VERTICAL SHORES
DETAILED SPECIFICATIONS
INSTALLATION
MANUFACTURE’S TABULATED DATA

TRENCH RESCUE SHORES
DETAILED SPECIFICATIONS
MANUFACTURE’S TABULATED DATA

MEGA-SHORES
MANUFACTURE’S TABULATED DATA
Units specified herein shall be fully assembled, adjustable, personnel protective devices specifically designed and professionally engineered to provide excavation safety protection for workers. These units shall be in full compliance with all applicable Federal Occupational Safety and Health Administration (OSHA) Regulations.

**HYDRAULIC CYLINDER CROSS-BRACES**

1. Cylinders shall be a minimum of 2" I.D. and shall have an allowable capacity of not less than 23,000 pounds axial compression load with a 1.5 safety factor.
2. Cylinders shall be furnished with aluminum oversleeves for protection of the piston rod through its complete stroke.
3. Cylinders barrels shall be composed of 6061-T6 aluminum alloy drawn seamless.
4. Cylinders shall be fitted with a wiper guide assembly to thoroughly clean the smooth exterior of the piston rod before entering the cylinder.
5. Cylinder pad (end of shoring device) shall be a minimum of 2 1/2" thick through its axis to insure sufficient support of the cylinder barrel.
6. O-ring seals in the cylinder pad are to be located in the annular space between the cylinder barrel wall and inside cylinder pad wall to reduce risk of O-ring distortion.
7. Cylinders shall be equipped with a solid piston head which permits maintenance of seals without detaching the piston head from the piston rod. Piston rod shall be composed of 2024-T351 aluminum alloy for higher yield strength.
8. The piston head seal shall be a loaded O-ring design for optimum seal and prevention of low pressure leakage. Seal hardness shall be a minimum of 85 durometers.
9. Cylinder barrel shall be permanently date stamped by manufacturer.
10. Oversleeve, cylinder barrel, cylinder pad, and socket pad shall be permanently stamped with manufacturer’s name.

**VERTICAL RAILS**

1. Standard vertical rails shall be no less than 8" in width and have an equivalent section modules of 0.44 in.³ or more.
2. Heavy duty vertical rails shall be no less than 8" in width and have an equivalent section modules of 1.24 in.³ or more.
3. Rails shall be permanently stamped with manufacturer’s name.

**GENERAL NOTES**

1. Attachment of the cylinder pads to the vertical rails shall be a flush mounted design to insure even distribution of load to the rails.
2. Each hydraulic cylinder shall have a variety of single unit extension systems available to increase the working range of each hydraulic cylinder.
3. All quick coupling fittings, pins, handles and keepers shall be plated for maximum life.
4. Supplier shall furnish with each bid Manufacturers Tabulated Data certified by a registered Professional Engineer, which clearly defines product capabilities.
ACCESSORIES

1. **Hydraulic Pumps**
   a. Hydraulic pumps shall be a minimum of 5 gallon fluid capacity, complete with calibrated gauge, hose, valves and fittings.
   b. Pump gauge shall have a green color coded face plate indicating normal operating range of 750 - 1,500 psi.
   c. Pump hose shall be a minimum of 12' in length with spring guards and a minimum working pressure of 5,000 psi.

2. **Release Tools and Removal Hooks**
   Manufacturer supplying goods must have available specially designed tools to facilitate above-ground installation and removal of all units.

3. **Videos**
   Optional job safety video and maintenance and repair video shall be available as needed.

EQUIVALENCIES

1. Refer to Speed Shore Corporation's technical data for specific models and accessories.
2. These specifications are intended to establish a standard of quality and performance.
3. Designs which meet or exceed these specifications shall be considered in compliance.

PARTS AND SERVICE

1. Replacement parts must be available for shipment within five working days of Purchase Order.
2. Parts List will be furnished upon request.

PRODUCT LIABILITY

The manufacturer under these specifications shall be required to carry a minimum one million dollars ($1,000,000.00) product liability insurance policy with bid award being contingent upon proof of coverage.

EXPERIENCE

The manufacturer under these specifications shall be required to furnish documented proof of professional expertise and competence in excavation safety product experience and manufacturing for a minimum of five (5) years. We reserve the right to request from the apparent successful manufacturer a client list for the purpose of obtaining references on quality of products furnished and service history.

DELIVERY

Delivery of all equipment, features and accessories specified herein is to be made within sixty (45) days after receipt of Purchase Order.

WARRANTY

The successful bidder under these specifications shall furnish a minimum one (1) year warranty on all parts and labor.

TRAINING

The manufacturer under these specifications shall provide installation instructions, recommended uses and maintenance instructions to the solicitor upon delivery of the unit(s).
VERTICAL SHORES

INSTALLATION and REMOVAL PROCEDURES

GENERAL NOTES
Speed Shore aluminum hydraulic Vertical shores are vertically oriented, hydraulically applied trench shoring devices. They are manufactured in compliance with the Federal Occupational Safety and Health Administration (OSHA) Standards.

Vertical shores are composed of vertical rails and 2" diameter hydraulic cylinders, which are manufactured from 6061-T6 aircraft grade aluminum alloy and have a safe working load of 23,000 pounds. The normal working pressure range of the cylinders is 750-1000 psi. Vertical shores with 1 1/2 foot long rails have a single hydraulic cylinder and are commonly known as single shores. Vertical shores with 3 1/2, 5, 7, or 8 foot long rails have 2 cylinders. Vertical shores with 12 foot rails have 3 cylinders, and those with 16 foot rails have 4.

Vertical shores with one or two cylinders (1 1/2 - 7 foot rails) use Standard Rail, with a section modulus of .44 cubic inches. Those with 3 or 4 cylinders (12 - 16 foot rails) use Heavy Duty Rail, with a section modulus of 1.24 cubic inches.

Sheeting is often used with vertical shores to control local raveling of the trench face between the shores. The OSHA Standard requires that the sheeting be either 1.125" softwood plywood, or 14 ply white artic birch finland form, although manufacturers and vendors may provide equivalent alternatives. The sheeting used with vertical shores is not intended for use as a structural member, but only to control local raveling (sloughing of the trench face) between the shores.

