Tabulated Data
Hydraulic Vertical Shores

Revised June 1, 1999

WARNING!
Use of this equipment not in accordance with Manufacturers Tabulated Data may lead to injury or death.

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CAUTION

EXCAVATION PROCEDURES
MAY CAUSE INJURY OR DEATH!

A COMPETENT PERSON WHO SATISFIES THE DEFINITION AND INTENT OF THE 1926 CONSTRUCTION STANDARD SUBPART P EXCAVATIONS SHALL: ENSURE THAT ALL EMPLOYEES ARE WORKING IN SAFE CONDITIONS AND THAT ALL EMPLOYEES HAVE BEEN TRAINED IN CORRECT EXCAVATION PROCEDURES AND THE PROPER USE OF THE PROTECTIVE EQUIPMENT CHOSEN.

EXCAVATIONS AND PROTECTIVE EQUIPMENT SHALL BE INSPECTED A MINIMUM OF ONCE EACH WORKING DAY AND WHENEVER THERE IS A CHANGE IN THE SOIL CONDITIONS AND/OR OTHER CHANGES SUCH AS AN INCREASE OR DECREASE IN WATER OR VIBRATIONS.

EMPLOYEES SHALL NOT BE ALLOWED TO ENTER AN EXCAVATION THAT IS NOT PROPERLY SHORED, SHIELDED, OR SLOPED.

EMPLOYEES SHALL ALWAYS ENTER, WORK, AND EXIT WITHIN THE SHORED, SHIELDED, OR SLOPED AREAS OF THE EXCAVATION AND/OR TRENCH.

ALL LIFTING AND PULLING EQUIPMENT, INCLUDING CABLES, SLINGS, CHAINS, SHACKLES AND SAFETY HOOKS SHALL BE INSPECTED FOR DAMAGE OR DEFECTS PRIOR TO USE AND SHALL BE EVALUATED FOR SUITABILITY AND CAPACITY.

THIS GME TABULATED DATA PROVIDES A GENERAL SET OF GUIDELINES TO ASSIST THE COMPETENT PERSON IN THE SELECTION OF A PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY. THE RESPONSIBILITY FOR JOB SITE SAFETY AND THE PROPER SELECTION, INSTALLATION AND REMOVAL OF THE SHORING EQUIPMENT BELONGS TO THE COMPETENT PERSON DESIGNATED FOR THAT JOBSITE. THIS TABULATED DATA IS NOT INTENDED TO BE USED AS A JOB SPECIFIC EXCAVATION/ TRENCHING SAFETY PLAN, BUT SHALL BE USED BY THE COMPETENT PERSON. TABULATED DATA IS INTENDED AS A SUPPLEMENT TO HIS/HER TRAINING, EXPERIENCE AND KNOWLEDGE OF SAFE PROCEDURES, JOB SITE CONDITIONS AND SOIL TYPES. TABULATED DATA IS INTENDED TO ASSIST HIM IN THE SELECTION OF AN APPROPRIATE PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY.

SOIL CLASSIFICATION

1. See the OSHA regulations for descriptions of Type A and B soils.
2. Type C-60 soil is a soft cohesive or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the protective system.

DESIGN CRITERIA AND LIMITATIONS

1. The tables include the effect of a three foot high spoil pile within a horizontal distance from the face of the excavation equal to the excavation's depth. Hydraulic Shores are not designed to support heavier surcharge loads, such as those imposed by building foundations. If Hydraulic Shores are used near building foundations, those foundations may need to be underpinned to prevent excessive settlement.
2. Hydraulic Shore struts are not designed to support vertical loads and shall not be used to provide access or egress to the trench.
3. This data is valid for Hydraulic Shores in structurally sound condition. Any significant damage will void this data, and all manufacturers warranty. The damaged Hydraulic Shores shall not be used.
4. The competent person shall monitor the excavation and adjacent areas daily, after every rainstorm, and after every event that might threaten the stability of the excavation.
5. The excavation must be kept free of water while using the Hydraulic Shores. Surface water shall be diverted away from the excavation, and water must be pumped out of the excavation bottom. The competent person shall monitor the excavation in these conditions to prevent the water from generating excessive lateral pressure on the Hydraulic Shore and to check for decreased soil stability.

