



DESIGN & GENERAL NOTES, SPECIFICATIONS and TYPICAL DETAILS

SS627R1 for

Patent's Heavy-Duty (10K) Shoring System

WARNING

Serious injury may result if you fail to use safe practice in the erecting, dismantling or use of scaffolding, shoring and/or forming equipment. Erectors, dismantlers and users must be familiar with and follow current laws and regulations, safe practice and the Safety Rules and Instructions. Individuals using this equipment must be instructed in these requirements. Safety Rules and Instructions pertaining to the products shown herein are provided upon sale or rental of equipment. Additional copies or further information shall be provided upon the customer's request.

It is important to note that current OSHA regulations require the use of guardrail systems and/or fall-protection devices at all working levels, open sides, and at all other openings on platforms and work areas above certain heights, as specified by OSHA. In all cases, where a worker is exposed to a fall hazard in the use of this equipment, guardrail systems, where appropriate, or other personal fall-protection devices, must be utilized. Means of access must be made available by the customer to all locations where people are expected to work. Materials for the provision of such means of access may be job-built by the customer or, at the customer's option, be obtained through Patent Construction Systems or other suppliers. Patent Construction Systems will, at the customer's request, consult on an alternative means of access.

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Frame Shoring Safety Rules

As recommended by
Scaffolding, Shoring & Forming Institute, Inc.

(See separate Scaffolding Safety Rules and Recommended Frame Shoring Erection Procedure)

Following are some common-sense rules designed to promote safety in the use of frame shoring equipment. These rules are illustrative and suggestive only, and are intended to deal only with some of the many practices and conditions encountered in the use of frame shoring. The rules do not purport to be all-inclusive or to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. They are not intended to conflict with, or supersede, any state, local or federal statute or regulation; reference to such specific provisions should be made by the user. (See Rule II.)

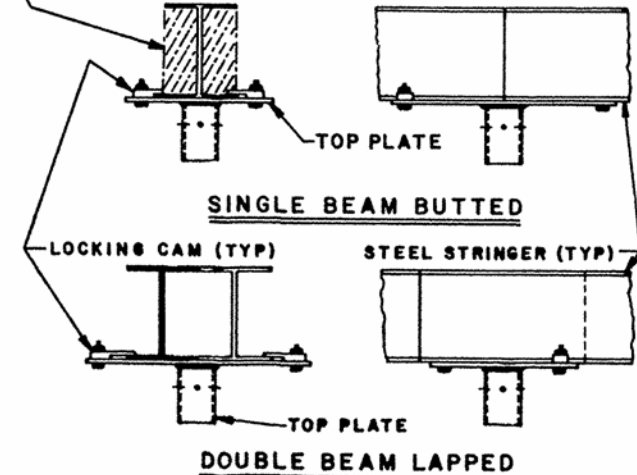
- I. **POST THESE SHORING SAFETY RULES** in a conspicuous place and be sure that all persons who erect, dismantle or use shoring frames are aware of them.
 - II. **FOLLOW ALL STATE, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS** pertaining to shoring.
 - III. **A SHORING LAYOUT** – shall be available on the jobsite at all times.
 - IV. **INSPECT ERECTED SHORING AND FORMING:** a. Immediately prior to pour; b. During pour; c. After pour until concrete is set.
 - V. **CONSULT YOUR SHORING EQUIPMENT SUPPLIER WHEN IN DOUBT.** Shoring is his business, **NEVER TAKE CHANCES.**
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- A. **USE MANUFACTURER’S RECOMMENDED SAFE WORKING LOADS CONSISTENT WITH** the type of **SHORING FRAME** and the height from supporting sill to framework.
 - B. **DO NOT EXCEED THE SHORE FRAME SPACINGS OR TOWER HEIGHTS** as shown on the layout.
 - C. **SHORING LOAD SHOULD BE CARRIED ON LEGS.** Consult your shoring supplier for **SHORING FRAMES** that are designed for taking loads on top horizontal.
 - D. **IF MOTORIZED CONCRETE EQUIPMENT** is to be used, be sure that the shoring layout has been designed for use with this equipment and such fact is noted on the layout.
 - E. **PROVIDE AND MAINTAIN A SOLID FOOTING** to distribute maximum loads properly.
 - F. **USE ADJUSTMENT SCREWS** to adjust to uneven grade conditions.
 - G. **USE ADJUSTMENT SCREWS** to level-off, to accurately position the falsework and for easy stripping.
 - H. **KEEP SCREW EXTENSIONS** to a minimum for maximum load-carrying capacity (follow manufacturer’s recommendation on screw extension.)
 - I. **MAKE CERTAIN THAT ALL ADJUSTMENT SCREWS** are firmly in contact with sills, formwork and frame legs.
 - J. **PLUMB AND LEVEL ALL SHORING FRAMES** as the erection proceeds. **DO NOT** force braces on frames to fit-level the shoring towers until proper fit can be made easily. **CHECK PLUMB AND LEVEL OF SHORING TOWERS** just prior to pour.
 - K. **FASTEN ALL BRACES SECURELY.**
 - L. **TIE HIGH TOWERS OF SHORING FRAMES TOGETHER** with sufficient braces to make a rigid, solid unit (see manufacturer’s recommendations.)
 - M. **EXERCISE CAUTION** in erecting or dismantling free-standing shoring towers to prevent tipping.
 - N. **DO NOT CLIMB CROSS BRACES.**
 - O. **AVOID ECCENTRIC LOADS ON U-HEADS,** top plates and similar members by centering stringers on those members.
 - P. **USE SPECIAL PRECAUTIONS** when shoring from or to sloped surfaces.
 - Q. **USE LUMBER STRESSES** as shown on layout and consistent with age, type and condition of the available lumber to be used. Use only the lumber that is in good condition.
 - R. **RESHORING PROCEDURE SHOULD BE APPROVED BY A QUALIFIED ENGINEER.**
 - S. **DO NOT REMOVE BRACES OR BACK-OFF ON ADJUSTMENT SCREWS** until proper authority is given.

