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Falling head permeability test lab report uthm

v. 2.0 THEORY BACKGROUND In the falling head test a relatively short sample is connected to a standpipe which provides both the head of water and the means of measuring the quantity of water flowing through the sample. Permeability , k ⎛ h ⎞2.303aL log10⎢⎢ 1 ⎢⎢(m / s) .....Eqn (3) 1000 xAx 60t⎝ h2 ⎠Where: a = area of cross-section of standpipe tube, A = area of cross section of sample h1 = heights of water above datum in standpipe at time t1 h2 = heights of water above datum in standpipe at time t2 L = heights of sample t = elapsed time in minutes 3.0 EQUIPMENTS 1. It includes objectives to measure permeability of low permeability soils and…AI-enhanced title and descriptionDownload as doc, pdf, or txt 0 ratings0% found this document useful (0 votes)831 views7 pagesThe document describes procedures for conducting a falling head permeability test to determine the coefficient of permeability (k) of soils. The equation used in determine the permeability of fine grained soils is given in Eqn (1). vii. The apparatus is set up as shown in Figure 2. Top clamping plate. If k is epxressed in m/s, the above equation becomes Eqn (3). For Later100%100% found this document useful, undefined100%(1)100% found this document useful (1 vote)324 views8 pagesThis document describes procedures for determining the permeability of silts and clays using a falling head test. 8.0 CONCLUSION As the result, we can able to describe the general accepted practice to determine the coefficient of permeability of silts and clay, identify the relationship between permeability and pore size of the fine grained soils and measure the coefficient of permeability of silts and clays. The test involves measuring the rate of water fl…AI-enhanced title and descriptionDownload as docx, pdf, or txtSaveSave FALLING HEAD PERMEABILITY LAB REPORT For Later100%100% found this document useful, undefined100%(1)100% found this document useful (1 vote)393 views11 pagesThis laboratory report summarizes a falling head permeability test conducted to determine the permeability of a low permeability soil sample. 100%(1)100% found this document useful (1 vote)393 views11 pagesThis laboratory report summarizes a falling head permeability test conducted to determine the permeability of a low permeability soil sample. The coefficient of permeability for the given sample of soil. - Testing involved measuring the quantity of water flowing … Lab. Undisturbed sample can be taken by means of core cutter. 3. Prepare cell, a. Dispersive clays however are very susceptible to erosion at much lower gradient. The sample is make sure that have a tight fit in the body and there are no cavities around the perimeter through which water could pass. It includes objectives to measure permeability of low permeability soils and understand the relationship between permeability and … This is a geotechnical engineering laboratory report related to the falling head permeability test. To determine permeability of soils of intermediate and low permeability (less than 10-4 m/s), i.e. silts and clays. Eqn (1) then becomes Eqn (2). Permeability, k ⎛ h ⎞aL log e⎢⎢ 1 ⎢⎢(mm / s) .....Eqn (2) Ax 60t⎝ h2 ⎠To convert natural logarithms to ordinary (base 10) logarithms, multiply by 2.303. b. It was initially assumed for the tests that Darcy’s law is valid and that the hydraulic conductivity is essentially unaffected by hydraulic gradient. Fill manometer system 9. 5. The mean internal diameter (D) and length (L) is measured to the nearest 0.5mm. The areas of cross-section of the three manometer tubes should be determined as follows for each tube: i. The test involves measuring the change in water h…Download as doc, pdf, or txtKey details include: - The test was used to determine the coefficient of permeability (k) of the sand, which was found to be 8.45x10-4 m/s. Connect cell 7. Report result 5.0 RESULTS Falling Head Permeability test Sample diameter, D: 99.21 Sample length, L: mm Sample area, A: 7730.38 Sample volume, V: mm2 Mass of mould: Mass of sample: 960 g 1860 g S.G. measured/assumed: Bulk density, : 129.84 mm 1003.7 cm3 Mass of sample + mould: 2820.0 g Voids ratio: 16.43 Dry density, : kN/m3 Moisture content: kN/m3 Test temperature: 20 % Standpipe diameter: 4.05 Standpipe area, a: 14.94 - c 12.88 mm2 mm Reading: h1 h2 Reference Height Height point above above datum, y outlet, h (mm) 933.6 833.6 733.6 633.6 (mm) 833.6 733.6 633.6 533.6 1 2 3 4 6.0

