



8.0 SCAFFOLDS

8.1 SECTION CONTENTS

This section provides general information and pertinent safety guidelines for single pole and independent pole wood scaffolds and tubular steel scaffolds which are needed for occasional Company work such as painting, insulating, maintenance work, pipefitting, etc. Refer to applicable code regulations for guidance in the use of other types of scaffolds.

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NOTE: An asterisk (*) after a section of text indicates that the information in that section is new or revised as of September 1996.

NOTE: This section only applies to scaffolding used in general industry. **Refer to Fed-OSHA 1926.451 (revised 11/96) for new projects, renovations, and turn-around maintenance.** Some of the requirements differ from those shown here.

Fed-OSHA 1910.28

Note: See 1910.28(a) for safety requirements for all scaffolds.

8.2 GENERAL AND DESIGN REQUIREMENTS FOR SCAFFOLDING

A. GENERAL REQUIREMENTS FOR ALL SCAFFOLDING

Chevron Guidelines

1. Scaffolds are temporary, elevated platform structures which shall be provided for all work that cannot be done safely from permanent or solid construction (minimum 20 inches wide), or cannot be done safely from ladders.
2. The erection and dismantling of scaffolds shall be performed under the supervision and direction of a qualified person experienced with or trained in scaffold erection, dismantling, and use as well as knowledgeable about the hazards involved.
3. Personnel shall not work on scaffolds during storms or high winds nor on scaffolds covered with ice or snow.
4. Some jurisdictions may require a permit for scaffold use.

B. GENERAL DESIGN REQUIREMENTS

Chevron Guidelines

1. Platform Footings

- The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum anticipated load without settling or displacement. Unstable objects such as boxes, loose bricks, concrete blocks, or scrap lumber shall not be used to support or level scaffolds or planks.
- The scaffold shall be erected as near as possible to the building or structure.
- All poles shall be set and maintained plumb for the full height of scaffold.

2. Guardrails and Toeboards

- Open sides and ends of working levels 10 feet 0 inches or more above grade shall be guarded by top rails, midrails, and toeboards with a top of railing at 42 inches above the platform level. (Some jurisdictions may require guarding of open sides and ends of working levels 7 feet 6 inches or more above grade - see Cal. Code of Regulations).
- Where personnel are required to work or pass under a scaffold platform, a screen (18 gage, 1/2-inch mesh or equivalent) shall be installed between top rail and toeboard of platform guardrail.



3. Design Load

- Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.

4. Access

- A safe means of access such as a walkway, stair or fixed ladder shall be provided to all scaffold platforms. A portable ladder may be used if securely attached to the scaffold.
- All ladders shall extend 3 feet minimum above the platform deck or 12 inches above top rail for handhold during mounting and dismounting.

5. Planking and Overlaps

- Wooden planking shall be scaffold grade as recognized by lumber industry standards.
- Where planking is lapped, each plank shall lap its end supports by a minimum of 12 inches or secured from movement. Overlapping of planks at the unsupported end or overhang of a plank is not permitted.
- Where the ends of planks abut each other to form a flush floor, the abutted ends shall be secured to separate bearers.
- Where planks rest on bearers, ends shall extend minimum 6 inches, but not more than maximum 18 inches over end supports.
- Platform slopes shall not exceed 2 inches in 10 feet.

8.3 GENERAL REQUIREMENTS FOR WOOD POLE SCAFFOLDING

Chevron Guidelines

1. Lumber

- Scaffold lumber shall be select grade as recognized by the lumber industry standards.
- Lumber shall be inspected for defective or damaged pieces before and regularly during use, and substandard pieces shall be replaced (see *Figures 8.1, 8.2, and 8.3*).

2. Splices

- When poles are spliced, their ends shall be squared and fit squarely together.
- Splice plates shall be at least 4 feet 0 inches in length and be the same width and have at least the cross sectional area of the poles being spliced.
- Splice plates shall be provided on two adjacent sides and shall overlap the abutted ends equally.
- Splice plates of other equivalent strength material may be used.

Note: See 1910.28(b) for general requirements for wood pole scaffolds.

Fed-OSHA 1910.28

3. Nailing

- Double-headed nails shall not be used where projections create a hazard such as on guardrails. Also lubricated, wax-coated nails are not permitted.
- All nails shall be 8d or greater, shall be driven full length or to the first head of double-headed nails, and shall not be subjected to a straight pull.

4. Ledgers

- Ledgers shall span pole spaces without splicing between poles.
- Ledgers shall be reinforced by bearing blocks securely nailed to the side of pole to form a support for the ledger.

5. Bearers

- Bearers shall be set on edge and long enough to project over the ledgers at least 3 inches for proper support.

SCAFFOLD COMPONENT	LIGHT DUTY		MEDIUM DUTY	HEAVY DUTY
Maximum uniformly distributed load	25 PSF		50 PSF	75 PSF
Maximum Height	20'	60'	60'	60'
Pole size	2" x 4"	4" x 4"	4" x 4"	4" x 4"
Longitudinal polespacing	6'	10'	8'	7'
Scaffold width (single pole)	5'	5'	5'	5'
Scaffold width (independent pole)	6'	10'	8'	7'
Ledger size	2" x 6"	2" x 10"	2" x 10"	2" x 10"
Bearer size	2" x 6"	2" x 10"	2" x 10"	2" x 10"
Maximum vertical spacing Horizontal members (single pole) Dim "A" Figure 8.3	7'	7'	7'	6'6"
Maximum vertical spacing Horizontal members (independent pole) Dim "B" Figure 8.2	7'	7'	7'	4'6"
Diagonal & Cross Bracing	1" x 6"	1" x 6"	1" x 6"	2" x 4"

Figure 8.1 Typical Wood Scaffold Specifications—Single Pole and Independent Pole

Dimensions are minimum nominal sizes and maximum allowable spacings.



6. Full Diagonal Bracing

- Full diagonal bracing shall be installed across the entire face of scaffold in both directions to prevent movement parallel to the building wall and buckling.
- Braces shall be spliced only at the poles.

7. Cross Bracing

- Cross bracing shall be provided between the inner and outer sets of poles in independent pole scaffolds. The free ends of pole scaffolds shall be cross braced.

8. Height Limitations

- Wood scaffolds over 60 feet in height shall be designed by a Civil Engineer registered within the appropriate jurisdiction.
- Scaffolds shall not be built beyond reach of effective fire fighting equipment.

9. Securing

- All scaffolds shall be securely guyed or tied to the building or structure.
- Ties shall be doubled 12 gage iron wire or equivalent and shall not be more than 20 feet apart horizontally or vertically.
- Heavy duty scaffolds require ties every 15 feet horizontally or vertically.

