

Soil Classification

1. Scope:

This procedure is for classifying soils and aggregate.

2. Apparatus:

2.1 For sieve analysis see SD 202.

2.2 For mechanical analysis (Colloid) see SD 102.

2.3 Liquid limit and plasticity index see SD 207.

3. Procedure:

3.1 Field Classification.

- A. Obtain the sieve analysis in accordance with SD 202 and the liquid limit and plasticity index in accordance with SD 207.
- B. With the required data from SD 202 and SD 207, determine the classification from the chart, figure 1.
- C. Enter the chart from the left and proceed to the right. The first group which the test data fits is the correct group classification.
- D. A-7 group only. To determine the subgroup of A-7 soil, use the following:

- (1) Subtract 30 from the liquid limit of the soil. If the P.I. is equal to or less than the L.L. minus 30, the subgroup is A-7-5.

If the P.I. is greater than the L.L. minus 30, the subgroup is A-7-6.

Examples:

L.L. = 43 P.I. = 11

L.L. $43 - 30 = 13$

The P.I. of 11 is less than 13; therefore, the subgroup is A-7-5.

L.L. = 43 P.I. = 15

L.L. $43 - 30 = 13$

The P.I. of 15 is more than 13; therefore, the subgroup is A-7-6.

E. Determination of Group Index.

- (1) The following must be known to determine the group index: The percent passing the #200 sieve, liquid limit and plasticity index.

Example:

Soil type A-6	
Percent passing the #200	= 65
Liquid limit	= 32
Plasticity index	= 13

- (2) The group index is the sum of the values determined from figure 2. and figure 3.

- (3) Enter figure 2. with 65 percent passing the #200 and a liquid limit of 32.

Follow the line for 65 percent passing the #200 up to the line marked L.L. 40 or less. This will give you a value of 6.

- (4) Using figure 3, enter the chart on the line marked passing the #200, 55 or more.

- (5) Follow the line marked 55 to the point (By interpolation) for a P.I. of 13. This will give a value of 1.

- (6) Total the values obtained from figure 2. and figure 3.

$$6 + 1 = 7$$

The group index is 7.

3.2 Central Laboratory.

- A. The sieve analysis may be taken from SD 102 or SD 202.
- B. The procedure in the Central Laboratory is the same as shown in paragraph 3.1.
- C. The Central Laboratory will also determine the textural classification from figure 4.
- D. To use this chart, obtain the percent clay and percent silt from the colloid test, SD 102.
- E. Enter the chart with the known percent clay and percent silt, where the lines cross is the textural classification.

4. Report:

Report the gradation, liquid limit, plasticity index and soil classification on a DOT-3.

5. References:

AASHTO M145
SD 102
SD 202
SD 207
DOT-3

CLASSIFICATION OF HIGHWAY SUBGRADE MATERIALS (With suggested subgroups)												
General Classification	Granular Materials (35% or less passing the #200)							Silt-Clay Materials (More than 35% passing the #200)				
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6	
Sieve Analysis Percent Passing:												
#10	0-50		51-100 0-10	0-35	0-35	0-35	0-35			36-100	36-100	36-100
#40	0-30											
#200	0-15											
Characteristics of fraction passing #40												
Liquid Limit Plasticity Index	0-6		N.P.	0-40 0-10	41+ 0-10	0-40 11+	41+ 11+	0-40 0-10	41+ 0-10	0-40 11+	41+ 11+	
Group Index	0		0	0		0-4		0-8	0-12		0-16	
Usual Types of Significant Constituent Materials	Stone Fragments, Gravel, & Sand			Fine Sand		Silty or Clayey Gravel & Sand			Silty Soils		Clayey Soils	
General Rating As Subgrade	Excellent to Good						Fair to Poor					