General Frame Shoring Notes

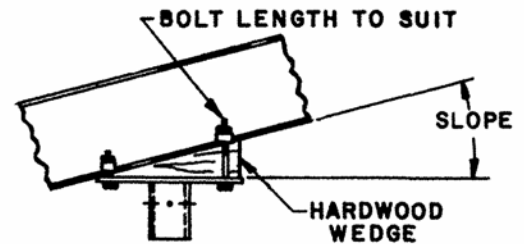
1. Contractor to check and verify all dimensions at job before proceeding with work.
2. Deviation from these layouts may be made only under the direction and supervision of a qualified person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project: and/or with the consultation of Patent Construction Systems.
3. The shoring installation must comply with safe practice and with the requirements of governmental regulations, codes and ordinances.
4. Contractor shall design and provide suitable sills to properly distribute the imposed shoring loads and shall restore as necessary.
5. When setting elevations, allow for compression of lumber and soil.
6. Design of formwork is the responsibility of contractor. Lumber formwork shown indicates suggested minimum methods and sizes only, to coordinate with design of horizontal and vertical shores. Final design and engineering of the lumber formwork and its construction is to be done by the contractor.
7. The formwork system must be stabilized to poured columns and walls. The layout as shown is designed with the provision that the formwork system is restrained from lateral movement with respect to the shoring. The contractor shall provide sufficient lateral support as necessary.
8. The shoring layout is not designed for motorized concrete placing equipment unless specifically stated.
9. All re-shoring design and procedures are the responsibility of others.
10. All vertical and horizontal shoring should be installed and used in compliance with safety rules and recommendation published by the Scaffolding, Shoring & Forming Institute, Inc. and by Patent Construction Systems.
11. Shoring layout design indicates concrete weight in lbs./cu. ft.
12. Imposed shoring loads are computed as applied concentrically to their vertical support member, whether frame legs or single post shores. Ledgers must be centered laterally and ledger joints buffed or lapped centrally over their vertical support members.
13. Lateral stability bracing must be designed and installed by contractor for all single post shoring. For general recommended methods refer to drawing and/or printed information available from Patent Construction Systems, such as SP 102.
14. The approximate amount of exposed thread of the screw legs and extension tubes is noted in the general notes of the shoring layout.

Typical Stringer Details

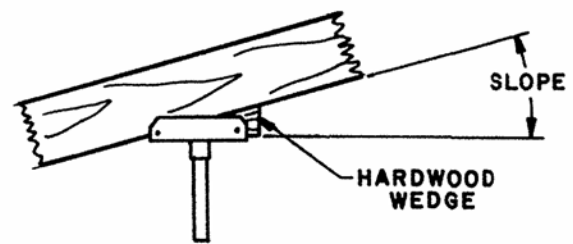
CHECK LAYOUT DRAWINGS FOR WEB STIFFENERS REQUIRED AT LEGS & OTHER LOAD POINTS UNDER SPECIAL CONDITIONS