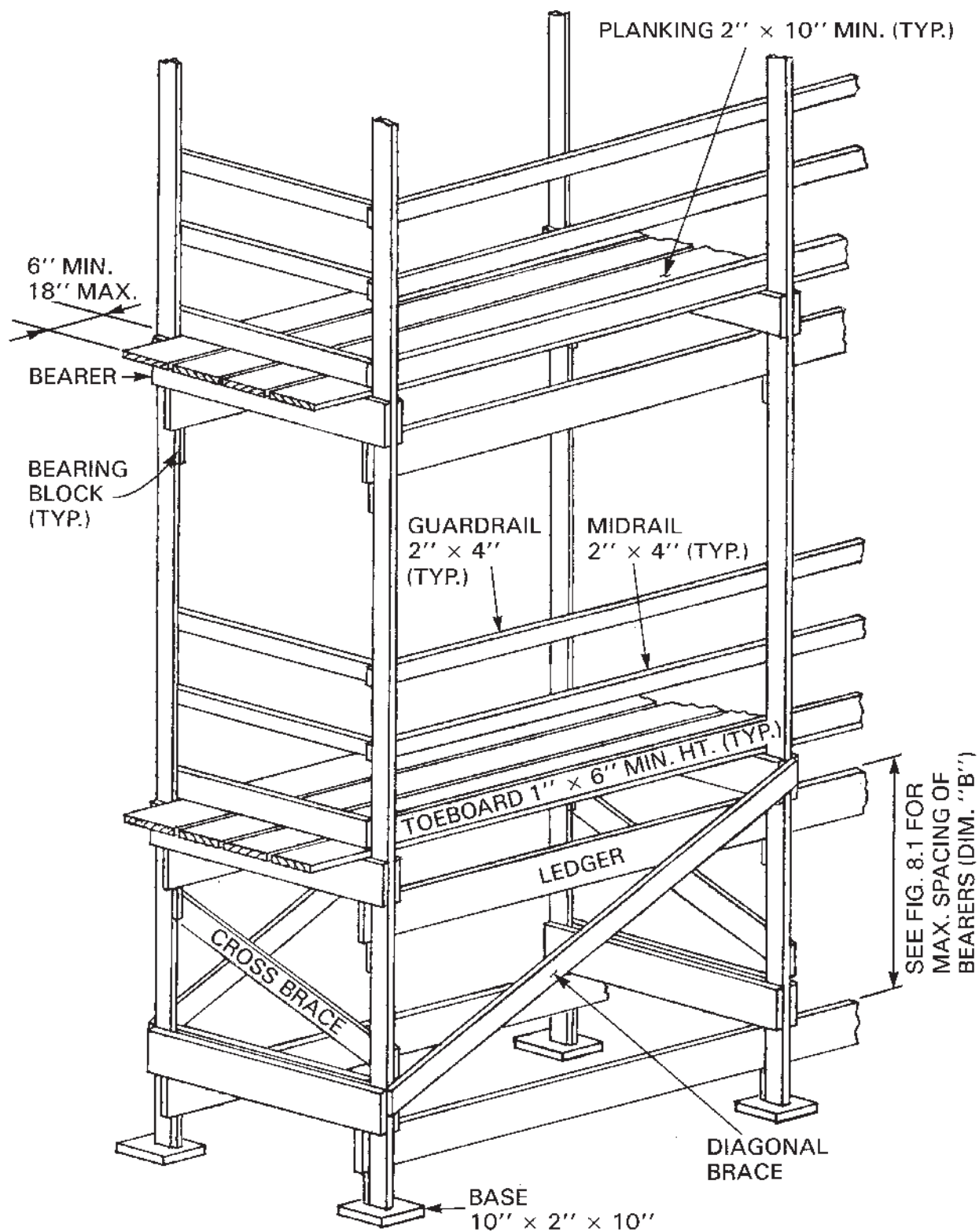


Figure 8.2 Wood Independent Pole Scaffold

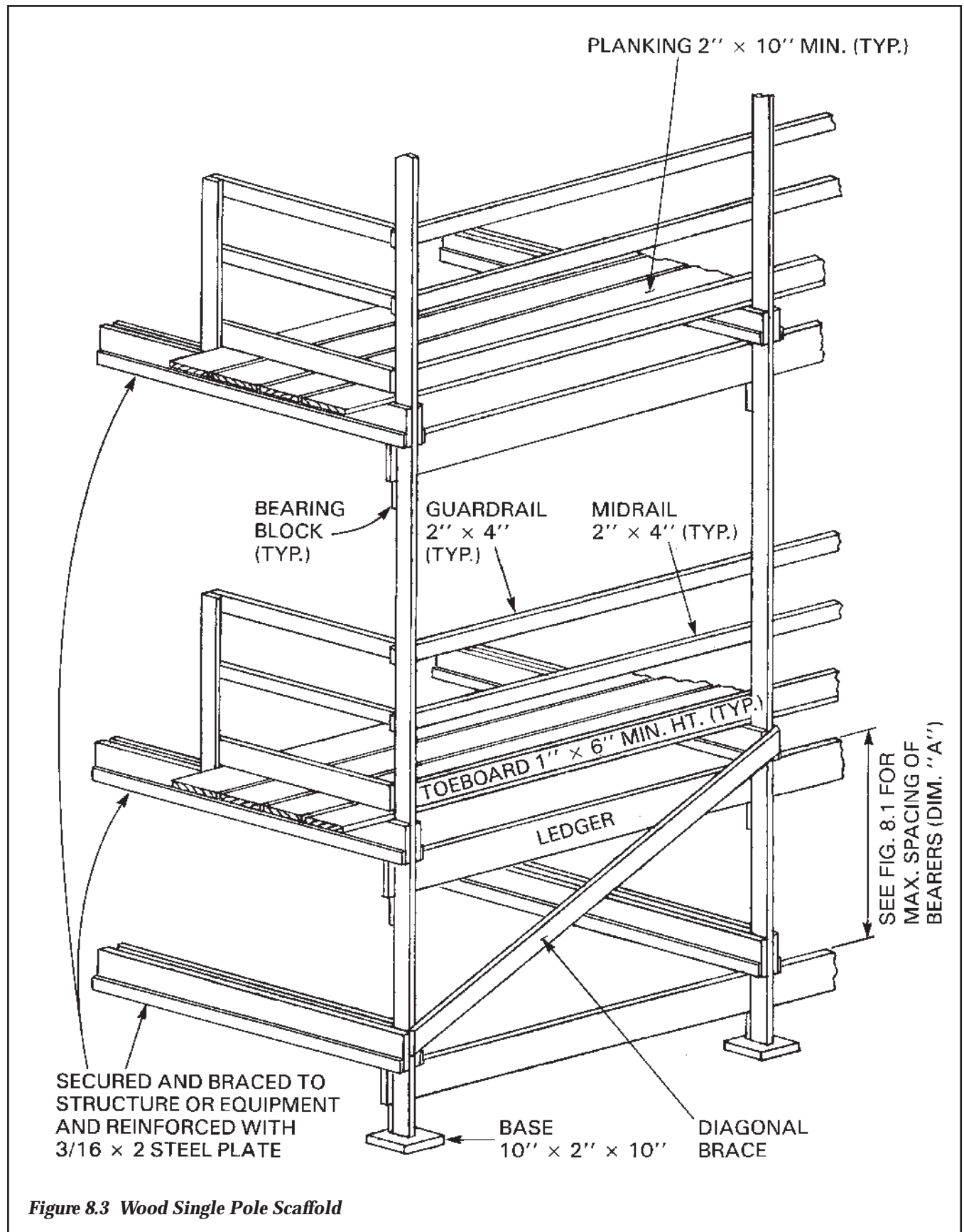


Figure 8.3 Wood Single Pole Scaffold

Fed-OSHA 1910.28

1. See 1910.28(c) for requirements for tube and coupler scaffolds.

8.4 TUBULAR STEEL SCAFFOLDING AND STAGING

Chevron Guidelines

1. Material

- Staging pieces such as poles, ledgers, bearers, ribbons, and braces shall be 2 inches nominal OD tube steel or other material of equivalent strength. “Tubelox” staging material may be used.
- All staging pieces shall extend 1/2 inch minimum through couplings to prevent crimping of ends.

2. Bearers

- Bearers shall be at least 4 inches, but not more than 12 inches longer than the pole spacing.

3. Height Limitations

- Tubular steel scaffolds exceeding the maximum heights listed in specifications (*Figure 8.4*) shall be designed by a Civil Engineer registered within the appropriate jurisdiction.
- Scaffolds shall not be built beyond reach of effective fire fighting equipment.
- Intermediate rest platforms should be provided for climbing to levels where the change in elevation is greater than 30 feet.
- Rest and intermediate platforms shall be fully planked, equipped with guardrail and toeboard, and shall not be used for storage of material or as an additional working platform.

