



Tabulated Data  
**Manhole Shores**

Revised June 1, 1999

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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.



**GME® MANHOLE SHORE  
TABULATED DATA**

**GENERAL:**

1. This data has been prepared by a Registered Professional Engineer as required 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 Manhole Shores.
3. “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.
4. All personnel involved with the use of GME Manhole Shores shall be trained in the proper use and installation procedures and other applicable safety requirements.
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. Manhole Shores shall only be used in the conditions and depths shown on the table. For other conditions, site specific designs are required.
7. GME shall not be liable for damage or injury resulting from improper use of the Manhole Shores. Improper use of or modifications to the Manhole 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 MANHOLE SHORES**

1. The sides or faces of the excavation must be near vertical to allow proper installation of the Manhole Shores. The sides of the Manhole 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.
2. The centerline of the top Manhole Shore shall be a minimum of one foot and maximum of two feet below the top of the excavation.
3. If the top of the excavation is sloped, the top of the Manhole Shore must be at least one foot below the toe of the slope.

## **SPECIFICATIONS FOR USE OF GME MANHOLE SHORES – continued**

4. If four feet o.c. spacing is utilized, the centerline of the bottom Manhole Shore shall be a maximum of four feet above the bottom of the excavation. If three feet o.c. spacing is utilized, the centerline of the bottom Manhole Shore shall be a maximum of three feet above the bottom of the excavation.
5. A minimum of two Manhole Shores are required for excavations over six feet in depth. A minimum of one Manhole Shore is required for excavations less than six feet in depth.
6. The top Manhole Shore's corner bracket shall be connected vertically to sheeting, or other vertical support, with safety chains to provide adequate alignment of the system. Each succeeding Manhole Shore shall be connected to either the sheeting or the preceding Manhole Shore corner bracket in the same manner.
7. The following materials are or an approved equal, shall be used for sheeting with the Manhole Shore:
  1. GME Aluminum Sheeting
  2. Two sheets of 3/4" thick CDX Plywood placed back to back
  3. 1 1/8" thick CDX Plywood
  4. 3/4" thick 14 Ply Arctic White Birch (Finland Form)
  5. 3/4" thick HDO - American Plywood Association, high density overlay exterior
  6. 3/4" thick Plyform - American Plywood Association B-B Class I Exterior
  7. 3/4" thick Combi Exterior Plywood
  8. 3/4" Omni Form
  9. Steel Plate 1/2" minimum thickness
  10. 2x6, 2x8, 2x10, 2x12 Timber sheeting or equivalent
  11. Steel Sheeting with a minimum section modulus of 7.08 in<sup>3</sup> / 24 in. width and a minimum yield strength of 50 ksi
8. The hydraulic cylinders shall be pumped to a minimum of 750 psi when the Manhole 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.
9. The sheeting used with the Manhole Shore 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

## **SOIL CLASSIFICATION**

1. See the OSHA regulations for descriptions of Type A, B, and C 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.
  3. Some OSHA Type C soils may not stand vertically long enough to allow the Manhole Shore to be installed. In this case, another protective system may be required, or the sheeting must be driven prior to the installation of the Manhole Shores.
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## **DESIGN CRITERIA AND LIMITATIONS**

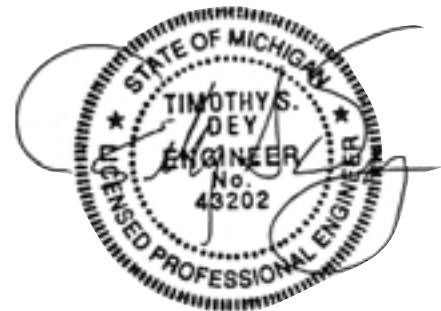
1. The tables include the effect of a three foot high spoil pile within a horizontal distance from the face of the excavation equal to the excavation's depth. Manhole Shores are not designed to support heavier surcharge loads, such as those imposed by building foundations. If Manhole Shores are used near building foundations, those foundations may need to be underpinned to prevent excessive settlement.
2. This data is valid for Manhole Shores in structurally sound condition. Any significant damage will void this data, and all manufacturers warranty. The damaged Manhole Shores shall not be used.
3. 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.
4. The excavation must be kept free of water while using the Manhole 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 Manhole Shore and to check for decreased soil stability.