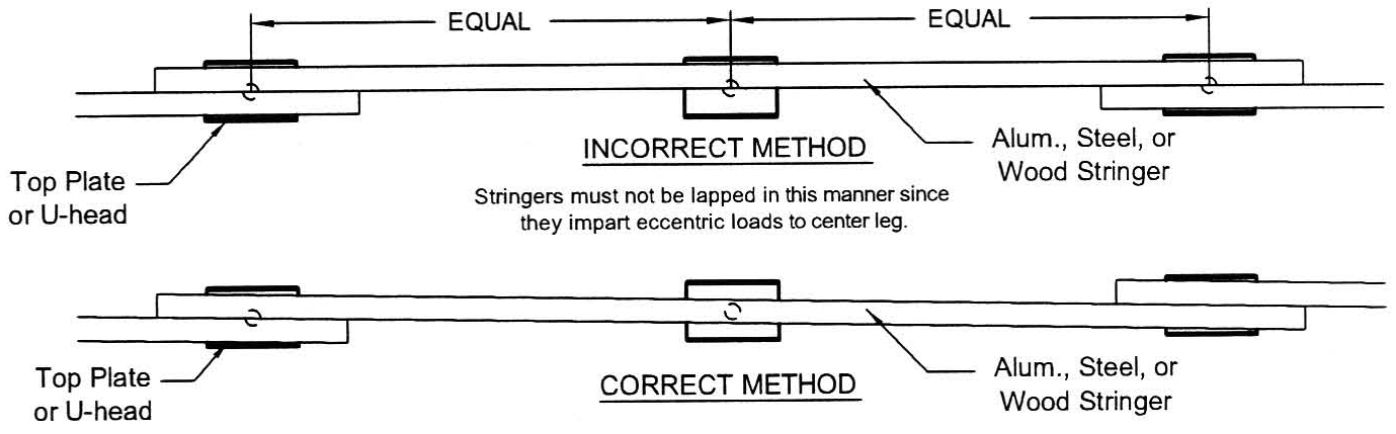
STEEL STRINGERS SHOWN ALSO TYPICAL FOR ALUMINUM STRINGERS



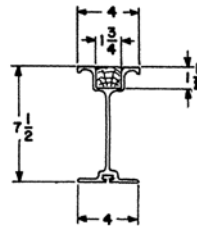
WEDGE TO SLOPE
WEDGING REQUIRED TO MAINTAIN CONCENTRIC LOADING OF TOP PLATE.



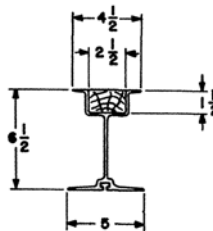
WEDGE TO SLOPE
WEDGING REQUIRED TO MAINTAIN CONCENTRIC LOADING OF U-HEAD.



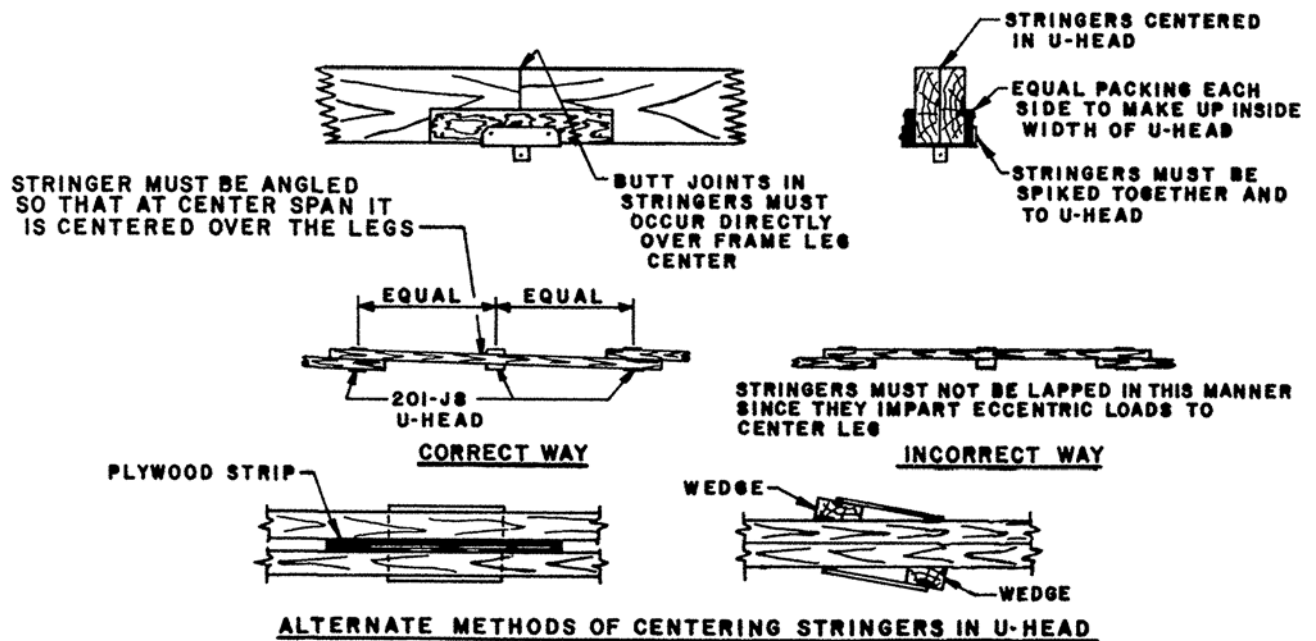
Typical Stringer Details (cont'd)



