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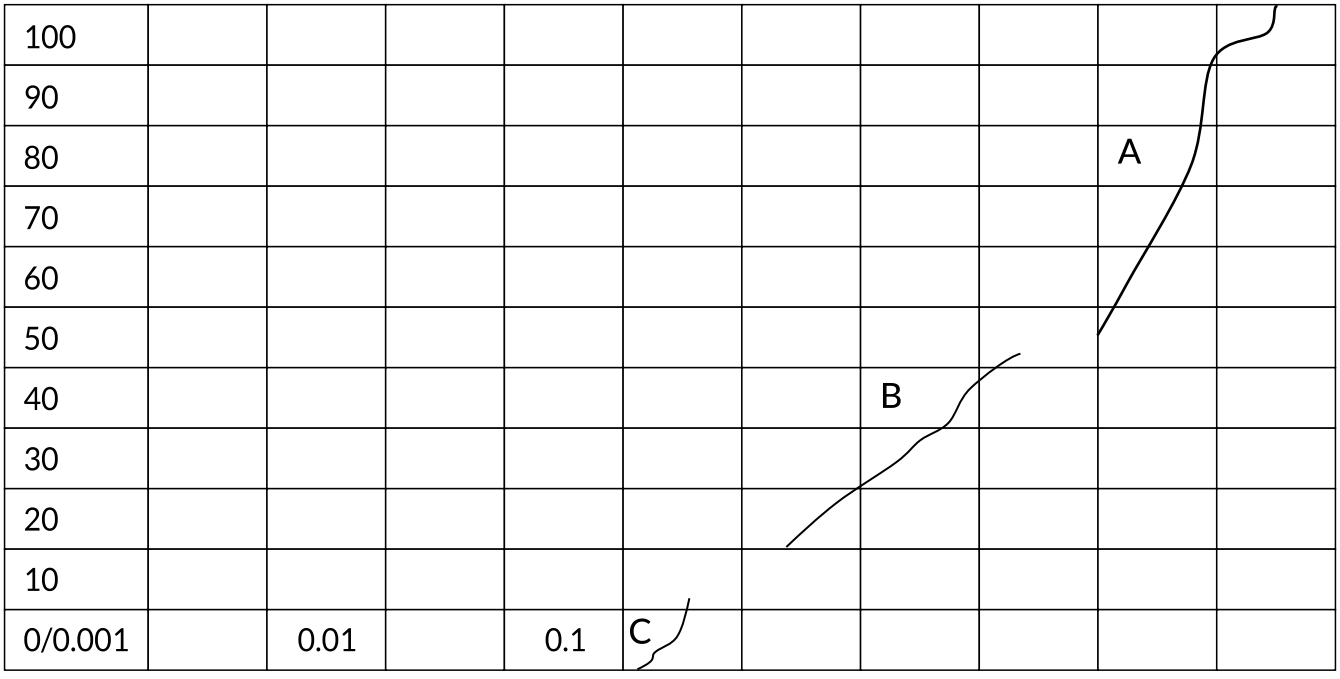
The objective of this paper is to determine the range of particle sizes and to classify the soil. This means that a sieve analysis of a granular soil should be carried out. A sieve analysis is also called gradation test; it is usually applied to define the particle size distribution of relevant materials. In the present case this substance is the granular soil. The classification process was carried out according to BS 5930. A granular soil is classified according to its particle size distribution.

To successfully complete this task, it is necessary to use the relevant data; the values required are as follows: BS test sieve, mass retained, percentage retained (m/m1), and cumulative percentage passing.

In order to accurately define the particle distribution size, the soil should be passed through a series of sieves of decreasing mesh sizes; the weight of soil should be recorded after each step of this process. The grading curve for the soil presented below helps to indicate the range of particle sizes within the soil.

Percentage passing – y-axis

Figure 1



Particle size (mm) – x-axis

A is the presentation of the range from 75mm to 20 mm, B – from 14 mm to 1,18 mm, and C - 850μm to 63 μm. If the curve is smooth, the soil is well graded; its symbol is W (A and B in the Figure 1). Curve C indicates a poorly graded soil with the symbol P.

This grading curve allows to conduct the soil description (Classification of Soils 2010). In order to properly classify the soils, it is important to know that soil classification is usually presented according to the dominant texture, structure and type. As for the structural classification, granular soil contains >85% of sand and gravel and less than 15% of silt and clay. As for the type classification – granular soil is a type C. Granular cohesionless is type B. Textural classification is based on designating clay as the last word in the textural name of all soils that are cohesive and sand or gravel as the last word for all soils that are granular. This is because the first name can be that name which has the less predominant constituents (Basic principles of Sieve Analysis 2004).

Coarse soil is classified according to the contents of sand and gravel as well as the fines that are present in the soil.

In order to determine the fines in the soil, such a characteristic as plasticity is used. It is the ability to absorb water and remain in a cohesive state. Silt (M) and clay(C) are the two sub-groups of the fine soil. If the particle size is in the range between 0.06 mm and 0.002 – it is silt; if it is less than 0.002 – it is clay. Liquid limits and plastic limit tests were carried out to determine if fine soil is either silt or clay. Silt and clay have very different mechanical characteristics: silt absorbs little amounts of water, dries to a powder state and has very low cohesive straight. Clay becomes brittle on drying and has a bigger range of moisture content at a plastic state in comparison to silk.

The particle size distribution of fine soils can be defined by employing a sedimentation test. For materials passing the 63 μ (0.063mm) sieve, the

particle size distribution is determined by means of observing the sedimentation characteristics of the particles as they settle out of suspension in water (BS 1377) (Classification of Soils, 2010).

As a result, the soil under research is cohesive soil, which means it is clay (fine grained soil); it can be characterized as high clay concentration soil with cohesive strength. According to U.S. Department of Labour (n.d.), this kind of "soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist".

References

'Classification of soils' 2010, available at <http://data.bolton.ac.uk/staff/phm2/files/Semester1/J1%20PJ1%20Soil%20Mechanics/Classification%20V1.00%20Sept2010.pdf>, [14 April 2013].

U.S. Department of Labour n.d., available at <http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10931>, [14 April 2013].

'Basic principles of sieve analysis' 2004, available at <http://www.retsch.com/dltmp/www/5930-47571c4ca53f/af_sieving%20basics_2004_en.pdf>, [14 April 2013].