Shrinkage

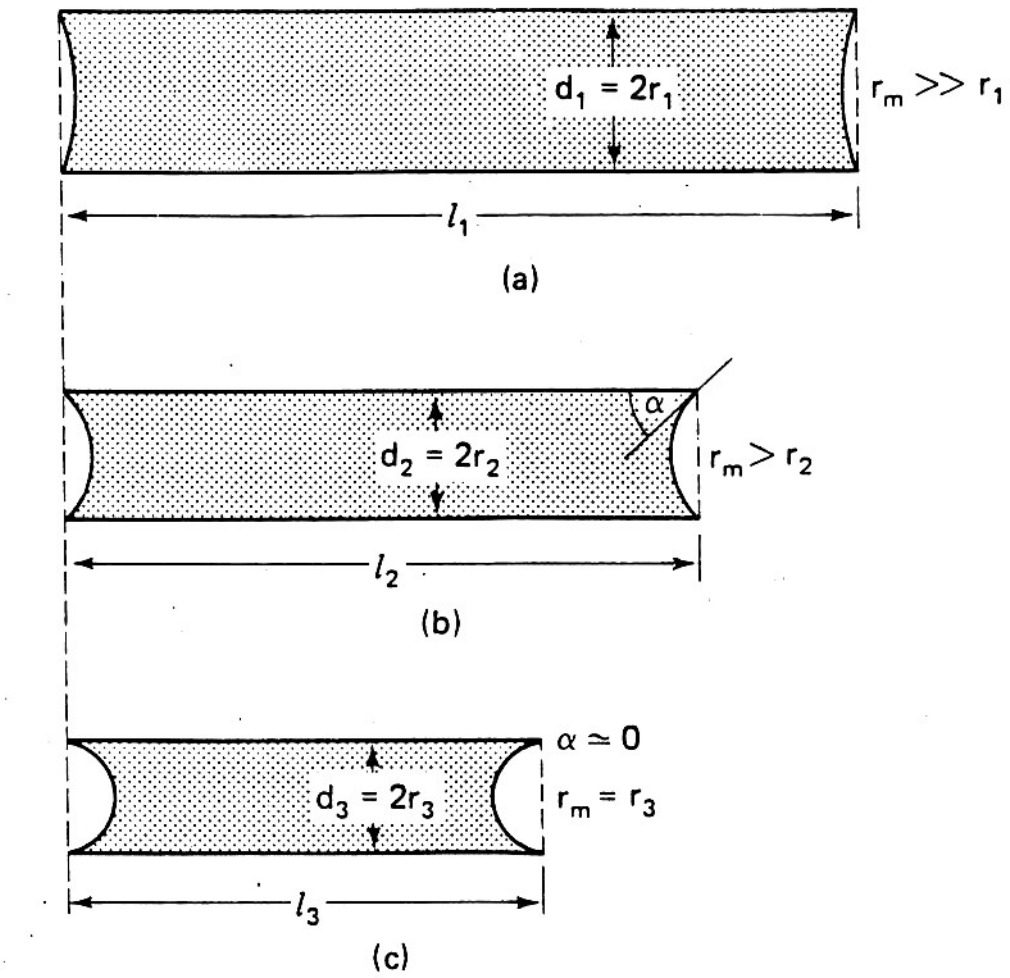
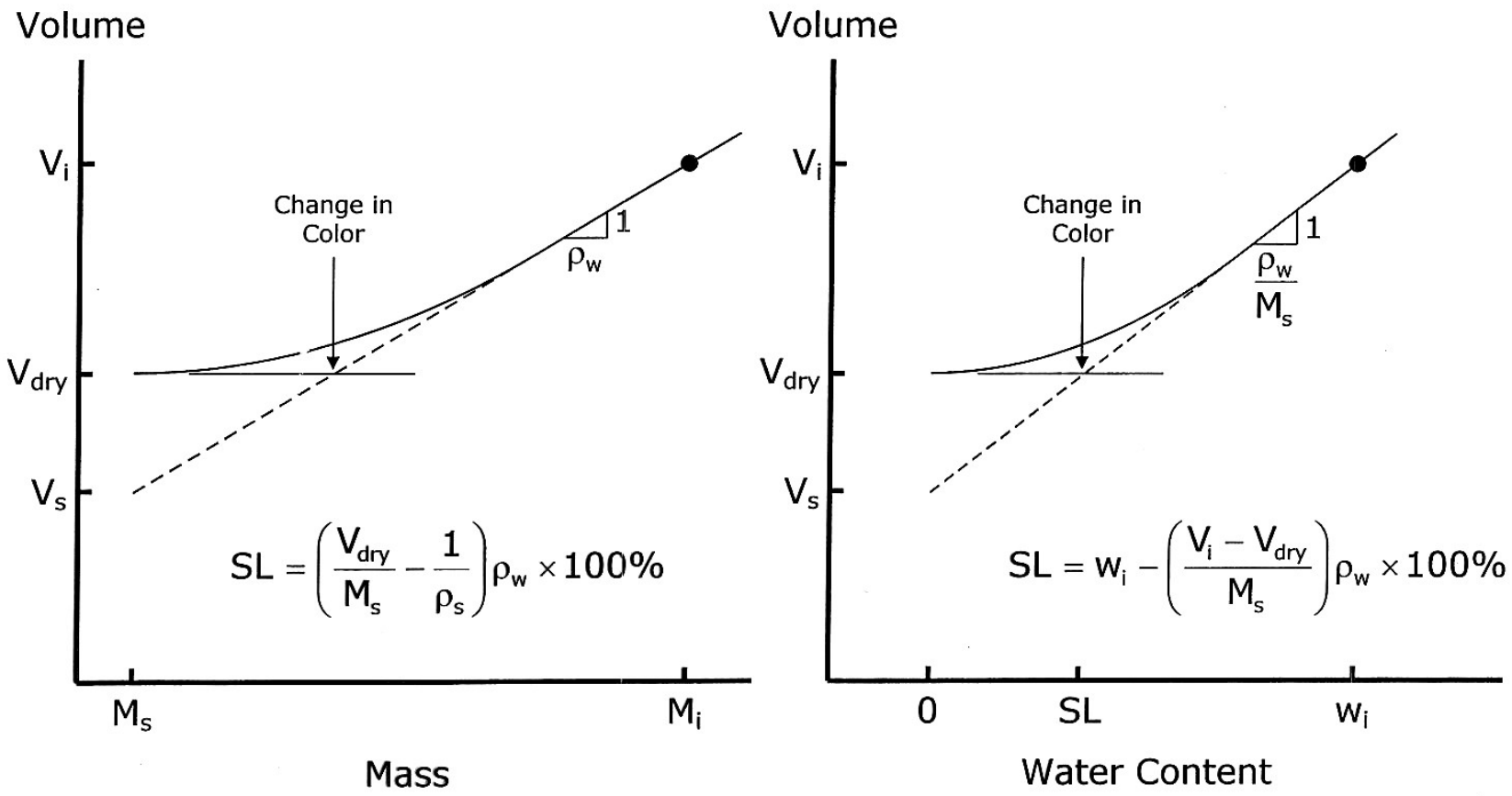
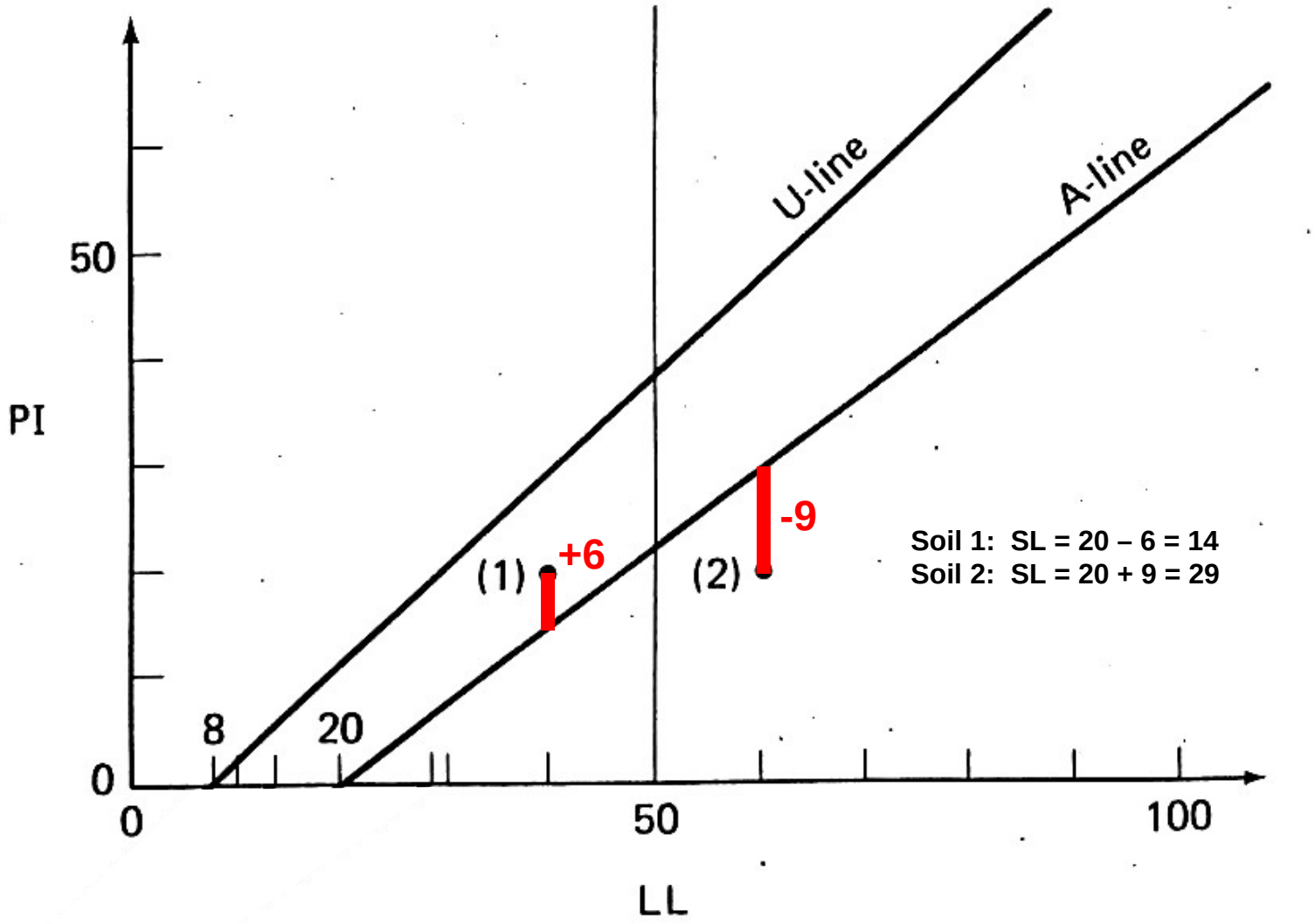


Fig. 6.8 Compressible elastic capillary tube shrinking due to evaporation and surface tension (after Terzaghi, 1927).