ALUMINUM STRINGER



J-400 ALUMINUM JOIST

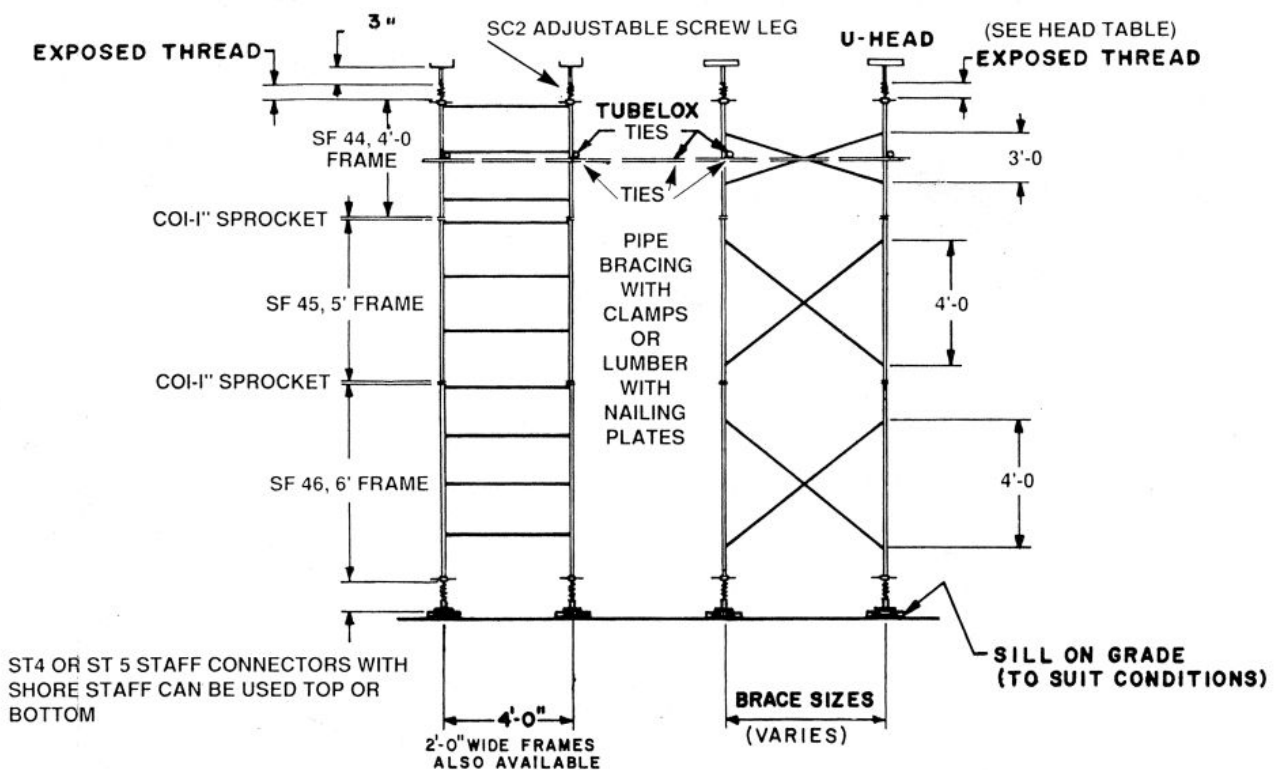


Stability and Lateral Force Consideration on Shoring Towers

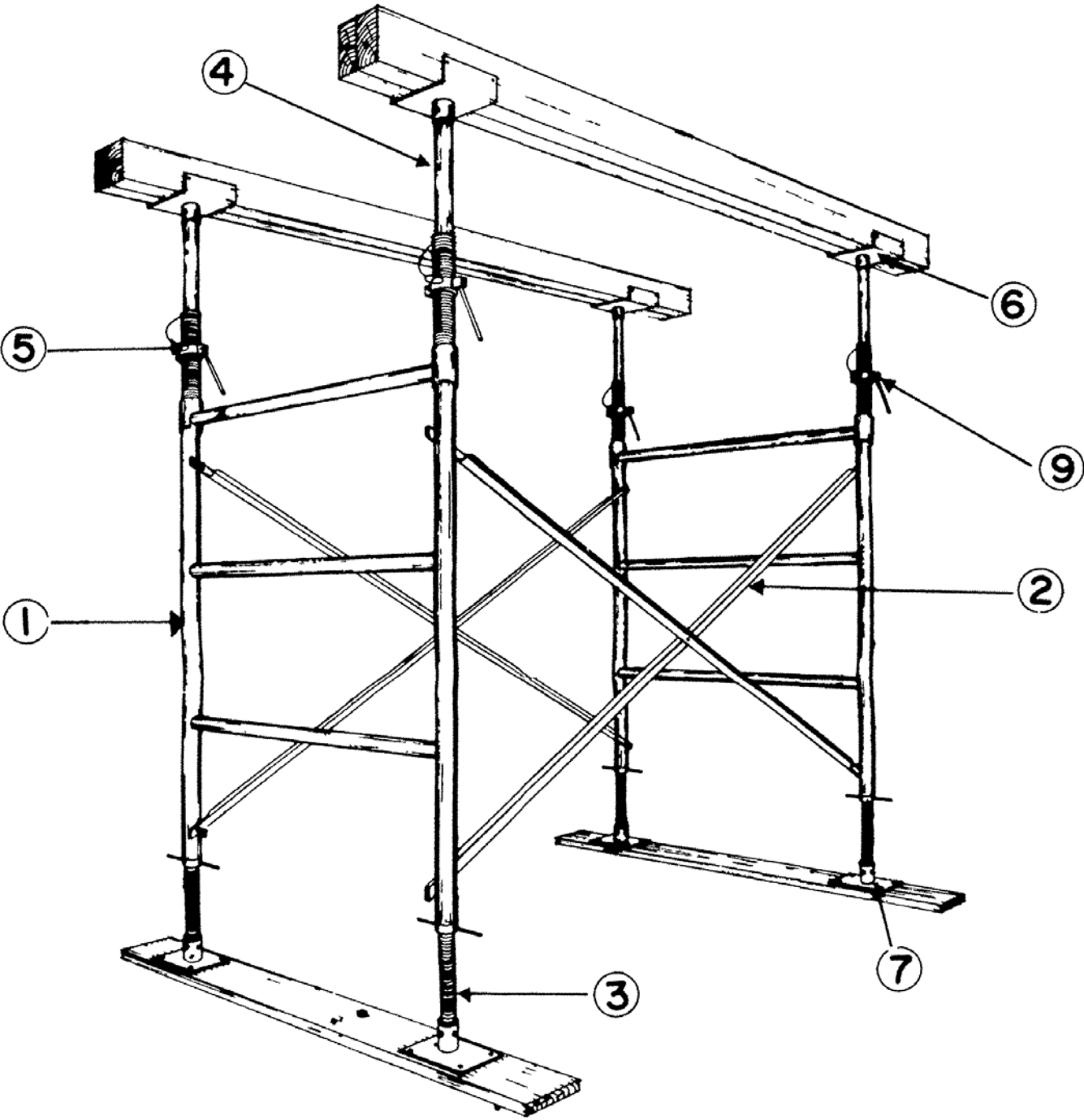
Bracing (tube and coupler or lumber and nailing plates). Ties when shown herein illustrate a typical method used for connecting and stabilizing shoring towers. Tube & Coupler, or other adequate and continuous ties between towers, are necessary to stabilize shoring towers during erection when the height of an individual tower exceeds four (4) times the minimum base dimension of that tower, or when the possible presence of wind or other lateral forces so dictate.