4. Securing

- Staging shall be tied securely to structures or equipment to prevent tipping over.
- Ties shall be doubled 12 gage iron wire or equivalent and not be spaced more than 30 feet horizontally or 26 feet vertically.
- The ties should be as close as possible to the top working platform.
- “TCC” clamps with staging pieces may be used instead of tie-wires to stabilize staging (*Figure 8.14*).

5. Diagonal Bracing

- The full height of all staging shall be braced. Both the front and back of longitudinal staging faces shall be braced.
- Diagonal bracing shall be installed at approximately a 45° angle from near the base of the first post upward to the extreme top of the scaffold. Repeat at the base of every fifth longitudinal post.
- Similarly diagonal bracing shall be installed from the base of the last post extending back and upward toward the first post (see *Figures 8.5, 8.6, and 8.7* for details).



6. Cross Bracing

- Cross bracing shall be installed across the width of the scaffold at least every third set of posts horizontally and every fourth ribbon vertically (see *Figures 8.5 and 8.6* for details).

TYPE	STANDARD			MEDIUM DUTY			HEAVY DUTY	
Application	Inspection, Painting, Insulating, Welding and Pipefitting			Exchangers Cleaning	Dis-mantling Pipe-fitting	Refrac-tory Work	Refrac-tory Work	Other Special
DISTRIBUTED LOAD LBS./SQ. FT.	25			50	50	50	70	70
CONCENTRATED LOAD/LBS.	300			320	350	375	350	450
POST SPACING LENGTHWISE DIM "B" SEE FIG. 8.5	10'			8'	8'	6'	6'6"	6'
POST SPACING LENGTHWISE DIM "A" SEE FIG. 8.5	6'			5'	4'	5'	6'	4'
MAXIMUM NUMBER OF LOADED/ WORKING PLATFORMS	1	2	3	1	2		1	
ADDITIONAL PLANKED LEVEL (NOT FOR STORAGE OR WORK)	8	4	0	6	0		6	
MAXIMUM HEIGHT	125'	125'	91'	125'	78'		125'	

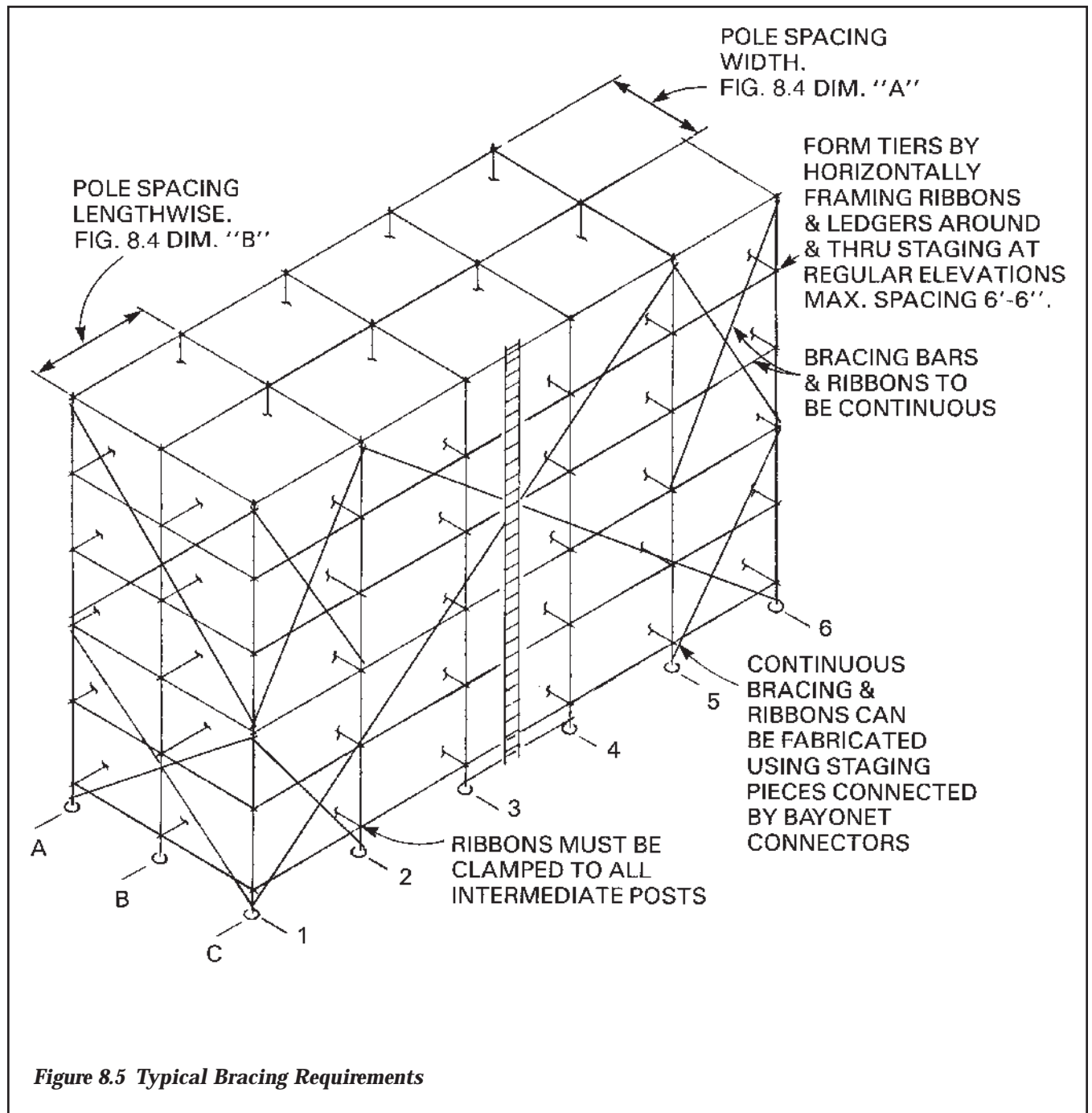
Figure 8.4 Typical Tubular Steel Scaffold Specifications



8.5 TYPICAL SCAFFOLDING ERECTION ARRANGEMENTS

Suggested Erection Arrangements and Nomenclature (see following pages)

<i>Figure 8.5</i>	<i>Typical Bracing Requirements</i>
<i>Figure 8.6</i>	<i>Typical Tubular Steel Nomenclature</i>
<i>Figure 8.7</i>	<i>Typical Tubular Steel Diagonal Bracing</i>
<i>Figure 8.8</i>	<i>Typical Tubular Steel Cross Bracing</i>
<i>Figure 8.9</i>	<i>Typical Front and Side Access Scaffold Ladders</i>
<i>Figure 8.10</i>	<i>Typical Tubular Steel Platform Staging and Ladder</i>
<i>Figure 8.11</i>	<i>Typical Tubular Steel Footing Connections</i>
<i>Figure 8.12</i>	<i>Typical Tubular Steel Connectors and Coupler</i>
<i>Figure 8.13</i>	<i>Typical Tubular Steel Planking Details</i>
<i>Figure 8.14</i>	<i>Typical Tubular Steel Tie and Clamp Details</i>



