ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

POST-GRADUATE PROGRAM

GEOTECHNICAL ENGINEERING STREAM

EFFECT OF SAMPLE HEIGHT ON STRESS- STRAIN BEHAVIOUR OF UNDRAINED SHEAR STRENGTH OF ADDIS ABABA RED CLAY SOIL USING UCS TEST

By

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A thesis submitted to the School of Graduate Studies of Addis Ababa University in Partial fulfillment of the Requirements for Degree of Master of Science (MSc) in Geotechnical Engineering.

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October 2016
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Declaration

I declare, this thesis is my own work and all sources of material used for the thesis have been duly acknowledged.

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POST GRAGUATE PROGRAM

This is to certify that the thesis prepared by Soressa Merga, entitled, **Effect of Sample Height on Stress-Strain Behavior Undrained Shear Strength of Red Clay Soils in Addis Ababa** and submitted in partial fulfillment of the requirements for the Degree of Master of Science (MSc.) in Geotechnical Engineering compiles with the regulation of the university and meets the accepted standards with respect to its originality and quality.

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Abstract

In this work, the effect of sample height (H/D) on the stress-strain behavior of undrained shear strength of red clay soil in Addis Ababa from a depth of 1.5m and 3m below the ground surface using unconfined compression test was assessed. In most scientific and technical standards, (H/D) of between 2 and 3 is generally accepted. This acceptance is based on the smooth slope of the change in shear strength of the soil at various (H/D) ratios and considering plate effect. But, there was no discussion about the failure pattern developed within the selected specimens size was full fill the assumptions made about stress-strain properties of soils. Therefore, this thesis investigated the effect of the specimen's size on the stress-strain behavior and undrained shear strength of red clay soil in Addis Ababa by testing undisturbed and compacted cylindrical specimens at different moisture content with four various H/D ratios (i.e. 1, 1.5, 2, and 2.5), while the specimens' diameter was constantly used as 38mm.

The test results indicated that the length of stress-strain curve increases with decreasing specimen's height. The specimens with H/D = 1 attained its peak strength at large axial strains and strain at failure is too small as specimen's H/D increased to 2 and 2.5. But, the range is not too much in both undisturbed and remoulded samples. The unconfined compressive strength and undrained shear strength of the sample also decreases with increasing H/D ratios. In addition, the failure pattern develops(ed) with the various specimens height changes from non-uniform to uniform as H/D ratio of the specimens decreases. For the H/D = 1, the shear failure plane and deformation are uniformly distributed with in the entire of specimens height and as the specimens H/D ratio increases, the deformation and shear failure distribution are localized to some portions of the specimens height. This indicates as sample height is one of the factor which causes non-uniform stress-strain distribution with in clay soils.

Generally, based on the uniformity of the failure mechanism developed with in the specimens height and the assumption made during calculation of axial strain, the specimens with H/D = 1 is preferable and based on axial strain ranges at which the sample attain its peak strength, sample with H/D = 1 to H/D = 2 is preferable. Accordingly for red clay soil sample in Addis Ababa it is possible to use sample with H/D = 1 to H/D = 2and further study was needed on the effect of end platen to highly recommend.

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LIST OF ABBREVIATIONS

AASHTO – American Association Society of Highway and Transport Organization

ASTM – American Society for Testing and Materials

BSI – British Standard Methods of Test for Soil

JIS – Japanese Standard Association

LL – Liquid Limit

MDD – Maximum Dry Density

OMC – Optimum Moisture Content

PI – Plasticity Index

PL – Plastic Limit

UCT – Unconfined Compression Test

UCS – Unconfined Compressive Strength

UU – Unconsolidated Undrained

USCS – Unified Soil Classification System

TS – Turkish Standard

LIST OF SYMBOLS

A_0 – Initial cross-sectional area

A' - Corrected cross-sectional area

A^0 – Angstrom unit

Cu – Undrained cohesion

P_z – Axial (plunger) load

q_u – Unconfined compressive strength

σ_3 – Minor principal stress

ε – Axial strain

CHAPTER ONE

INTRODUCTION

1.1 General

Red clay soil in Addis Ababa is found around the North and North-west of the city. Mostly, for such types of soil the undrained shear strength is determined by using unconfined compression test, since it is quickest and cheapest than others. From the test results, one can determine the unconfined compressive strength and stress- strain behavior of the soils. But there are a number of sources that affect the strength and stress-strain behavior of the soil while conducting the unconfined compression test. Some of the sources are; sample disturbance (unrepresentative sample), sample size, confinement and other sources. In fact, sampling disturbance and confinement usually have effect of lowering the strength of the soil and reducing the slope of stress –strain behavior of clay soil. However, use of underestimated soil strength in geotechnical analysis is almost always conservative, so long as the strength used is not too much lower than the actual field strength [1].

But sample size may underestimate or overestimate the strength and increasing or decreasing of the slope and length of stress- strain curve from which the deformation parameters are determined. Such a problem causes foundation problem. Also as per of different standards, the height to depth ratio for sampling size is different. For example ASTM standard recommends the height to depth ratio 2-2.5 while British standard recommend height to diameter ratio of 2. This indicates that depending on the original formation and their stiffness, soil in different countries failed in different manner during unconfined compression test is undertaken [1].

The shear strength is one of the most important engineering properties of a soil in the stability of many foundations of structures; such as bearing capacity of shallow and deep foundation, the stability of slope, dams and embankments and lateral earth pressure on retaining wall [2]. A considerable research works have been done to determine the shear strength parameters of clay in Addis Ababa.

Accordingly, the author of this thesis also tried to see the effect of sample height on stress-strain behavior of red clay soil in Addis Ababa and to show how the variation in sampling height causes the non-uniform stress-strain distribution in the clay soil.

1.2 Statement of the Problem

The primary purpose of the unconfined compression test is to quickly obtain the approximate compressive strength of soils that possess sufficient cohesion to permit testing in the unconfined state and to calculate undrained shear strength of soil. According to ASTM Standard D 2166 in sampling size case, specimens shall have a minimum diameter of 30mm and the height to diameter ratio shall be between 2 and 2.5. These may not work for all clay soils found in each country because; soil may differ based on their geological formations, topology and environmental conditions and may not fulfill the assumptions made for stress-strain calculation.

Determination of the effect of sampling height on stress-strain behavior of clay soil is one of the critical problems in geotechnical engineering analysis for determining undrained shear strength in order to reduce damage occurred in foundation due to over or underestimating the shear strength of clay soil.

1.3 Objectives

1.3.1 General Objectives

The general objective of this research is to determine the effect of sampling height on stress-strain behavior of red clay soil in Addis Ababa.

1.3.2 Specific Objectives

1. To determine the most appropriate sampling size for Addis Ababa red clay soil under Unconfined Compression Test.
2. To determine the Unconfined Compressive Strength of red clay soil in Addis Ababa and compare with the previous research result of the site.

1.4 Methods and Materials

To meet the above objectives, the following methods and materials were employed:

1. The literature review concerning stress- strain behavior of undrained shear strength of clay soil and soil investigation done on Addis Ababa red clay soil was made.
2. During the field work stage, visual identification of soils around the study area was made and subsurface exploration has been performed using dug test pits to a maximum depth of 3.0m.
3. A total of 3 samples from 1 test pit were taken from Bethel area and, both disturbed and undisturbed samples were collected for the test from 1.5m and 3m depth below the ground.
4. The specimen was handled carefully to prevent sample disturbance, change in cross section, or loss of water content during transportation to the laboratory.
5. Some of the index properties used for soil classifications and remolding purposes were determined from disturbed sample in the laboratory.
6. In the laboratory, part of undisturbed sample and disturbed samples were used for determining the unconfined compressive strength and the stress strain behavior of red clay soils in Addis Ababa by considering effect of different sampling height (height-to-depth ratio of 1, 1.5, 2 and 2.5) using constant sampling diameter available in the laboratory, which is a diameter of 38mm sampling size. Here, for a single unconfined compression test including different height- to- diameter ratio the moisture content kept to be uniform.
7. The tests were done using unconfined compression test by strain controlled method with lubricated plate ends to reduce effect of end-restrain.
8. Finally the results were compared with the available data and discussion and conclusion were made on the effect of sampling height on stress strain behavior of Addis Ababa red clay soils.

1.5 Scope of the Study

The scope of the study includes determining the following properties for red clay soils in Addis Ababa;

- ✓ Undrained shear strength considering effect of different sampling height
- ✓ Plot of axial stress with axial strain considering effect of different sampling height
- ✓ Plot of unconfined compressive strength with sampling size, from which the more appropriate sampling size ratio for Addis Ababa red clay soil is determined.