In the case when shoreframes towers or the shoring system are supporting potentially unstable members, such as steel or precast members, contractor shall give special attention to lateral forces induced into the shoreframes towers or shoring system from those potentially unstable members during the process of erection and prior to installation of permanent structural bracing.

Typical Shoreframes Tower Assembly

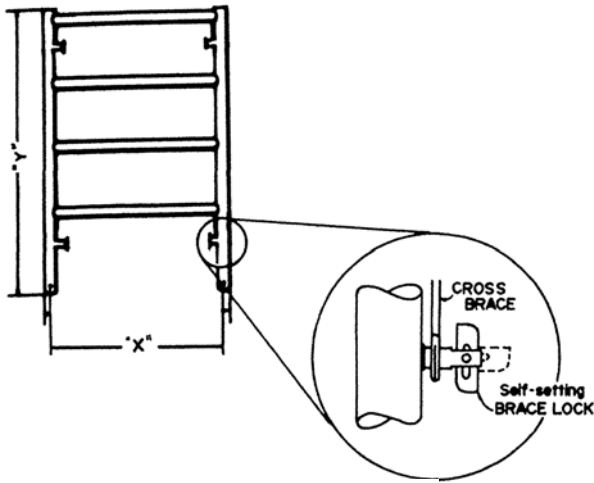


Basic Shoreframes Components



1

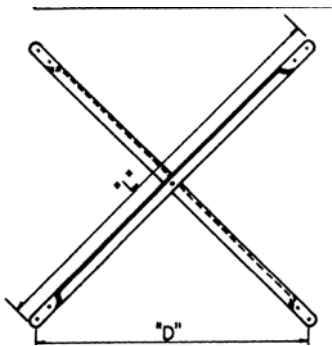
Shoreframes



Frame No.	"X"	"Y"	WEIGHT
SF24	2'-0"	4'-0"	38.0 lbs.
SF25	2'-0"	5'-0"	45.5 lbs.
SF26	2'-0"	6'-0"	56.0 lbs.
SF43	4'-0"	3'-0"	34.0 lbs.
SF44	4'-0"	4'-0"	48.0 lbs.
SF45	4'-0"	5'-0"	55.0 lbs.
SF46	4'-0"	6'-0"	66.5 lbs.

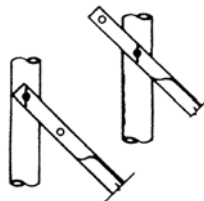
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Cross Braces



Brace No.	"D"	"L"	WEIGHT
XB4	4'	69-3/8"	11.0 lbs.
XB5	5'	78-3/8"	12.0 lbs.
XB6	6'	88"	14.7 lbs.
XB7	7'	98-1/4"	16.7 lbs.
XB8	8'	108-7/8"	18.0 lbs.
XB10	10'	130-3/4"	22.0 lbs.
XB12	12'	153-1/2"	27.6 lbs.
XB15	15'	188"	32.2 lbs.

CROSS BRACES come in a wide range of sizes. For indicated spacing "D," use inside brace hole on SF 44 and 24; use outside brace hole on SF 45, 46, 25 and 26.

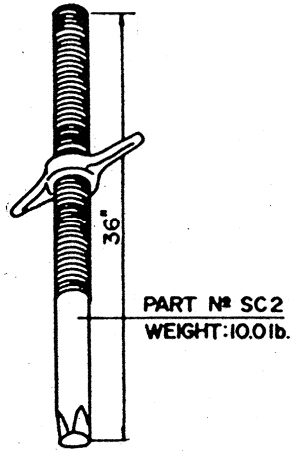


Double-hole feature allows use of only one size cross brace for any size Shoreframe.