NOTES FOR TABULATED DATA

1. The top cylinder of the Hydraulic Shore shall be no less than twelve inches and no more than twenty four inches below the top of the trench.
2. The lowest cylinder of a Hydraulic Shore shall be no more than forty eight inches above the bottom of the excavation.
3. If sheeting is required, the sheeting shall extend from the top of the excavation to a maximum of two feet off the bottom of the excavation. Some soils may require that the sheeting be extended to the full depth of the excavation. (Maximum horizontal gap between sheets not to exceed 24")

NOTE: In some applications, sheeting may not be required, but it may be desired to prevent random sloughing or raveling of the soil.

4. When an Oversleeve is required, the Oversleeve shall be a structural steel tube (TS 3 1/2 x 3 1/2 x 3/16) and shall extend the full collapsed length of the cylinder. The Oversleeve is only applicable to a Vertical Shore.

5. Hydraulic Shores may be used vertically, horizontally, or diagonally, as long as all other requirements of this data are satisfied.

6. If a Hydraulic Shore is positioned on a joint between two pieces of sheeting, the shore shall split the seam equally.

7. The hydraulic cylinders shall be pumped to a minimum of 750 psi when a Hydraulic Shore is used. If the pressure drops below the initial pressure, check for leaks, repair any found, and re-pressurize the system. If the initial pressure still can't be maintained because the soil is too soft, another protective system will be required.

8. An approved shoring system shall consist of a minimum of two Hydraulic Shores, spaced in accordance with this data, and the safe working area shall be between two consecutive shores.

9. In excavations that are six feet deep or less, only one Hydraulic Shore is required in a vertical plane.

10. The following materials, or an approved equal, shall be used for sheeting with the Hydraulic Shore:

    1. Two sheets of 3/4" thick CDX Plywood placed back to back
    2. 1 1/8" thick CDX Plywood
    3. 3/4" thick 14 Ply Arctic White Birch (Finland Form)
    4. 3/4" thick HDO - American Plywood Association, high density overlay exterior
    5. 3/4" thick Plyform - American Plywood Association B-B Class I Exterior
    6. 3/4" thick Combi Exterior Plywood
    7. 3/4" Omni Form
    8. Steel Plate 1/2" minimum thickness

11. When Hydraulic Shores are used in conjunction with Waler Systems or Hydraulic Shields, the maximum horizontal spacing between the ends of each unit shall be twenty four inches.

ADDITIONAL SPECIFICATIONS FOR USE OF GME VERTICAL END SHORES

The Vertical End Shore will support loads across the end of a trench by placing an approved sheeting against the Vertical End Shore's struts. The sheeting shall be secured in place by utilizing a GME End Panel Bracket or by backfilling against the sheeting at least 2/3 of its height.

In addition to the approved sheeting listed for the Hydraulic Shore, the following materials may be used for end loading:

1. GME Aluminum Sheeting
2. 2x6, 2x8, 2x10, 2x12 Hardwood sheeting or equivalent

The **MAXIMUM WIDTH** of a Vertical End Shore is seven feet eleven inches (7'-11").

GME® HYDRAULIC SHORE TABULATED DATA

GENERAL:

1. This data has been prepared by a Registered Professional Engineer as required by the OSHA standard 29 CRF, Part 1926, Subpart P, Excavations.

2. This data is to be used by the "competent person" for the proper use and placement of GME Hydraulic Shores.

3. The term "Hydraulic Shore" refers to both GME Vertical Shores and Vertical End Shores unless otherwise noted.

4. "Competent person" is 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.

5. When there is a discrepancy concerning the use of protective systems between this tabulated data and the OSHA standard, this data shall take precedence. Any topic not covered by this data shall be governed by the OSHA standard.

6. GME shall not be liable for damage or injury resulting from improper use of the Hydraulic Shores. Improper use of or modifications to the Hydraulic Shores, or use of components not specifically authorized by GME without the written consent of GME shall void this data and all manufacturers warranty.

SPECIFICATIONS FOR USE OF GME HYDRAULIC SHORES

1. All personnel involved with the use of GME Hydraulic Shores shall be trained in the proper use and installation procedures and other applicable safety requirements.

2. GME Hydraulic Shores shall be used only in soil conditions indicated in this data.

3. Refer to the installation procedures for typical installation figures.

4. The sides or faces of the excavation must be near vertical to allow proper installation of the Hydraulic Shores. The sides of the Hydraulic Shore shall bear continuously and firmly against approved sheeting. The sheeting shall bear against the soil or a solid and stable filler in order to adequately distribute the loads to and from the cylinder struts. DO NOT butt rails back-to-back to span a wider excavation.