Single and double cylinder vertical shores are typically installed and removed from the top of the trench by manual means using Speed Shore installation tools, but the larger systems or those with plywood sheeting attached to the rails are typically installed and removed by hoisting equipment and slings.

The designated Competent Person shall ensure that all excavation work is done in compliance with the requirements of the OSHA standard for excavations and manufacturer's tabulated data. They will inspect all components of the shoring system prior to use, as well as daily and when changes in jobsite conditions require. Any damaged, defective or inadequate components shall be repaired or replaced.

A TRAINED COMPETENT PERSON SHALL: SUPERVISE ALL EXCAVATION OPERATIONS, ENSURE THAT ALL PERSONNEL ARE WORKING IN SAFE CONDITIONS, AND HAVE THOROUGH KNOWLEDGE OF THE APPROPRIATE TABULATED DATA. THE COMPETENT PERSON SHALL HAVE THE AUTHORITY TO STOP WORK WHEN IT IS UNSAFE FOR WORKERS TO ENTER AN EXCAVATION.

Manufacturers Tabulated Data
Speed Shore's Tabulated Data complies with the O.S.H.A. standards as stated in the Code of Federal Regulations 29, Part 1926, Subpart P - Excavations, Section 1926.652(c)(2). This data shall only be used by the contractor's competent person in the selection of Speed Shore Vertical Shores. The competent person shall be experienced and knowledgeable in trenching and excavation procedures.

Depth of Operation
Vertical Shores are designed to support lateral earth pressure through the strength of its hydraulic cylinders. Lateral Earth Pressure being a function of the equivalent weight effect of the soil and the depth of excavation. Vertical shores may be used to shore trenches up to 20 feet in depth in Type A and B soils with the charts provided in Appendix D of the OSHA excavation standard (subpart P), and up to 25 feet in Type A, B, and C-60 soils with Speed Shore manufacturer's tabulated data.

Lifting Sling
When required Vertical Shores must be lifted with a removable sling manufactured in compliance with the requirements of OSHA standard for rigging equipment, and rated for the anticipated load. Please note that tie-down chains and other improvised slings are not appropriate as lifting devices.

Inspection
The designated Competent person will inspect all components of the shoring system prior to use, as well as daily and when changes in jobsite conditions require. Any damaged, defective or inadequate components shall be repaired or replaced.
ACCESSORY ITEMS

Hydraulic Pump – required to pressurize the shoring system. There are three pumps available for use:
HP-100 - Manual hydraulic pump – 5 gallon metal container
HVP-2000 - High volume manual hydraulic pump with 7 ½ gallon plastic container.
HP-200 - 12-volt electric hydraulic pump

Shoring Fluid – required for use with hydraulic pumps. Speed Shore manufactures two grades of shoring fluid:
SF-SG-12 - Summer grade shoring fluid concentrate
  *Sold as one case of 12 each- 8oz. Bottles.
  *One 8oz. bottle of SG fluid is used per 5 gallons of water.
SF-WG-06 - Winter grade shoring fluid concentrate
  *Sold as one case of 6 each – 1 gallon bottles
  *Mix ratios are prescribed on each container

Release/Removal Tools
The release tool is required to remove the hose from the vertical shore after installation and release pressure from the cylinders prior to removal of the vertical shore from the excavation. Removal hook used in conjunction with the Release tool is required to remove vertical shore from the excavation. Speed Shore manufactures three lengths available for use:
RT-30 - 30” Release Tool
RH-30 - 30” Removal Hook
RT-48 - 48” Release Tool
RH-48 - 48” Removal Hook
RT-96 - 96” Release Tool
RH-96 - 96” Removal Hook

Installation Procedures
In stable soils that will stand throughout excavation, the following procedure is appropriate:

1. Complete the excavation.
2. Place vertical shore perpendicular to trench.
3. Unfold shore to open position.
4. Connect the female coupler on the pump hose to the male coupler on the vertical shore.
5. Prime the system by pumping enough fluid to initiate movement of cylinders.
6. Vertical Shore should now be expanded to a position slightly less than the inside dimensions of the excavation or plywood sheeting.
7. Suspend the vertical shore at its intended location in the excavation (top hydraulic cylinder between 1’ and 2’ below surface).
8. Pump the system to pressure desired (750-1,000 psi), momentarily monitor pressure gauge for pressure loss, and then release hydraulic coupler from cylinder by use of the Release Tool.
9. Release pressure from the pump hose by opening the bypass valve on the hydraulic pump. This relief will be indicated by the pressure gauge on the pump.
10. Care must be taken to insure that hydraulic connections are kept clean during removal and reconnection to the next vertical shore.
11. Connect the hose assembly to the next vertical shore to be installed.
Removal Procedures

To remove Vertical Shores from the excavation the following procedure is suggested:

1. From the surface of the excavation, relieve pressure on the cylinders in the Vertical Shore by use of the Release Tool. The tool is used to press on the male connector on the top of cylinder allowing shoring fluid to escape to the excavation, insure hook is attached to rail. Initially release a small amount of fluid from the cylinder and observe the shoring system for any soil movement. Next, take the Removal Hook and attach removal tool to opposite rail handle. Take care to remain in a safe position during continued pressure release on cylinder. After observing the effect of pressure release upon the system, complete fluid removal until the cylinder has been compressed to the desired position.

2. After pressure has been relieved on the cylinders, lift unit sideways out of the excavation.

3. Continue this procedure until all units are removed from the excavation.

4. If used, remove sheeting.

Note: When using single vertical shores or when stacking units, the vertical shore should always be installed from the top down and removed beginning with the bottom unit and working upward. All installation and removal should be accomplished from outside the excavation.

**Speed Shore Vertical Shores** must always be installed in accordance with requirements of all regulatory agencies having jurisdiction over shoring systems, and installation must meet the minimum requirements of current Manufacturer's Tabulated Data published by Speed Shore Corporation.
Examples of typical installations

**FIG. 1**
WITH SHEETING

**FIG. 2**
WITHOUT SHEETING

**FIG. 3**
STACKED
MANUFACTURERS
TABULATED DATA

VERTICAL SHORES

January 1, 1995
WARNING

EXCAVATION PROCEDURES MAY BE VERY DANGEROUS

- A TRAINED COMPETENT PERSON SHALL: SUPERVISE ALL EXCAVATION OPERATIONS, ENSURE THAT ALL PERSONNEL ARE WORKING IN SAFE CONDITIONS, AND HAVE THOROUGH KNOWLEDGE OF THIS TABULATED DATA. THE COMPETENT PERSON SHALL HAVE THE AUTHORITY TO STOP WORK WHEN IT IS UNSAFE FOR WORKERS TO ENTER AN EXCAVATION.