1.6 Organization of the Thesis

The thesis consists of five Chapters. The first Chapter gives the basic introduction to the research back ground, statement of the problem, objectives of the research, methods and materials, the scope of the research and structure of the thesis. Literature review is presented in the second Chapter of the thesis. In the literature review some of the points concerning the background of the site, unconfined compression test; scientific papers and technical standards on the effect of specimen's size have been discussed.

Chapter three outlines the different laboratory tests done to determine both index and engineering properties with some discussions. The analysis and discussion on the objective of the thesis is made in chapter four.

Chapter five closes the whole team of the thesis by making conclusion and recommendation.

Finally, appendices of different tabular calculations regarding both index properties and stress-strain behaviors, and relevant tables and plots for each sample are attached.

CHAPTER TWO

LITERATURE REVIEW

2.1 Clay and Clay Mineralogy

The term "clay" refers to a naturally occurring material composed primarily of fine-grained minerals, which is generally plastic at appropriate water contents and will harden with dried or fired. Although clay usually contains phyllosilicates, it may contain other materials that impart plasticity and harden when dried or fired. Associated phases in clay may include materials that do not impart plasticity and organic matter [3].

Generally clay is applied to a natural material with plastic properties, particles of very fine size, customarily those defined as particles smaller than two micrometers and very fine material fragments or particles composed mostly of hydrous-layer silicates of aluminum, though occasionally containing magnesium and iron [3].

2.1.1 Clay minerals

According to the clay mineral concept, clay materials are essentially composed of extremely small crystalline particles of one or more members of a small group of minerals that are commonly known as clay minerals. These minerals are essentially hydrous aluminum silicates, with magnesium or iron replacing wholly or in part for the aluminum, in some minerals. Many clay materials may contain organic material and water-soluble salts [4].

Clay soils may contain clay minerals as well as non-clay minerals. The non-clay minerals that found in clay are quartz, feldspar or mica of clay size. Clay minerals are mostly in the form of sheets; their thickness is relatively smaller than width and length of sheets, their surface area is so larger than their volume. As the result the behavior of clay soil is governed by surface forces [5].

Clay minerals are small group of minerals that constitute clay soils together with other minerals. Most of clay minerals are formed from two basic units known as octahedral and silica sheets. The octahedral unit consists; aluminum, magnesium or iron embedded between

two layers of oxygen or hydroxyl layers. The silica sheet consist tetrahedron of four oxygen atoms and one silicon atoms in between.

Most of the clay minerals are the products of chemical weathering of rock forming minerals like feldspar and mica. The clay minerals include illite, kaolinite and montmorillonite, halloysite, and vermiculite. However, the main groups of crystalline materials that make up clays are the minerals kaolinite, illite, and montmorillonite [4]. Accordingly,

2.1.1.1 Illite

Illite is made up of octahedral sheet bonding with two silica sheets: one at the top and another at the bottom. The illite layers are bonded by potassium ions. Illite particle range from $50A^0$ to $500A^0$ in thickness and have specific surface area of about $80m^2/g$.

2.1.1.2 Kaolinite

Kaolinite is composed of a single tetrahedron sheet and single aluminum octahedral sheet combined in a unit so as the tips of silica tetrahedron and one of the layers of kaolinite. The thickness of kaolinite layer is about $7A^0$. The kaolinite mineral is formed by stacking the layers of $7A^0$ thick one above the other with the base of silica bonding the hydroxyls of the octahedral sheet by hydrogen bond. Since the hydrogen bonds are relatively strong, therefore, the mineral is stable and water cannot enter between the sheets to expand the unit cells.

2.1.1.3 Montmorillonite

Montmorillonite has similar structure to illite. The structure has one octahedral sheet sandwiched between two silica sheets and bonded with weak vander walls forces. Large amount of water is attracted into the space between the layers and causing the layer's to expand significantly. Montmorillonite particles have the lateral dimension of $100A^0$ to $500A^0$ and thickness of $10A^0$ to $50A^0$ and its area is about $800m^2/g$ [4].

2.2 Origin and Mineralogical Composition of Red Clay Soils in Ethiopia

Ethiopian red clay soils are principally residual, derived from the weathering of volcanic rocks. The parent rocks for black and red clays in Ethiopia are mainly olivine basalt, basalt and trachyte.

Ethiopian red clay soils have developed where rainfall is more plentiful and drainage is good. They contain kaolinite and halloysite as the principal clay minerals but montmorillonite is also frequently present in significant amounts. The red color of the Ethiopian soil indicates the presence of iron [6].

The mineralogy identification result shows the clay mineral that occurs in the red clay soils investigated in Bahir Dar town is predominantly kaolinite, which is expected for the red clay soil as per the study carried out by Morin [7].

Red clay soil in Addis Ababa is commonly found around the North and North-west of the city. The depth of red clay soil in Addis Ababa ranges from few centimeters to about 10 meters. In the areas covered by the study, however, the thickness of the soil is found to be 1.5 meters in Semen-Gebeya and Rufael while more than three meters in Kolfe areas [8]. The results of index properties tests determined in the laboratory by different authors indicate that the soil is not potentially expansive and further, the results show that with in the investigated depth the index properties of the soil have no variation.

Table 2.1: Ranges in properties of Ethiopian red clay soils from previous studies (self-construct)

	Morin & Parry [6]	Samuel T. [8]	Fasil A. [7]	Sisay Y. [9]	Hailemariam A. [10]	Admassu T. [11]
Soil type	Red clay	Red clay	Red clay	Red clay	Red clay	Red clay
Location	Ethiopia	AA	Bahir Dar	AA (kolfe)	AA	AA
Clay content %	34-76	58 - 70	74 - 82	51 - 65	35 - 73	_____
Activity	---------	< 0.75	0.56	----------	0.5 - 0.85	
Clay minerals	Kaolinite Halloysite Montimoril	---------	kaolinite	----------	Kaolinite Halloysite Montimorill.	_____
LL (%)	44 - 66	56 - 75	61 - 68	47 – 74	54 – 81	66
PI (%)	14 - 30	29 - 47	24 - 31	21 – 39	28 – 58	32
G_s	2.61-2.90	2.66 - 2.77	2.75–2.83	23 – 39	2.61 – 2.79	2.76

q_u (kN/m^2)	146.5 - 251	--------	148 - 220	---------	49 - 250	--------

2.3 Shear Strength Tests

The shear strength of a soil is its maximum resistance to shear stresses just before failure [3]. The shear strength of soils is an important aspect in many foundation-engineering problems related to stability such as the bearing capacity of shallow foundations and piles, the stability of slopes of dams and embankments, and lateral earth pressure on retaining walls.

The shear force in a shear test is applied either by increasing the shear displacement at a given rate or by increasing shear force at a given rate. Accordingly, the shear tests are either strain-controlled or stress- controlled [12].

In a strain controlled test, the test is conducted in such a way that the shearing strain increases at a given rate. Generally, the rate of increase of shearing strain is kept constant, and the specimen is sheared at a uniform strain rate.

The shear force acting on the specimen is measured indirectly using proving ring. The rate of shearing strain is controlled manually or by a gear system attached to an electric motor.

Most of the shear tests are conducted as strain controlled. The stress- strain characteristic are easily obtained in these tests, as the shape of the stress- strain curve beyond the peak point can be observed only in a strain –controlled test. A strain- controlled test is easier to perform than stress- controlled test.

In a stress-controlled test, the shear force is increased at a given rate. Usually, the rate of increase of the shear force is maintained constant. The shear load is increased such that the shear stresses increase at a uniform rate. The resulting shear displacements are obtained by means of dial gauge.

Stress- controlled tests are preferred for conducting shear tests at a very low rate, because an applied load can easily be kept constant for any given period of time. Further, the loads can be conveniently applied and removed. The stress- controlled test represents the field conditions more closely [12].

The purpose of shear strength testing is to establish representative values for the shear strength parameters both total and effective cohesion and internal angle of friction. The drainage conditions during the test influence the measured values considerably.

The most common laboratory methods employed to obtain shear strength parameters are direct shear test, triaxial compression test and unconfined compression test.

2.3.1 Direct shear test

The popular apparatus to determine the shear strength parameters is the shear box. This test is useful when a soil mass is likely to fail along a thin zone under plane strain conditions. The shear box is consists of a horizontally split, open metal box. Soil is placed in the box and one –half of the box is moved relative to the other half. Failure is there by constrained along a thin zone of soil on the horizontal pane. Serrated or grooved metal plates are placed at the top and bottom of faces of the soil to generate shearing force [13].

