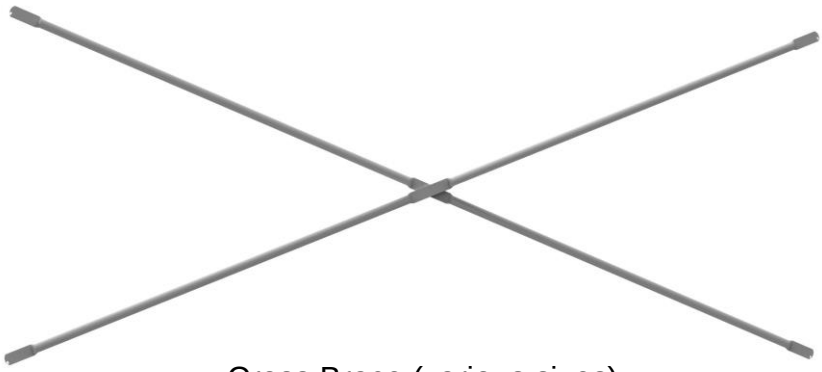
4’-6” (1359mm) Leg

6’-4” (2316mm) Leg



Splice Plate

Doubling Pin



Cross Brace (various sizes)

ASSEMBLY PROCEDURE *(in conjunction with page 8 diagram)*

These sections are light enough to be manhandled during initial assembly on the lower floor. Pre-drilled and with connectors supplied, the sections can be assembled very quickly into the lengths required. Once the form has been initially assembled on the lower floors, it remains intact throughout the entire project.

STEP 1
Slide in steel sliding column M4 in to truss vertical member M3 and pinned them.

STEP 2
Beam M2, as a bottom chord; lay down on the leveled surface. If necessary use splice to connect two or more lengths.
Bolt all connection of vertical (M3, M5) and diagonal (M6) members with bottom chord (M2)

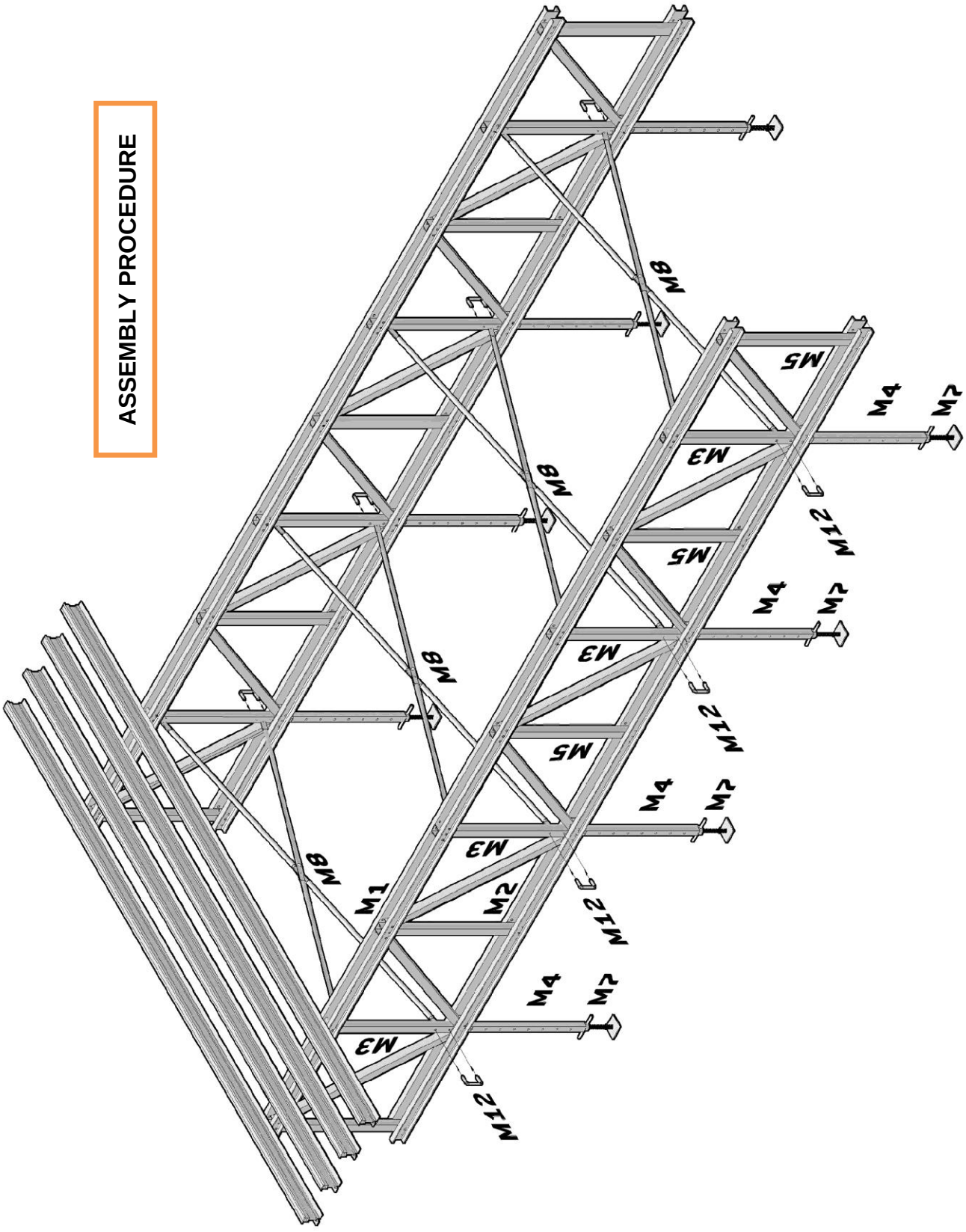
STEP 3
To form top chord, take member (M1) and if necessary use splice to connect two or more lengths. Bolt all connection of vertical (M3, M5) and diagonal (M6) members with top chord (M1)