SAMPLE CALCULATION Test No. 1 2 3 4 Time, t Height (min) ratios 0.48 1.05 1.60 2.22 1.12 1.14 1.16 1.19 1. To identify the relationship between permeability and pore size of the fine grained soils. To measure the coefficient of permeability of silts and clays. iv. Key details include: - The test was used to determine the coefficient of per…Download as docx, pdf, or txt TABLE OF CONTENTS 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 OBJECTIVES THEORY BACKGROUND EQUIPMENTS PROCEDURES RESULTS SAMPLE CALCULATIONS DISCUSSION CONCLUSION 1.0 OBJECTIVE 1. Calculate permeability 12. Perforated base plate with straining rods and wing nuts. The falling head principle can be applied to an undisturbed sample in a sampling tube and to a sample in an oedometer consolidation cell. 2. Repeat test 11. The coefficient of permeability is defined as the flow rate under laminar flow conditions through a unit cross sectional are of porous medium under unit hydraulic gradient. Permeability can be defined as the ability of a porous medium to allow the flow of a fluid through it, typically expressed as the coefficient of hydraulic conductivity, (k). Based on Figure 3, the sample soil is classified as silt or silt clay. First, the calculated permeability values for samples tested using this setup, as well as the permeameter assembly and process itself is easily checked for consistency. Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. The time is observed and recored when the level reaches h 3, and when it reaches h2, then the clock is stopped. A porous medium is a material, granular or fibrous, containing void spaces. Permeameter cell, comprising: Cell body, with cutting edge (core cutter), 100 mm diameter and 130 mm long. Figure 1: Compaction permeameter (Courtesy of ELE International, 2007) 4.0 PROCEDURES 1. The beaker containing water from the tube (weighings should be to the nearest 0.01g) is weighted. Silt has a relatively limited surface area and little chemical activity. 4. The measurements is repeated two or three times for each tube, and average the results. The document describes procedures for conducting a falling head permeability test to determine the coefficient of permeability (k) of soils. iii. 7 2 Fig (1): Principle of falling head test. From here, we knew that silt clay comprised mainly of intermediate sized particles, are fertile, fairly well drained and hold more moisture than sandy soils, but are easily compacted. ii. Secondly, the validity of Darcy’s Law for the test executed in the laboratory can be evaluated. Several standpipes of different diameters are normally available from which can be selected the diameter most suitable for the type of material being tested. The tube is filled with water up to a known mark near the top of the scale, observed to the nearest mm. PROCEDURE 1- Measure the inside diameter and height of the permeameter cell. It includes objectives to measure permeability of low permeability soils and…AI-enhanced title and descriptionDownload as doc, pdf, or txtSaveSave 241309538 Falling Head Permeability Test Lab Repor... The average for the coefficient of permeability is 4.7475 x 10 -7 m/s. Run test a. The coefficient of permeability for our soil sample is k 1= 8.51 x 10-7 m/s, k2= 4.39 x 10-7 m/s m/s , k3= 3.30 x 10-7 m/s and k4= 2.79 x 10-7 m/s. The volume of water passing through a sample of low permeability is quite small and a continuous supply of de-aired water is not necessary, but the reservoir supplying the de-airing tank should be filled with distilled or de-ionised water 2. Permeability, k ⎛ h ⎞aL log e⎢⎢ 1 ⎢⎢.....Eqn (1) A(t 2 t1)⎝ h2 ⎠The time difference (t2-t1) can be expressed as the elapsed time, t (minutes). The coefficient of permeability is … This document describes procedures for determining the permeability of silts and clays using a falling head test. Assemble apparatus, a. void ratio. Assemble cell 6. Water is runoff from the tube into a weighted beaker, until the level in the tube has fallen by about 500mm or more. Determine the standpipe area (a) by measuring the … Measure the coefficient of permeability of silts and clays. The test involves measuring the change in water height over time as water flows through a soil sample … The falling head test is used to determine the coefficient of permeability of fine-grained soils such as silts and clays. Soils high in silt may compact under heavy traffic and this affects the movement of air and water in the soil. Report NO. Saturate and de-air sample 8. 