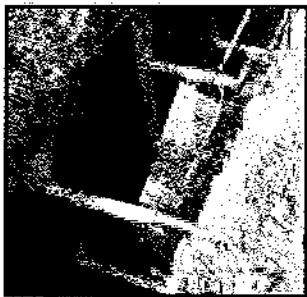
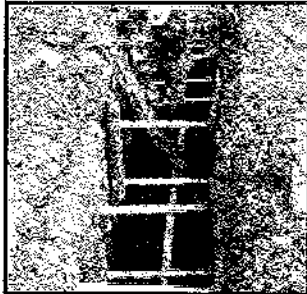


EFFICIENCY PRODUCTION, INC.

AMERICA'S TRENCH BOX BUILDER™

Hydraulic Aluminum Shoring



EFFICIENCY PRODUCTION, INC.
Hydraulic Shoring Tab Data 2010

Tabulated Data

Effective January 4, 2010

Revised: February 26, 2013 - with CHANGE TWO



AMERICA'S TRENCH BOX BUILDER™
America's Trench Box Builder™

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General Information for Using Hydraulic Aluminum Shoring

This 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. The hydraulic aluminum shoring system tabulated data is based on the OSHA Safety requirements defined in 29 CFR, Part 1926, Subpart P - Excavations and Trenches.
2. This data is to be used by a soils engineer, or a competent person. The competent person shall be experienced and knowledgeable of trenching and excavation procedures, these of hydraulic shoring systems, soils identification, and the OSHA standards.
 - a. 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.
 - b. All personnel shall be trained in correct excavation procedures, proper use of the protective system and all safety precautions.
 - c. 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.
 - d. 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.
3. The competent person shall continually monitor the excavation for signs of deterioration such as seepage of water or flowing soil into the excavation. Promptly dewater any accumulated water and reassess the trench for safety. Changing soil conditions may require adjustments to the shoring system.
 - a. All installation and removal of shoring and shielding shall be from above ground only.
 - b. Do not allow personnel to enter an excavation that is not properly shored, shielded or sloped.
 - c. Personnel shall always work within the shoring and shielding. Personnel shall not stand on the edge of an un-shored excavation.
 - d. All personnel shall enter and exit excavations only within shielded or shored areas.

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Hydraulic Aluminum Shoring - Tabulated Data

4. The tabulated data shall only be used for those soil conditions indicated. The data is not considered adequate when loads imposed by structures, equipment, traffic, or stored materials adjacent to the trench exceed the assumed design surcharge loads of 20,000 pounds, or the imposed load of a 2 ft. spoil pile located less than 2 ft. from the edge of the excavation. An engineered shoring design is required for conditions other than those assumed in the tables.
5. When only the lower portion of a trench is to be shored and the remaining portion is benched or sloped at an angle steeper than three horizontal to one vertical (3H:1V), the shoring members shall be selected from the tabulated data for use at a depth which is determined from the top of the overall trench and not the toe of the sloped portion.
6. The faces of the excavation shall be straight and near vertical. Shoring members must bear on firm soil or solid filler.
7. Trenches shall be kept dry and free of water at all times.
8. Vertical and/or horizontal lateral loads shall not be applied to the hydraulic cylinders.
9. Once cylinders are pressurized between 750 - 1500 PSI, the soil should not give and reduce the pressure within the cylinder.
10. Whole length of the trench can be shored within maximum of 4 ft. of the ends. Competent Person may decrease distance as conditions merit.
11. Plywood sheeting shall be 1.125" thick CDX or .75" thick, 14 ply, arctic birch. Note that the plywood is not intended as a structural member, but only for the prevention of local raveling or sloughing of the trench face between the shores.
12. When plywood sheeting is used, it shall extend to the top of the excavation and to within 2 ft. of the bottom of the excavation in Type A & B soils, and to the bottom of the trench in Type C-60 soils. See typical installation diagrams.
13. Plywood sheeting, as referenced throughout this tabulated data may be substituted with other engineered sheeting, such as (1) 0.75 in. thick, 14 ply, white birch - Finland Form; also known as Euro Form, Metsaform, Wisiform and Chudoform, (2) 1.125 in. thick soft plywood, (3) 0.25 in. thick steel plate, with a min. yield strength (fy) of 50,000 psi., (4) 0.3125 in. minimum thickness steel plate, with a min. yield strength (fy) of 36,000 psi., (5) 0.75 in. thick, 13 ply, plywood consisting of both hardwood and soft wood veneers, known as OMNI FORM, (6) Efficiency 2-3/4" thick or 4-9/16" thick extruded aluminum Build-A-Box or XLAP panels, (7) 0.75 in. thick Sentry Panel. Any of these sheets may be used in any combination in the same trench, either on same side or on the opposite side.