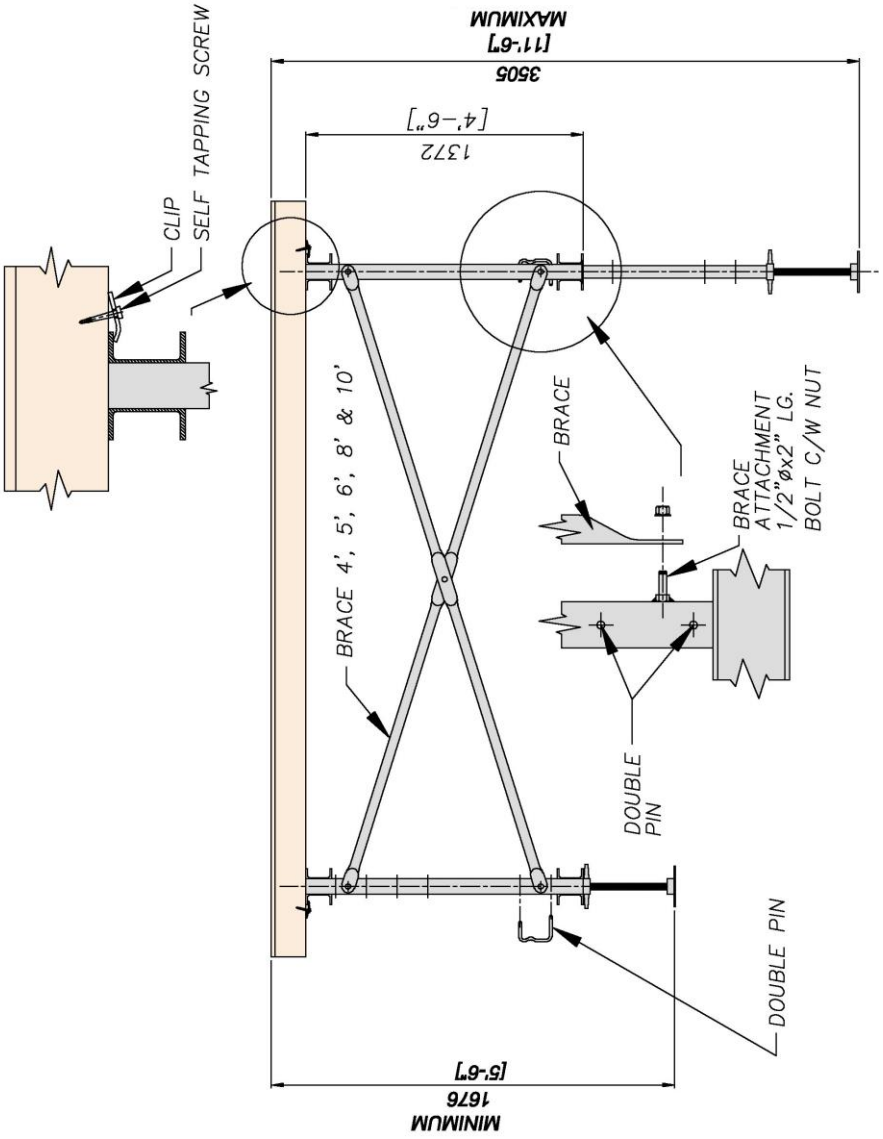
STEP 4
Install cross braces (M8) between main trusses. Tighten braces at the lock bolts on the top and bottom chord using 1/2" bolts.
Square the table with usual carpentry method, using line rope.

STEP 5
Place the aluminum beam on the top of the pair of truss and secure them with Beam Clips for truss. Place 3/4" plywood on the top of the joist, with grain perpendicular to the joist. Use fastener such as ring - nails or screw to secure plywood for joists. Plywood decking is nailed to the 2 x 2 inch nailing strip incorporated in the joists. Spacing between fastener to be 6" o/c maximum.

STEP 6
Lift the complete assembled table with the crane, and attached the Sliding columns (M4) and jacks (M7).