Vertical forces are applied through a metal platen resting on the top serrated plate. Horizontal forces are applied through a motor for displacement control or by weights through a pulley system for load control. Most shear box tests are conducted using displacement control because we can get both the peak shear force and the critical shear force. In load control tests, you cannot get data beyond the maximum or peak shear force [13].

2.3.2 Triaxial compression test

A widely used and reliable apparatus to determine the shear strength parameters and the stress strain behavior of soil is the triaxial apparatus. The triaxial apparatus is versatile because we can independently control the applied axial and lateral stresses, conduct tests under undrained and drained conditions and it is possible to both control and measure the pore pressure. In the triaxial test, a cylindrical sample of soil usually with a length to diameter ratio of two [14] is subjected to either controlled increases in axial stresses or axial displacements and radial stresses. A membrane laterally confines the sample, and radial stresses are applied by pressuring water in the chamber. The axial stresses are applied by loading a plunger.

The triaxial tests are classified according to the condition of drainage during the test as UU, CU, and CD tests [15].

Unconsolidated Undrained (UU) tests are carried out by placing a specimen in the chamber and applying lateral pressure without allowing the specimen to consolidate or drain under the

confining pressure. Axial load is then applied fairly rapidly without permitting drainage of the specimen.

Consolidated undrained (CU) tests are performed by placing a specimen in the chamber and applying lateral pressure. The specimen is then allowed to consolidate under the all-round confining pressure by leaving the drain lines open. The drain lines are then closed, and axial stress is induced without allowing further drainage.

Consolidated drained (CD) tests are similar to CU tests except that the specimen is allowed to drain as axial load is applied so that high excess pore pressure do not develop. CD tests may take a considerable period of time to run because of the time required for both consolidation under the confining pressure and drainage during application of axial load.

For practical tests both CU and CD yield the same strength provided the tests are performed correctly [13]. Most triaxial testing is CU because the time for testing is less than for CD test. Therefore CU tests were carried out on undisturbed samples obtained, by tube sampling, from the field.

2.3.3 Unconfined compression test

The unconfined compression test is the simplest, easiest, and least expensive test for investigating the shear strengths of cohesive and semi-cohesive soils in terms of the total stress in either the undisturbed or remolded and compacted state, i.e., it is not applicable to cohesion less or coarse-grained soils[2], [16].

The unconfined compression test is a special case of the unconsolidated undrained triaxial test. In this case no confining pressure to the specimen is applied (i.e.,σ_3 = 0). For such conditions, for saturated clays, the pore water pressure in the specimen at the beginning of the test is negative (capillary pressure). Axial stress on the specimen is gradually increased until the specimen fails [14].

The test can be conducted only on clay soils which can stand without confinement. The test is generally performed on intact (non-fissured), saturated clay specimens. Although the test can be conducted in a triaxial test apparatus as a U-U test, it is more convenient to perform it in an unconfined testing machine [12].

This test can be applied to soils at construction sites where the rate of construction is very fast and the pore water does not have enough time to drain. In other words, the test (a modified version of the triaxial compression test) is used to calculate the unconsolidated undrained shear strength under unconfined conditions [2].

Figure 2.1 Unconfined Compression test machine

The primary purpose of the unconfined compression test is to quickly obtain the approximate compressive strength of soils that possess sufficient cohesion to permit testing in the unconfined state [16].

The unconfined compressive strength, which accurately describes the undrained conditions of fine-grained (cohesive and semi cohesive) foundations, is widely used in almost all geotechnical engineering applications, such as buildings, bridges, dams, and embankments.

Two cohesive soil parameters, the undrained shear strength (Su) and cohesion (Cu) on a failure plane in a ground can be obtained from the average value of unconfined compressive strength. Unconfined compressive strength is the load per unit area at which an unconfined prismatic or cylindrical specimen of material will fail in a simple compression test without lateral support [18].

In this test method, unconfined compressive strength is taken as the maximum load attained per unit area or the load per unit area at 15 % axial strain, whichever is secured first during the performance of a test [16].

The results from UC tests are used to estimate the short-term bearing capacity for foundations and the short-term stability of slopes of fi ne-grained soils. Also, it is used to compare the shear strengths of soils from a site to establish soil strength variability quickly and cost-effectively (the UC test is cheaper to perform than other triaxial tests) and to determine the stress–strain characteristics under fast (undrained) loading conditions [13].

The axial (plunger) load is increased rapidly until the soil sample fails, that is, it cannot support any additional load. The loading is applied quickly so that the pore water cannot drain from the soil; the sample is sheared at constant volume [13].

If both an undisturbed and a remolded test are performed on the same sample, the sensitivity of the material can be determined. This method of determining sensitivity is suitable only for soils that can retain a stable specimen shape in the remolded state [16].

2.3.3.1 Data analysis methods in unconfined compression test

It is impossible to use the deformation dial reading and load dial reading recorded during unconfined compression test directly. One should change into the standardized unit using the conversion factors given with the calibrated machine. Therefore, to analyze the unconfined compression test data the following steps were used:

1. Convert the dial readings to the appropriate load and length units, and enter these values on the data sheet in the deformation and total load columns. (Confirm that the conversion is done correctly, particularly proving dial gage readings conversion into load)

2. Compute the sample cross-sectional area , $A_0 = \frac{\pi d^2}{4}$

3. Compute the strain, $\varepsilon = \frac{\Delta H}{H_0}$

4. Compute the corrected area, $A' = \frac{A_0}{1-\varepsilon}$

5. Using A', compute the specimen stress, $q_u = \frac{P}{A'}$, where P is the axial load applied to the specimen through the plunger.

6. Plot the stress versus strain. Show q_u as the peak stress (or at 15% strain) of the test. Be sure that the strain is plotted on the abscissa.

7. Draw Mohr's circle using q_u from the last step and show the undrained shear strength, $S_u = Cu$ (or cohesion) $q_u/2$.

2.4 Factors Affecting Shear Strength of Cohesive Soils

There are many factors affecting the shear strength of cohesive soils. Those factors include:

(1) Structure of clay: the clay exhibits a definite structure. Even normally consolidated clay exhibits a small peak due to structural strength. In case of over-consolidated clays, the structural strength is predominant.

(2) Clay content: the ultimate friction angle ϕ' of the cohesive soil depends up on the clay content. As clay content increases, the angle decreases.

(3) Drainage conditions: as the cohesive soils have low permeability, the shear strength will depend whether it is in drained conditions or in undrained condition. The cohesive soils have very low strength just after the application of the load when undrained conditions exist.

(4) Rate of strain: in the case of normally consolidated clays, the effect of rate of strain up on the angle of shearing resistance is relatively small. The value of ϕ' may decrease by about 10% of the strain rate is reduced by a factor of 10. However, in some cases, the angle ϕ' is found to increase with a decrease in rate of strain. In the case of over-consolidated clays, some of the shear strength is always lost when the rate of strain is decreased.

(5) Intermediate principal stress: the value of C' and ϕ' are affected very little by the magnitude of the intermediate principal stress.

(6) Confining pressure: the shear strength of clays increases with an increase in confining pressure provided there is enough time available for the pore water pressure to dissipate.

(7) Plasticity Index: the value of ϕ' decreases with an increase in Plasticity Index of the clay.

(8) Stress history: the values of strength parameters depend up on the stress history.

(9) Disturbance: the shear strength of undisturbed sample is less than that of the undisturbed samples [12].

The most important factors affecting the strength of saturated clay are drainage conditions, disturbance (manifested in a change in effective stress and loss of cementation), consolidation ratios and creep effects. Also, strain rate has effects on shear strength of clay soil. Migration of water from the ends towards the center of the specimen increases as strain rate increases in the undrained compression test. As a result, the cohesion of the soil increases with increasing strain rate [11].

2.5 Typical Undrained Shear Strength Properties of Addis Ababa Red Clay Soil

The red clay soil in Addis Ababa covers North and North-west of the city. Different authors have investigated the shear strength of red clay soil in Addis Ababa.

Tadesse, S. (January 1989) determined the unconsolidated undrained shear strength of red clay soils in Addis Ababa while investigating into some of the engineering properties of Addis Ababa red clay soil using triaxial test. Accordingly, the unconsolidated undrained shear strength of red clay soils from Kolfe, Semen-Gebeye and Rufael area were 185, 180 and 180 kN/m^2 respectively [8].