- ALL PERSONNEL SHALL BE TRAINED IN CORRECT EXCAVATION PROCEDURES, PROPER USE OF THE PROTECTIVE SYSTEM AND ALL SAFETY PRECAUTIONS.

- EXCAVATIONS AND PROTECTIVE SYSTEMS SHALL BE INSPECTED A MINIMUM OF ONCE EACH WORKING DAY AND WHENEVER THERE IS A CHANGE OF SOIL, WATER OR OTHER JOB SITE CONDITIONS.

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

- ALL INSTALLATION AND REMOVAL OF SHORING AND SHIELDING SHALL BE FROM ABOVE GROUND ONLY.

- DO NOT ALLOW PERSONNEL TO ENTER AN EXCAVATION THAT IS NOT PROPERLY SHORED, SHIELDED OR SLOPED.

- PERSONNEL SHALL ALWAYS WORK WITHIN THE SHORING AND SHIELDING. PERSONNEL SHALL NOT STAND ON THE EDGE OF AN UNSHORED EXCAVATION.

- ALL PERSONNEL SHALL ENTER AND EXIT EXCAVATIONS ONLY WITHIN SHIELDED OR SHORED AREAS.

THIS SPEED SHORE TABULATED DATA IS A GENERAL SET OF GUIDELINES AND TABLES TO ASSIST THE COMPETENT PERSON IN SELECTING A SAFETY SYSTEM AND THE PROPER SHORING OR SHIELDING EQUIPMENT. THE COMPETENT PERSON HAS SOLE RESPONSIBILITY FOR JOB SITE SAFETY AND THE PROPER SELECTION AND INSTALLATION AND REMOVAL OF THE SHORING OR SHIELDING EQUIPMENT.

THIS TABULATED DATA IS NOT INTENDED TO BE USED AS A JOB SPECIFIC EXCAVATION SAFETY PLAN, BUT SHALL BE USED BY THE COMPETENT PERSON TO SUPPLEMENT HIS TRAINING, HIS EXPERIENCE AND HIS KNOWLEDGE OF THE JOB CONDITIONS AND SOIL TYPE.
1.0 SCOPE

1.1 Speed Shore's Tabulated Data complies with the O.S.H.A. standards as stated in the Code of Federal Regulations 29, Part 1926, Subpart P - Excavations, Section 1926.652(c)(2). This data shall only be used by the contractor's competent person in the selection of Speed Shore Vertical Shores. The competent person shall be experienced and knowledgeable in trenching and excavation procedures, soil identification and in the use of Speed Shore Vertical Shores.

1.2 All personnel involved in the installation, removal and use of Vertical Shores shall be trained in their use and advised of appropriate safety procedures.

1.3 Table VS-1, VS-2 and VS-3 is based upon requirements stated in CFR 29, Part 1926 and applicable portions of CFR 29, Part 1910. The competent person shall know and understand the requirements of those parts before using this data.

1.4 Whenever there is a variance between this Tabulated Data and CFR 29, Part 1926, Subpart P - Excavations, this Tabulated Data shall take precedence. Whenever a topic or subject is not contained in this Tabulated Data, the competent person shall refer to CFR 29, Part 1926, Subpart P - Excavations.

1.5 This data refers to the Code of Federal Regulations, 29, Parts 1910 and 1926. In states that have their own state O.S.H.A. refer to similar regulations in the current construction rules published by the state office of Occupational Health and Safety.

1.6 Tables VS-1, VS-2 and VS-3 shall be used only in excavations with soil conditions as noted. Table VS-1, VS-2 and VS-3 are for depths to 25 feet. For other soil and excavation conditions and depths, site-specific engineered designs are required. Contact Speed Shore Corporation for assistance.

1.7 This Tabulated Data is applicable for standard products manufactured exclusively by Speed Shore and may only be used with Speed Shore manufactured products. Any modification or repair of Speed Shore products not specifically authorized by Speed Shore Corporation voids this data.

2.0 DEFINITIONS (RE: CFR 29, Part 1926.32 Definitions) - RESTATED FOR EMPHASIS

2.1 1926.32 (f) "competent person" means 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.

2.2 1926.32 (p) "Shall" means mandatory.

2.3 1926.32 (q) “Should” means recommended.

3.0 SOIL CLASSIFICATIONS

3.1 In order to use the data presented in Tables VS-1, VS-2 and VS-3 the soil type, or types, in which the excavation is cut shall first be determined by the competent person according to the O.S.H.A. soil classifications as set forth in CFR 29, Part 1926, Subpart P, Appendix A.

3.2 Table VS-3 is also for use in Type C-60 soil (see 3.3 for definition).

3.3 Type C-60 soil is a moist, cohesive soil or a moist dense granular soil, which does not fit into Type A or Type B classifications, and is not flowing or submerged. This material can be cut with near vertical sidewalls and will stand unsupported long enough to allow the Vertical Shores to be properly installed. The competent person must monitor the excavation for signs of deterioration of the soil as indicated by, but not limited to, freely seeping water or flowing soil entering the excavation around or below the sheeting. An alternate design for less stable Type C soil will be required where there is evidence of deterioration.
4.0 PRESENTATION OF INFORMATION

4.1 Information is presented in tabular form in Tables VS-1, VS-2 and VS-3. Each table presents the maximum vertical and horizontal spacing that may be used with Vertical Shores for indicated soil types. Table VS-1 is for O.S.H.A. Type A Soil, Table VS-2 for O.S.H.A. Type B Soil and Table VS-3 is for Vertical Shore use in Type C-60 soil (see 3.3 for definition).