ASSEMBLY PROCEDURE





TYPICAL SECTION

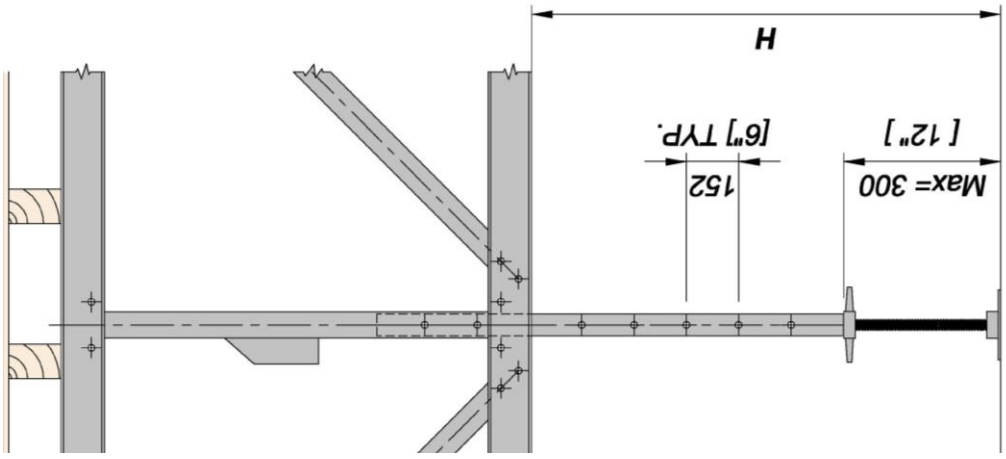