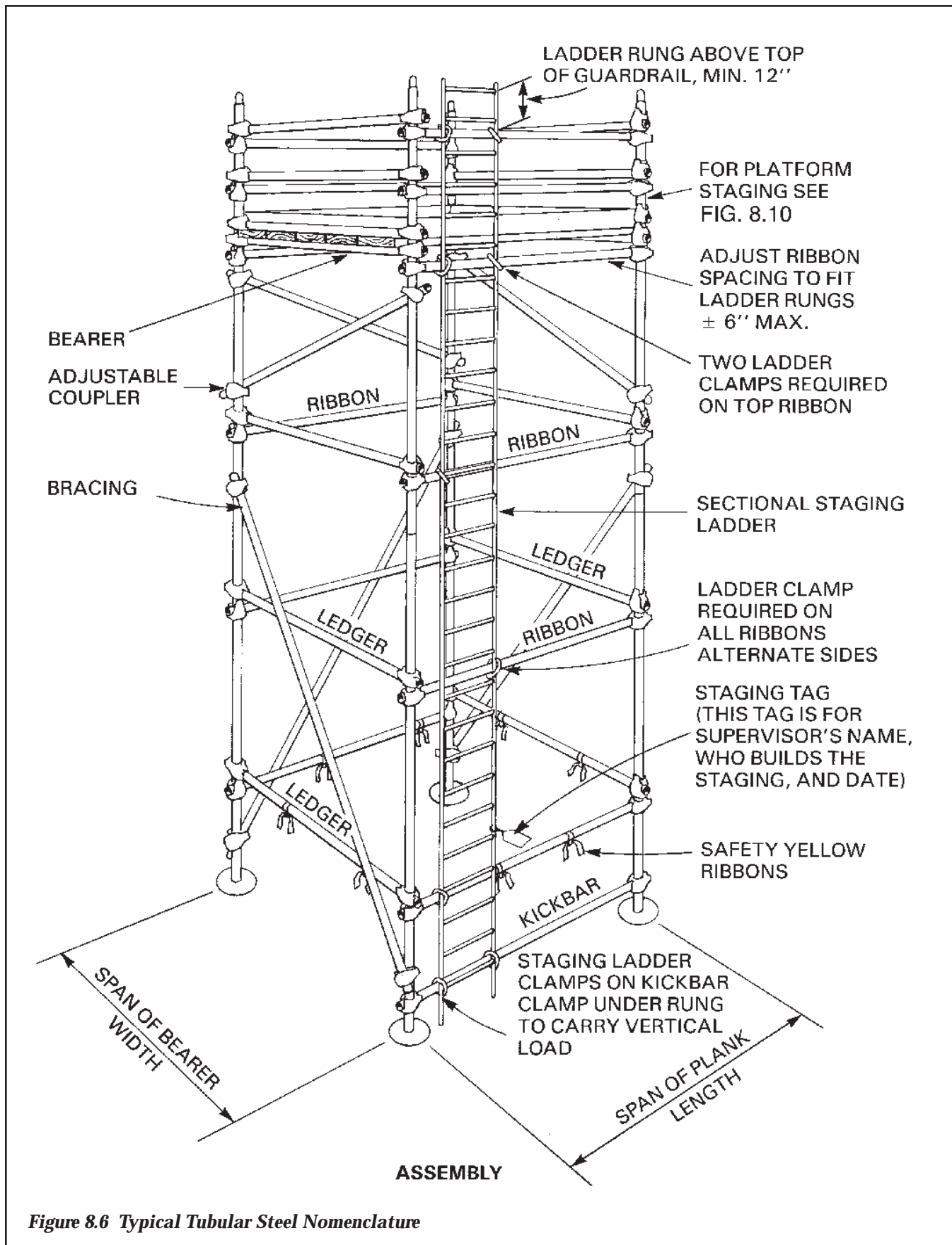


Figure 8.6 Typical Tubular Steel Nomenclature

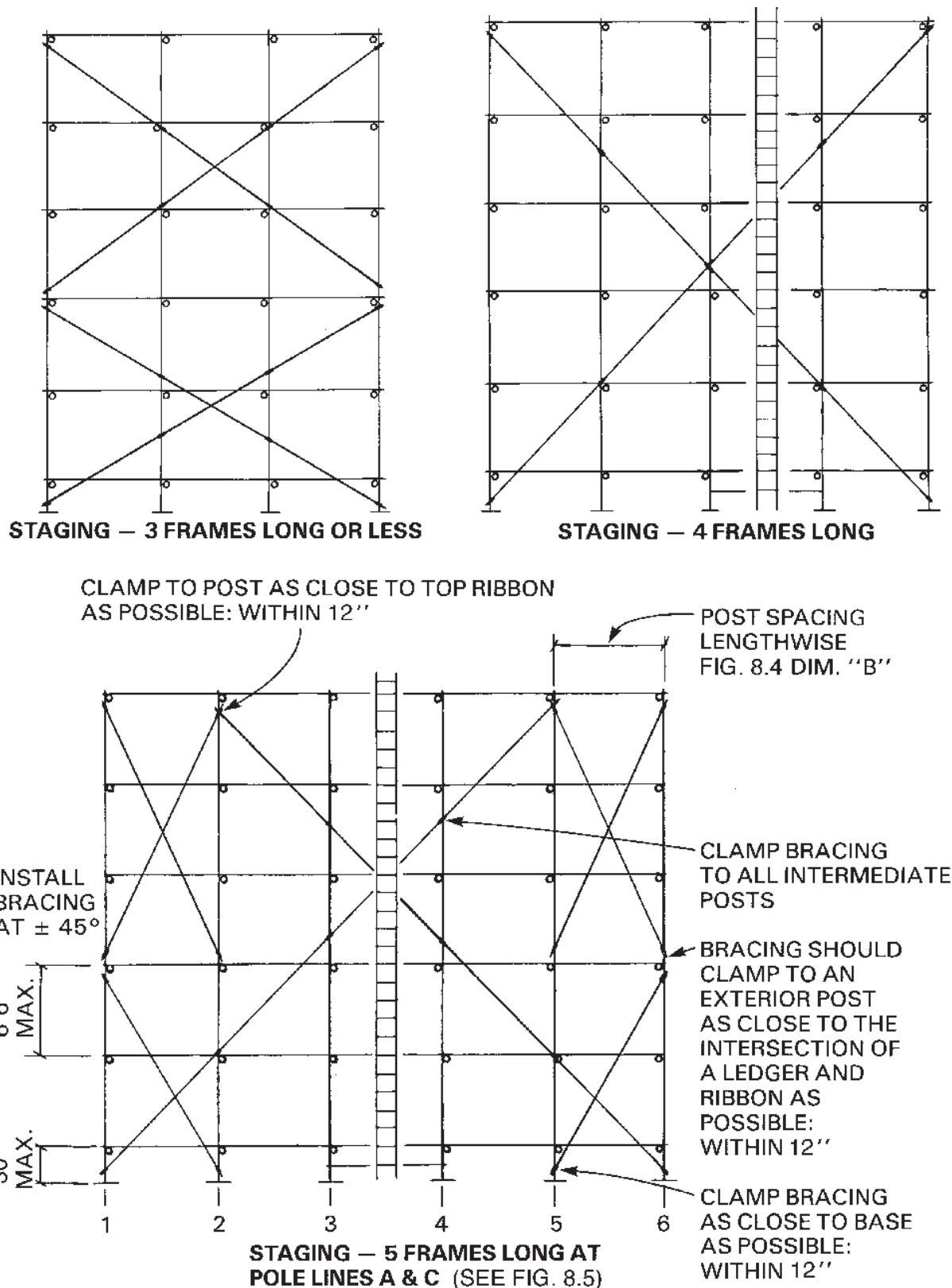
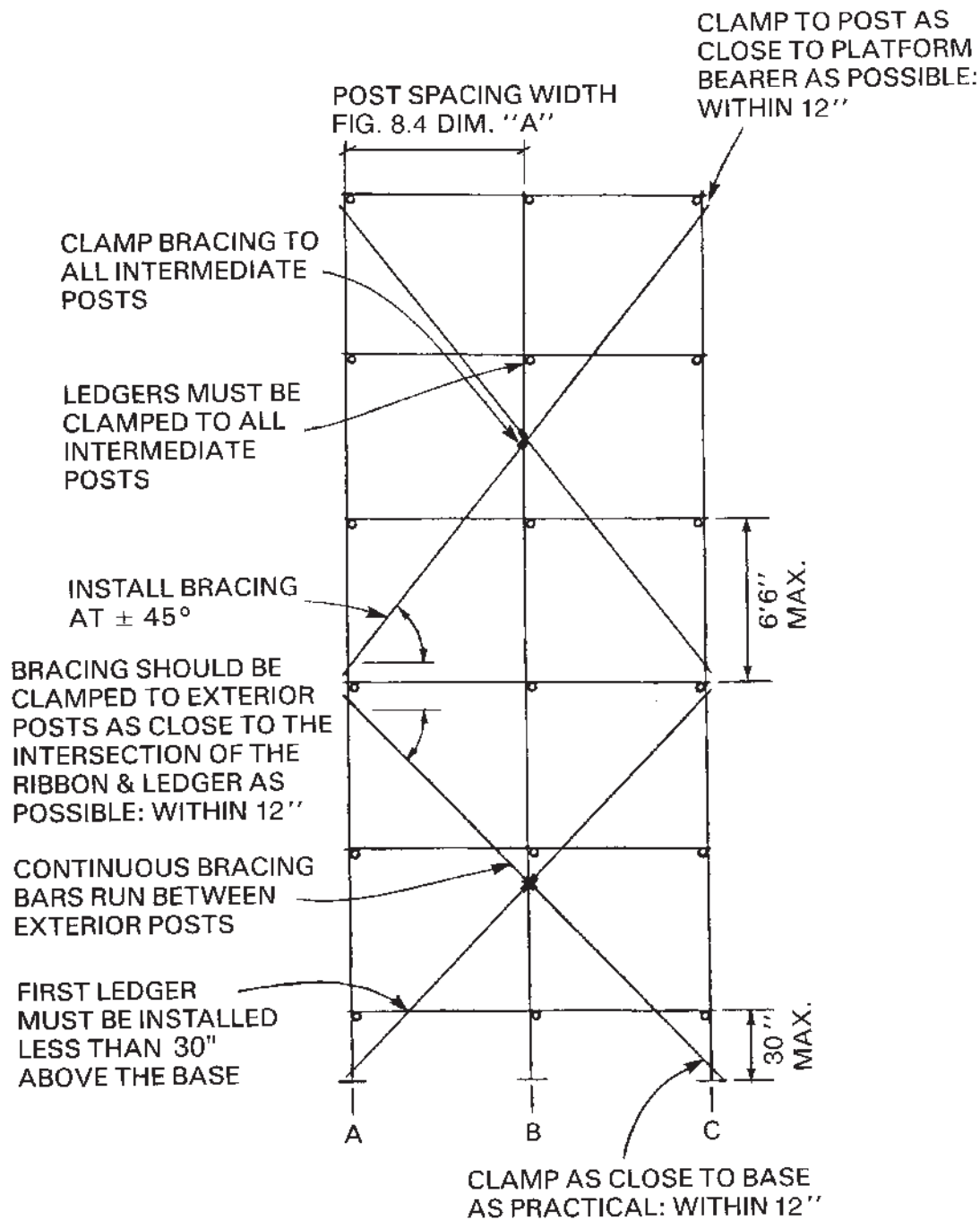