Abzo, H, (April 1992) stated as the average value of unconfined compressive strength of Addis Ababa is 89 kN/m^2 and undrained shear strength is 45 kN/m^2 at an average moisture content of 29% and the unconfined compressive strength ranges between 49 – 250 kPa with moisture of 22-34 % during his studies on investigation in to shear strength characteristics of red clay soil of Addis Ababa [10].

Taye, S. (December 1990) investigated a comparative study of undrained shear strength of red clay soil as determined by insitu and laboratory tests. Accordingly, he stated the unconfined compressive strength of red clay soil varies from 86-107 kPa [19].

Yimer, S. (March 2005) explained the unconfined compressive strength of red clay samples collected from Kolfe area were ranges between 127-317 kPa during his studies on correlation between standard penetration and unconfined compression strength of Addis Ababa red clay soils [9].

Generally one can observe as the unconfined compressive strength values of red clay soil in Addis Ababa varied from site to site from the previous studies.

2.6 Effects of Sampling Size on Stress-Strain Characteristics of Clay Soil

There are a number of sources that affect the strength and stress-strain behavior of clay soil while conducting the unconfined compression test. Some of the sources are; sample disturbance (unrepresentative sample), sampling size, strain rate, confinement and other sources. In fact, sampling disturbance and confinement usually have effect of lowering the strength of the soil and reducing the slope of stress –strain behavior of clay soil. However, use of underestimated soil strength in geotechnical engineering analysis is almost always conservative and is not necessarily bad, so long as the strength used is not too much lower than the actual field strength [1].

But sampling size may underestimate or overestimate the strength and lowering or decreasing of the slope of stress- strain curve from which the deformation parameters are determined. Such a problem causes a foundation problem. Also as per of different standards, the height to diameter ratio for sampling size is different. For example:-

- ASTM D2166-00 (ASTM 2002a) specifies that the test specimen should be a right circular cylinder with a minimum diameter of 1.3 inch and a height-to-diameter ratio of 2–2.5.
- BSI 1377-7 (BSI 1990) recommends that the test specimen should have a diameter of between 35 and 100 mm and a length-to-diameter ratio of 2.
- JIS A 1216 (Japanese Standards Association 1993) requires that the cylindrical test specimen's diameter and length are 35 and 80 mm, respectively.
- TS 1900-2 (Turkish Standards Institution 2006) recommends that the cylindrical test specimen should have a diameter of 50 mm preferably (38 mm if necessary), and a height-to-diameter ratio of 2.
- Das (2002) suggests that the cylindrical test specimen should have a diameter of 1.4 feet and a length-to-diameter ratio of 2–3.

Those standards are stated depending on the stress and strain behaviors of the soil. Therefore the difference of those standards are depending the nature of the soil found in those countries and factors affecting the stress-strain behavior of soils.

K. Venkat Raman, P. Dayakar and S. Sankaran (2015) demonstrated that increasing or decreasing of length and diameter of specimen decreases strength from studying the effect of L/D Ratio of UCC specimen on shear strength of clay soil [20].

H. Guneyli and T. Rusen (2015) carried out unconfined compression tests considering the effect of length-to-diameter ratio. For that purpose they used cylindrical soil samples with 11 different length-to-diameter (L/D) ratios (from 0.5:1 to 3:1) were prepared from Handere clay, Almanpinari clay, Sam-Tekin clay, and kaolinite). The lengths of the cylindrical specimens of each soil type ranged from 24 to 144 mm. In each case, the diameter was 48 mm. The range of L/D values tested started from 0.5, in case the undisturbed samples obtained were much smaller than the sample sizes specified by the standards. The results obtained show that the stress–strain curves obtained in the UCS tests indicate that increasing the L/D of the compacted cylindrical specimen decreases its unconfined compression strength and changes its deformation behavior from ductile (for $0.50 \leq L/D \leq 1.00$) to brittle (for $1.25 \leq L/D \leq 2.50$) and finally to a combination of ductile and brittle failure ($L/D \geq 2.70$). Furthermore, the peak stresses generally occur within smaller axial strain ranges as L/D increases, although there are some exceptions [2].

The failure pattern generally changes from ductile to brittle with increasing L/D ratio. Especially in the range $1.25 \leq L/D \leq 2.5$, brittle deformation predominates, as characterized by a distinct failure plane. At larger L/D ratios, the failure mechanism is mostly complex and chaotic.

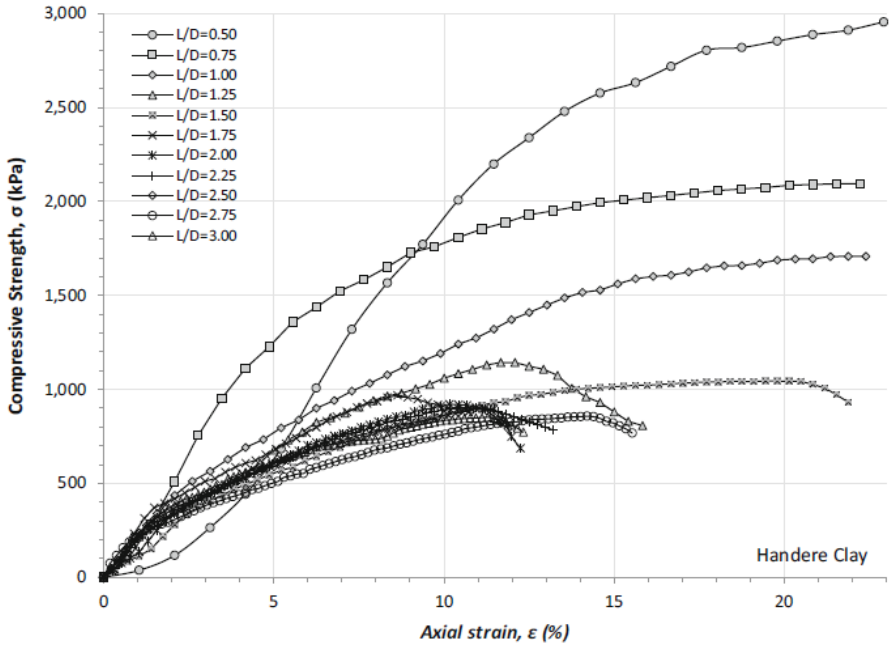


Fig.2.2. Stress–strain curves for Handere clay specimens with various length-to-diameters (L/D) ratios [2].

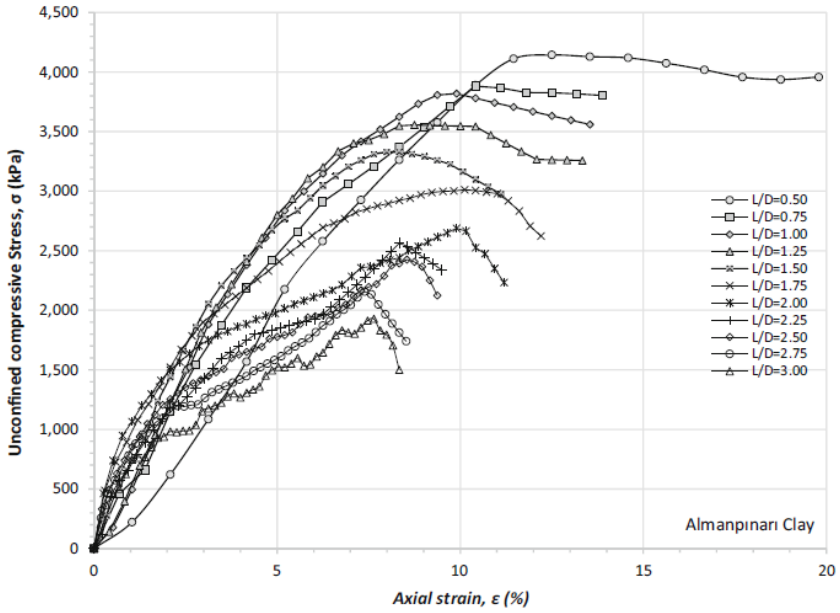


Fig. 2.3 Stress–strain curves of Almanpinari clay specimens with various length-to-diameters (L/D) ratios [2].

Also different papers were published as the non-uniformity of stress-strain behaviors of soils occurred depending on sampling height- to-diameter ratio during determination of soil strength using triaxial compression test.

As the literature review written by Neringa, D.; Jonas, A., and Vincentas, S. (ND), during the determination of soil strength in triaxial compression apparatus the main reasons for non-uniform stress-strain distribution in the soil sample is obtained due to the sample height/diameter ratio and the friction between triaxial sample ends and the platens. Eliminating friction, shorter soil samples may be used, thus, the testing time is reduced, sample saved and the measured strength increase caused by friction between the sample ends and the platens is avoided. The sample height may be lessened from the standard height/diameter (*H/D*) ratio 2.