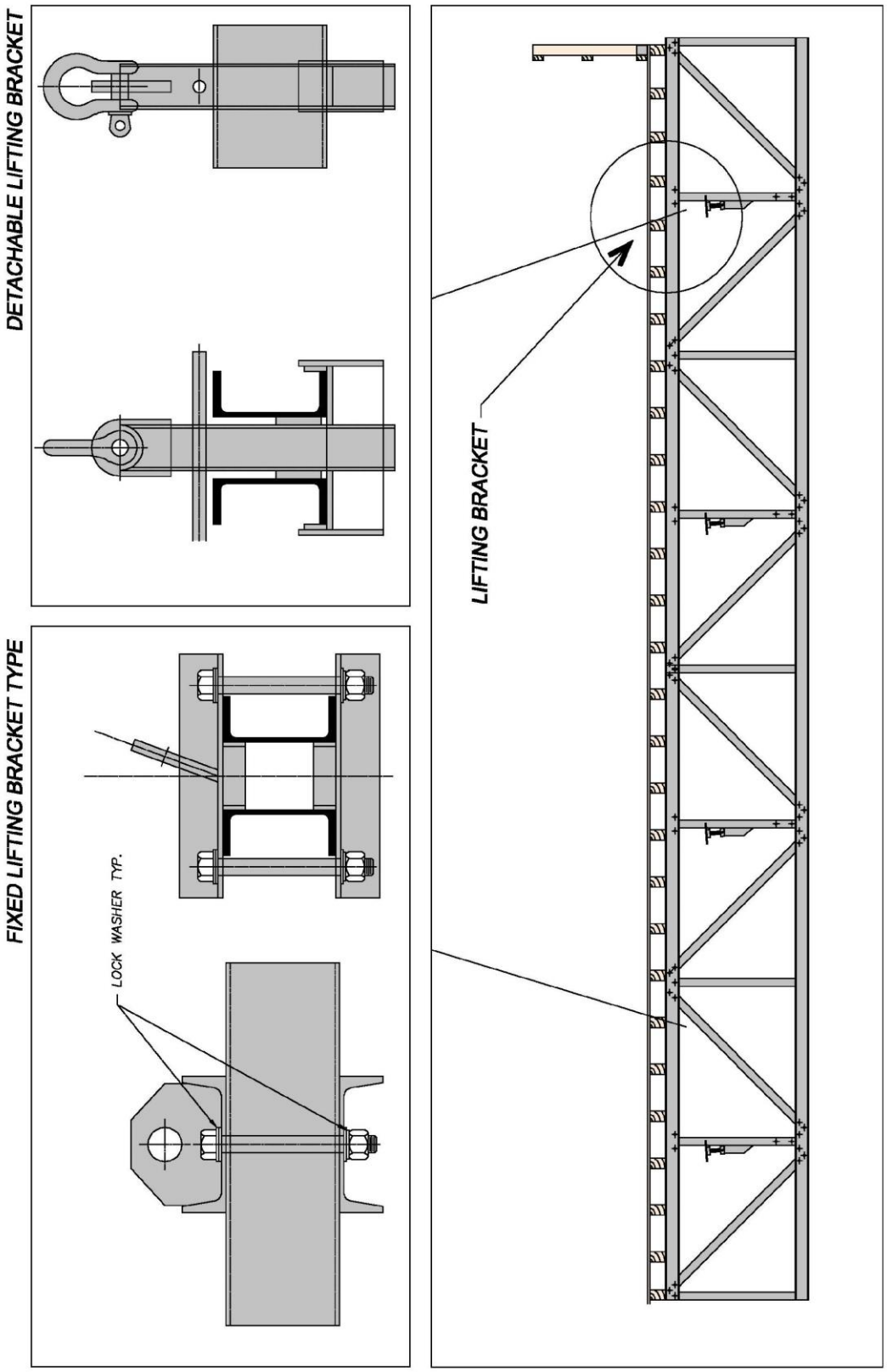
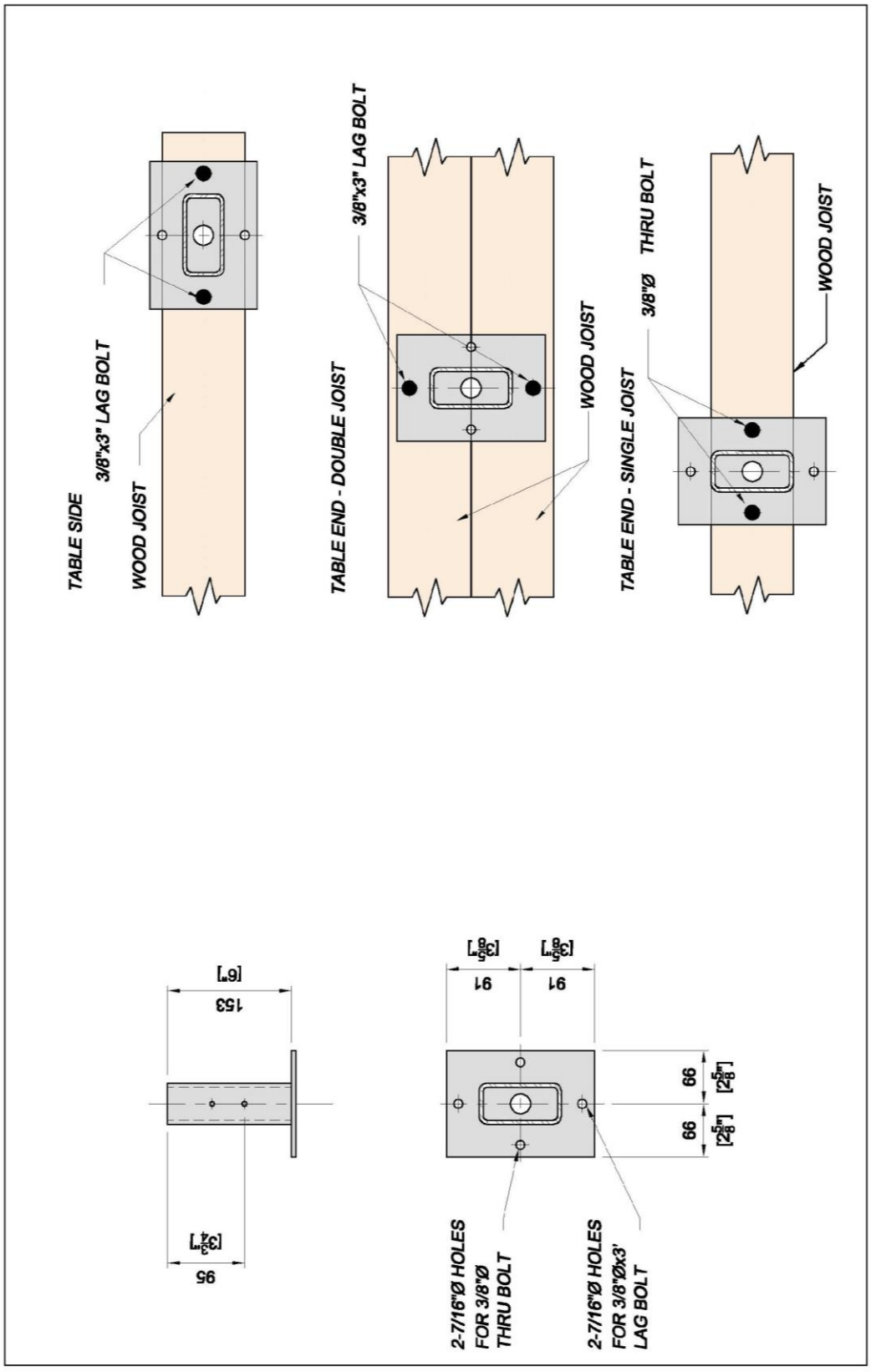