Adjustment Screw Assembly

3

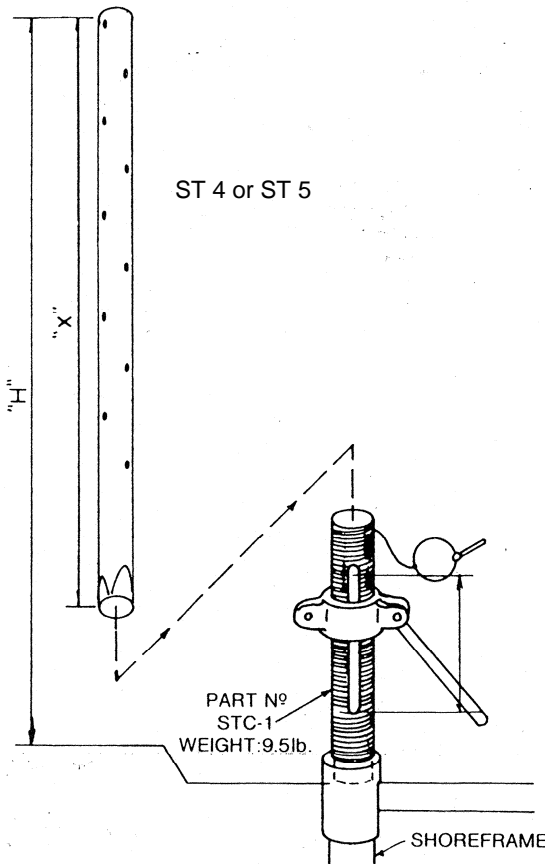
Adjustable screws can be readily used with base plates or shore heads; give up to 20" of adjustment.



Shore Staff Assembly

4

Part No.	"X"	Weight
ST 4	5'-0"	13.5 lbs.
ST 5	6'-0"	16.5 lbs.



Pounds	Height in feet "H"								
	1	2	3	4	5	6	7	8	9
10,000									
9,000									
8,000									
7,000									
6,000									

Versatile SHORE STAFFS up to 5'-0" of speedy, positive adjustment; excellent for multi-height forming applications.

Staff Connector

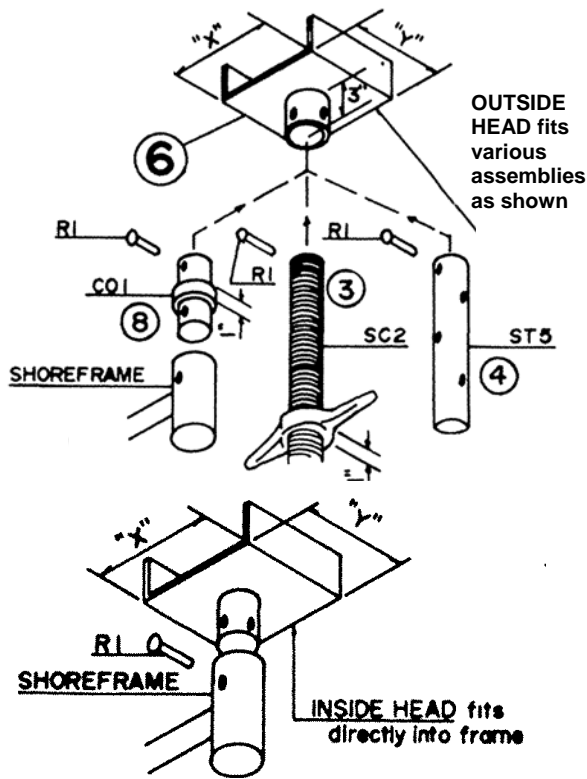
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STAFF CONNECTOR is used for fine adjustment of the staff assembly. Max. adjustment = 9"

6

Heads

Assorted SHORE HEADS are available for various sizes of ledgers – see table below.



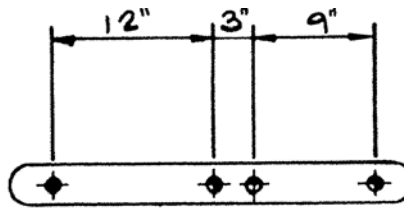
Head No.	"X"	"Y"	WEIGHT	Accommodates
UHI-66	4"	8"	5.5 lbs.	4X Ledger
UHI-58	4-1/4"	8"	5.7 lbs.	8B 10
UHI-88	8"	8"	12.5 lbs.	(2) 4X Ledgers

INSIDE HEADS

UH-48	4"	8"	5.5 lbs.	4X Ledgers
UH-58	4-1/4"	8"	5.7 lbs.	8B 10
UH-88	8"	8"	12.5 lbs.	(2) 4X Ledgers
UH-98	9"	8"	12.7 lbs.	(2) 8B 10
UH-814	8-3/4"	14"	17.0 lbs.	SPECIAL