## MANHOLE SHORE DEPTH TABLE

MODEL	SPAN (FT.)		MAXIMUM TRENCH DEPTH (FT.)					
	MIN.	MAX.	4 FT. O.C. VERTICAL SPACING			3 FT. O.CO. VERTICAL SPACING		
			A & B	C-60	C-80	A & B	C-60	C-80
2 MHS4-5	5	8	25	20	10	25	25	12
2 MHS 4-6	6	9	25	20	10	25	25	12
2 MHS 4-7	7	10	25	20	10	25	25	12
3 MHS 6-6	6	9	25	25	12	25	25	16
3 MHS 6-7	7	10	25	25	12	25	25	16
3 MHS 6-8	8	11	25	25	12	25	25	16
3 MHS 6-9	9	12	19	14	7	25	20	9
3 MHS 6-10	10	13	17	13	6	23	18	8
3 MHS 6-11	11	14	15	11	5	21	16	7
3 MHS 6-12	12	15	14	10	–	19	14	6
3 MHS 6-13	13	16	13	9	–	17	13	5
3 MHS 6-14	14	17	11	8	–	15	11	–
3 MHS 6-15	15	18	9	7	–	13	10	–
3 MHS 6-16	16	19	8	6	–	12	9	–
3 MHS 6-17	17	20	7	5	–	10	8	–
3 MHS 8-8	8	11	25	25	18	25	25	20
3 MHS 8-9	9	12	25	25	16	25	25	20
3 MHS 8-10	10	13	25	25	14	25	25	19
3 MHS 8-11	11	14	25	25	12	25	25	16
3 MHS 8-12	12	15	25	23	10	25	25	14
3 MHS 8-13	13	16	25	20	9	25	25	12
3 MHS 8-14	14	17	23	17	8	25	23	11
3 MHS 8-15	15	18	20	15	7	25	20	10
3 MHS 8-16	16	19	18	13	6	24	18	8
3 MHS 8-17	17	20	16	12	5	21	16	7
3 MHS 8-18	18	21	14	10	–	19	14	–
3 MHS 8-19	19	22	12	9	–	16	12	–
3 MHS 8-20	20	23	11	8	–	15	11	–
3 MHS 8-21	21	24	10	7	–	14	10	–

**NOTE:**

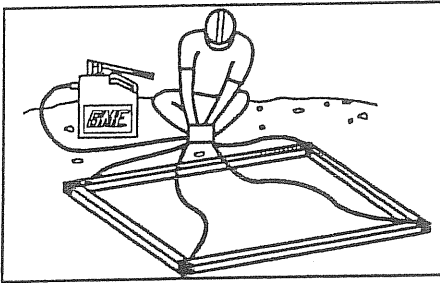
1. For unequal leg lengths in rectangular shaped excavations, find the maximum depth of the longest leg.
2. The first digit of the model number denotes the diameter, in inches, of the hydraulic cylinder required.  
The fifth digit of the model number indicates the size in inches, of the steel box tubing used as the outer sleeve.





# MANHOLE SHORING INSTALLATION & REMOVAL INSTRUCTIONS

1. Select the appropriate hose bridle manifold for the job. (Example: A four-way manifold for a Manhole shore with four hydraulic cylinders.)

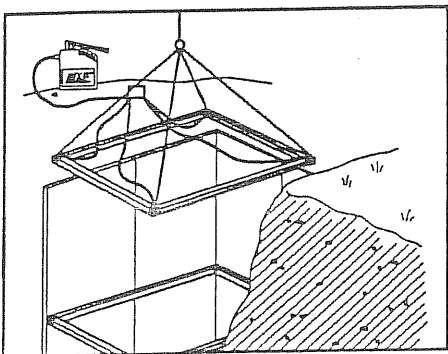


2. Connect the female end of the manifold to the quick disconnect fittings on the cylinders. Care should be taken at this point to make sure that you have a good connection. You should also note which 1/4 turn valve on your manifold is connected to which hydraulic cylinder. **HINT: Gather four colors of tape, one for each cylinder hose. Tape a 2" piece at the top of the hose, just below the 1/4 turn valve. Then take another 2" piece and tape the bottom of the hose, just above the female coupler. This will indicate which 1/4 turn valve, controls which cylinder.**