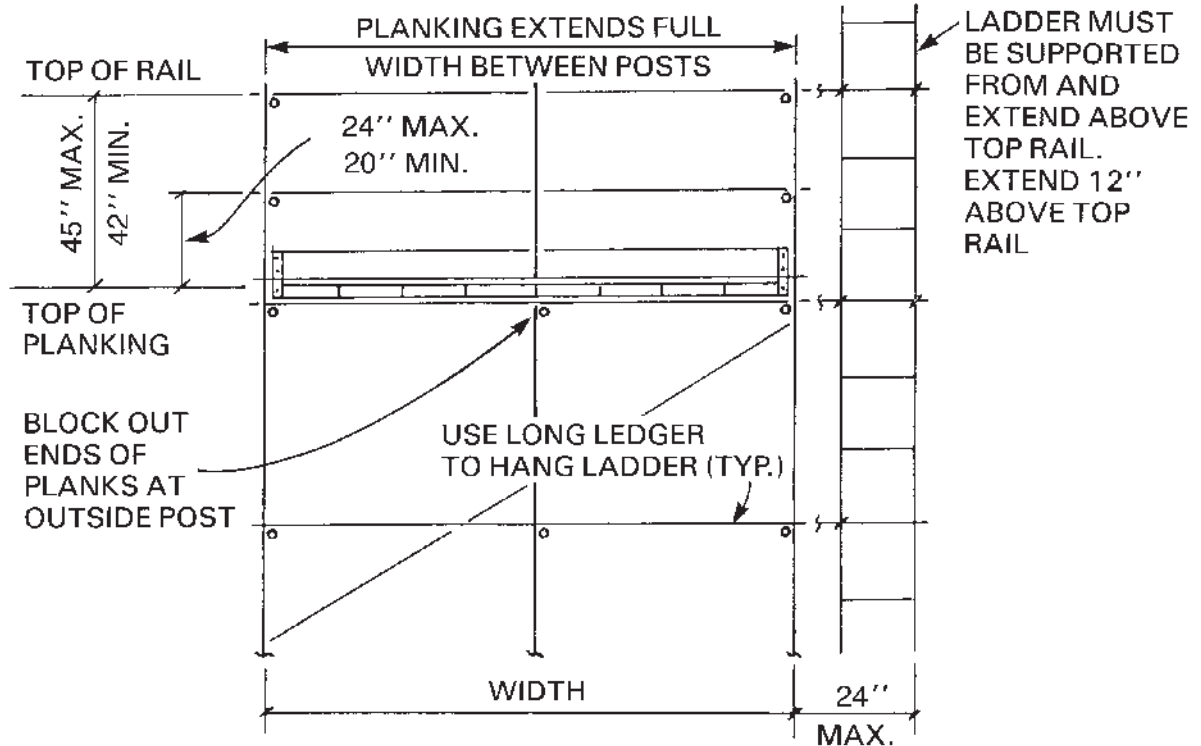
Figure 8.7 Typical Tubular Steel Diagonal Bracing

BRACING ACROSS STAGING WIDTH

BRACING AT POLE LINE 1, 3 & 5
(SEE FIG. 8.5)