4.2 Tables VS-1, VS-2 and VS-3 are not considered adequate when loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by 3 feet of soil surcharge. The term "adjacent" as used here means the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

4.3 Using the appropriate table, the competent person selects the horizontal spacing of the vertical shores and the sheeting required, if any. The selection is based on the depth and width of the trench in varying soil conditions. In these tables, the vertical spacing of the cylinders is held constant at a maximum of 4 feet on center. The horizontal spacing of the hydraulic cylinders is the same as the horizontal spacing of the vertical rails.

5.0 BASIS AND LIMITATIONS OF THE DATA

5.1 Sheetng is used only to prevent local raveling or sloughing of the trench face between the Vertical Shores. Sheetng shall be one of the following or an approved equal.

5.1.1 Aluminum: Speed Shore's Aluminum Sheeting
5.1.2 Steel: 0.5 inch or thicker Steel Plate
5.1.3 Plywood:
  3/4 inch Finn Form
  3/4 inch Omni Form
  3/4 inch Combi Exterior Plywood
  3/4 inch Plyform American Plywood Association, Plyform, B - B, Class I Exterior
  3/4 inch HDO American Plywood Association, High Density Overlay, Exterior
  3/4 inch 14 Ply Artic White Birch
  1 1/8 inch CDX
  Two sheets of 3/4 inch thick CDX Plywood.

5.2 When sheeting is used, it shall extend to the top the excavation and to within 2 feet of the bottom of the excavation; except in Table VS-3 for excavation depths 0 - 25 feet, where the sheeting shall extend to the bottom of the excavation. If there is an indication of a possible loss of soil from behind or below the support system, sheeting must extend to the bottom of the excavation.

5.3 All spacings indicated are measured from center to center of the members.

5.4 The center line of the top hydraulic cylinder shall be a minimum of 12 inches and a maximum of 24 inches below the top of the excavation.

5.5 The center line of the bottom hydraulic cylinder shall be a maximum of 4 feet above the bottom of the excavation.

5.6 In excavations 6 feet deep or less, only 1 hydraulic cylinder (Single Shore) is required in each vertical plane. The cylinder shall be no more than 4 feet above the bottom of the excavation, and no more than 2 feet below the top of the excavation. In excavations 6 feet to 10 feet deep there shall be a minimum of 2 hydraulic cylinders in each vertical plane. The horizontal spacing shall be as shown in the tables.

5.7 The vertical rails directly behind each hydraulic cylinder pad must bear on firm soil or a solid and stable filler to distribute the cylinder load to the face of the excavation. Do not butt rails back to back across an excavation.

5.8 Two single shores may be substituted for a vertical shore.

5.9 The aluminum rails are designed to be used vertically, however they may be orientated horizontally or diagonally if all other provisions of this data are satisfied.

5.10 The maximum vertical spacing between center lines of hydraulic cylinders shall be 4 feet.

5.11 The faces of the excavation must be cut near vertical and straight
5.12 There shall be a minimum of 3 consecutive shores in a row, at the horizontal spacing indicated (or less), to form a shoring system. In trenches over 12 feet deep, and whenever possible, a minimum of 4 shores should be used. For excavations that are too short to place 3 or 4 shores at the required spacing, the shores shall be placed at the required spacing from end to end of the excavation with a minimum of 2 shores. There shall be a shore within 2 feet of each end of the excavation.

5.13 The ends of trenches shall be shored or sloped in accordance with Appendix B of CFR 29, Part 1926 Subpart P Excavations.

5.14 No vertical or lateral loads shall be applied to the cylinders.

5.15 Water flowing into an excavation, from either above or below ground, will cause a decrease in the stability of the soil. Therefore, the competent person shall take action to prevent water from entering the excavation and remove any water that accumulates in the excavation. Closer monitoring of the soil is required under wet conditions, particularly in less cohesive (weaker) soil conditions. A small amount of water, or flowing conditions, may downgrade the soil classification to a less stable classification. A large amount of water, or flowing conditions, may downgrade all soils to O.S.H.A. Type C. Speed Shore shoring and shielding systems may be used safely in wet conditions when the excavation is monitored by the competent person. Example: When repairing a leak in utility lines, it is often difficult or even impossible, to keep water out of the excavation.

5.16 If shores are installed on the seam between 2 adjacent sheets of plywood, each plywood sheet shall bear a minimum of 4 inches on each vertical rail.

5.17 Tables VS-1, VS-2 and VS-3 shall be used only for selecting the spacing and excavation depths for Single Shores, Vertical Shores and Multi-Shores. Normally, a Single Shore has 1 hydraulic cylinder, a Vertical Shore has 2 hydraulic cylinders and Multi-Shores have 3 or more hydraulic cylinders. All three types may be used and may be mixed if the provisions of this Tabulated Data are followed.

6.0 INSPECTION

6.1 The competent person must evaluate the soils to assure the rated capacity of the Vertical Shores is not exceeded by the lateral pressure of the soil. Soils shall be evaluated in accordance with Part 3.0.

6.2 The competent person shall monitor all phases of the assembly, installation and use of this product to evaluate and eliminate methods, which could endanger employees utilizing this product.

6.3 Daily inspections of the Vertical Shores and accessories must be performed by the competent person and deficiencies corrected.

6.4 Inspections shall be conducted as necessary for hazards associated with water accumulation, changing soil conditions, or changing site weather conditions.
7.0 EXAMPLE TO ILLUSTRATE THE USE OF TABLES VS-1, VS-2 and VS-3:

Problem: Design a trench safety system using Speed Shore Vertical Shores for an excavation 8 feet deep and 4 feet wide in O.S.H.A. Type B soil.

Study tables: Select Table VS-2 for Type B soil. Look in the column “Depth of Excavation” on line 0 to 15 feet. Next, read across and find under “Hydraulic Cylinders”, “Maximum Horizontal Spacing” at 8 feet and “Maximum Vertical Spacing” at 4 feet. Next, locate the hydraulic cylinder size under “Width of Excavation”, 0 to 8 feet”: 2 inch diameter. Finally, under “Sheeting”, Notes 2 and 3 apply.

Conclusion: Install Speed Shore Vertical Shores with 2 inch diameter cylinders at 8 feet intervals with or without plywood sheeting, depending upon the competent person’s judgment of the raveling or sloughing of the excavation face. (See Notes 2 and 3).