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)



(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)



(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)

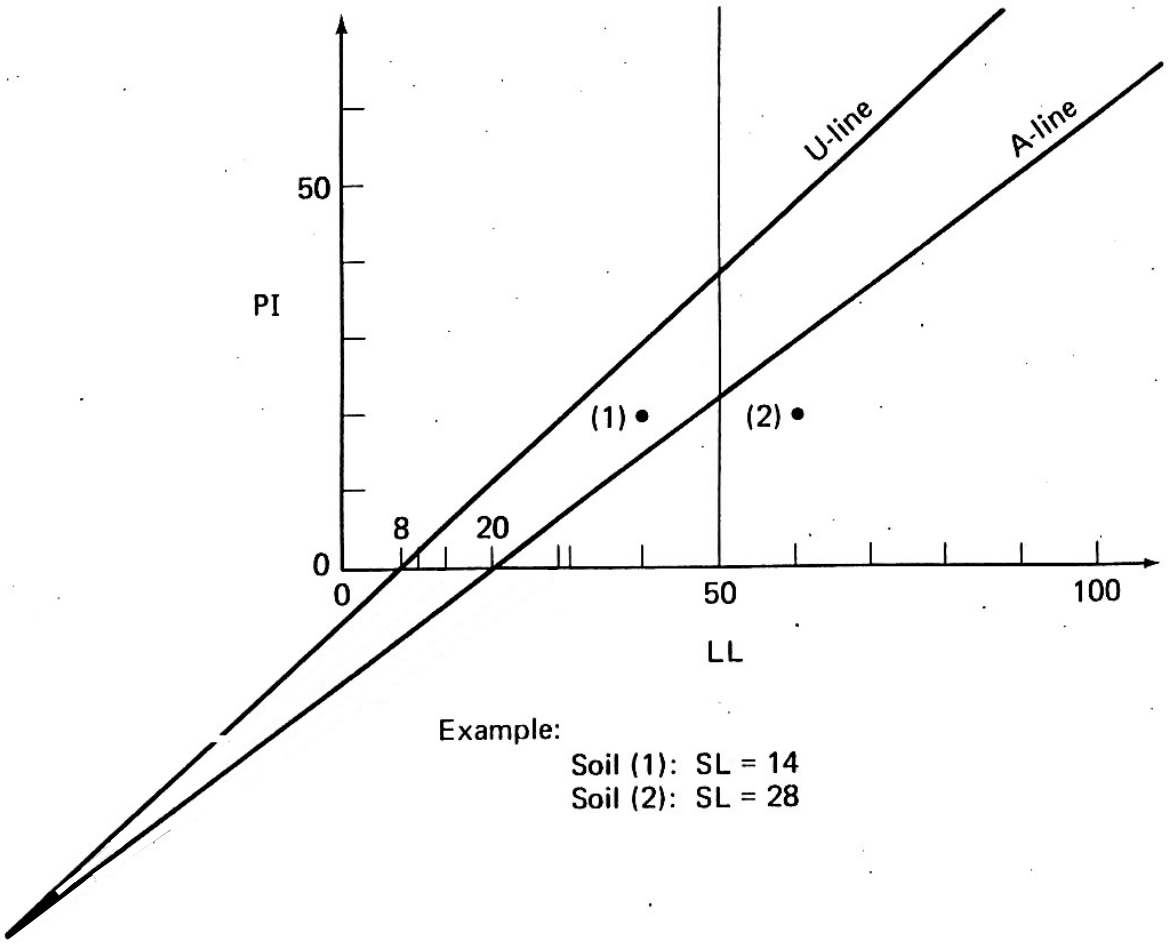


Fig. 6.12 Casagrande's procedure for estimating the shrinkage limit.

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)