Figure 8.8 Typical Tubular Steel Cross Bracing: Across Width of Scaffold

TYPICAL SIDE ACCESS LADDER DETAIL



TYPICAL FRONT ACCESS LADDER DETAIL

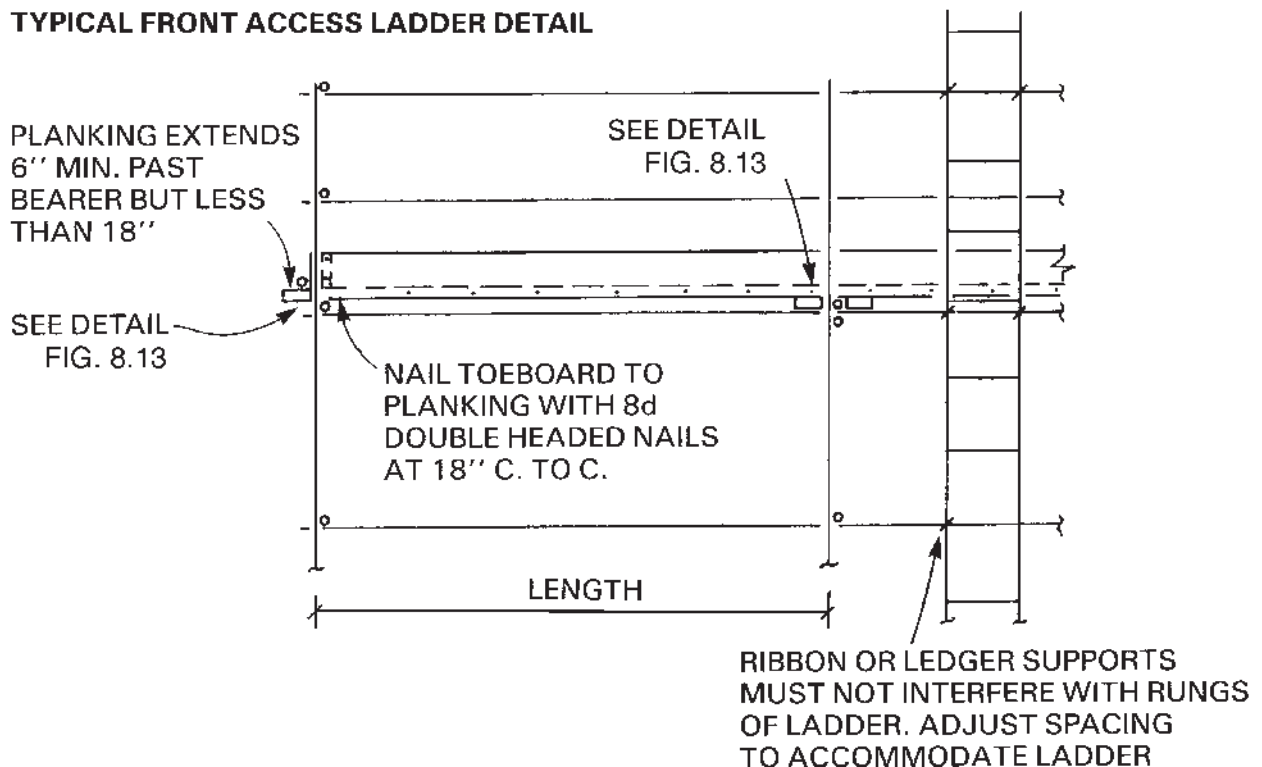


Figure 8.9 Typical Front and Side Access Scaffold Ladders

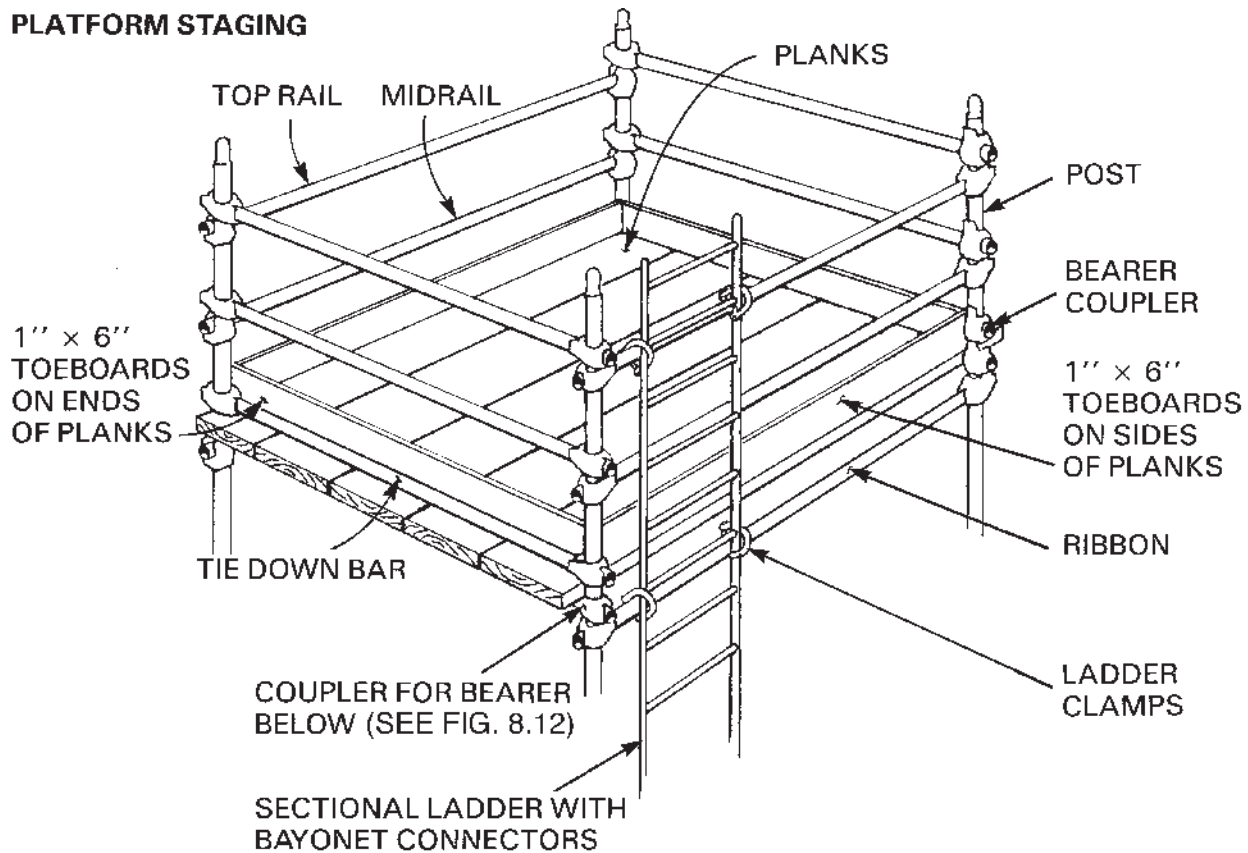
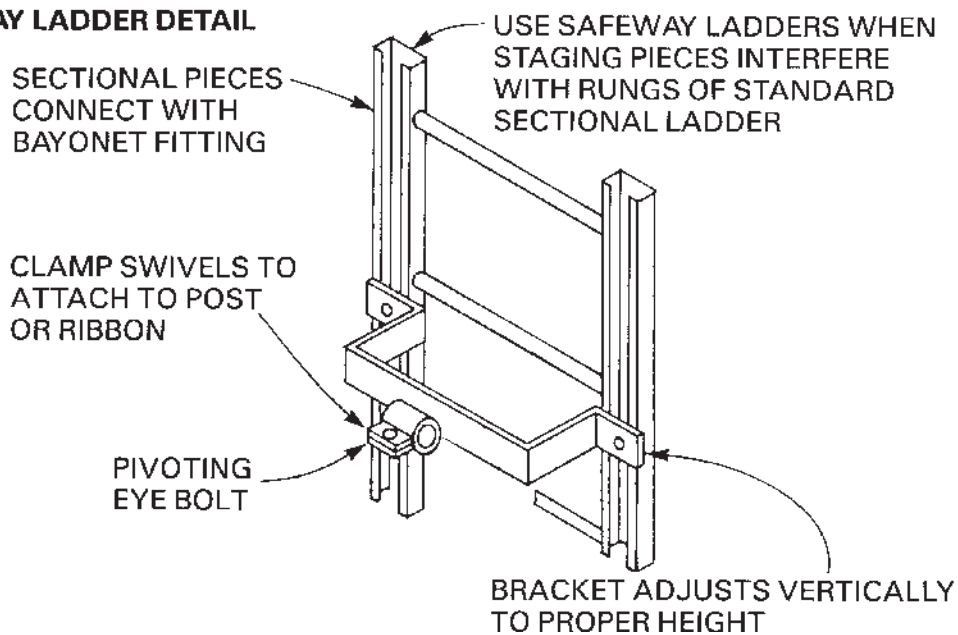
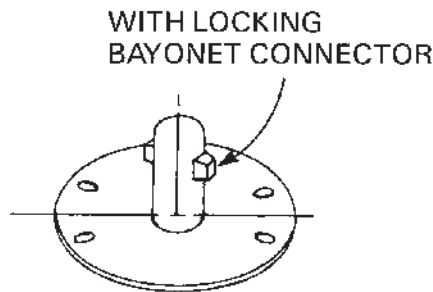
PLATFORM STAGING**SAFETY LADDER DETAIL**