HYDRAULIC VERTICAL SHORE DEPTH TABLES

Hydraulic Shores - Type "A" Soils

Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 ft – 15 ft	4 ft	8 ft	0 ft – 8 ft*	No	No
			8 ft – 12 ft	No	
			12 ft – 15 ft	Yes	
15 ft – 25 ft	4 ft	8 ft	0 ft – 8 ft*	No	No
			8 ft – 12 ft	Yes	
			12 ft – 15 ft	Yes	

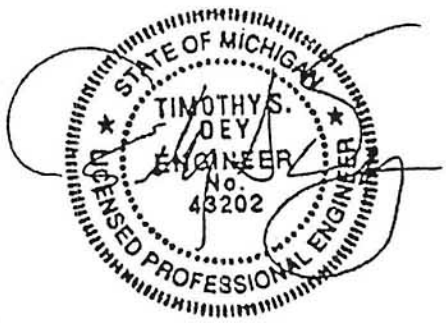
Hydraulic Shores - Type "B" Soils

Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 ft – 15 ft	4 ft	8 ft	0 ft – 8 ft*	No	No
			8 ft – 12 ft	No	
			12 ft – 15 ft	Yes	
15 ft – 25 ft	4 ft	6 ft	0 ft – 8 ft*	No	No
			8 ft – 12 ft	Yes	
			12 ft – 15 ft	Yes	

Hydraulic Shores - Type "C60" Soils

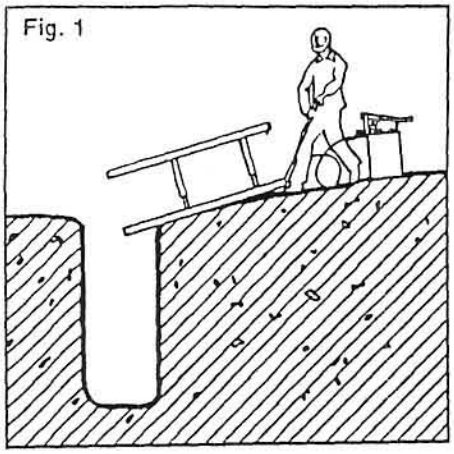
Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 ft – 15 ft	4 ft	6 ft	0 ft – 8 ft*	No	Yes
			8 ft – 12 ft	No	
			12 ft – 15 ft	Yes	
15 ft – 25 ft	4 ft	4 ft	0 ft – 8 ft*	No	Yes
			8 ft – 12 ft	Yes	
			12 ft – 15 ft	Yes	

*Indicates maximum width for a Vertical End Shore



GME VERTICAL SHORES INSTALLATION

Fig. 1



STEP ONE

Place the shore at the lip of the trench with approximately 12" overhanging the edge in the upright and open position. (See Fig. 1). Place the pump bucket alongside of the shore.

STEP TWO

Open the 1/4 turn valve on the pump bucket and connect the quick disconnect fitting on the hose from the pump bucket to the male fitting on the shore. Close the 1/4 turn valve on the pump bucket.

STEP THREE

Place the release tool through the handle of the bottom rail with the hook in position to catch the handle when the shore is lowered into the trench.

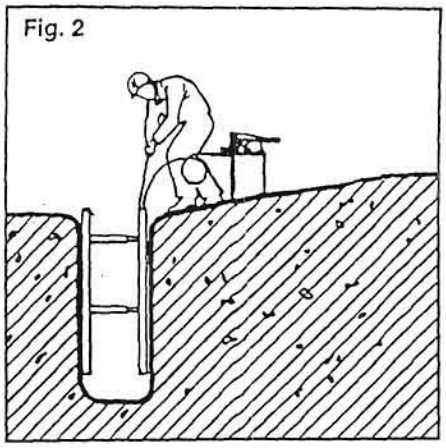
STEP FOUR

Grab the handle on the top rail and pull toward you causing the shore to collapse.

STEP FIVE

Lower the shore into the trench allowing the hook to support the weight.