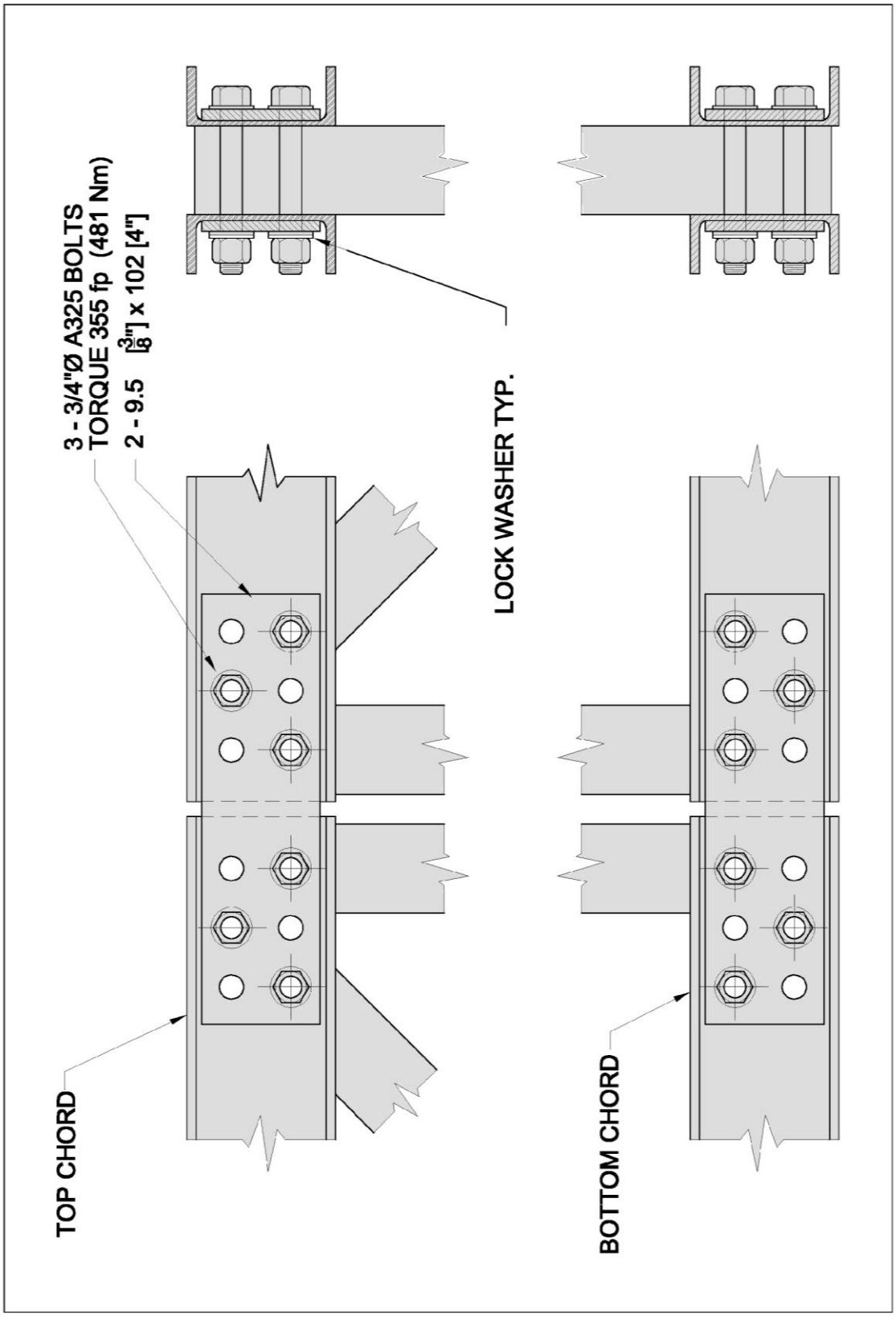
TABLE LEG



LIFTING BRACKET

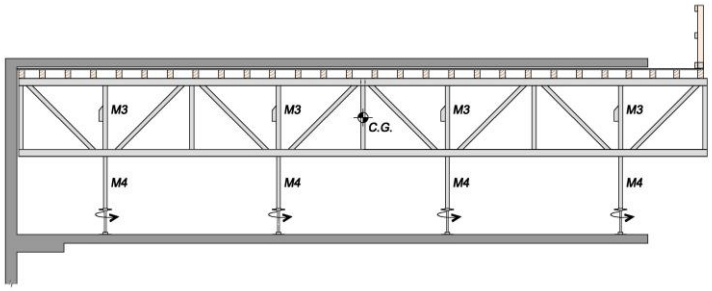
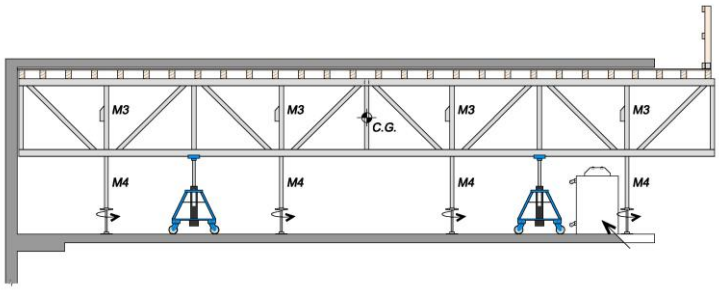
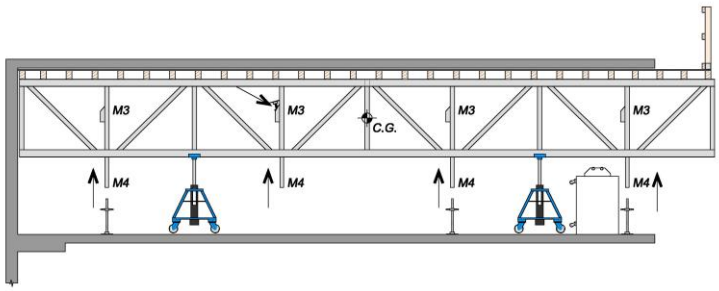
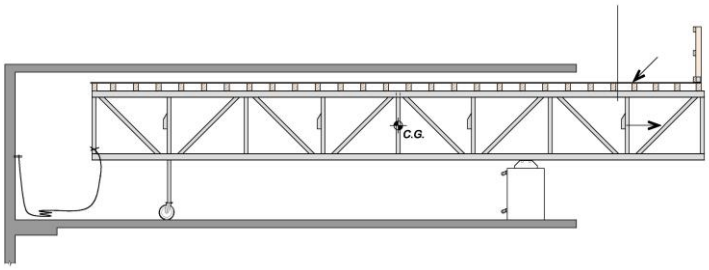
