DPNicoli
Superior Piling & Shoring Solutions
www.dpnicoli.com

Oregon
19600 SW Cipole Road
Tualatin, OR 97062
Phone: (503)692.6080
Fax: (503)692.1799

California
266 Harbor Way
San Francisco,CA 94080
Phone: (650)873.2999
Fax: (650)873.2988

Washington
3700 6th Avenue
South Seattle,WA 98134
Phone: (206)767.6080
Fax: (206)763.4088

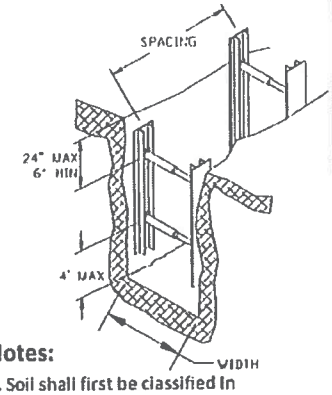
Bay Point
1666 Willowpass Road
Bay Point,CA 94565
Phone: (925)432.6080
Fax: (925)432.6099

TABULATED DATA FOR HYDRAULIC SHORING

Table 1 Hydraulic Shore Selection Guide (1)

Depth of Trench (ft)	Number of Cylinders	Hydraulic Cylinder Requirements: Maximum Horizontal Spacing (ft)	Maximum Vertical Cylinder Spacing (ft)	Cylinder Size Width of Excavation (ft): to 8	8 to 12	12 to 15	Sheeting
Type "A" Soil							
to 10'	2	8'	4'	2"	2"	2" + OS2	Note 2
10' to 14'	3				2" + OS1		
14' to 18'	4						
18' to 22'	5						
22' to 25'	6	7'-6"					
Type "B" Soil							
to 10'	2	8'	4'	2"	2"	2" + OS2	Note 2
10' to 14'	3	7'			2" + OS1		
14' to 18'	4	5'-6"					
18' to 22'	5	4'-6"					Notes 3, 4
22' to 25'	6						
Type "C-60" Soil							
to 10'	2	6'-6"	4'	2"	2"	2" + OS2	Note 3
10' to 14'	3	5'			2" + OS1		
14' to 18'	4	4'					
18' to 22'	5	3'-6"					Notes 3, 4
22' to 25'	6						

OS1 = 3" x 3/16" Wall Aluminum Oversleeve
OS2= 3.5"x3.5"x3/16" Wall Steel Oversleeve



Notes:

1. Soil shall first be classified in accordance with OSHA Appendix A Soil Classification for use with this selection guide. Type C-60 soil is OSHA Appendix A Type C soil that will stand up long enough to install the hydraulic shores.
2. Sheeting is required at any depth whenever sloughing or raveling occurs. If sloughing or raveling occurs between sheeting, decrease spacing until it is prevented. See Table 2 for allowable sheeting. Sheeting may be attached to jack or set into trench separately.
3. Sheeting is required at this depth.
4. Sheeting must extend to the bottom of the excavation.
5. This tabulation includes lateral loading from equipment weighing 20,000 lbs or less and a maximum 3 ft high spoil pile set back a minimum of 2 ft. The competent person shall determine the effect of all other surcharge loads and reduce hydraulic shore spacing as required to resist those loads.
6. This Tabulated Data has been prepared by a Registered Professional Engineer as required to comply with the OSHA standard 29 CFR Part 1926 Subpart P, which assumes a 72 psf surcharge load.

Table 2 Allowable Sheeting

Plywood

3/4" Finn Form
3/4" Omni Form
3/4" Plyform, APA B-B Class 1 Exterior
3/4" HDO, APA High Density Overlay Exterior
3/4" 14 Ply Arctic White Birch (Finland From)
1 1/8" CDX
2 Sheets of 3/4" CDX (back to back)
3/4" Combo Exterior Plywood

Other Materials

1" Thick steel plate 4' min wide x depth
Steel sheet piling
Aluminum Sheet piling
Buildable box panels