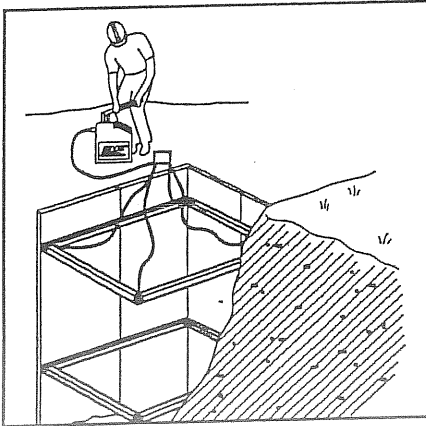
3. It is time to check the manifold for proper valve alignment.
  - A. Inlet valve on manifold should be open and connected to the pump bucket.
  - B. Valves for the cylinder hoses should be open.
  - C. Discharge valve in the middle of the manifold should be closed.
  - D. The return valve on the pump bucket should be closed.

**HINT: Valves are open when they are in line with the hoses.**

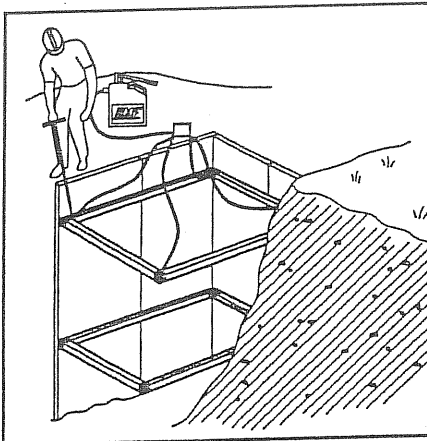
4. Connect the lifting sling to the Manhole Shore lifting eyes, on all four corners.
5. Lower the Manhole Shore into the excavation in its proper position. (Remember to space the Manhole Shore according to the Manufacturer's Tabulated Data.)



6. Manhole Shore should be expanded to the size of a few inches narrower than the excavation. Remember to leave room for sheeting.
7. Position the sheeting around the excavation between the Manhole Shore and the excavation side walls.
8. Expand the Manhole Shore out evenly to the side wall of the excavation. Use the manifold to open and close the appropriate cylinders, which need to be expanded.



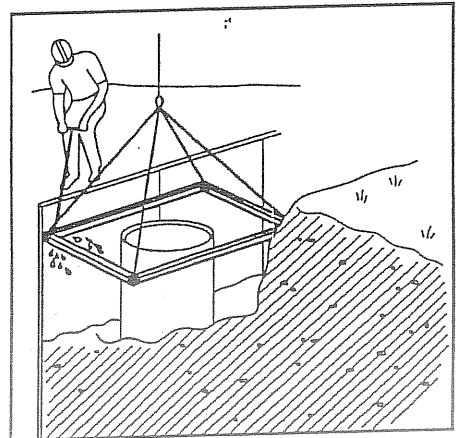
9. Pump the Manhole Shore to approximately 750 PSI, as indicated by the gauge on the pump bucket.
10. After setting the pressure to 750 PSI, allow the system to set for one minute. Then check to see if the pressure gauge is still in the green zone. If it is, proceed to the next step. If it isn't, re-apply pressure until you reach 750 PSI. Then check the gauge again.



11. Using the Manhole Shore release tool, disconnect the hoses from the cylinders.
12. Release the pressure from the pump and manifold assembly by opening the 1/4 turn valve on the pump bucket.
13. Reconnect the manifold assembly to the next Manhole Shore to be installed.

14. Lower the next Manhole Shore into the excavation. If the Manhole Shore is to be positioned below the existing Manhole Shore, care should be taken to insure that the Manhole Shore being installed is narrower than the one in the excavation, to allow passage.
15. Repeat the above steps until all the Manhole Shore units are installed and the excavation is properly shored.

## REMOVAL



1. Connect the lifting sling to all four corners on the bottom Manhole Shore.
2. Using the Release Tool, release the pressure in the cylinders. While you are releasing the pressure, pay close attention to the ground that you are standing on for movement of the soil. If there is no movement of the soil, continue to release the pressure until the Manhole Shore is away from the side walls of the trench.
3. Remove the bottom Manhole Shore by passing it through the next existing unit in the trench. Repeat this procedure until all the Manhole Shores are out of the trench.

**NOTE: This procedure is to be used along with GME Manufacturer's Tabulated Data to establish minimum spacing requirements.**



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