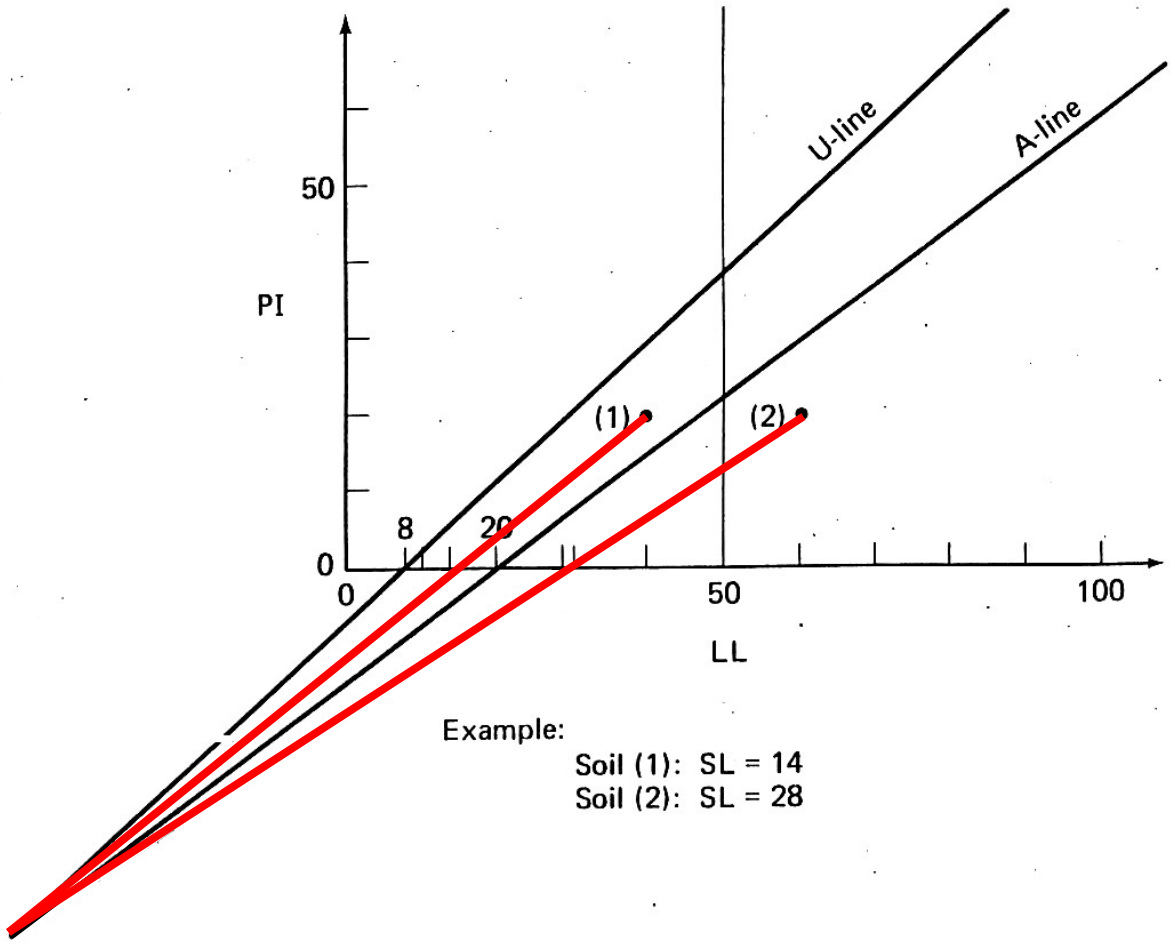


Fig. 6.12 Casagrande's procedure for estimating the shrinkage limit.

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)

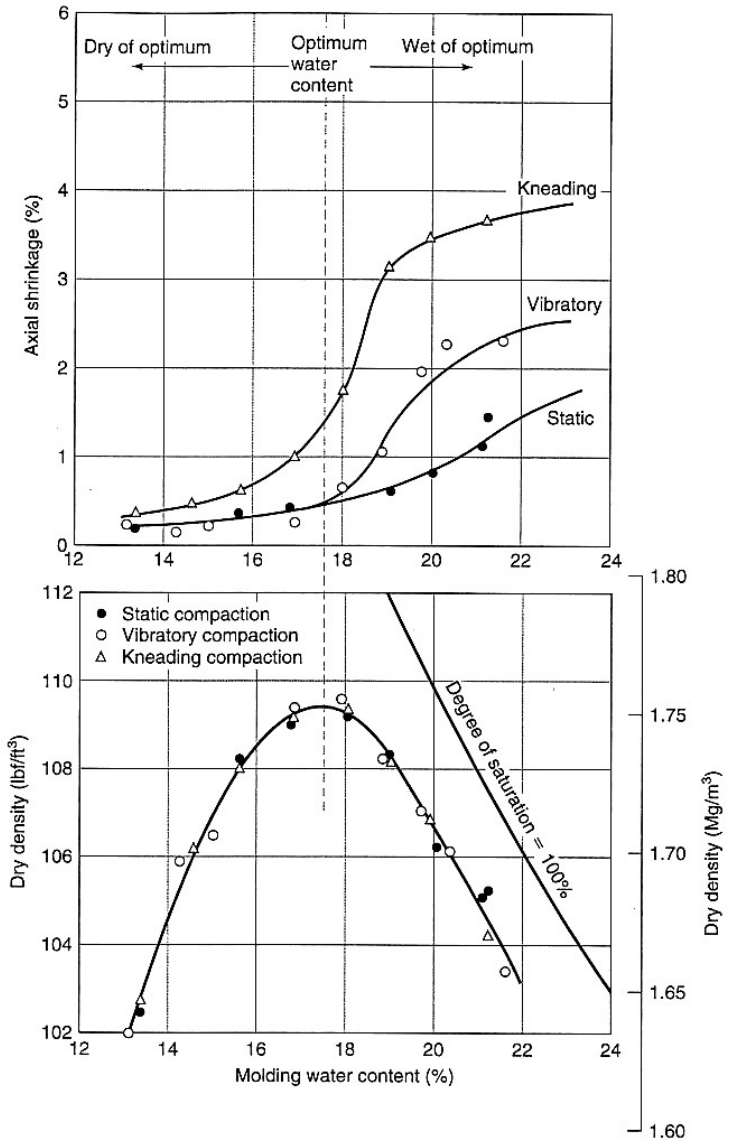


FIGURE 6.15 Shrinkage as a function of water content and type of compaction (after Seed and Chan, 1959).