This reduction is necessary for the friction elimination to be effective. This allows for a more uniform stress and strain distribution, the sample may remain cylindrical in shape even at large strains. However, elimination of friction has little impact on samples of standard height. The decrease of sample *H/D* ratio till 1 is recommended only for clays but not for sands [21].

Bishop and Green (1965) even demonstrated the same strength in compacted sand sample with lubricated ends, when the sample dimension ratios were 1 and 2. The authors pointed out the necessity of efficient lubrication for short samples [22].

P.V. Lade and U. Wasif (1988**)** experimented with dense Cambria sand samples of anisotropic fabric and square sections with height/diameter (*H/D*) ratio of 1 and 2.5. Drained triaxial tests were carried out. The samples were formed of several layers, which were inclined at various angles from vertical. The authors analyzed the influence of the sample boundary conditions (flexible membrane; lubricated, rigid end platens) on two different types of samples. The test results showed that boundary conditions had different impact on samples with ratio of 1 and 2.5.

Samples with *H/D* = 2.5 and with inclined and vertical layer planes showed obvious stress-strain curve drop of short duration at a pre-failure stage. The angle of internal friction of soil decreased when the angle inclination of layer platens increased. The stress-strain curve of samples with *H/D* = 1 was more even, uniform. The inclination of layer plane did not influence the angle of internal friction of the soil sample very significantly. The authors

maintain that the most consistent test results were those of the samples with *H/D* = 1. The deformations achieved were uniform [23].

Mathewos A. (April 2005) stated that, when tests were performed on triaxial specimens with fixed ends and height – to – diameter ratio of 2:1 has failed as a narrow rupture or shear band, where two practically solid bodies have slide past each other. When shearing occurs in such mode, deformation and volume change will be confined in the localized zone, and therefore soil properties measured do not refer to the whole specimen as normally assumed, but only the materials sheared in this narrow failure zones, and shear strains should be calculated relative to height of the localized zones not the height of the entire specimen [24].

Unfortunately, the height of the localized zone is unknown, and the height of the specimen is employed for calculation of strains. Consequently, the stress strain curve will be too short and the sample attains its ultimate stress at very small strain than the actual one.

Finally, he stated in undrained triaxial tests with or without pore water measurement, the lubricated end tests with a sample height to diameter ratio of 1:1 are preferable. But, the relative height of the specimen does not play any role in the stress distribution inside a specimen bounded by smooth pressure heads (lubricated ends), but non-uniformities in strain can be developed if tall specimens used [24].

In undisturbed sample of normally consolidated and in some over-consolidated clays high strength failure may occur at 2 – 5 % axial strain.

Ali J. Hamad (September 2015) stated the small size of specimen for cubes or cylinder gives higher compressive strength of high performance lightweight foamed concrete compared with other sizes while studying size and shape effect of specimen on the compressive strength of HPLWFC reinforced with glass fibers [25].

Bieniawski (1968) undertook tests on cubic coal samples and showed that the UCS of coal decreased with increasing specimen size but after a sample dimension of 1 m the UCS was nearly constant [26].

Yoshinika (1976) and Lo (1970) mentioned that the strength properties are influenced by the specimen size in the studies for the effect of specimen size on unconfined compressive strength properties for rock materials and fissured clays respectively [27], [28].

When clays are over consolidated, they may exhibit higher strength than that of normally consolidated clays. The strength envelop of the two types of clays at the same effective stress

depends up on type of clay, drainage conditions during shearing and amount of over consolidation.

The stress-strain behaviors of soils are different for different types and condition of soils. Soils like some quick clay, cemented soils, heavily over consolidated clays and dense sands have brittle nature. But Remolded and insensitive clays, and loose sands have ductile nature (Mitchell, J. K., 1976) [29].

A.L. Painting (1974) studied the end effects in specimen cores under compression tests, with a view to the elimination of these effects. When a core is compressed between steel platens, the ends of the core in contact with the steel are not free to move or spread laterally compared with the middle section of the core, owing to the inward directed frictional forces exerted by the steel platens on the core. The core becomes barrel-shaped as a result of these compressive shearing stresses on the ends. Since these end effects restrict lateral expansion, they are likely to give false values for *UCS* and *E*. These apparent values will probably be higher than the true values. Hence, if these end effects could be eliminated, a more significant value of *UCS* and *E* of specimen rock samples could be determined. In addition, the fracture and failure mechanisms would be represented more accurately under a uniform compression test with no end effects [31].

CHAPTER THREE

LABORATORY TESTS

Most of the laboratory tests were carried out according to ASTM standard procedures for the soil testing. The red clay soil samples were collected from Bethel; Kolfe - Keraneyho subcity, Addis Ababa. The laboratory tests conducted include the following:

3.1 Index Property Tests

As an aid for the soil and foundation engineer, soils have been divided into basic categories based upon certain physical characteristics and properties. The categories have been relatively broad in scope because of the wide range of characteristics of the various soils that exist in nature.

Basically, soil is a more complex material usually realized. The complexity is contributed by the existence in almost innumerable varieties, by, its combination of solid, liquid and gases, where in many instances of the solid particles vary in size from big boulders to colloidal size.

Furthermore, the relative quantities of solid, liquid and gases in a given soil are bound to change due to any physical cause, such as loading, seasonal variation and change of temperature.

For a proper evaluation of the suitability of soil for use as foundation or construction material, information about its properties, including the composition and the relative amount of each component must be known in addition to classification, is frequently necessary.

Those properties which help to assess the engineering behavior of a soil and which assist in determining its classification accurately are termed as '**Index Properties'**. Therefore, the index property of soil is the physical properties of the soil which serve mainly for identification and classification of soils.

The properties of soil which are considered as index properties are:

Grain size analysis

Atterberg limits

Free swell

Specific gravity and etc.

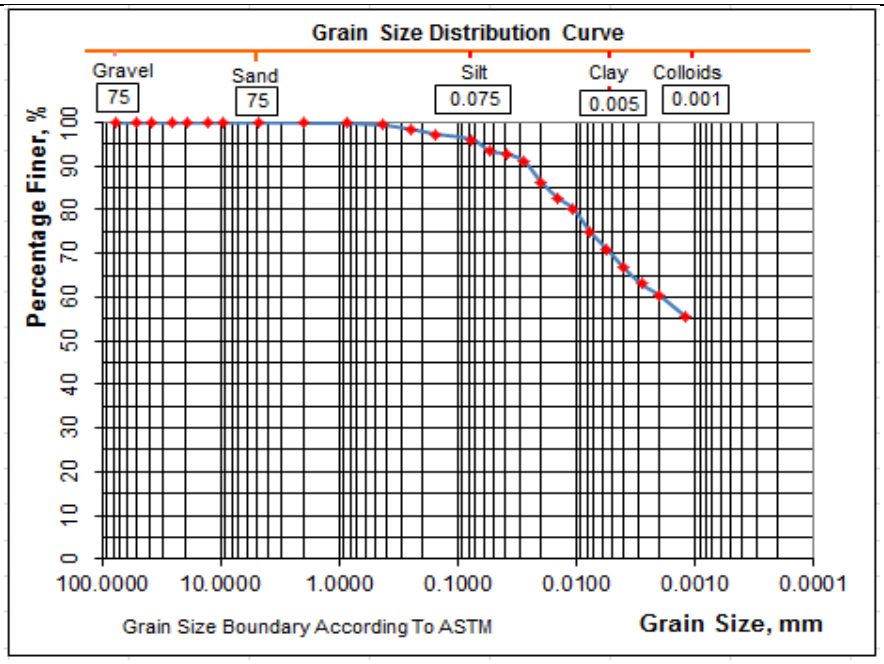
3.1.1 Grain Size Analysis

This test is performed to determine the percentage of different grain sizes contained within a soil. The mechanical or sieve analysis is performed to determine the distribution of the coarser, larger-sized particles, and the hydrometer method is used to determine the distribution of the finer particles.