OUTSIDE HEADS

Bar Brace 2.3lbs



7

Plates

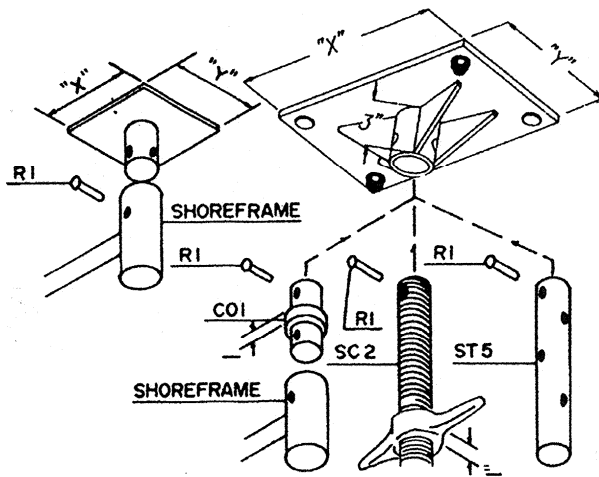


Plate No.	"X"	"Y"	WEIGHT
PHI-66	6"	6"	5.5 lbs.
PHI-69	6"	9"	7.5 lbs.

INSIDE PLATES

PH-66	6"	6"	5.5 lbs.
PH-69	6"	9"	7.5 lbs.
PH-813	13"	8"	16 lbs.

OUTSIDE PLATES

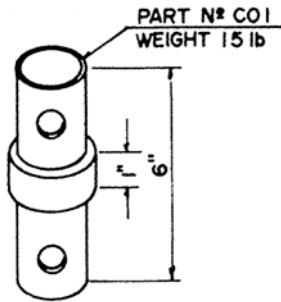
Heavy-duty BASE PLATES for load distribution.

INSIDE PLATE fits directly into frame leg.

OUTSIDE PLATE fits various assemblies as shown.

Connector (Sprocket)

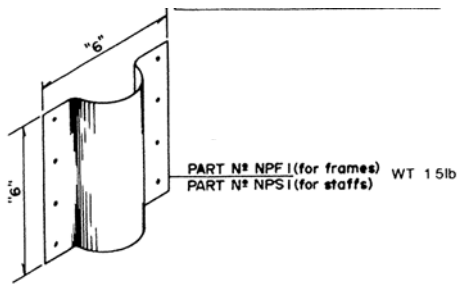
8



CONNECTOR permits stacking of frames and joining of heads and plates to frame leg. Collar ring adds 1" to tower height.

Nailing Plate

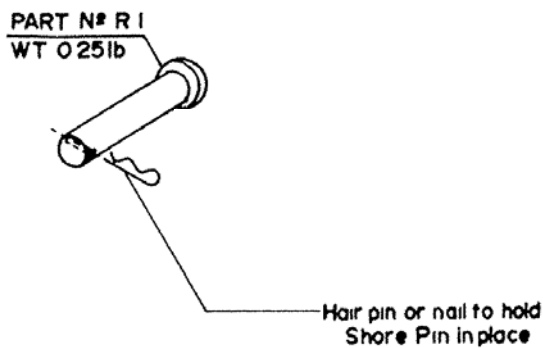
9



NAILING PLATE is used to fasten timber bracing to frame legs or staffs for stability.

Button Head Shore Pin

10



SHORE PIN is used to assemble heads and plates to staffs, screws and frames, and when lifting frames with a crane.

Leg Load and Frame Data

Allowable load data contained herein has been developed through the use of test procedures recommended by the Scaffolding, Shoring & Forming Institute, Inc. and a minimum safety factor of 2.5 to 1.

Allowable load per leg

4 Ft. Wide (#SF43, 44, 45 & 46) Shoreframes
2 Ft. Wide (#SF23, 24, 45 & 26) Shoreframes

Allowable leg load for Shoring Towers up to 3 frames high with the total extension equal to the sum of the distance between the top of frame and bottom of stringer and bottom of frame to top of sill, is as indicated below:

Sum of distance from top & bottom	12"	24"	36"	48"
Allowable leg load	10,500 lbs.	10,000 lbs.	8,600 lbs.	8,200 lbs.
Reduce allowable leg load for each additional frame in tower height above 3 frames	70 lbs.	70 lbs.	70 lbs.	75 lbs.

Consult Patent Construction Systems for towers above 60'-0".

Horizontal Shoring Beam Safety Rules

As recommended by
Scaffolding, Shoring and Forming Institute, Inc.

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines, which are designed to promote safety in the erection, dismantling and use of horizontal shoring beams. These guidelines are not all inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to horizontal shoring beams.

A. GENERAL GUIDELINES

1. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
2. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
3. SURVEY THE JOB SITE. A survey by a qualified person shall be made of the jobsite for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
4. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
5. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
6. A SHORING DRAWING prepared by a person qualified to analyze the loading intended and consistent with the manufacturer's recommended safe working loads, shall be used in the job at all times.
7. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a qualified person.
8. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT.

9. INSPECT ERECTED SHORING:

- (a) immediately prior to concrete placement;
- (b) during concrete placement and while vibrating concrete, and
- (c) after concrete placement until concrete is set.

10. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.

11. USE SHORING EQUIPMENT only for the purposes or in ways for which it was intended. Use proper tools when installing equipment.

12. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.