Fig. 2



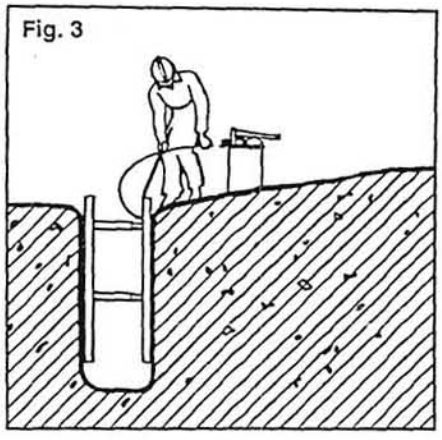
STEP SIX

Release the handle of the top rail allowing the shore to completely unfold into an open and locked position. (See Fig. 2)

STEP SEVEN

Hold the shore at the proper height. Start pumping the handle of the pump bucket until you have reached a minimum of 750 psi on the gauge.

Fig. 3



STEP EIGHT

Disconnect the hose from the shore by positioning the release tool flange behind the collar of the quick disconnect fitting using the hook as a pivot point. (See Fig. 3) Pull the tool toward yourself causing the hose to release from the shore. This completes the installation procedure.

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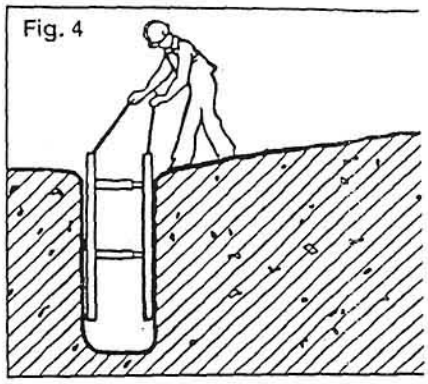
REMOVAL

STEP ONE

Begin removal by placing release through handle of shore. (See Fig. 4 Turn tool so that hook will catch handle when pressure is released. Position cupped end of release too over the male fitting.

Fig. 4



STEP TWO

Place the removal hook through the other handle of the shore.

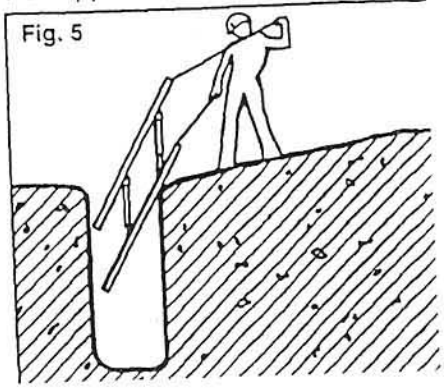
STEP THREE

Begin to push the handle of the release tool away from you using the handle as a leverage point. At the same time that you push the release tool start pulling the removal hook back toward yourself. **CAUTION:** This will cause a small amount of fluid to be released from the fitting on the shore. Care should be taken to avoid being sprayed by the fluid. Also, the release of pressure could cause unstable ground to begin to move. Care should be used to release the pressure in small amounts.

STEP FOUR

Remove the shore from the trench by pulling on the removal hook causing the shore to collapse and using the release tool to assist in pulling the shore from the trench. (See Fig. 5) The shore is now ready to be used for its next application.