(Holtz, Kovacs, and Sheahan, *An Introduction to Geotechnical Engineering*, 2011)

Swelling

TABLE 6-2 Probable Expansion as Estimated from Classification Test Data*

Degree of Expansion	Probable Expansion as a % of the Total Volume Change (Dry to Saturated Condition)†	Colloidal Content (% −1 μm)	Plasticity Index, PI	Shrinkage Limit, SL
Very high	> 30	> 28	> 35	< 11
High	20–30	20–31	25–41	7–12
Medium	10–20	13–23	15–28	10–16
Low	< 10	< 15	< 18	> 15

*After Holtz (1959) and U.S.B.R. (1974).
†Under a surcharge of 6.9 kPa (1 psi).

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)

$\frac{PI}{Percent\ clay\ sizes}$

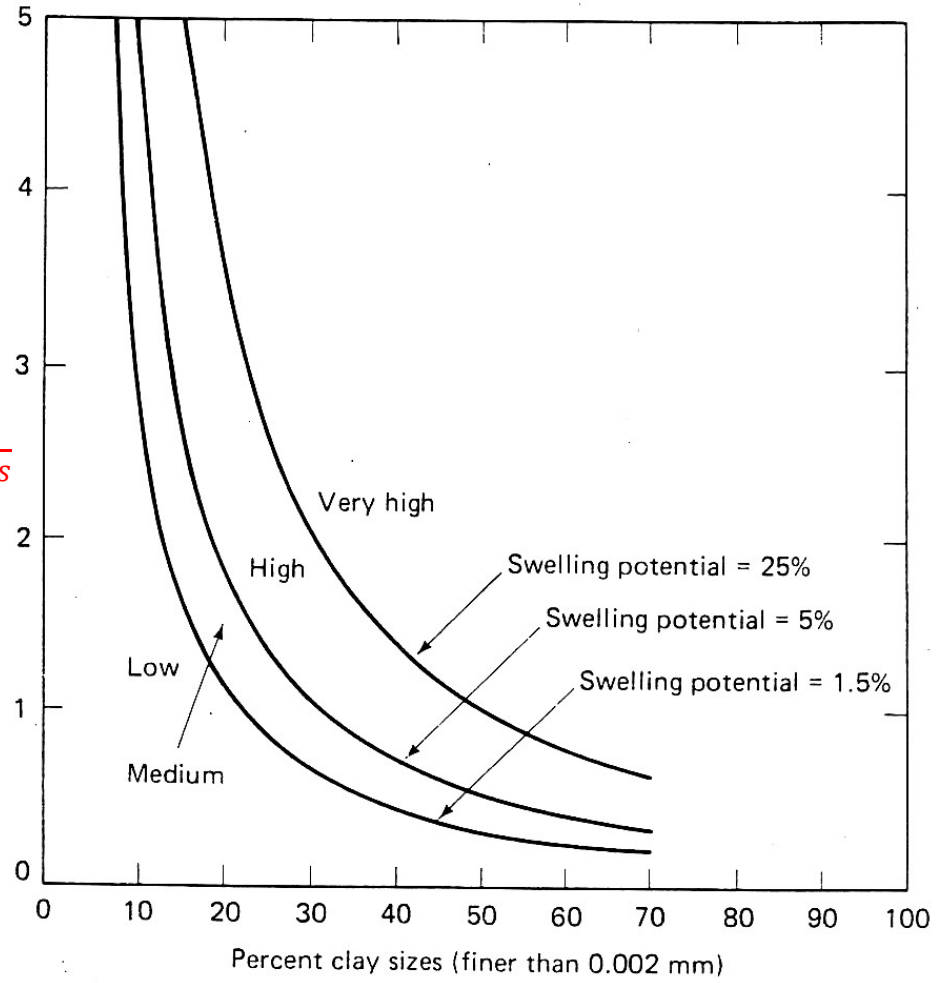
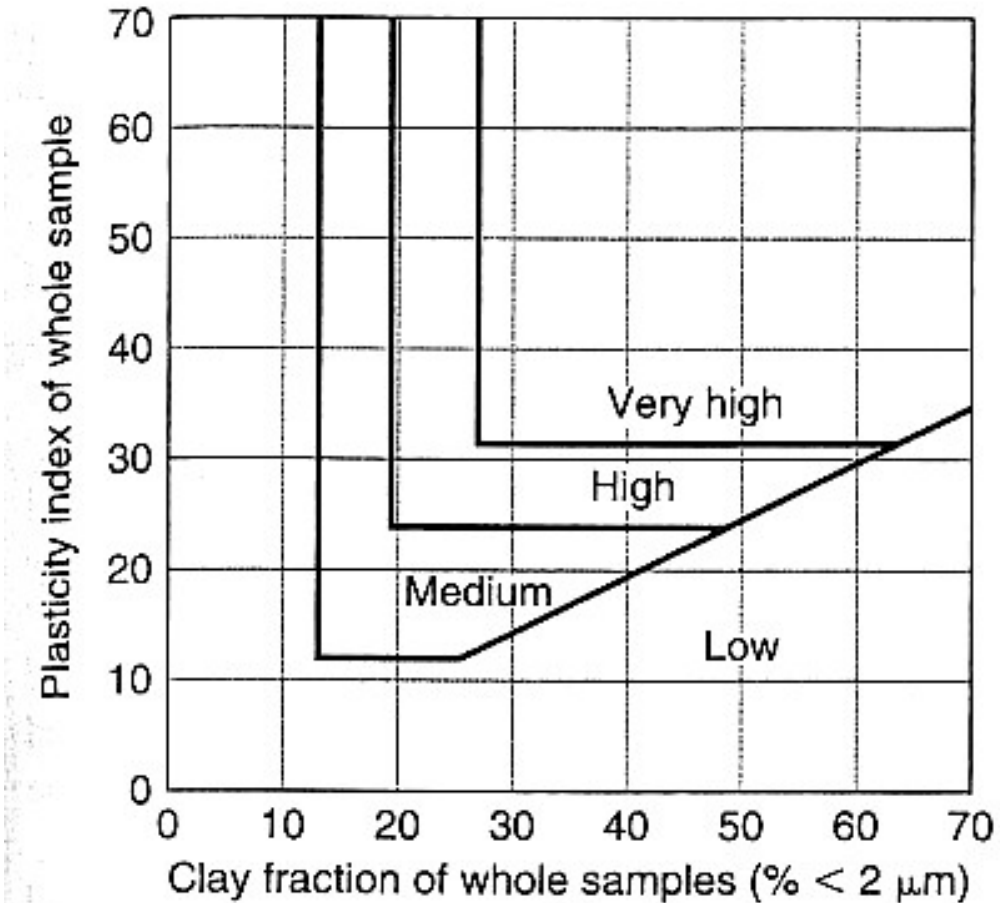