13. DO NOT USE SHORING SYSTEMS for fall protection.

B. USE MANUFACTURER'S RECOMMENDED SAFE WORKING LOADS AND PROCEDURES FOR:

1. Span, spacing, and types of shoring beams.
2. Types, sizes, heights, and spacing of vertical shoring supports.

C. USE LUMBER EQUIVALENT TO THE STRESS, species, grade and size used on the layout. Use only lumber that is in good condition. Do not splice between supports.

D. DO NOT MAKE UNAUTHORIZED CHANGES OR SUBSTITUTIONS OF EQUIPMENT; always consult your supplier prior to making changes necessitated by jobsite conditions.

Horizontal Shoring Beam Safety Rules (cont'd)

E. PROVIDE AND MAINTAIN ADEQUATE

SUPPORT TO properly distribute shoring loads. When supporting horizontal beams on:

1. Masonry walls, insure that masonry units have adequate strength. Brace walls as necessary.
2. Ledgers supported by walls using bolts, or other means, should be properly designed and installed per recommendation of supplier or job architect/engineer.
3. Formwork, such formwork should be designed for additional loads imposed by the shoring beams.
4. Structural Framework, the ability of the steel to support this construction loading should be checked and approved by the responsible project architect/engineer.
5. When supporting horizontal beams on steel hangers, be sure that the bearing ends fully engage on the hangers. The hangers shall be designed to conform to the bearing end and shall have a rated strength to safely support the shoring loads imposed. (Follow hanger manufacturers' recommendations.)
6. Do not bear adjustable horizontal beams on other adjustable horizontal beams.

F. SPECIAL CONSIDERATION MUST BE GIVEN TO THE INSTALLATION OF HORIZONTAL SHORING:

1. When sloped or supported by sloping ledgers (stringers).
2. When ledger (stringer) including blocking, height/width ratio exceeds 2-1/2 to 1. Under no circumstances shall horizontal shoring beams bear on a single "two by" ledger (stringer).
3. When eccentric loading conditions exist.
4. When ledger (stringer) consists of multiple members (i.e., double 2x6, 2x8, etc.).

G. ASSURE THAT BEARING ENDS OF SHORING BEAMS ARE PROPERLY SUPPORTED and the locking devices are properly engaged before placing any load on beams.

H. IF MOTORIZED CONCRETE PLACEMENT EQUIPMENT IS TO BE USED, be sure that lateral and other forces have been considered and adequate precautions taken to assure stability.

I. HORIZONTAL SHORING BEAMS SHOULD NOT be supported other than at the bearing prongs unless recommended by supplier.

J. DO NOT NAIL BEAM BEARING PRONGS TO LEDGER.

K. PLAN CONCRETE POURING METHODS AND SEQUENCES TO insure against unbalanced loading of the shoring equipment. Take all necessary precautions to avoid uplift of shoring components and formwork.

L. AVOID SHOCK OR IMPACT LOAD FOR which the shoring was not designed.

M. DO NOT PLACE ADDITIONAL, TEMPORARY LOADS (such as rebar bundles) on erected formwork or poured slabs, without checking the capacity of the shoring and/or structure to safely support such additional loads.

N. DO NOT RELEASE ANY PART OF THE FORMWORK OR SHORING until proper authority has been obtained. Particular consideration must be given to reshoring procedures.

O. RESHORING is one of the most critical operations in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer of record.

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SPANALL[®] Horizontal Shoring Beams

HORIZONTAL SHORE DESIGN & BEARING EAR DATA					
SPANALL MEMBER ASSEMBLY	MAX. ALLOW. BENDING MOMENT	MAX. ALLOW. END REACTION	MINIMUM LEDGER WIDTH	MINIMUM AREA OF EARS	THICKNESS OF EARS
730 (2 member)	12,000 ft. lb.	3,740 lb.	2-3/8"	6.75 sq. in.	½" max.
730 (3 member)	10,800 ft. lb.	3,740 lb.	2-3/8"	6.75 sq. in.	½" max.
1015	9,100 ft. lb.	3,300 lb.	2-1/4"	6.00 sq. in.	½" max.
814	6,200 ft. lb.	2,500 lb.	2-1/4"	5.00 sq. in.	½" max.
610	4,000 ft. lb.	2,750 lb.	2-1/4"	4.80 sq. in.	½" max.
47	1,450 ft. lb.	2,380 lb.	2"	4.80 sq. in.	½" max.

- NOTES:**
1. Ensure that Spanall bearing ears are fully supported.
 2. Vertical shores and beam side studs shall be positioned directly under each Spanall bearing ear unless otherwise detailed herein.
 3. Tighten adjusting bolts with 10" long #4 rebar to good snug fit. Do not over-tighten.
 4. Spanall should not be nailed in place except for temporary positioning during erection.
 5. Never place intermediate shoring under round bars of lattice section of Spanall.
 6. *Spanall adjacent to walls, beams, etc. Which are underloaded, immediately after pour, adjust camerbolt to lower to desired level.
 7. All vertical and horizontal shoring should be installed and used in compliance with safety rules and recommendations published by the Scaffolding, Shoring & Forming Institute, Inc. and Patent Construction Systems.

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