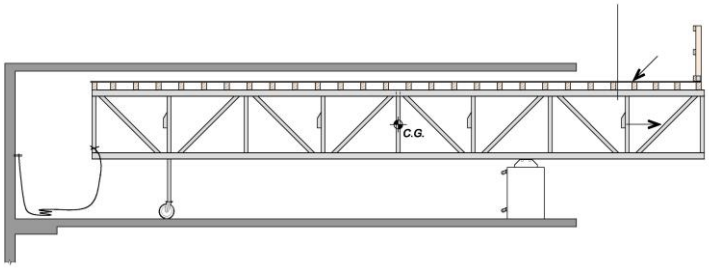


GUARD POST BRACKET

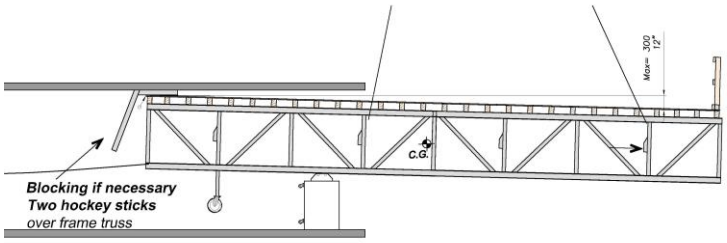
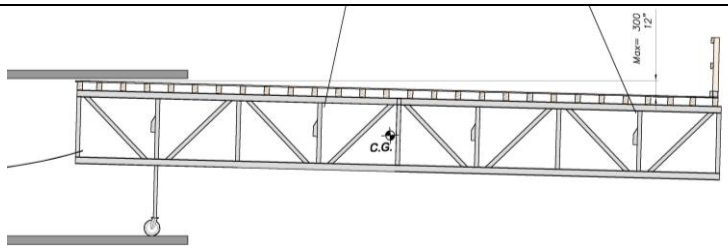
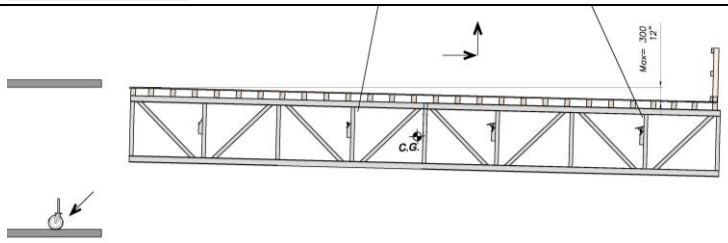
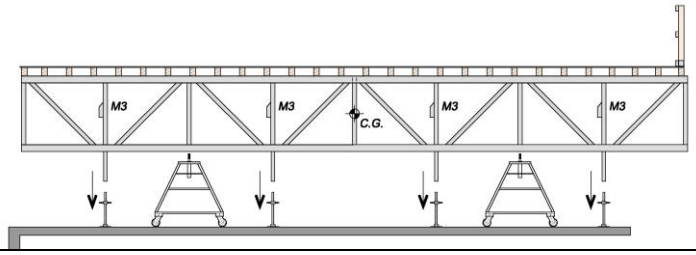
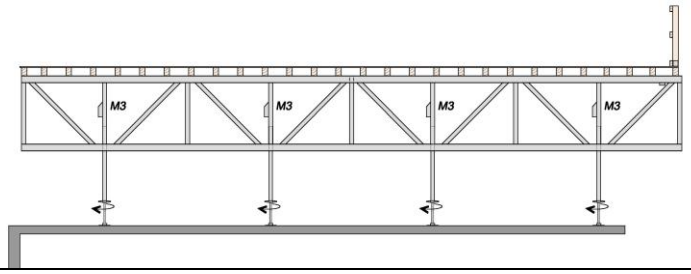