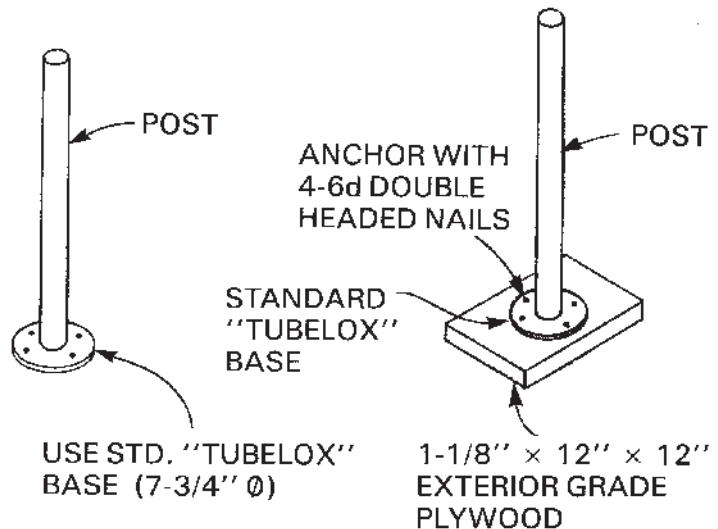
Figure 8.10 Typical Tubular Steel Platform Staging and Ladder

TYPICAL FOOTING CONNECTION ON CONCRETE OR PAVING



NOTE: ADDITIONAL CRIBBING OR CONTINUOUS MUDSILLS MAY BE REQUIRED DEPENDING ON THE SPECIFIC SOIL AND LOADING CONDITIONS.

TYPICAL FOOTING CONNECTION ON SOIL OR GRAVEL



TYPICAL FOOTING CONNECTION ON A PLATFORM

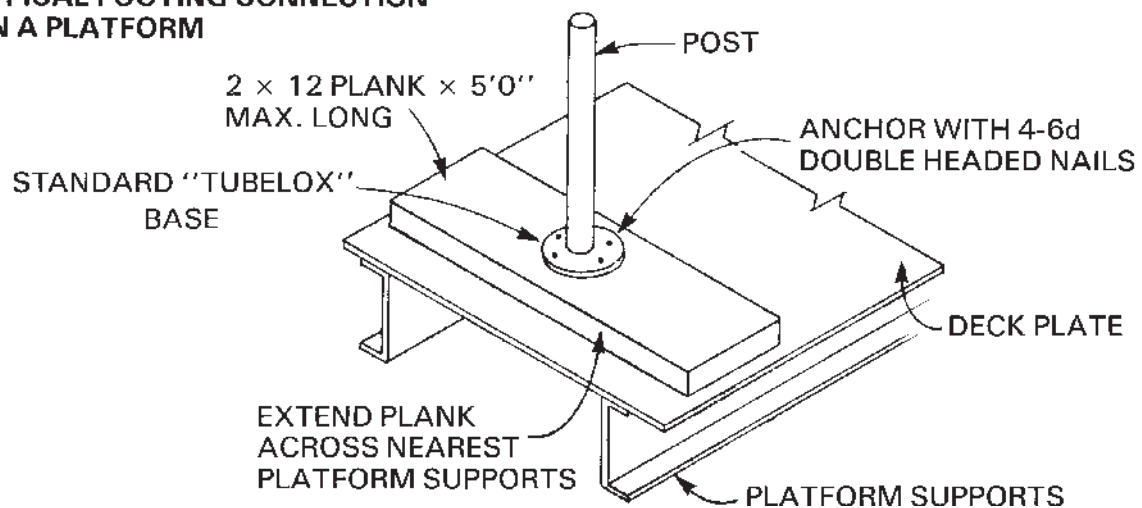
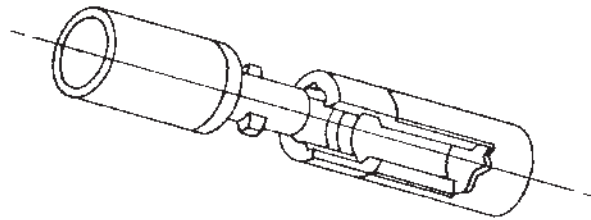


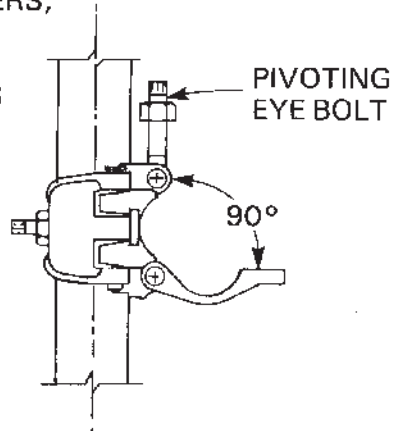
Figure 8.11 Typical Tubular Steel Footing Connections

LOCKING BAYONET CONNECTOR

INSERT AND ROTATE 1/4 TURN TO LOCK. MATCH GROOVES ON MALE AND FEMALE ENDS. DO NOT USE ON BEARERS.

**STANDARD COUPLER**

FOR LEDGERS,
BEARERS,
KICKBAR
& RIBBONS

**ADJUSTABLE COUPLER**

FOR BRACES ONLY

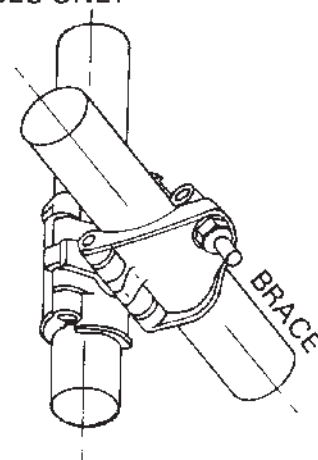
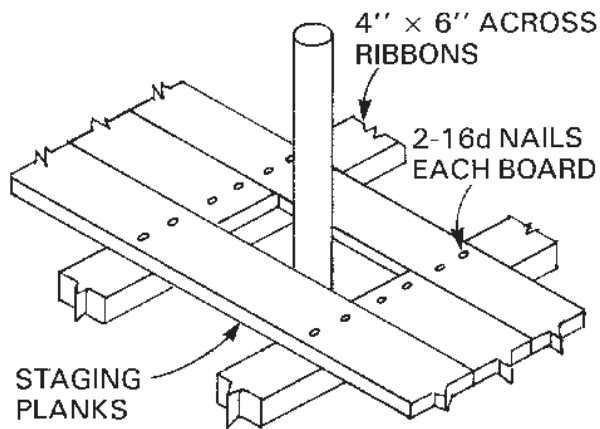
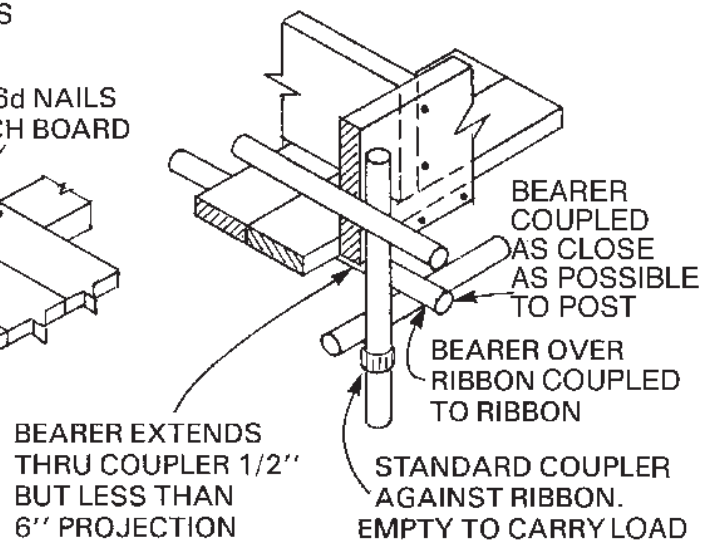