Revised: February 26, 2013 - CHANGE TWO

Classification of Soil Types

The soil descriptions for OSHA Type "A", "B", & "C" Soils are based on Appendix A to OSHA Subpart P of 29CFR Part 1926, "Excavations and Trenches". The Type "C-60" Soil referred to in Efficiency's Tabulated Data represents a more stable soil condition than the Type "C" described in Appendix A.

Type "A" Soil - Equivalent weight effect of **25 PSF** per foot of depth.

Description: Cohesive soil (i.e., clay, silty clay, sandy clay, clay loam) with an unconfined compressive strength of 1.5 TSF (tons per square foot) or greater; or cemented soils such as caliche and hardpan. No soil is Type A if the soil is fissured; subject to vibration from heavy traffic, pile driving or similar effects; has been previously disturbed; or part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater.

Type "B" Soil - Equivalent weight effect of **45 PSF** per foot of depth.

Description: Cohesive soil with an unconfined compressive strength greater than .5 TSF but less than 1.5 TSF; and granular cohesionless soils including angular gravel, silt, silt loam, sandy loam, and in some cases, silty clay loam and sand clay loam; previously disturbed soils except those which would otherwise be classed as Type C; soil that meets requirements for Type A, but is fissured or subject to vibration; dry rock that is unstable; and material that is part of a layered system where layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type "C-60" Soil - Equivalent weight effect of **60 PSF** per foot of depth.

Description: Soft cohesive to moist soil with an unconfined compressive strength less than .5 TSF; moist cohesive soil or moist dense sand which is not flowing or submerged. When cut with near vertical side walls, soil can stand with unsupported vertical sidewalls long enough for shoring installation. (see "1.c.")

Type "C-80" Soil - Equivalent weight effect of **80 PSF** per foot of depth.

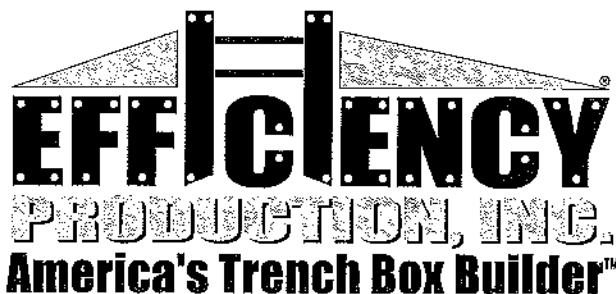
Description: Cohesive soil with an unconfirmed compressive strength of .5 TSF or less; granular soils including gravel, sand, and loamy sand; submerged soil or soil from which water is freely seeping; submerged rock that is not stable; and material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H : 1V) or steeper.

Vertical Hydraulic Shoring System:

- A. Trenches exceeding 8 ft. in length will have a minimum of 3 shores spaced according to the tables. In trenches shorter than 8 ft. in length, 2 sets of vertical shores are required at the horizontal spacing indicated in the tables.
- B. For trenches 6 ft. in depth, vertical shoring shall consist of a minimum of one single cylinder rail. The bottom or single cylinder shall be positioned no more than four ft. from the bottom of the trench and there shall be no more than two ft. from the top of the trench to the top or single cylinder. See typical installation diagrams.
- C. For trenches 6 to 10 ft. in depth, vertical shoring shall consist of a minimum of two hydraulic cylinders in each vertical plane. See typical installation diagrams.
- D. Single (cylinder) shores may be substituted for two-cylinder vertical shores. The cylinder spacing tables (page 4, page 9-top figure) must be followed.
- E. Do Not butt rails back to back across an excavation.
- F. This standard applies to both standard and rescue shores

Hydraulic Water Shoring System:

- A. Timber sheeting shall be #1 Douglas Fir with a minimum Fb = 1,500 psi, or equivalent.
- B. When timber sheeting is used in Type C soil, the maximum distance from the bottom of the excavation to the bottom wale shall be 2' - 6" unless the sheeting is over-driven into the bottom of the trench a minimum of 1 ft. If over-driven, the maximum distance to the bottom wale shall be 4 ft.. See typical installation diagrams.
- C. A minimum of 2 sets of waler rails shall be used, one above the other. A single set of waler rails does not provide adequate protection.
- D. When double hydraulic cylinders are required at one location, both cylinders must be pressurized the same to prevent the possible failure of a single cylinder.
- E. Walers shall be placed end to end where more than one is used in the horizontal direction.