SPLICE PLATE CONNECTION

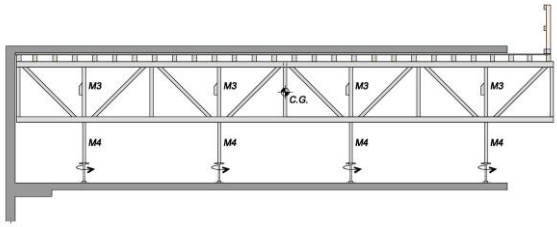
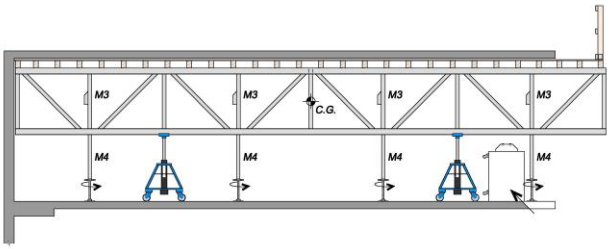
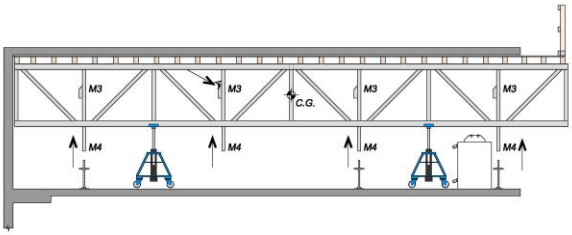
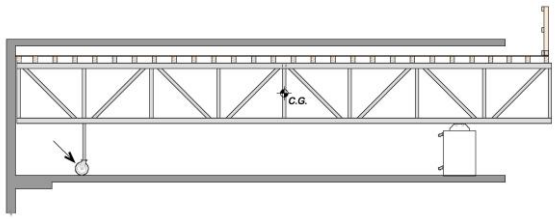
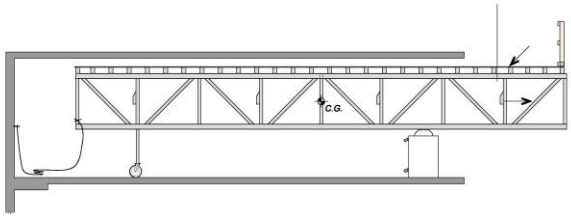
FLYING PROCEDURE – Pinching Method

STEP 1		Attach safety restraining line. Remove any single post shores which may be in use and retract hinged panels or sliders if applicable. Release truss screwjacks to break from loose by lowering jacks.
STEP 2		Hydraulic lowering jacks are available to help speed stripping and lowering tables. These jacks fit under the bottom chord of the truss and hold the table while extension legs are telescoped back into the leg sockets. Place hydraulic jacks under bottom chord of truss and place rollers 24" back from slab edge under truss
STEP 3		Retract extension legs except rear pair which will be fitted with castors. (Slide in steel sliding leg M4 in to truss vertical member M3 and pin them) Store screwjacks in storage pockets.
STEP 4		Install on the back sliding leg caster. Lower table onto rollers at the front and castors at the rear. All fillers should be freed and slid onto the top of table. Remove all hydraulic jacks.
STEP 5		Roll the table forward until the first two pick points are exposed. The outer chain from the crane should then be attached to these points and the crane should take the load and slightly raise the front of truss to clear the rollers. Remove the rollers