Timber Lagging Set Horizontal

Thickness	Soil Type/ Span: A	B	C-60
2"	4 ft		
3"	5 ft	4 ft	
4"	8 ft	6 ft	4 ft

DF#2 or Oak

REGISTERED PROFESSIONAL ENGINEER 79695PE EXP. 6/30/2016 OREGON January 1, 2008 ADRIANUS J. VERMEULEN

REGISTERED PROFESSIONAL ENGINEER ADRIANUS J. VERMEULEN No. 69082 CIVIL STATE OF CALIFORNIA 12/12/14

ADRIANUS J. VERMEULEN STATE OF WASHINGTON 43601 REGISTERED PROFESSIONAL ENGINEER

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1325 COLLEGE AVE., SANTA ROSA, CA. 95401
(707) 528-4503 FAX (707) 528-4505

Date:	Revised:	Job No:	Sheet No.:
12/30/14		14157-1	2 of 2

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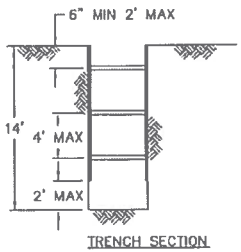
THIS TABULATED DATA APPLIES TO ALL HYDRAULIC SHORING AND PARTS MANUFACTURED BY, CERDA INDUSTRIES INC., SPEED SHORE CORPORATION, EFFICIENCY PRODUCTION, INC., PACIFIC SHORING LLC, PRO-TEC EQUIPMENT, CANTEL, INC., ALLIED SHORING, SAFE-T-SHORE AND GME CORPORATION. PARTS MAY BE INTERMIXED ON THE SHORE.

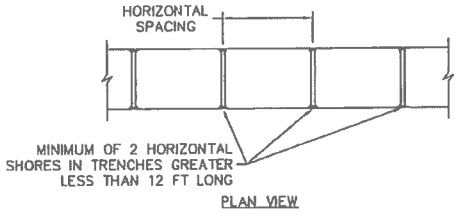
REVISIONS	BY

(1) VERTICAL SPACING



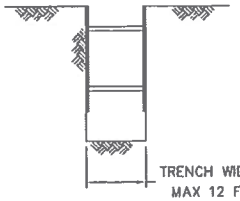
TRENCH SECTION

(2) HORIZONTAL SPACING



PLAN VIEW

(3) TRENCH WIDTH

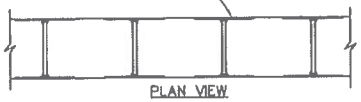


TRENCH SECTION

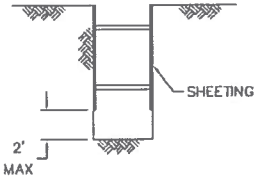
TRENCH WIDTH OVERSLEEVE REQUIREMENTS:

- 0 TO 8 FT WIDE:
  NO OVERSLEEVE REQUIRED TYPE A&B SOIL
- 8 TO 12 FT WIDE:
  3" ROUND ALUMINUM OVERSLEEVE
  OR EPI UNIVERSAL ONE-PIECE ALUMINUM EXTENSION
- 12 TO 15 FT WIDE:
  3.5" TUBE STEEL OVERSLEEVE

(4) SHEETING



PLAN VIEW

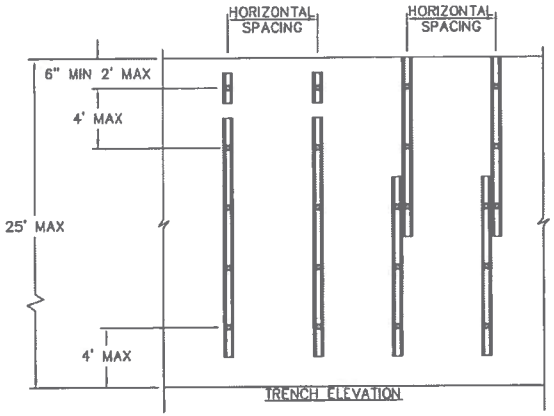


SHEETING

USE OF SHEETING:

- IN ALL CASES WHERE SLOUGHING OR RAVELING OCCUR. IF SKIPPED SHEETING DOES NOT PREVENT IT, DECREASE SHORE SPACING UNTIL IT DOES
- TYPE C-60 SOIL
- MAXIMUM 2 FT ABOVE BOTTOM IN TYPE A&B SOIL TO BOTTOM IN C-60 SOIL