10. c. Prepare sample, a. The new water level is read on the scale, to the nearest mm. As soon as it reaches the level h1, the timer clock is started. Calibrate manometer tubes, a. Key details include: - The test was used to determine the coefficient of per…Download as docx, pdf, or txtSaveSave Constant Falling Head Permeability Test Lab Report For Later100%100% found this document useful, undefined100%(3)100% found this document useful (3 votes)3K views12 pagesThis document describes the process and results of a constant head permeability test conducted on a sand sample. In this particular project, the medium studied was Superpave designed asphalt mixtures and the fluid used was distilled water at room temperature This test was initially investigated for two primary reasons. The test involves measuring the change in water h…Download as doc, pdf, or txtSaveSave Falling Head Permeability Test Lab Report For Later0%0% found this document useful, undefined0 ratings0% found this document useful (0 votes)831 views7 pagesThe document describes procedures for conducting a falling head permeability test to determine the coefficient of permeability (k) of soils. d. The test involves measuring the rate of water flow through a soil sample using a standpipe to … In permeability tests on clays, much higher hydraulic gradients than are normally used with sands can be applied, and are often necessary to induce any measurable flow. The cohesion of clays provides resistance to failure by piping at gradients of up to several hundred, even under quite low confining or surcharge pressures. The cell is dismantled. The cell body is checked clean and dry, and weighted to the nearest 0.1g. TO describe the general accepted practice to determine the coefficient of permeability of silts and clays. Screw clip at inlet is closed. The test involves measuring the rate of water fl…AI-enhanced title and descriptionDownload as docx, pdf, or txt 100%(1)100% found this document useful (1 vote)324 views8 pagesThis document describes procedures for determining the permeability of silts and clays using a falling head test. Screw clip at inlet is opened to allow water to flow down through the sample, and the water level is observed in the standpipe. The diameter of the manometer can be calculated as follows: diameter, a 1000m w mm2 h1 h2 If mw = mass of water (g), h1 = initial level in tube (mm), h2 = final level in tube (mm), A = area of cross-section of tube (mm2) vi. It included the introduction, objective, theory, apparatus, procedures, data and calculation and discussion, conclusion and … This laboratory report summarizes a falling head permeability test conducted to determine the permeability of a low permeability soil sample. The falling head permeability test involves flow of water through a relatively short soil sample … The constant head permeability cell is intended for testing disturbed granular soils which are recompacted into the cell, either by using a specified compactive effort, or to achieve a certain dry density, i. For these types of soils, the rate of water … The test of falling head permeability test is carried out to determine the permeability of soils of intermediate and low permeability than is less than 10 -4 m/s. The heights h1 and h2 and the length, L are expressed in millimetres, and the areas A and a in square millimetres. 100%(3)100% found this document useful (3 votes)3K views12 pagesThis document describes the process and results of a constant head permeability test conducted on a sand sample. Permeability, k k1 ⎛ h ⎞2.303aL log10⎢⎢ 1 ⎢⎢(m / s) = 1000 xAx 60t⎝ h2 ⎠2.303 x12.88 x129.84⎛ 933.6 ⎞log10⎢ ⎢(m / s) 1000 x 7730.38 x 60 x 0.48⎝ 833.6 ⎠= 8.51 x 10-7 m/s k2 2.303 x12.88 x129.84⎛ 833.6 ⎞log10⎢ ⎢(m / s) 1000 x 7730.38 x60 x1.05⎝ 733.6 ⎠= 4.39 x 10-7 m/s k3 2.303 x12.88 x129.84⎛ 733.6 ⎞log10⎢ ⎢(m / s) 1000 x7730.38 x 60 x1.60⎝ 633.6 ⎠= 3.30 x 10-7 m/s k4 2.303 x12.88 x129.84⎛ 633.6 ⎞log10⎢ ⎢(m / s) 1000 x 7730.38 x 60 x 2.22⎝ 533.6 ⎠= 2.79 x 10-7 m/s 7.0 DISCUSSION The test of falling head permeability test is carried out to determine the permeability of soils of intermediate and low permeability than is less than 10 -4 m/s. Connecting tube and fittings.