Figure 1

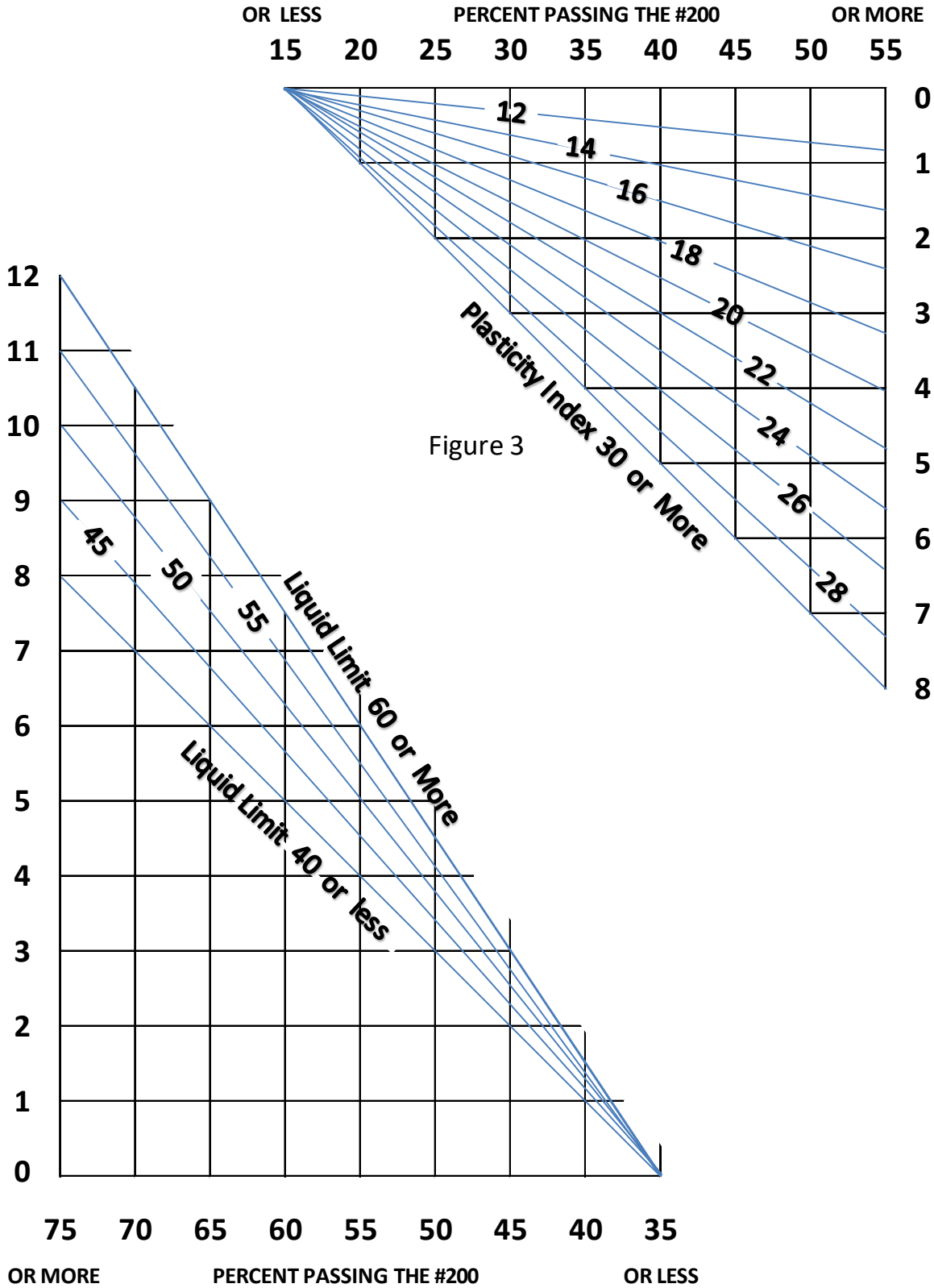
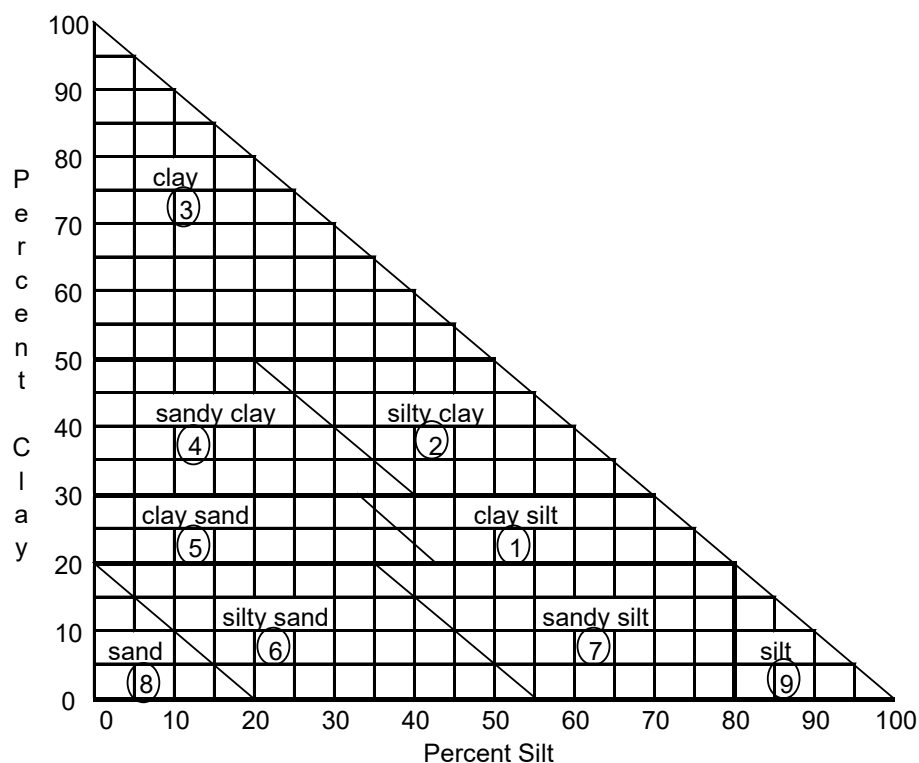


Figure 2

Figure 3

TEXTURAL CLASSIFICATION CHART



- 0% - 19% retained #10 sieve = Use fine classification (1) thru (9).
- 20% - 49% retained #10 sieve. Use fine classification determined from the minus #10 sieve analysis (soil textures 1 thru 9). Add the word "Gravelly" ahead of the fine classification (i.e. Gravelly sand). Use the fine classification (1) thru (9) on the soils profile.
- 50% - 84% Retained #10 sieve = Clayey, silty or sandy gravel. (10) Soil texture indicated on soil profile
- 85% - 100% retained #10 sieve = Gravel (10).

SOIL LEGEND


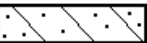
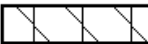
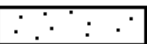
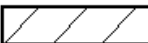
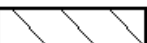
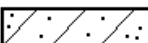
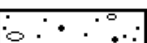
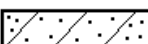
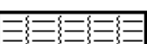
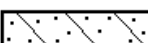
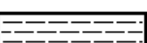
①  clay silt	⑦  sandy silt
②  silt clay	⑧  sand
③  clay	⑨  silt
④  sandy clay	⑩  gravel
⑤  clay sand	⑪  soft shale (Textural classification is clay)
⑥  silty sand	⑫  hard shale (Textural classification is clay)

Figure 4