<table>
<thead>
<tr>
<th>TABLE VS-1 TYPE “A” SOIL</th>
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<tbody>
<tr>
<td><strong>HYDRAULIC CYLINDERS</strong></td>
</tr>
<tr>
<td><strong>Sheeting</strong></td>
</tr>
<tr>
<td><strong>Width of Excavation</strong></td>
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<tr>
<td><strong>0 to 8</strong></td>
</tr>
<tr>
<td><strong>Vertical Spacing</strong></td>
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<tr>
<td><strong>0 to 15</strong></td>
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<tr>
<td><strong>0 to 25</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE VS-2 TYPE “B” SOIL</th>
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</thead>
<tbody>
<tr>
<td><strong>HYDRAULIC CYLINDERS</strong></td>
</tr>
<tr>
<td><strong>Sheeting</strong></td>
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<td><strong>Vertical Spacing</strong></td>
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<td><strong>0 to 20</strong></td>
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<tr>
<th>TABLE VS-3 TYPE “C-60” SOIL (See 3.3 for definition of C-60 Soil)</th>
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<tbody>
<tr>
<td><strong>HYDRAULIC CYLINDERS</strong></td>
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<td><strong>Sheeting</strong></td>
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NOTES TO TABLES VS-1, VS-2 and VS-3

1. Two inch diameter cylinders shall have a structural steel tube oversleeve 3.5 x 3.5 x 0.1875 inches extension (installed over the aluminum oversleeve extension) or a steel tube oversleeve 3 x 3 x 0.1875 inch extension (installed without the aluminum oversleeve) that extends the full retracted length of the cylinder. CAUTION: In either case, the aluminum load transfer plug and the aluminum innersleeve shall be used or a steel load transfer plug shall be welded securely in place inside the steel oversleeve to transfer the load through the steel oversleeve to the socket pad. Other Speed Shore approved oversleeves may be used.

2. The bottom of the sheeting shall extend within 2 feet of the bottom of the excavation. If there is an indication of a possible loss of soil from behind or below the support system, sheeting must extend to the bottom of the excavation.

3. Four feet wide sheeting is required at each Vertical Shore if raveling or sloughing of the excavation face appears likely to occur.

4. Four feet wide sheeting shall be used.

5. When 4 feet horizontal spacing is exceeded, the open spaces between the sheeting must be monitored for sloughing and raveling of the excavation face.

6. The bottom hydraulic cylinder shall be a maximum of 4 feet above the bottom of the excavation.

7. Sheetinig shall extend to the bottom of the excavation.
EXAMPLES OF TYPICAL INSTALLATION

FIG. 1
WITH SHEETING

FIG. 2
WITHOUT SHEETING

FIG. 3
STACKED
TRENCH RESCUE KITS
Detailed Specifications

Units specified herein shall be fully assembled, adjustable, personnel protective devices specifically designed and professionally engineered to provide excavation safety protection for workers. These units shall be in full compliance with all applicable Federal Occupational Safety and Health Administration (OSHA) Regulations.

HYDRAULIC CYLINDER CROSS-BRACES

1. Cylinders shall be a minimum of 2” I.D. and shall have an allowable capacity of not less than 23,000 pounds axial compression load with a 1.5 safety factor.
2. Cylinders shall be furnished with aluminum oversleeves for protection of the piston rod through its complete stroke.
3. Cylinders barrels shall be composed of 6061-T6 aluminum alloy drawn seamless.
4. Cylinders shall be fitted with a wiper guide assembly to thoroughly clean the smooth exterior of the piston rod before entering the cylinder.
5. Cylinder pad (end of shoring device) shall be a minimum of 2 1/2" thick through its axis to insure sufficient support of the cylinder barrel.
6. O-ring seals in the cylinder pad are to be located in the annular space between the cylinder barrel wall and inside cylinder pad wall to reduce risk of O-ring distortion.
7. Cylinders shall be equipped with a solid piston head which permits maintenance of seals without detaching the piston head from the piston rod. Piston rod shall be composed of 2024-T351 aluminum alloy for higher yield strength.
8. The piston head seal shall be a loaded O-ring design for optimum seal and prevention of low pressure leakage. Seal hardness shall be a minimum of 85 durometers.
9. Socket pads shall include swivel capability at one end of the trench rescue shore which provides for installation in trenches with non vertical walls.

VERTICAL RAILS

Standard vertical rails shall be no less than 8" in width and have an equivalent section modules of .44 in.³ or more.

GENERAL NOTES

1. Attachment of the cylinder pads to the rails shall be a flush mounted design to insure even distribution of load to the rails, while maintaining uninterrupted column strength.
2. Each trench rescue shore shall have a variety of quick-connect, single unit extension systems available to increase the working range of each hydraulic cylinder.
3. All quick coupling fittings, pins, handles and keepers shall be plated for maximum life.
4. Supplier shall furnish with each bid Manufacturers Tabulated Data certified by a registered Professional Engineer, which clearly defines product capabilities.
ACCESSORIES

1. Hydraulic Pumps
   a. Hydraulic pumps shall be a minimum of 7.5 gallon fluid capacity, complete with calibrated gauge, hose, plastic container, valves and fittings.
   b. Pump gauge shall have a green color coded face plate indicating normal operating range of 750 - 1,500 psi.
   c. Pump hose shall be a minimum of 12’ in length with spring guards and a minimum working pressure of 5,000 psi.

2. Hydraulic Shoring Fluid
   Shoring fluid shall be non-hazardous, bio-degradable, nonflammable, water soluble, actuating fluid that lubricates and protects the hydraulic cylinder and pump parts. Shoring fluid shall have a neutral effect on bituminous pipe coatings, plastic pipes and asphalt. Shoring fluid shall enable trench rescue shores to operate in temperatures to 30 degrees below zero (Fahrenheit) (34.4 degrees Celsius).

3. Release Tools, Removal Hooks and Utility Ropes
   Manufacturer supplying products must have available specially designed tools and utility ropes to facilitate above-ground installation and removal of all units.