Fig. 6.15 Classification chart for swelling potential (after Seed, et al., 1962).

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)



(Holtz, Kovacs, and Sheahan, *An Introduction to Geotechnical Engineering*, 2011)

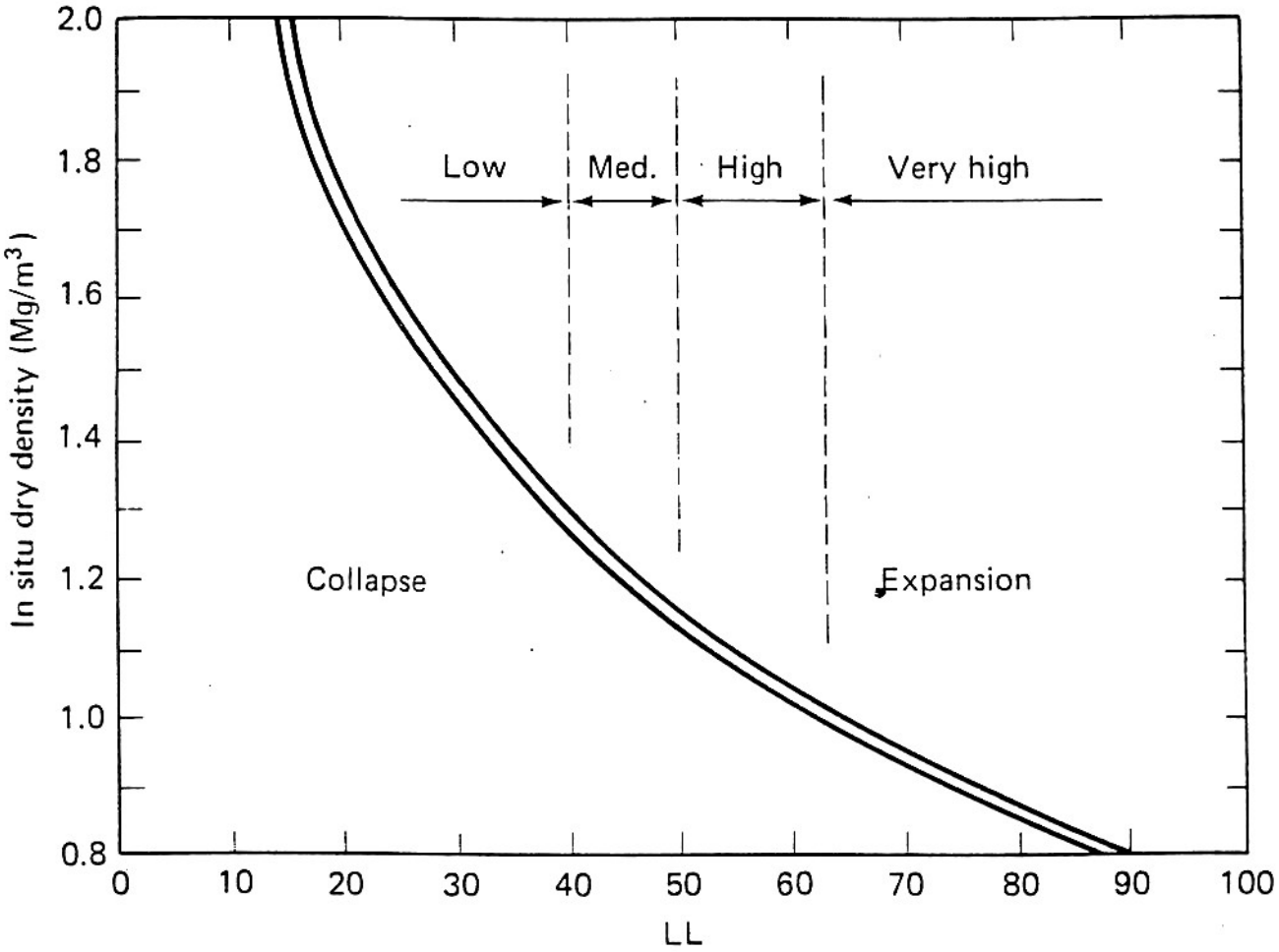
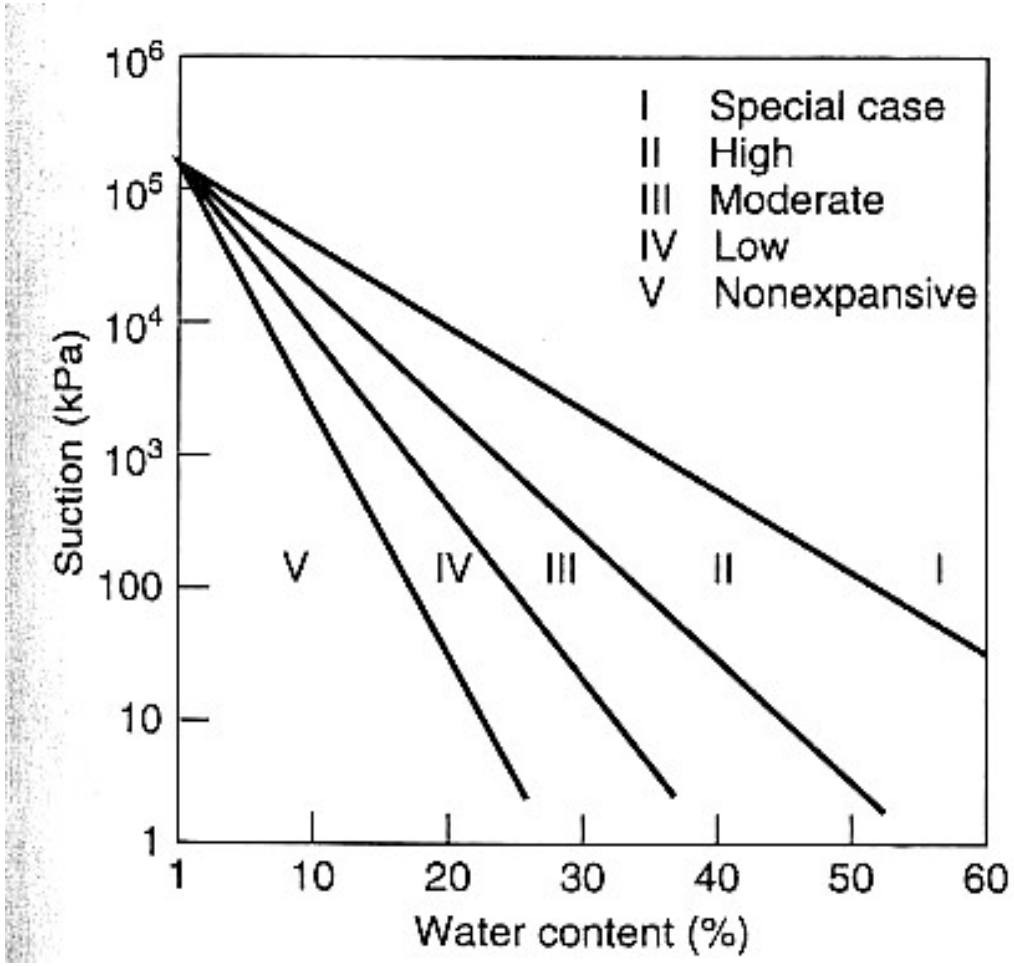
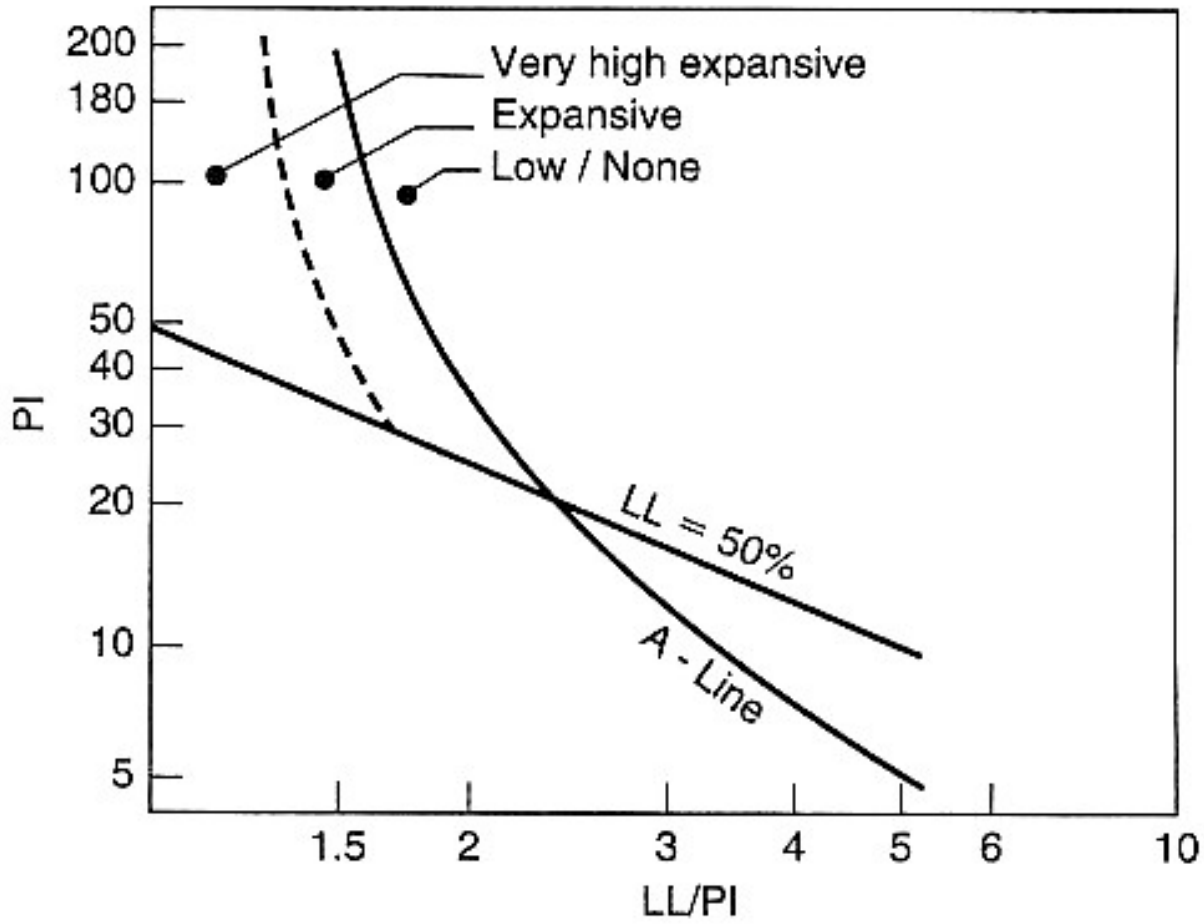


