

# SOILS — FROST

**FROST ACTION SOILS:** \* Soils subject to frost action are well-graded soils containing more than 3 per cent by dry weight of particles less than 0.02 mm. (0.0008 inch) in size, and uniformly graded soils containing more than 10 per cent of particles less than 0.02 mm. in size. See Fig. B.

**GENERAL:** To prevent frost damage, the combined thickness of pavement and non-frost action base should be equal to the average depth of frost penetration as shown in Fig. A except as limited by Table C below.

Plasticity Index should be less than 6, preferably non plastic and liquid limit less than 25 if soils are not subject to frost damage.

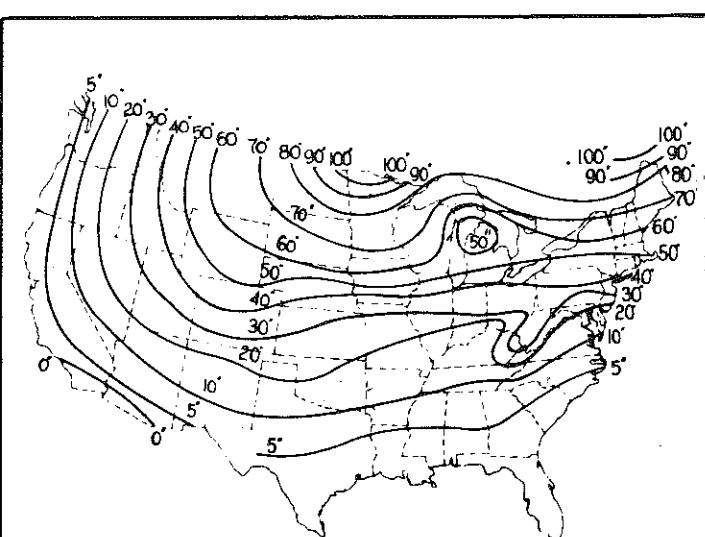


FIG. A: MAXIMUM FROST PENETRATION IN INCHES<sup>®</sup>  
USE FOR FOUNDATIONS

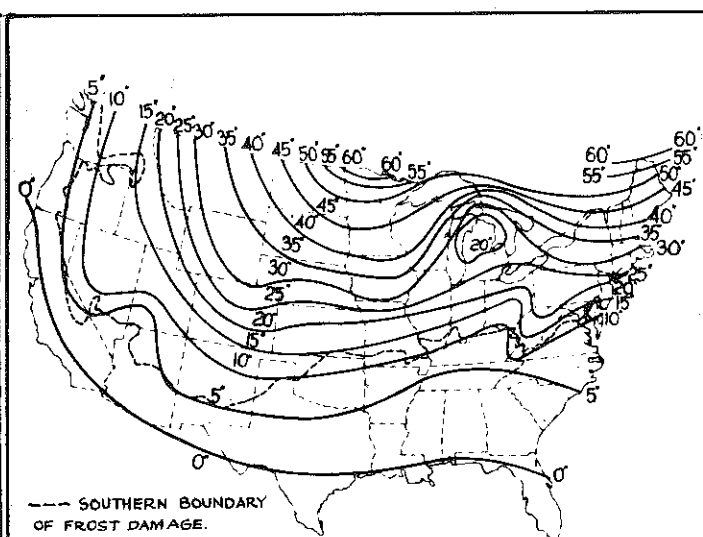


FIG. A': AVERAGE ANNUAL FROST PENET. & SO. LIMIT OF FROST DAMAGE<sup>®</sup>  
USE FOR HIGHWAY SUBGRADE

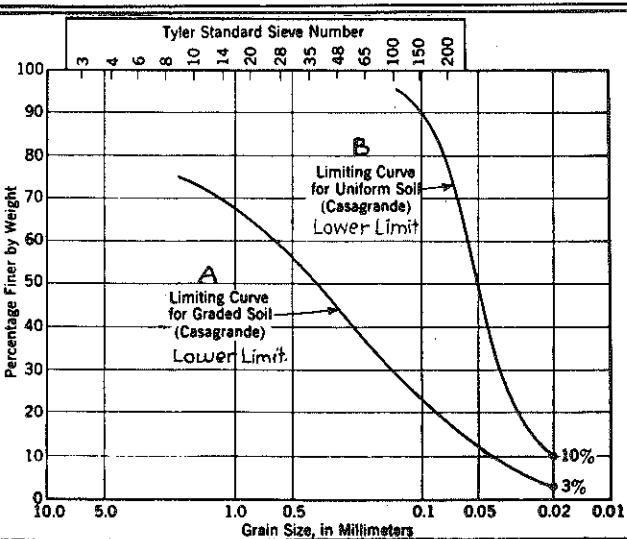


FIG. B: LIMITING CURVES FOR NON-FROST HEAVING SOILS (AFTER CASAGRANDE).<sup>†</sup>

See explanation for use of chart at right.

Adopted from: Aviation Engineers Manual, 1944.

Board 1943 Proceedings D.J. Belcher.

TABLE C - MAXIMUM REQUIRED THICKNESS IN INCHES OF FLEXIBLE PAVEMENT AND NON-FROST ACTION BASE<sup>®®</sup>

DESIGN WHEEL LOAD (POUNDS)	FINENESS OF SUBGRADE-% PASSING SIEVE NO. 200		
	OVER 25%	10 - 25%	UNDER 10%
15,000 and under	24 in.	20 in.	15 in.
40,000	38 "	26 "	26 "
60,000	46 "	38 "	32 "
150,000	72 "	60 "	48 "

## USE OF FIG. B.

Plot curve for soil in question on Fig. B. If the curve is close to curve A, the 3% limit for dry weight of particles less than .02 mm. is to be used. If the curve is close to curve B, the 10% limit shall be used. The Highway Research Board recommends all soils containing more than 8% by weight of particles, finer than 200 mesh, be considered as soils subject to frost action.

\*\* C.A.A. Design Manual. \*\*\* Highway Research Civil Engineering, Vol. 12. © U.S. Weather Bureau, 1951. War Dept. C.E.