SHEETING

Trench panels shall be customized 0.75 inch thick, 14-ply, arctic birch reinforced with center bracing, angled corners and pre-drilled hand/utility-rod slots for ease of transporting. Trench panels shall have a means for overlapping panels that can also serve to stabilize each trench panel during installation.

PARTS AND SERVICE

1. Replacement parts must be available for shipment within five working days of Purchase Order.
2. Parts List will be furnished upon request.

PRODUCT LIABILITY

The manufacturer under these specifications shall be required to carry a minimum one million dollars ($1,000,000.00) product liability insurance policy with bid award being contingent upon proof of coverage.

EXPERIENCE

The manufacturer under these specifications shall be required to furnish documented proof of professional expertise and competence in excavation safety product experience and manufacturing for a minimum of five (5) years. We reserve the right to request from the apparent successful manufacturer a client list for the purpose of obtaining references on quality of products furnished and service history.

DELIVERY

Delivery of all equipment, features and accessories specified herein is to be made within sixty (60) days after receipt of Purchase Order.

WARRANTY

The successful bidder under these specifications shall furnish a minimum one (1) year warranty on all parts and labor.
MANUFACTURERS TABULATED DATA

TRENCH RESCUE SHORES™

January 11, 1994

3330 S. SAM HOUSTON PKWY E. HOUSTON, TEXAS 77047
Tel: (713) 943-0750  U.S.A. Toll Free: (800) 231-6662  Fax: (713) 943-8483
COPYRIGHT, U.S.A., SPEED SHORE CORPORATION, 1994
WARNING

EXCAVATION PROCEDURES MAY BE VERY DANGEROUS

- A TRAINED COMPETENT PERSON SHALL: SUPERVISE ALL EXCAVATION OPERATIONS, ENSURE THAT ALL PERSONNEL ARE WORKING IN SAFE CONDITIONS, AND HAVE THOROUGH KNOWLEDGE OF THIS TABULATED DATA. THE COMPETENT PERSON SHALL HAVE THE AUTHORITY TO STOP WORK WHEN IT IS UNSAFE FOR WORKERS TO ENTER AN EXCAVATION.

- ALL PERSONNEL SHALL BE TRAINED IN CORRECT EXCAVATION PROCEDURES, PROPER USE OF THE PROTECTIVE SYSTEM AND ALL SAFETY PRECAUTIONS.

- EXCAVATIONS AND PROTECTIVE SYSTEMS SHALL BE INSPECTED A MINIMUM OF ONCE EACH WORKING DAY AND WHENEVER THERE IS A CHANGE OF SOIL, WATER OR OTHER JOB SITE CONDITIONS.

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

- ALL INSTALLATION AND REMOVAL OF SHORING AND SHIELDING SHALL BE FROM ABOVE GROUND ONLY.

- DO NOT ALLOW PERSONNEL TO ENTER AN EXCAVATION THAT IS NOT PROPERLY SHORED, SHIELDED OR SLOPED.

- PERSONNEL SHALL ALWAYS WORK WITHIN THE SHORING AND SHIELDING. PERSONNEL SHALL NOT STAND ON THE EDGE OF AN UNSHORED EXCAVATION.

- ALL PERSONNEL SHALL ENTER AND EXIT EXCAVATIONS ONLY WITHIN SHIELDED OR SHORED AREAS.

THIS SPEED SHORE TABULATED DATA IS A GENERAL SET OF GUIDELINES AND TABLES TO ASSIST THE COMPETENT PERSON IN SELECTING A SAFETY SYSTEM AND THE PROPER SHORING OR SHIELDING EQUIPMENT. THE COMPETENT PERSON HAS SOLE RESPONSIBILITY FOR JOB SITE SAFETY AND THE PROPER SELECTION AND INSTALLATION AND REMOVAL OF THE SHORING OR SHIELDING EQUIPMENT.

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SPEED SHORE
TABULATED DATA

WARNING: Rescue operations are dangerous. The sides of the trench will have already collapsed at least once and maybe two or three times. There is a high probability that the trench will collapse again during the rescue operations. No personnel shall enter a trench deeper than four feet below the bottom level of shores. Constant monitoring of the sides of the trench and the shoring equipment for signs of distress and failure is necessary.

WARNING: All personnel involved in the installation, use and removal of Trench Rescue Shores shall be trained and knowledgeable rescue personnel that shall have specific training in the use of Trench Rescue Shores. Training in trench excavation safety, trench shoring and soils is necessary.

1.0 SCOPE

1.1 Speed Shore's Tabulated Data complies with the O.S.H.A. standards as stated in the Code of Federal Regulations 29, Part 1926, Subpart P - Excavations, Section 1926.652(c)(2).
1.2 This data may be used in all soil conditions and types except for submerged soil and soils that are flowing so severely that the Trench Rescue Shores cannot be placed safely and securely.
1.3 This data is applicable to Trench Rescue Shores manufactured exclusively by Speed Shore Corporation. Any modification or repairs of Speed Shore products not specifically authorized by Speed Shore Corporation voids this data.
1.4 This data is based on a 1.5 to 1 safety factor and worse case O.S.H.A. Type C soil conditions.
1.5 This data refers to the code of Federal Regulations 29, Parts 1910 and 1926. In states that have their own state O.S.H.A. refer to similar regulations in the current construction rules published by the state office of Occupational Safety and Health.

2.0 PROCEDURES

2.1 Trench Rescue Shores shall only be used where there has been an excavation or trench cave in and a victim, or victims is being removed. Do not use in normal trenching operations.
2.2 The primary purpose of Trench Rescue Shores is to protect the rescue team as they remove the victim.
2.3 The soils will be unstable as demonstrated by the cave-in. There will likely be one or more cave-ins following the first one. Therefore caution shall be taken by all those entering the collapsed excavation and all personnel shall work in areas protected by the Trench Rescue Shores.
2.4 Excavation, sheeting and hydraulic cylinders shall be continually monitored for signs of failure, distress and buckling.
2.5 Trench Rescue Shores are designed to be used primarily with personnel digging with hand tools. Mechanical excavating is not recommended. The Trench Rescue Shores shall be placed in the excavated area from the top down.
2.6 The vertical spacing of the shores shall be no more than four feet on center, and the horizontal spacing shall be no more than four feet on center.
2.7 Rescue personnel shall dig down in four feet increments, placing plywood or approved sheeting and shores as digging progresses.
2.8 Plywood or approved sheeting shall be placed vertically against the excavation faces and the shores firmly pressurized tight against the plywood to prevent the shores from slipping vertically or horizontally.
2.9 Cylinders shall be placed as near perpendicular to the trench face as possible and as near horizontal as possible.
2.10 The 12 foot long wale, furnished in the City and Metro Kits, shall be used with four hydraulic cylinders to span voids of three feet or less in the trench face. The one foot six inches long rail is removed from one end of the four shores and the shores attached to the wale. The ends of all shores shall bear against soil, backfill or other filler material. The aluminum wale will not support the end of shore that is placed over a void larger than six inches wide in the trench face.

