SPEED SHORE TECHNICAL DATA SHEET
NUMBER : SS 011492

Subject: C-60 SOIL CLASSIFICATION; IT'S USE AND IMPORTANCE

History of O.S.H.A. soil classifications :
The present O.S.H.A. soil classification system is based on a study by the National Bureau of Standards titled: Soil Classification For Construction Practice In Shallow Trenching, N.B.S. Building Science Series 121, which was prepared specifically for O.S.H.A. Also considered were the comments of engineers and contractors during the review period of the latest excavation regulation. Both the N.B.S. study and the comments of engineers and contractors indicated the need for a four part classification of soils rather than the simplified three part classification system that O.S.H.A. adopted.

The three O.S.H.A. soil classifications are each a range of soil stability conditions with Type C being the widest range, and the least stable. Soon after the present regulation went into effect it became apparent that Speed Shore Corporations Manufacturer's Tabulated Data would make shoring safer and more economical if a soil classification from least stable Type B soil to middle range Type C were added instead of designing all Type C soil shoring for the least stable condition. The following Type C-60 definition was developed.

Speed Shore definition of Type C-60 soil :
C-60 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 shoring 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.

Speed Shore's check list for Type C-60 soil :
Included with this Technical Data Sheet is a check list to help the Competent Person determine if job site soil conditions fit into the C-60 soil classification.

Other definitions and use of C-60 soil classification :
The Trench Shoring and Shielding Association and the major manufacturers of shoring and trench shields have either defined a Type C-60 soil classification or have limited their tabulated data to a Type C soil that is comparable to Speed Shore's Type C-60.

Reference Material :
Speed Shore Corporation has on file a report by Robert C. Davis, Ph.d., P.E., Senior Geotechnical Engineer with Trinity Engineering Testing Corporation, in which he concludes that Speed Shore's C-60 soil check list is in agreement with the O.S.H.A. Excavation regulation and the N.B.S. study 121. This report is on file and available from Speed Shore Corporation.

Also, recommended reading is the National Bureau of Standards, Building Science Series 121, Soil Classification For Construction, pages 12 through 17, and 38 through 54, and the Federal Register, vol. 54, no. 209, October 31, 1989 - Excavations ; pages 45936 through 45942.

Discussion :
Several decades of good safe field practice has shown that if the excavation will stand long enough to get the shoring safely into place, the shores will support the lateral earth pressures. If the soil is flowing or submerged it must be supported with sheet piling or caissons.

The N.B.S. study 121 has tables on pages 41, 49, and 53 showing that granular soils that are not flowing or submerged are Type B, and have an equivalent weight effect (w_e) of 40 p.c.f. or less, and only a very soft clay would have an equivalent weight effect of more than 60 p.c.f. The very soft clays with an equivalent weight effect higher than 60 p.c.f. will not stand vertical long enough to place the shoring. For a very soft clay to develop an equivalent weight effect in the 80 p.c.f. range, it will have to be about 20 ft. deep.

If a sand is very dry and has no clay, silt or cementing material, it will be a flowing sand and will not stand vertical long enough to shore.

On pages 53 and 38, the N.B.S. study 121 states that "Analysis of traditional timber shoring leads to the conclusion that actual field conditions for shallow trenches produce pressures which are much lower than those predicted by analysis" and "N.B.S. study of widely used conventional timber shoring indicated that it could not resist the pressures calculated by present engineering practice".

This discussion applies to lateral earth pressures for the design of shoring and does not apply to sloping.

Conclusion :
Each excavation should be studied to determine if it is Type A or B soil. If it is not Type A or B, and it will stand vertically long enough to place the shoring, it fits the Type C-60 classification.

For further review of Type C-60 soil, contact the Engineering Staff of the Speed Shore Corporation.

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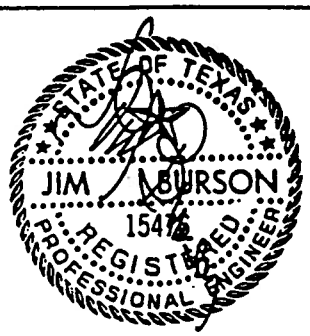

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C-60 SOIL CLASSIFICATION CHECKLIST

This check list is a supplement to Speed Shore Corporation's Manufacturer's Tabulated Data.

Complete the check list, and if all of the answers are yes, the soil is classified as C-60 and Speed Shore's vertical shores and shoring shields may be selected from the appropriate C-60 table and column. If any of the answers are no, another method of excavation protection may be required.

1. Has it been determined that soil is not O.S.H.A. type A or B? YES ☐ NO ☐
2. The soil is a moist cohesive or a moist dense granular material. YES ☐ NO ☐
3. The soil is not flowing. YES ☐ NO ☐
4. The soil is not submerged. YES ☐ NO ☐
5. Can the excavation be cut with near vertical sides? YES ☐ NO ☐
6. Will the excavation stand long enough for the shoring to be safely and properly installed? YES ☐ NO ☐
7. Do the hydraulic cylinders push against firm soil and hold at fixed extension? YES ☐ NO ☐
8. There is no deterioration of the excavation wall around or below the shoring? YES ☐ NO ☐
9. There are no site conditions (such as existing utilities, vibrations or surcharge loadings) in the immediate area around the excavation that cause the excavation face to be unstable and flow around the shoring. YES ☐ NO ☐
10. The site conditions are being continually monitored by the competent person for signs of deterioration? YES ☐ NO ☐

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OSHA SOIL CATEGORIES
including C-60 SOIL DESIGNATION

DECREASING ORDER OF STABILITY ⟶

	STABLE ROCK	TYPE A	TYPE B	TYPE C-60	TYPE C
EQUIVALENT FLUID PRESSURE	0	25	45	60	80
DESCRIPTION	Natural solid mineral material	Cohesive soil or cemented soil	Cohesive soil or stable granular soil	Will stand when cut	Running or flowing soil