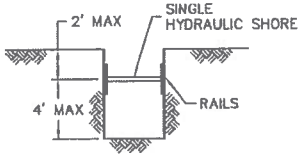
(5) STACKED SHORES



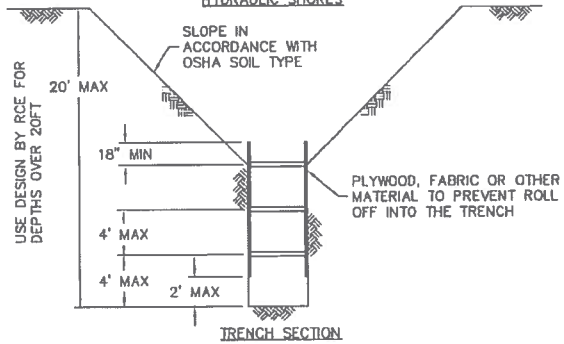
TRENCH ELEVATION

OK TO STAGER PROVIDED HORIZONTAL SPACING IS NOT TO EXCEED

(6) SINGLE SHORE IN 6FT TRENCH



(7) SLOPED TRENCH WITH HYDRAULIC SHORES



TRENCH SECTION

REGISTERED PROFESSIONAL ENGINEER
79695PE
EXP. 6/30/2016
OREGON
AGN/ANUS J. VERMEULEN
January 1, 2008

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ADRIANUS J. VERMEULEN
No. 69082
CIVIL
STATE OF CALIFORNIA
1/15/15

ADRIANUS J. VERMEULEN
STATE OF WASHINGTON
43601
REGISTERED PROFESSIONAL ENGINEER

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

QUICK USE GUIDE
HYDRAULIC SHORING
TABULATED DATA

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Superior Piling & Shoring Solutions

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1235 COLLEGE AVE. SANTA ROSA, CA 95404
(707) 528-4503 FAX (707) 528-4505

SCALE:	1/8"=1'
DATE:	12/30/14
DRAWN BY:	A.B.B.
CHECKED BY:	A.J.V.
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SHEET:	1 OF 2

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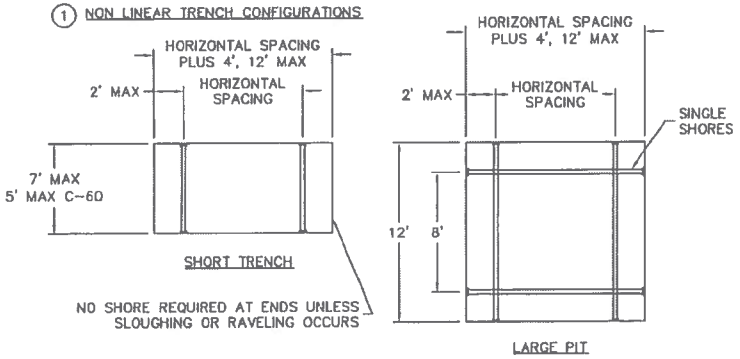
Superior Piling & Shoring Solutions

THIS TABULATED DATA APPLIES TO ALL HYDRAULIC SHORING AND PARTS MANUFACTURED BY, CERDA INDUSTRIES INC., SPEED SHORE CORPORATION, EFFICIENCY PRODUCTION, INC., PACIFIC SHORING LLC, PRO-TEC EQUIPMENT, CANTEL, INC., ALLIED SHORING, SAFE-T-SHORE AND GME CORPORATION. PARTS MAY BE INTERMIXED ON THE SHORE.

REVISIONS	BY

QUICK USE GUIDE
HYDRAULIC SHORING
TABULATED DATA

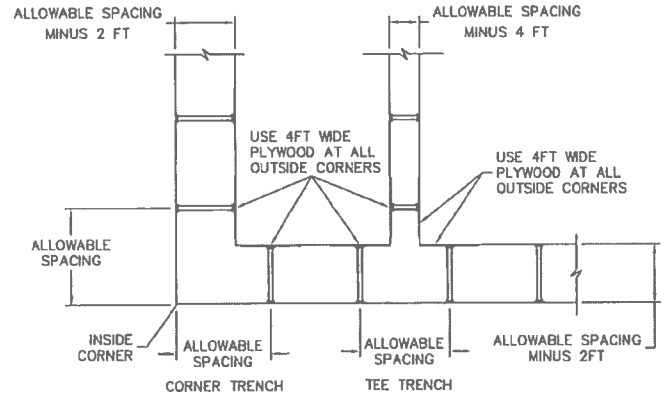
(1) NON LINEAR TRENCH CONFIGURATIONS



NOTES:

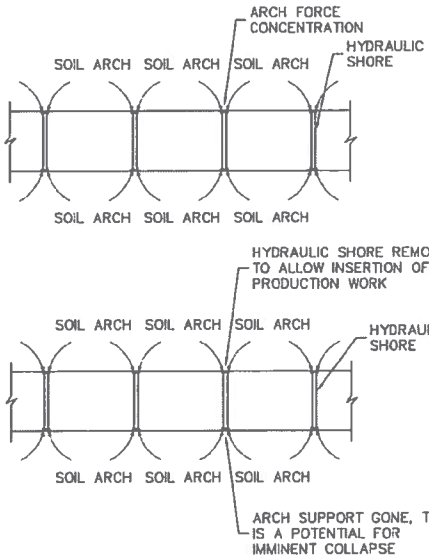
- WORKERS ALLOWED BETWEEN SHORES ONLY
- SHEETING IS REQUIRED IF SLOUGHING AND/ OR RAVELING OCCUR
- IT IS ACCEPTABLE TO INSTALL THE TRENCH JACKS WITH PLYWOOD EITHER HORIZONTAL, VERTICAL OR DIAGONAL IN THE TRENCH AS LONG AS THE CYLINDER SPACING DOES NOT EXCEED THE MAXIMUM ALLOWABLE DISTANCE

(2)



NOTE:
OUTSIDE CORNERS HAVE A STRESS CONCENTRATION AND WILL CRACK AND FALL OFF USE PLYWOOD TO PROTECT WORKERS

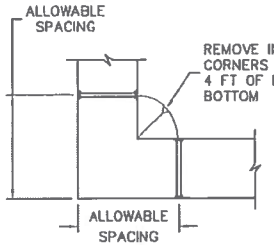
(3) REMOVAL OF SOIL ARCH

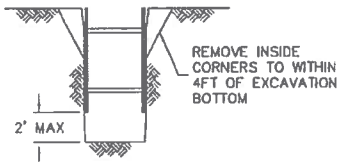


PROBLEM:
SOIL ARCHING IS ESTABLISHED WHEN SHORES ARE INSTALLED.
TEMPORARY OR PERMANENT REMOVAL OF THE SHORE IS A POTENTIAL FOR IMMINENT COLLAPSE.

SOLUTION:
WHEN REMOVING SHORES KEEP BACKFILL CLOSE TO SHORES BEING REMOVED.

COMPETENT PERSON TO DETERMINE APPROPRIATE RE-INSTALLATION PROCEDURE WHEN REMOVING AND RESETTING SHORES TO ALLOW PLACEMENT OR PRODUCTION WORK





CORNER AND T TRENCH ALTERNATIVE TO USING PLYWOOD AT OUTSIDE CORNERS
NOTE: THESE CONFIGURATIONS PRESENT THE LIMITS OF EXCAVATION SIZES THAT CAN BE SHORED WITH 8' VERTICLE HYDRAULIC SHORES

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79695PE
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No. 69082
CIVIL
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12/30/14

ADRIANUS J. VERMEULEN
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43691
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J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
325 COLLEGE AVE. SANTA ROSA, CA. 95404
(707) 526-4505 FAX (707) 526-4535

SCALE:	1/8"=1'
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DRAWN BY:	A.B.B.
CHECKED BY:	A.J.V.
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Oregon
19600 SW Cipole Road
Tualatin, OR 97062
Phone: (503)692.6080
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TABULATED DATA FOR HYDRAULIC SHORING

CONDITIONS FOR USE OF TABULATED DATA:

1. This Tabulated Data has been prepared by a Registered Professional Engineer as required to comply with the OSHA standard 29 CFR Part 1926 Subpart P, which assumes a 72 psf surcharge load.
2. HYDRAULIC SHORING must be used in a manner consistent with safe working procedures, Federal, State and Local regulations.
3. A "competent person", who has trained in the proper use of hydraulic shoring, safe excavation practices and soil classification must direct and control the use of the vertical hydraulic shoring system according to the spacing required in the depth chart.
4. The "Competent Person" must be knowledgeable and capable of complying with all federal regulations, state and local laws and ordinances.
5. The Soil Types A-25, B-45, are as defined in the OSHA standard. Soil Type C-60 is a moist, cohesive soil or a moist dense granular soil, which is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the protective system.
6. The "competent person" must monitor the excavation for any signs of deterioration or condition change that may alter soil classifications.
7. "Competent person" is also 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.
8. Any topic not covered by this data shall be governed by the OSHA Standard.
9. DP Nicoli shall not be liable for damage or injury resulting from improper use of the Hydraulic Shores. Improper use of, or modification to the Hydraulic Shores, or use of components not specifically authorized by DP Nicoli without the written consent of DP Nicoli shall void this data and all manufacturer's warranty.

DESIGN CRITERIA AND LIMITATIONS:

1. Depth and chart tables include a three-foot high spoil pile within a distance of 2' from the face of the excavation. 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 any settlement.
2. Hydraulic Shore struts are not designed to support any vertical loads and shall not be used as a ladder to provide access or egress to the trench.
3. The data is valid for Hydraulic Shores that are in structurally sound condition. Any significant damage will void this data, and all manufacturers' warranty. Any damaged Hydraulic Shores shall not be used.
4. The excavation and adjacent areas shall be monitored daily, after every rainstorm, and after every event that might change the stability of the excavation.
5. Surface water shall be diverted away from the excavation and water must be pumped out of the excavation bottom. The excavation shall be monitored in these conditions to prevent the water from generating excessive lateral pressure on the Hydraulic Shore.

NOTES FOR TABULATED DATA:

1. The top cylinder of the Hydraulic Shore shall be no less than six 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").
4. When an Over sleeve is required, the Over sleeve shall extend the full collapsed length of the cylinder.
5. Trenches wider than 8' max require over sleeves. Utilize Efficiency's 2 in diameter hydraulic cylinders with standard or heavy duty extension system as required for desired excavation width. Trenches wider than 8 ft up to 12 ft (112 in - 144 in) require Efficiency's Steel Oversleeves that extend the full, collapsed width; or universal one-piece aluminum extension. Trenches 12 ft- 1 in up to 15 ft (145 in - 180 in) wide require Efficiency's Steel Oversleeves that extend the full, collapsed width.
6. If a Hydraulic Shore is positioned on a joint between two pieces of sheeting, the shore shall be spaced on the seam equally.
7. The Hydraulic cylinders shall be energized to maintain 750 psi. If the initial pressure cannot 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 horizontally spaced Hydraulic Shores in trenches less than 12 ft long and 3 horizontally spaced shores in trenches greater than 12 ft long, spaced in accordance with this data, and the safe working area shall be 2 ft maximum beyond the last set of shores.
9. Trenches in Type A soil less than 7 ft wide do not require end shoring. Trenches in Type B soil less than 6 ft wide do not require end shoring. Trenches in Type C-60 soil less than 5 ft wide do not require end shoring. Workers shall stay in the safe working area which shall be between shores only. The competent person on-site is to address the condition at the ends of the trench and is to abide by the sheeting requirements if sloughing and/ or raveling occur.
10. Soil shall be classified in accordance with OSHA Appendix A or by a registered Civil Engineer prior to installing this equipment.
11. Surcharge load shall be determined by a competent person or Registered Civil Engineer.
12. Cylinder shall be pinned at each end and the connecting points shall not be allowed to translate in any direction, except when using universal extensions (per universal extension tab data).
13. The hydraulic system including pumps, hoses, and fittings used to pressurize cylinders shall have a safe working capacity of 10,000 psi.
14. Minimum of two, horizontally spaced, hydraulic vertical shores must be in place to classify the trench as shored.

This tabulated data applies to all hydraulic shoring and parts manufactured by, Cerda Industries Inc., Speed Shore Corporation, Efficiency Production, Inc., Pacific Shoring LLC, Pro-Tec Equipment, Cantel, Inc., Allied Shoring, Safe-T-Shore and GME Corporation. Parts may be intermixed on the shore.

REGISTERED PROFESSIONAL ENGINEER 79695PE EXP. 6/30/2016 OREGON ADRIANUS J. VERMEULEN January 1, 2008

REGISTERED PROFESSIONAL ENGINEER ADRIANUS J. VERMEULEN No. 69082 CIVIL STATE OF CALIFORNIA 12/15

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