Fig. 5



Typical Installations For GME Vertical Shoring

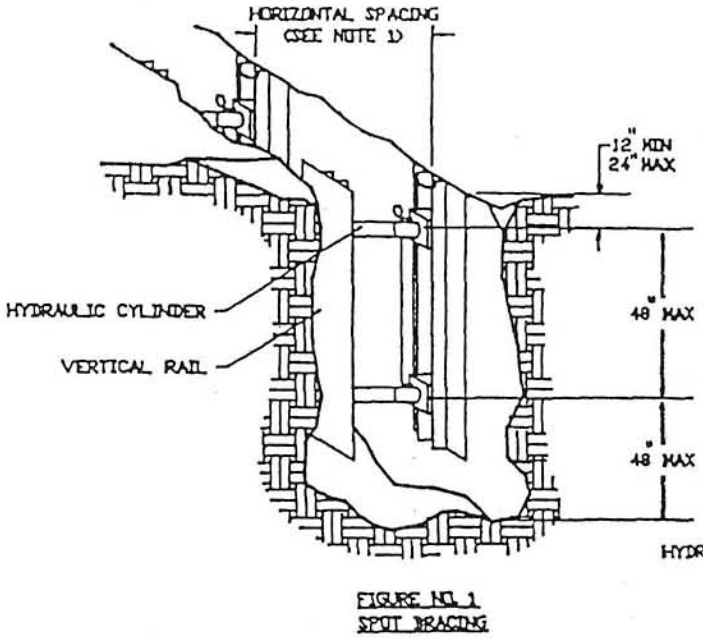


FIGURE NO. 1
SPOT BRACING

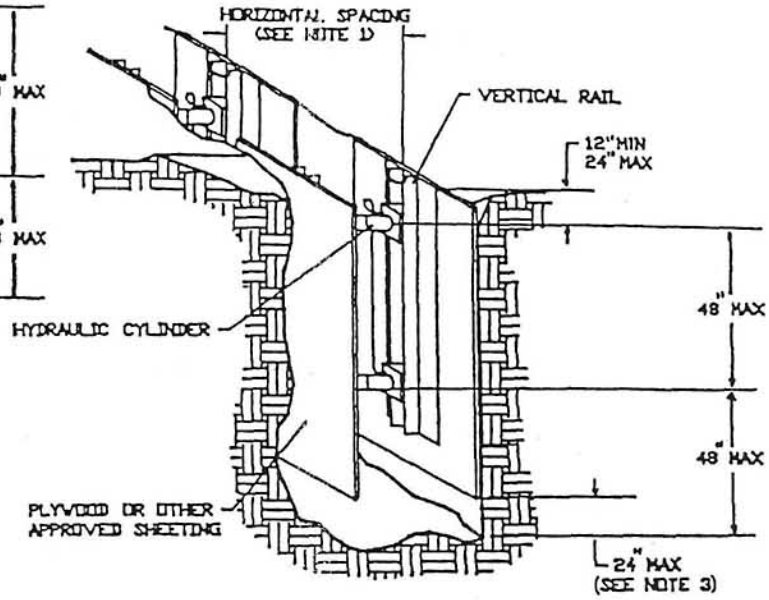


FIGURE NO. 2
SHORES WITH SHEETING
(SEE NOTE 2)