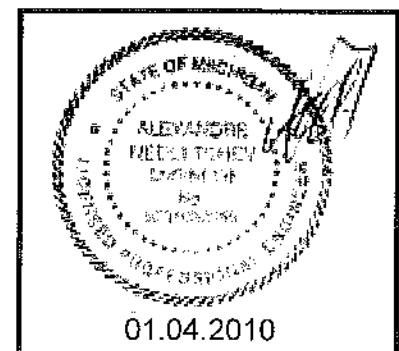
This tabulated data is applicable to any vertical hydraulic shoring system or hydraulic water shoring system manufactured by Efficiency Production, Inc. or Safe-T-Shore.

Depth of Trench (ft.) SEE NOTE 5	Max. Horizontal Shoring Spacing (ft.) SEE NOTE 6	Maximum Vertical Cylinder Spacing (ft.) SEE NOTE 1	Max. Width of Trench (ft.) Up to 12 ft. - SEE NOTE 1, 2 12-15 ft. - SEE NOTE 2, 7	Sheeting SEE NOTE 2 and:
TYPE "A" SOIL				
Up To 10'	8'	4'	12' to 15'	3
11' To 15'	8'	4'	12' to 15'	3
16' To 20'	8'	4'	12' to 15'	3
21' To 25'	8'	4'	12' to 15'	3
TYPE "B" SOIL				
Up To 10'	8'	4'	12' to 15'	3
11' To 15'	7'	4'	12' to 15'	3
16' To 20'	6'	4'	12' to 15'	3
21' To 25'	5'	4'	12' to 15'	3
TYPE "C-60" SOIL				
Up To 10'	6'	4'	12' to 15'	3
11' To 15'	5'	4'	12' to 15'	4
16' To 20'	4'	4'	12' to 15'	4
21' To 25'	3'	4'	12' to 15'	4
TYPE "C-80" SOIL				
N/A	N/A	N/A	N/A	N/A

NOTES:

- Utilize Efficiency's 2 in. diameter hydraulic cylinders with standard or heavy duty extension system as required for desired excavation width. Trenches wider than 9'-4" up to 12' (112"-144") require Efficiency's Steel Oversleeves that extend the full, collapsed width; or universal one-piece aluminum extension. Trenches 12'-1" up to 15' (145"-180") wide require Efficiency's Steel Oversleeves that extend the full, collapsed width.
- Plywood sheeting shall consist of 1.125 in. CDX plywood or .75 in., 14 ply Arctic Birch.*
- Plywood sheeting required if raveling or sloughing is likely to occur. (see installation diagrams)*
- Plywood sheeting shall be used.*
- Material can stand with unsupported vertical sidewalls long enough for shoring installation.
- Vertical shoring shall be Efficiency's Standard or Heavy Duty vertical rail sections. (see pg 6).
- Extra Heavy Duty Steel-Oversleeve Extensions Required.
- Applies to all 2 in. hydraulic cylinders, standard or with Positive Locking Device (Rescue Shores).




* See [13] of "General Information" for alternate sheeting.



The following additional certifications apply to pages 1-25 of this document, stamped by Alex Nedeltchev, P.E., on January 4, 2010.

 <p>LICENSED PROFESSIONAL ENGINEER A.V. NEDELTCHEV PROVINCE OF ONTARIO</p>	 <p>PROFESSIONAL ENGINEER ALBERTA ALEX NEDELTCHEV 01.04.2010</p>	 <p>PROFESSIONAL ENGINEER A.V. NEDELTCHEV Member 33107 01.04.2010</p>
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 <p>PROFESSIONAL ENGINEER 2010 Alexandre V. Nedeltchev 01.04.2010</p>	 <p>ORDRE DES INGÉNIEURS DU QUÉBEC Permis Temporaire / Temporary Licence Nom / Name: Alexandre Nedeltchev No. DID: PTO 1008 Valable après / Valid after: 2010-08-13 Site: DEALERSHIPS HEWITT CAT / POINTE-CLAIRE</p>	

The following additional certifications apply to pages 1-25 of this document.

		 EXPIRES 09-04-14