2.11 In many situations it will be necessary to shore the ends of the excavation as well as the sides of the excavation.

2.12 Vertical or lateral loads shall not be applied to the hydraulic cylinders.

2.13 Ladders or approved means shall be used for entering and exiting the excavation.

2.14 Prevent water from entering the excavation and remove all water in excavation.

2.15 After the rescue operation is completed, remove the plywood and Rescue Shores from the bottom up.

2.16 Sheetling shall be 3/4 in, Finn Form plywood or a panel of equivalent strength.

3.0 TABLE TRS-1

3.1 Table TRS-1 shows the different models of Rescue Shores and extensions along with the minimum and maximum length of each shore combination.

3.2 Model ETR 54/84 with 42 in. extension is limited to excavations 15 feet deep. Model ETR 54/88 with 56 in. extension is limited to excavation 13 feet deep. All other models are limited to excavations 20 feet deep. These limitations are based on a 1.5 to 1 safety factor for the working load, and worse case O.S.H.A. Type C soil conditions.

3.3 Closed spaced sheeting shall be used at all times.
<table>
<thead>
<tr>
<th>MODEL</th>
<th>EXTENSION</th>
<th>LENGTH</th>
<th>CYLINDER</th>
<th>SHORE SPACING</th>
<th>MAX.</th>
<th>OVER</th>
<th>CLOSE</th>
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</thead>
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<tr>
<td></td>
<td>IN.</td>
<td>MIN. IN.</td>
<td>MAX. IN.</td>
<td>STROKE IN.</td>
<td>HORIZ. FT.</td>
<td>VERT. FT.</td>
<td>DEPTH FT.</td>
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<tr>
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<tr>
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</tr>
</tbody>
</table>

Read all of pages 2 through 4 before using this table.
MANUFACTURERS
TABULATED DATA

MEGA-SHORE™
WITH HYDRAULIC CYLINDERS
A High Clearance Hydraulic Shore

June 17, 1999

3330 S. SAM HOUSTON PKWY E. HOUSTON, TEXAS 77047
Tel: (713) 943-0750 U.S.A. Toll Free: (800) 231-6662 Fax: (713) 943-8483

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1.0 SCOPE

1.1 Speed Shore's Tabulated Data complies with the O.S.H.A. standards as stated in the Code of Federal Regulations 29, Part 1926, Subpart P - Excavations, Section 1926.652(c)(2). One of the functions of this document is to show this compliance and Mega-Shores load tables for the use and benefit of Speed Shore's users. The first and apparent purpose of this “Manufactures’ Tabulated Data” (Data) is to help in the selection of Speed Shore equipment for the job. As well, the competent person should use it to demonstrate compliance with OSHA regulations at the jobsite and to show others how the equipment will be used. OSHA regulations also require that:

1.2 All personnel involved in the installation, removal and use of Mega-Shores shall be trained in their use and advised of appropriate safety procedures.

1.3 The competent person shall know and understand the requirements of the OSHA regulations before using the Data or the equipment. Table MS-1 is based upon requirements covered in CFR 29, Part 1926 and applicable portions of CFR 29, Part 1910.

1.4 If a variance between this Tabulated Data and CFR 29, Part 1926, Subpart P – Excavations is encountered, this Tabulated Data shall take precedence. This Data does not cover all subject under OSHA regulations. Therefore it is expected that the competent person is already trained in general trench safety requirements and is referred to the full CFR 29, Part 1926, Subpart P to supplement this Data.

1.5 In states having their own OSHA regulations, that publication should be used in conjunction with this Data. ONLY the CFR 29, Parts 1910 and 1926 is addressed in this Data.

1.6 Table MS-1 depths shall be used only for the soil conditions noted in the table. Soils which fall between classifications shall be downgraded to the next weaker soil classification. For other soil and excavation conditions and depths, site-specific engineered designs may be required. Contact Speed Shore Corporation for assistance.

1.7 This Data is applicable to the Mega-Shore as manufactured exclusively by Speed Shore and may only be used with Speed Shore manufactured products. Any modification of the equipment not specifically authorized by Speed Shore Corporation voids this Data.

2.0 DEFINITIONS (RE: CFR 29, Part 1926.32 Definitions) - RESTATED FOR EMPHASIS

2.1 1926.32 (f) "competent person" means 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.

2.2 1926.32 (p) "Shall" means mandatory.

3.0 SOIL CLASSIFICATIONS

3.1 In order to use the data presented in Tables MS-1 the soil type, or types, in which the excavation is cut, shall first be determined by the competent person according to the OSHA soil classifications as set forth in CFR 29, Part 1926, Subpart P, Appendix A.

3.2 Table M-2 is also in Type C-60 soil (see 3.3 for definition).

3.3 Type C-60 soil is a moist, cohesive soil or a moist dense granular soil, which does not fit into Type A or Type B classifications, and is not flowing or submerged. This material can be cut with near vertical sidewalls and will stand unsupported long enough to allow the shores to be properly installed. The competent person must monitor the excavation for signs of deterioration of the soil as indicated by, but not limited to, freely seeping water or flowing soil entering the excavation around or below the Mega-Shore. An alternate design for less stable Type C soil may be required where there is evidence of deterioration.