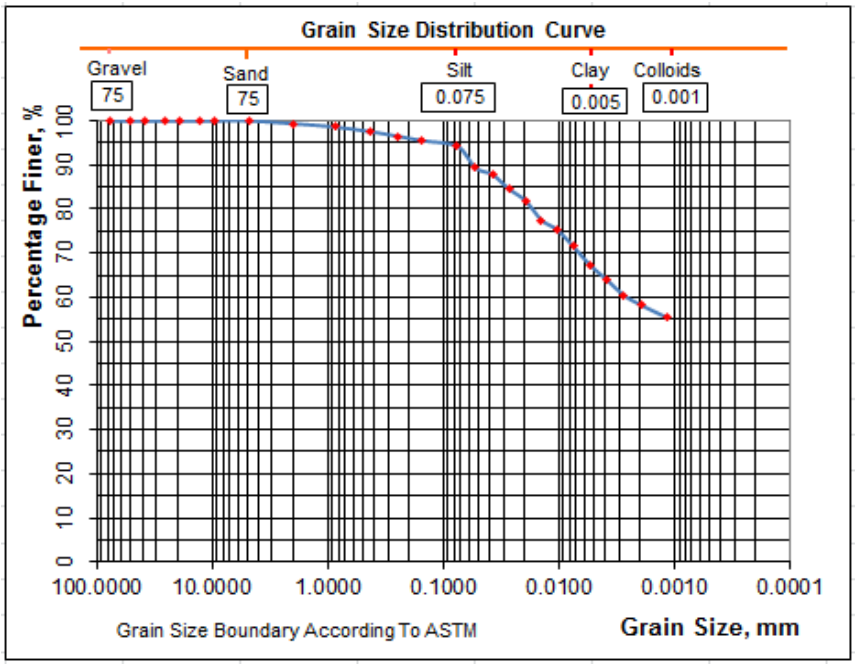
The distribution of particle sizes larger than 75 μm (retained on the No. 200 sieve) is determined by sieving, while the distribution of particle sizes smaller than 75 μm is determined by a sedimentation process, using a hydrometer. The detailed procedure of this analysis can be obtained from the ASTM Designation D 422 – 63).

Table 3.1 Grain size analysis test results of red clay soil sample in Addis Ababa (Bethel)

Parameter	Depth (m)	
	1.5m	3m
Fines Content (%)	96.14	94.24
Sand Size (4.75mm - 0.075mm) (%)	3.86	5.76
Silt Size (0.075mm - 0.002mm) (%)	34.77	35.24
Clay Size (< 0.002mm) (%)	61.37	59



a) 1.5m depth



b) 3m depth

Figure 3.1 Grain size distribution curves of red clay soil samples in Addis Ababa (Bethel)

3.1.2 Atterberg limits

Atterberg, a Swedish scientist, developed a method for describing the limit consistency of fine-grained soils on the basis of moisture content. These limits are the liquid limit, the plastic limit, and the shrinkage limit. The liquid limit is defined as the moisture content, in percent, at which the soil changes from a liquid state to a plastic state. The moisture contents (in percent) at which the soil changes from a plastic to a semisolid state and from a semisolid to a solid state is defined as the plastic limit and the shrinkage limit, respectively. These limits are generally referred to as the Atterberg limits. The Atterberg limits of cohesive soil depend on several factors, such as amount and type of clay minerals and type of adsorbed cation.

However, like any classification system, the Atterberg limits when used properly, provide a reliable index to the clay properties. The particle significances of the liquid and plastic limit lies in their ability to reflect the types and amount of clay minerals present in the fine fraction.

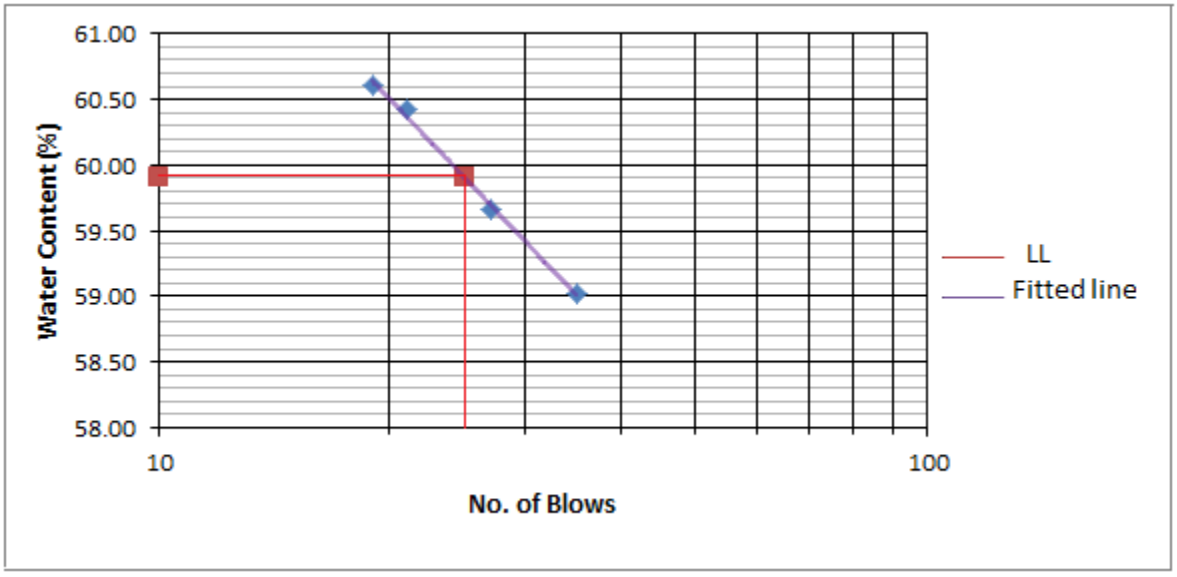
This lab is performed to determine the plastic and liquid limits of the selected sample following the procedures on ASTM standard, Designation D 4318.

Accordingly, liquid limit (LL) is arbitrarily defined as the water content, in percent, at which a pat of soil in a standard cup and cut by a groove of standard dimensions will flow together at the base of the groove for a distance of 13 mm (1/2 in.) when subjected to 25 shocks from the cup being dropped 10 mm in a standard liquid limit apparatus operated at a rate of two shocks per second and the test results were determined on the figure 3.2.(a & b).

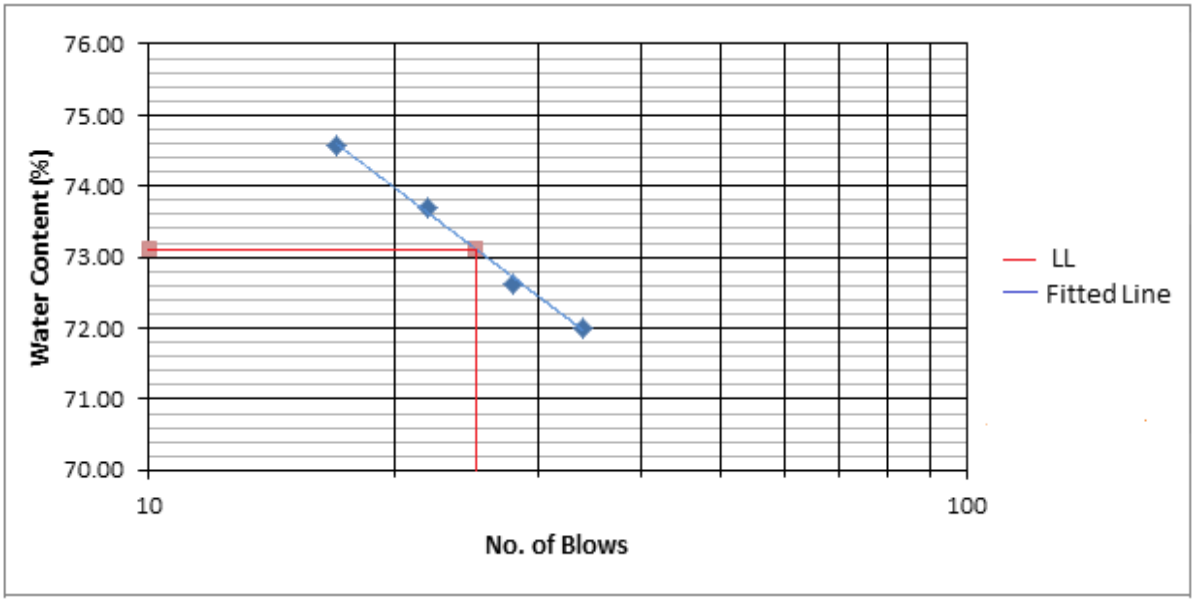
The plastic limit (PL) is the water content, in percent, at which a soil can no longer be deformed by rolling into 3.2 mm (1/8 in.) diameter threads without crumbling. The test results for the selected sample were determined in table 3.2.