Fig. 6.14 Guide to collapsibility, compressibility, and expansion based on in situ dry densities and the liquid limit (adapted from Mitchell and Gardner, 1975, and Gibbs, 1969).

(Holtz & Kovacs, *An Introduction to Geotechnical Engineering*, 1981)



(Holtz, Kovacs, and Sheahan, *An Introduction to Geotechnical Engineering*, 2011)



(Holtz, Kovacs, and Sheahan, *An Introduction to Geotechnical Engineering*, 2011)

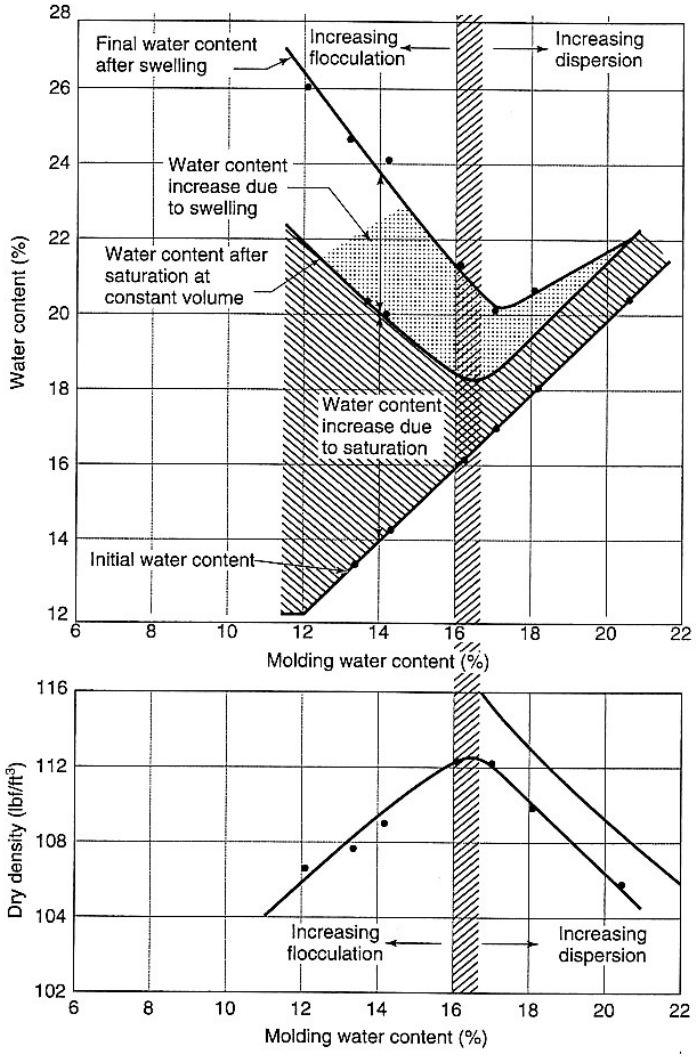


FIGURE 6.19 Influence of molding water content and soil structure on the swelling chartacteristics of a sandy clay (Seed and Chan, 1959).

(Holtz, Kovacs, and Sheahan, *An Introduction to Geotechnical Engineering*, 2011)