3.4 Water flowing into an excavation, from either above or below ground, will cause a decrease in the stability of the soil. Therefore, the competent person shall take action to prevent water from entering the excavation and remove any water that accumulates in the excavation. Closer monitoring of the soil is required under wet conditions, particularly in less cohesive (weaker) soil conditions. A small amount of water, or flowing conditions, may downgrade the soil classification to a less stable classification. A large amount of water, or flowing conditions, may downgrade all soils to O.S.H.A.
Type C. Speed Shore shoring and shielding systems may be used safely in wet conditions, however the conditions shall be monitored by the competent person.

4.0 PRESENTATION OF INFORMATION

4.1 Information is presented in tabular form in Tables MS-1 for use in O.S.H.A. Type A, B and C soils, including soil Type C-60 soil (see 3.3 for definition).

4.2 The 72 psf lateral pressure allowed for surcharge loads is for spoil piled three (3) feet high next to the trench. If the surcharge load is expected to exceed this allowance, an engineered Trench Safety Plan should be obtained.

4.3 Table MS-1 gives allowable depths for each soil classification with the side panel at the bottom of the excavation. For this placement the Table is extended to include OSHA soil Type C (80). The Table also gives allowable depths for two (2) feet more clear height (CH). The additional clearance is from placing the shore sidewall above the bottom (2 feet maximum).

5.0 PRE-ASSEMBLY REQUIREMENTS

5.1 Shores shall be inspected by a competent person before assembly.

5.2 All damage shall be evaluated and repairs made under the direction of a registered professional engineer. All missing or damaged components shall be replaced with genuine Speed Shore parts.

5.3 All lifting and pulling equipment, (including cables, slings, chains, shackles and safety hooks) used to handle shores or components shall be evaluated for lifting capacity, and inspected for damage or defects, prior to use by experienced operators and shall meet OSHA requirements.

5.4 Tag lines or other approved safety devices shall be used to keep employees away from loads handled by lifting equipment.

5.5 Struts, pins with keepers and accessories shall be in place before using the shore.

6.0 INSPECTION

6.1 The competent person must evaluate the soils to assure the rated capacity of the Mega-Shore is not exceeded by the lateral pressure of the soil. Soils shall be evaluated in accordance with Part 3.0.

6.2 The competent person shall monitor all phases of the assembly, installation and use of this product to evaluate and eliminate methods, which could endanger employees utilizing this product.

6.3 Daily inspections of the Mega-Shore and accessories must be performed by the competent person and deficiencies corrected.

6.4 Inspections shall be conducted as necessary for hazards associated with: water accumulation, changing soil conditions, or changing site weather conditions.

7.0 SAFETY SPECIFICATIONS

7.1 Personnel shall be protected from loose or fallen material. Mega-Shore must always be used in a manner that loose or falling soil cannot enter over the top or through the end of the Mega-Shore. End plates may be required. Spoil piles must be kept back from the edge of the excavation at least 2 feet.

7.2 Employees shall not enter or exit shores through unprotected areas and shall remain in shores at all times while working.

7.3 Employees shall not be in or under a shore while it is being lifted or moved.

7.4 Bottom of shore walls may be maximum of 2 feet above the bottom of the trench if there are no signs of deterioration of the trench face below or at the end of the shores.

7.5 Use of spreader systems for any purpose other than support for the side walls panels, or for pulling them forward is prohibited without written permission from the manufacturer.

7.6 The sides of the excavation should be cut vertically to stay within the rotation allowed in the strut pin.

7.7 Water shall be prevented from entering the excavation and any water that does accumulate in the excavation shall be pumped out.

7.8 Contact Speed Shore for any non-typical use of the Mega-Shore.
### MEGA-SHORE WITH HYDRAULIC STRUTS

#### Table MS-1

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Clear Height CH (ft)</th>
<th>Strut Position</th>
<th>Type A Soil 25 PSF/ft</th>
<th>Type B Soil 45 PSF/ft</th>
<th>Type C-60 Soil 60 PSF/ft</th>
<th>Type C Soil 80 PSF/ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-0804</td>
<td>3'-0&quot;</td>
<td>A</td>
<td>205</td>
<td>114</td>
<td>86</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>4'-0&quot;</td>
<td>B</td>
<td>120</td>
<td>67</td>
<td>51</td>
<td>39</td>
</tr>
<tr>
<td>MS-0806</td>
<td>3'-0&quot;</td>
<td>A</td>
<td>154</td>
<td>86</td>
<td>65</td>
<td>49</td>
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<tr>
<td></td>
<td>4'-0&quot;</td>
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<td>51</td>
<td>39</td>
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<td>MS-0808</td>
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<td>75</td>
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<td>66</td>
<td>56</td>
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<td>36</td>
</tr>
<tr>
<td></td>
<td>7'-0&quot;</td>
<td>C</td>
<td>56</td>
<td>46</td>
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<td>30</td>
</tr>
<tr>
<td></td>
<td>8'-0&quot;</td>
<td>D</td>
<td>48</td>
<td>38</td>
<td>32</td>
<td>24</td>
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<tr>
<td></td>
<td>9'-0&quot;</td>
<td>E</td>
<td>40</td>
<td>30</td>
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<td></td>
<td>10'-0&quot;</td>
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<td>F</td>
<td>28</td>
<td>20</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

*NOTE: Strut positions E and F are applicable to this model only.*

Notes to the Tables:
- When the depth rating exceeds the height of the wall panel or stacked panels, the excavation shall be sloped above the panel starting at a point at least 18" inches below the panel top edge in accordance with OSHA requirements.
- The maximum permissible horizontal clear spacing between Mega-Shore units is: Type A Soil, 8'0"; Type B Soil, 6'0"; Type C Soil, 4'0". The distance is measured between the vertical edges of adjacent units.
- Soil presumed weight (PSF/ft) means pounds per square foot for each vertical foot of depth below grade.
- Tabulated rating allow for the OSHA required surcharge of 72 psf of lateral pressure.
- Mega-Shores may be stacked utilizing sockets providing the allowable depth ranges of the tables are not exceeded.
- Four (4) foot high stacking Mega-Shores shall not be used as the bottom shore.
- Stacked Mega-Shores shall be monitored to assure that each shore is secured to the one below.
EXAMPLE OF TYPICAL INSTALLATION

Note:
When units are stacked,
Replace mechanical spreader
with hydraulic spreader.