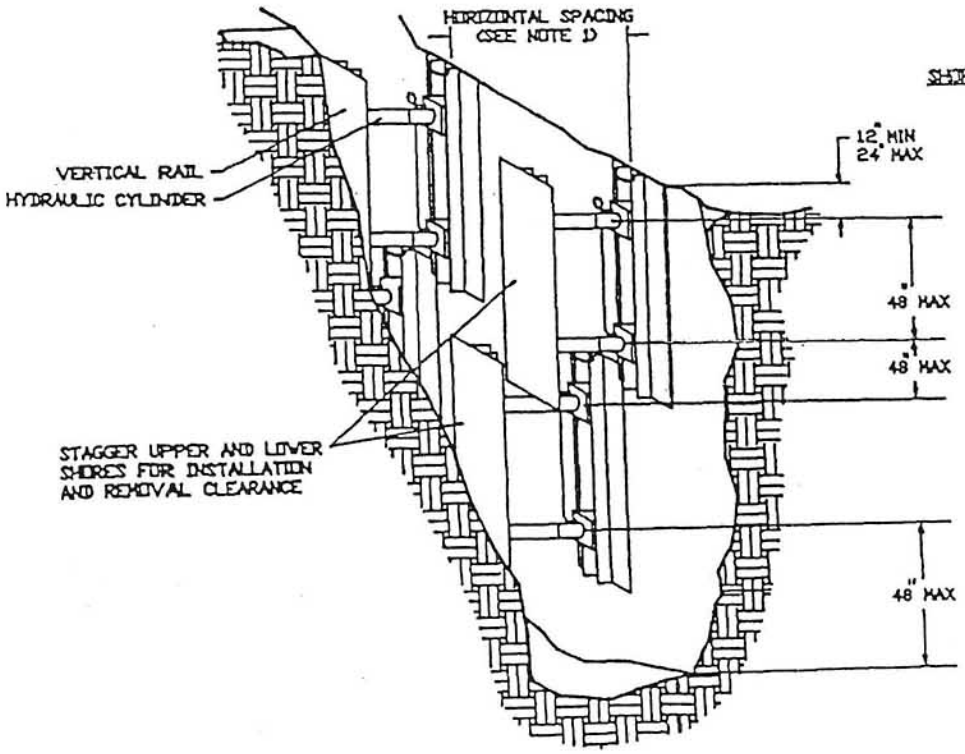
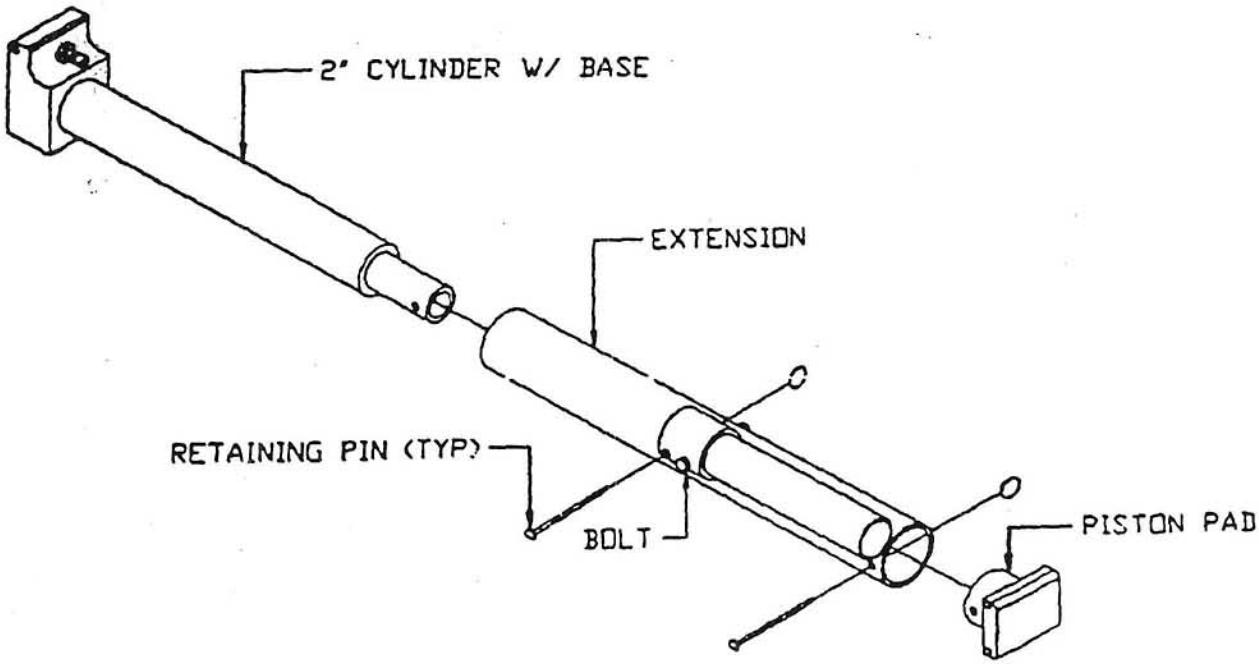
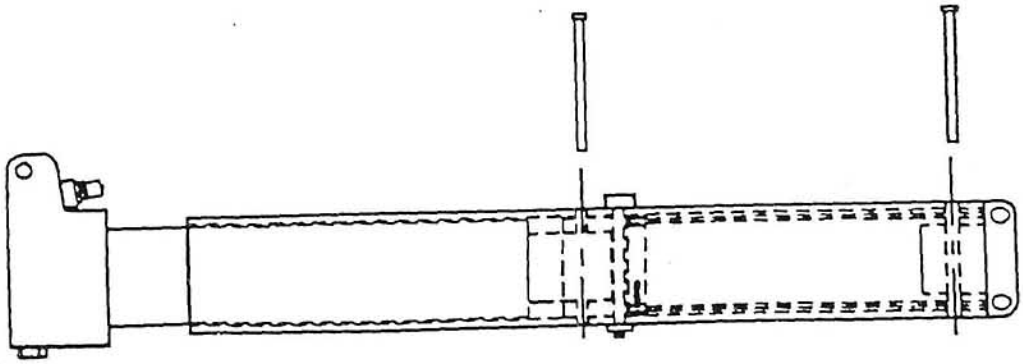


FIGURE NO. 3
STACKED SPOT BRACING

2" Hydraulic Cylinder Extension Installation Procedure

1. Select the correct extension size for your application
2. Remove the retaining pin from the cylinder that secures the oversleeve and piston pad to the piston rod.
3. Remove the piston pad and set it aside for later use.
4. Remove the oversleeve. (You will not need it while you are using the extension).
5. Remove the two retaining pins from the extension **(DO NOT REMOVE THE BOLT)**
6. Slide the extension onto the cylinder, as shown in the illustration.
7. Replace the retaining pin through the extension, making sure that it also goes through the piston rod. Replace the piston pad and the retaining pin. The cylinder is now ready for use.