Table: 3.2 Atterberg limit test results of red clay soil sample in Addis Ababa (Bethe

Depth Sample (m)	Liquid Limit , %	Plastic Limit,%	Plasticity Index,%
1.5	60	25	35
3	73	31.9	41.3



a) 1.5m depth



b) 3m depth

Figure: 3.2 Flow charts for red clay soil samples in Addis Ababa (Bethel)

Plasticity Index is the numerical difference between liquid and plastic limits. It is used to represent the range in water content through which a soil is in a plastic state. A high numerical value of plasticity index is an indication of the presence of high percentage of clay in the soil sample. Information regarding the type of clay in the sample, however, may be obtained by considering the plasticity index in relation to the liquid limit (Samuel T.). This is the best done by means of a plasticity chart shown on the figure: 3.3.

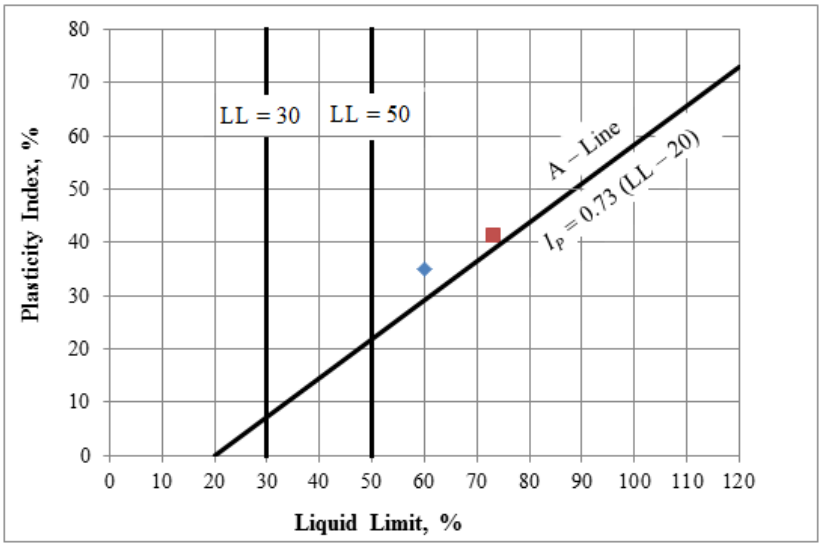


Figure: 3.3 plasticity charts of red clay soil samples in Addis Ababa (Bethel)

The empirical boundary designated by A-line on the chart separates inorganic clays from silts and organic clays. Accordingly, the red clay soil samples from bethel fall in the region of inorganic clays with high plasticity.

3.1.3 Free swell

This test is a recent innovation of very simple laboratory tests, which is used to approximate the degree of expansiveness of the soil sample. It is performed by slowly pouring 10 cm^3 of dry soil which has passed No. 40 sieve in to 100 cm^3 graduated cylinders filled with water and putting the content stand approximately twenty four hours until all the soil completely settles on the bottom of the cylinder. Then the difference is observed and the final volume of the soil is recorded.

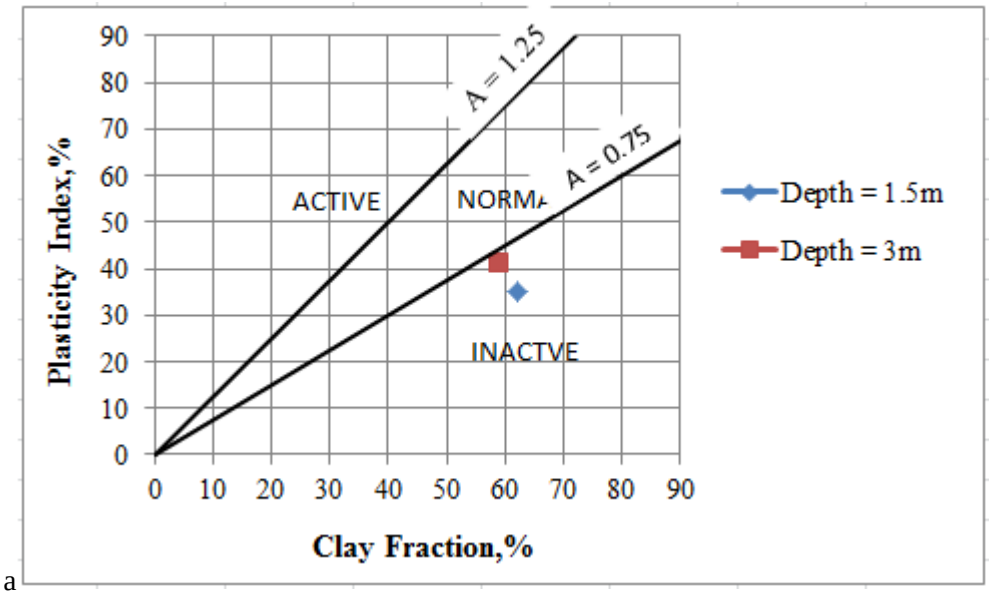
$$\text{Free Swell (\%)} = \frac{Final\ Volume - Initial\ volume\ of\ soil}{Initial\ volume} * 100$$

Table 3.3 Free Swell Test Results of the red clay soil samples in bethel of Addis Ababa

Depth Sample (m)	Free swell (%)
1.5	44
3	47.5

From the above table 3.3 the free swell of the red clay soil sample from bethel is 44% at 1.5m and 47.5% at 3m depth respectively. Therefore, from the free swell test results the sample is categorized in to not expansive soil since the value is less than 50%.

Depending on the results of Atterberg limits and particle size determination, it is possible to estimate the degree of expansiveness by plotting the results on an established activity chart shown on the figure 3.4. The plasticity index and the grain size in percent finer than 2 μm of red clay soil in Addis Ababa (Bethel) lies below the activity number 0.75, which is categorized as active soil. This result is also similar to the previous studies of Samuel T. [11], Solomon T. [12] and Hailemariam A [24].



a

Figure: 3.4 Activity charts of red clay soil samples in Addis Ababa (Bethel)

3.1.4 Specific gravity

This lab is performed to determine the specific gravity of soil by using a pycnometer. Specific gravity is the ratio of the mass of unit volume of soil at a stated temperature to the mass of the same volume of gas-free distilled water at a stated temperature. It is used in computing other soil properties, such as void ratio, unit weight and soil particle size determination by means of Hydrometer. It is also used in consolidation studies of clays, to calculate the degree of saturation of a soil.

Under these studies, the specific gravity of the soil sample is determined following the procedure on ASTM Standard, Designation D 854-00 and the result is given in Table 3.4.

Table 3.4 Specific gravity of red clay samples of Bethel in Addis Ababa

Depth Sample (m)	Specific Gravity
1.5	2.67
3	2.74

From the test results, one can summarize that as the specific gravity of the samples is almost similar with the previous study of Samuel T. [11], Solomon T. [12] and Hailemariam A [24].

3.2 Compaction Test

Mechanical compaction is one of the most common and cost effective means of stabilizing soils. An extremely important task of geotechnical engineers is the performance and analysis of field control tests to assure that compacted fills are meeting the prescribed design specifications. Design specifications usually state the required density (as a percentage of the "maximum" density measured in a standard laboratory test), and the water content. In general, most engineering properties, such as the strength, stiffness, resistance to shrinkage, and imperviousness of the soil, will improve by increasing the soil density.

The optimum water content is the water content that results in the greatest density for a specified compactive effort. Compacting at water contents higher than (wet of) the optimum water content results in a relatively dispersed soil structure (parallel particle orientations) that is weaker, more ductile, less pervious, softer, more susceptible to shrinking, and less susceptible to swelling than soil compacted dry of optimum to the same density. The soil compacted lower than (dry of) the optimum water content typically results in a flocculated soil structure (random particle orientations) that has the opposite characteristics of the soil compacted wet of the optimum water content to the same density.

Compaction test is performed to determine the relationship between the moisture content and the dry density of a soil for a specified compactive effort.

The compactive effort is the amount of mechanical energy that is applied to the soil mass. Several different methods are used to compact soil in the field, and some examples include tamping, kneading, vibration, and static load compaction.

This laboratory will employ the tamping or impact compaction method using the type of equipment and methodology developed by R. R. Proctor in 1933, therefore, the test is also known as the Proctor test.