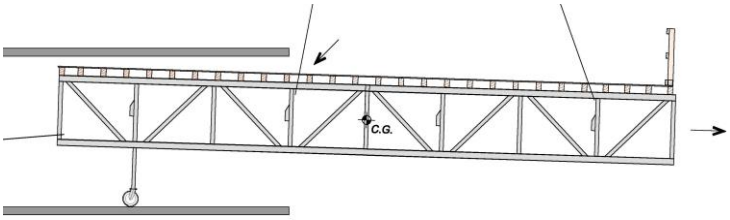
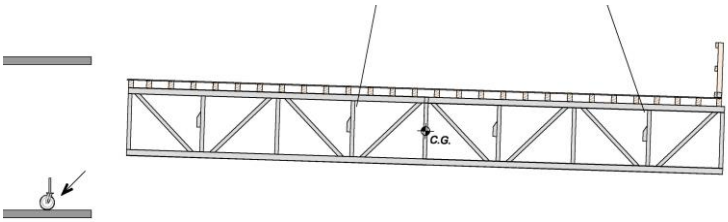
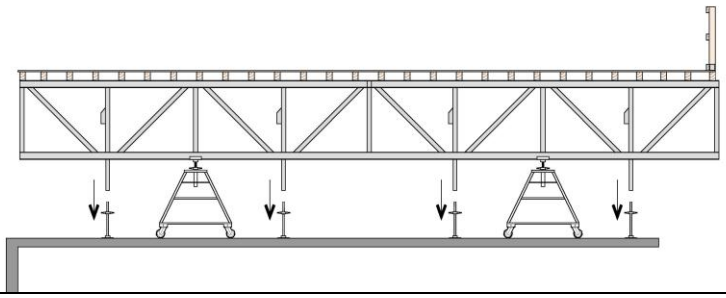
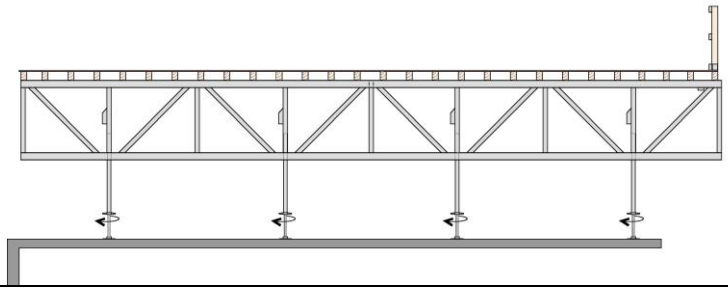
FLYING PROCEDURE – Pinching Method con't

STEP 6		Carefully continue to roll the table out further while gradually booming out the front sling until the rear sling position are exposed. Install two "Hockey sticks" & lower the front slings slowly; the table will tilt toward the front until its rear tilts up and pinches against the interior slab soffit. Protect any slab pipe inserts or projections. The table should now be stabilized under this "pinch effect". Attach the rear slings similarly to the front slings, and take up the weight of the table on the four slings legs until they are slightly tensioned. Remove the rollers
STEP 7		Continue to push out the table while the crane boom out to keep pace.
STEP 8		Remove castors and retract rear extension legs. The crane may now remove the table from the building. Use a hand-held line to prevent the table from slewing sideways. As the table is being raised, the line should be passed to the upper level
STEP 9		The table should then be landed on the four landing dollies on the floor above
STEP 10		Lower inner legs, install screw jacks and pin legs in place. Release the chains and the operation is repeated

FLYING PROCEDURE – Chain Fall Method

STEP 1		Attach safety restraining line. Remove any single post shores which may be in use and retract hinged panels or sliders if applicable Release truss screwjacks to break form loose by lowering jacks.
STEP 2		Hydraulic lowering jacks are available to help speed stripping and lowering tables. These jacks fit under the bottom chord of the truss and hold the table while extension legs are telescoped back into the leg sockets. Place hydraulic jacks under bottom chord of truss and place rollers 24" back from slab edge under truss
STEP 3		Retract extension legs except rear pair which will be fitted with castors. (Slide in steel sliding leg M4 in to truss vertical member M3 and pin them) Store srewjacks in storage pockets.
STEP 4		Install on the back sliding leg caster. Lower table onto rollers at the front and castors at the rear. All fillers should be freed and slid onto the top of table. Remove all hydraulic jacks.
STEP 5		Roll the table forward until the first two pick points are exposed. The outer chain from the crane should then be attached to these points and the crane should take the load and slightly raise the front of truss to clear the rollers. Remove the rollers

FLYING PROCEDURE – Chain Fall Method con't

STEP 6		Push table forward until the back pick point are exposed. Connect the inner chains to the truss. Continue to push out the table while the crane boom out to keep pace. Shorten the rear chains with the use of chain fall until total weight of the table is supported by the crane. At this point table should be slightly nose down.
STEP 7		Remove castors and retract rear extension legs. The crane may now remove the table from the building. Use a hand-held line to prevent the table from slewing sideways. As the table is being raised, the line should be passed to the upper level
STEP 8		The table should then be landed on the four preset elevation landing dollies on the floor above
STEP 9		Lower inner legs, install screw jacks and pin legs in place. Release the chains and the operation is repeated

General Notes:

1. Design: S269.1 - 1975 falsework for construction purpose
2. Loading: BCFS l165 (149,600kg. G.v.w.) e=450, dist.=55/45.
3. Aluminum: CAN3 S157 -M83 alloy 6061-T6
   - bends shall be smooth without sharp kinks
   - crack shall be cause for rejection if the crack lies in zone that is stressed in service
4. Steel: CSA G40.21M
   Grade 350a (sections)
   Grade 300w (column bracing)
5. Steel welding: CSA W59 6 F.W.
   Welders certified to CSA W47
6. Aluminum welding: CSA standard S244
   Welders certified to CSA W47.2
   Electrode wire shall be HA.6.4043 or, provided that no heat treatment is require after welding, HA.6.5356
7. All connections bolts 3/4"ø A325, torque 355 fp (481 nm)
8. Timber: D/fir rough sawn no.2 or better, untreated.

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