Figure 8.12 Typical Tubular Steel Connectors and Coupler

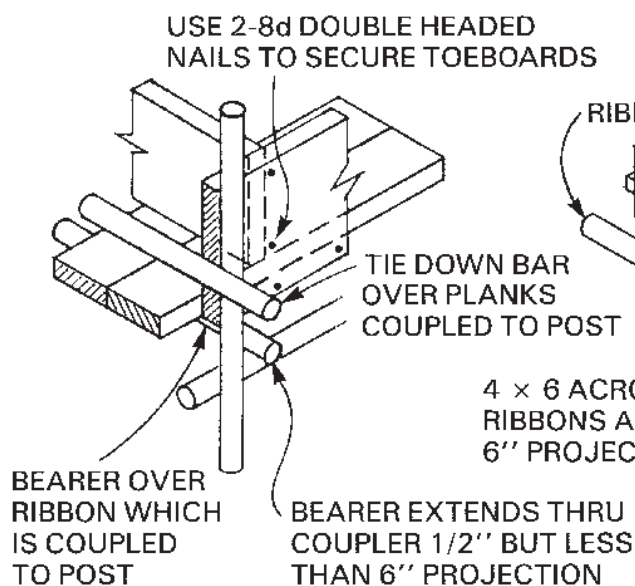
TYPICAL DETAIL FOR GAP IN STAGING PLANKS OR FRAMING AROUND AN OBSTRUCTION



ALTERNATE BEARER CONNECTION



TYPICAL FREE END PLANK DETAIL



TYPICAL DETAIL FOR INTERMEDIATE OUTSIDE POST

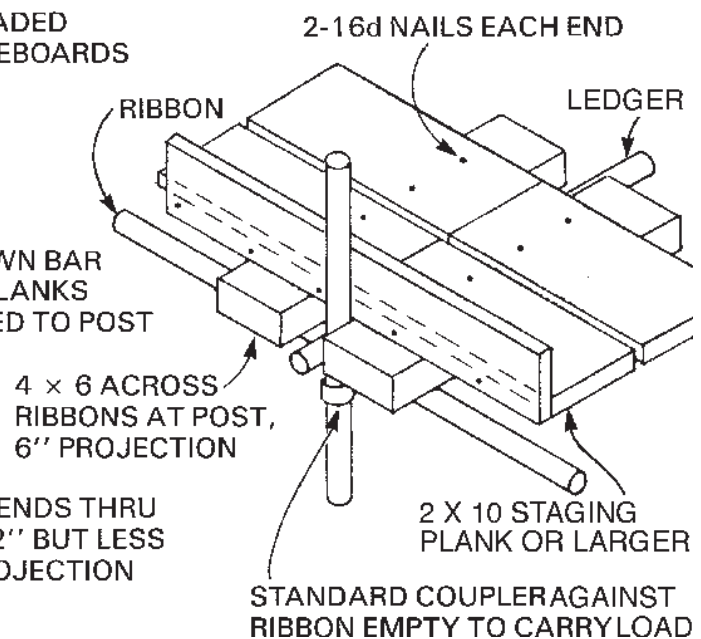


Figure 8.13 Typical Tubular Steel Planking Details

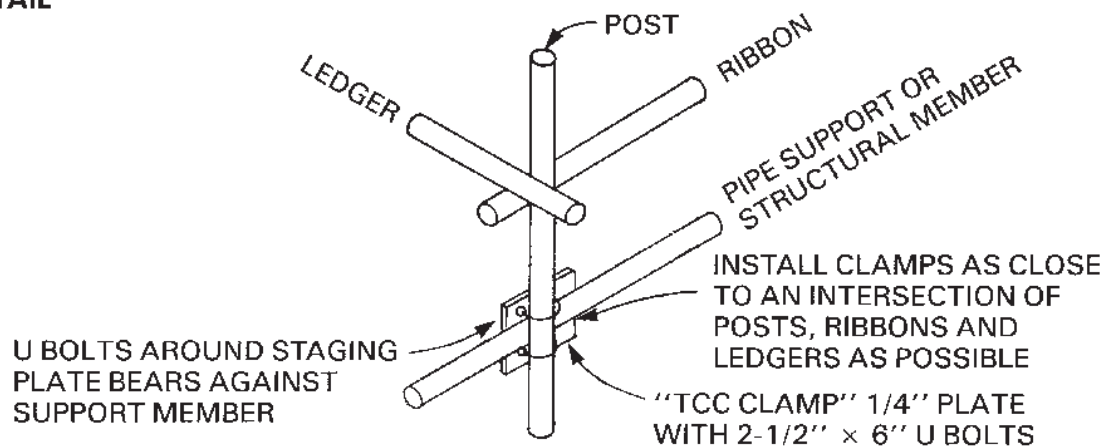
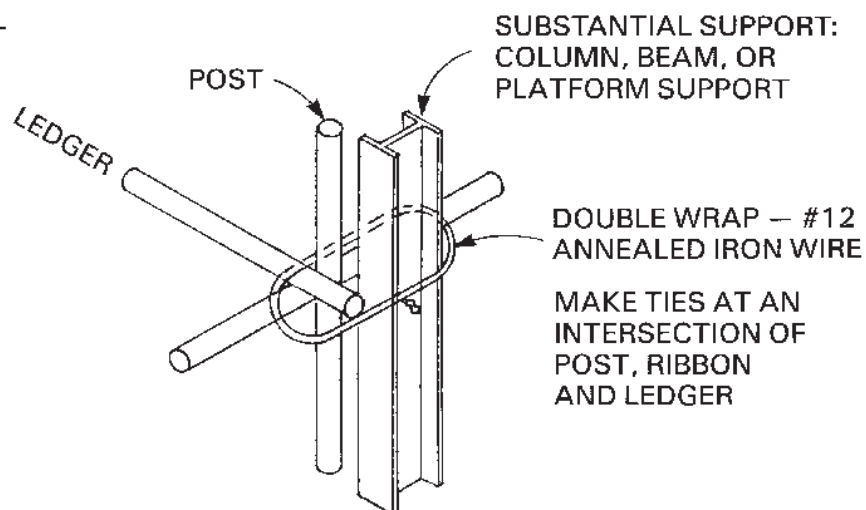
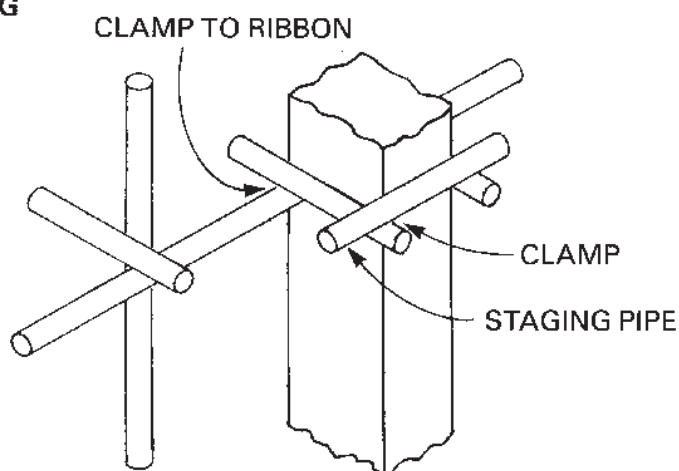
**TYPICAL "TCC" CLAMP
DETAIL****TYPICAL TIE DETAIL****TYPICAL DETAIL USING
STAGING PIECES**

Figure 8.14 Typical Tubular Steel Tie and Clamp Details



8.6 NOTES AND REFERENCES

OTHER GUIDES

A10.8-1988 ANSI Standard

“Construction and Demolition Operations - Scaffolding -
Safety Requirements”