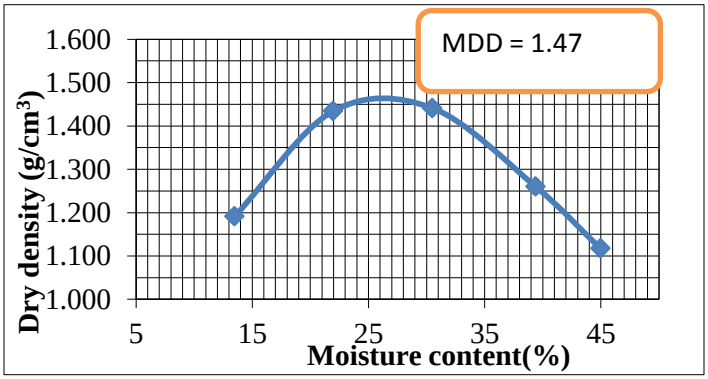
Two types of compaction tests are routinely performed:

1. The Standard Proctor Test, and
2. The Modified Proctor Test.

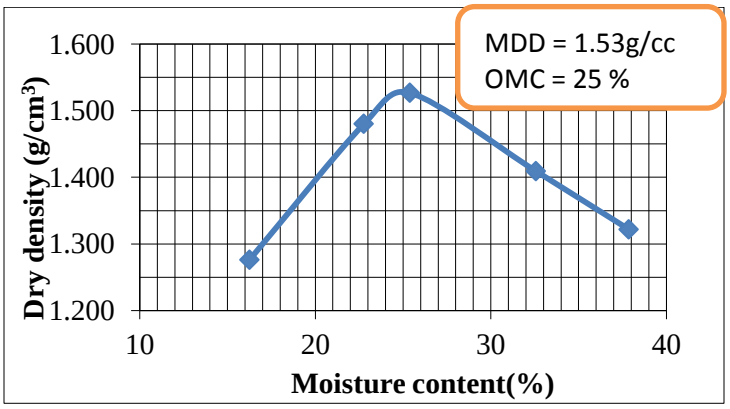
Standard Proctor compaction tests according to ASTM D 698-00a (ASTM 2002e) was performed on each soil samples. Because, it generally accepted as it used to simulate the field compaction for routine foundation and embankment design. Maximum dry densities (MDD) and optimum moisture contents (OMC) of the soils were achieved by applying an energy

level of 600 KN m/m3, equal to the standard compactive effort recommended by ASTM D 698-00a (ASTM 2002e). A rigid mold made of stainless steel and measuring 101.7 mm in diameter and 115.8 mm in height was used in the tests for all soils. Each sample was compacted in three equal layers inside the mold by dropping a 24.4-N rammer a distance of 305 mm. Twenty-five blows were then applied to each layer according to method B of ASTM D 698-00a (ASTM 2002e).

The compaction curves of both soil samples displayed in Fig. 3.5 (a, b) were obtained by plotting the dry densities of the compacted samples with reference to their water contents. Both of soil samples i.e at depth of 1.5m and 3m had bell-shaped compaction curves, among which were that of 1.5m depth was flatter than at 3m depth. From Fig.3.5 (a, b), it is clear that the values of MDD and OMC were 1.47 & 1.53 g/cc and 26% & 25% at a depth of 1.5m and 3m respectively.



a) For soil samples from 1.5m depth



b) For soil samples from 3m depth

Figure: 3.5 Graph of standard Proctor compaction curves of the soils used in this study

Generally, the index properties of the soils including the classification according to AASHTO soil classification and USC soil classification standard was given in table 3.5.

Table 3.5: Summary of index properties, classifications, and compaction parameters of the soils tested

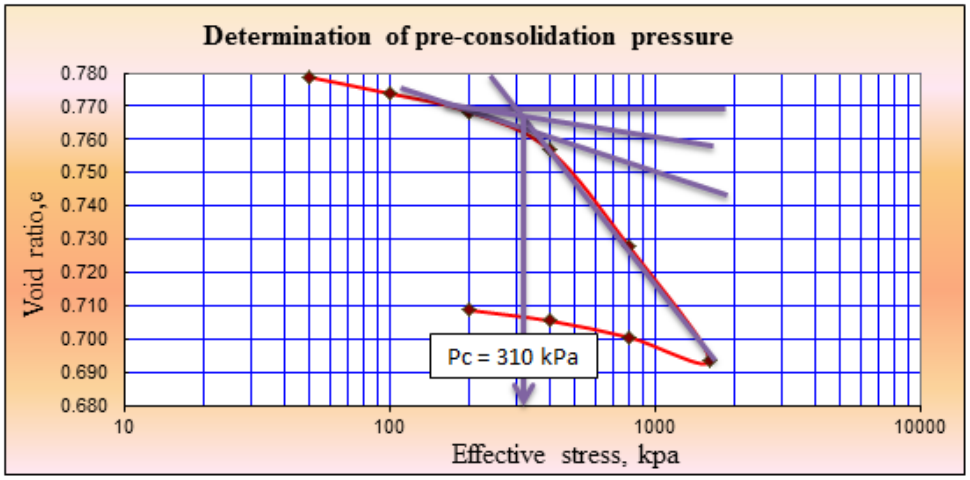
Parameter	Depth (m)	
	1.5m	3m
LL (%)	59.91	73.14
PL (%)	24.99	31.86
PI (%)	34.92	41.28
Specific Gravity, Gs	2.6	2.74
Fines Content (%)	96.14	94.24
Sand Size (4.75mm - 0.075mm) (%)	3.86	5.76
Silt Size (0.075mm - 0.002mm) (%)	34.77	35.24
Clay Size (< 0.002mm) (%)	61.37	59
Activity	0.56	0.70
Classification		
USCS	CH	CH
AASHTO	A-7-6	A-7-6
Group Name	Inorganic clays of high plasticity	Inorganic clays of high plasticity
Standard Proctor compaction		
MDD (KN/m^3)	1.47	1.53
OMC (%)	26	25

3.3 One Dimensional Consolidation Test

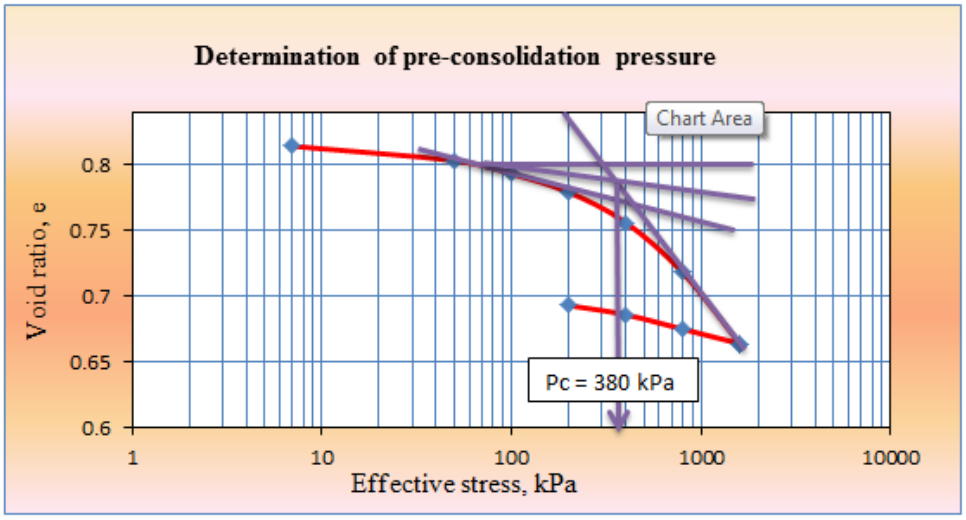
The one dimensional consolidation test was carried out to study the stress-strain and compressibility of the soil at hand under different conditions using the apparatus called Odometer. Tests were carried on undisturbed and remolded samples. Diameter of 50mm soil samples having height of 20 mm were loaded from 50 kPa to 1600 kPa by doubling the loading. For each loading starting from 50 kPa to 1600 kPa the compression was recorded from the dial gauge at intervals of: 0.1, 0.25, 0.5, 1, 2, 4,…, 1440 mins for twenty-four hours.

Unloading was also done by steps to examine the unloading behavior. A total of two consolidation tests were run on samples of undisturbed from 1.5m and 3m depth and pre-consolidation pressure were obtained.

Pre-consolidation pressure was determined from void ratio versus log pressure curve by Casagrande's method discussed in Buduh (2007) and shown on figure 3.6.



a. 1.5m depth



b. 3m depth

Fig. 3.6 Void ratio versus log effective pressure curve

From pre-consolidation pressure obtained using the above method and effective overburden pressure, the over consolidation ratio (OCR) was also calculated. The results of these parameters are summarized in Table 3.6 and detailed calculations are shown in the appendix-

C. The bulk unit weight of the soil was determined from unconfined compression test using undisturbed sample.

Table 3.6 Summary of pre-consolidation pressure and over consolidation ratio (OCR) of red clay soil samples in Bethel, Addis Ababa

Depth (m)	Bulk unit weight, kN/m^3	Pre-consolidation pressure, kPa	OCR
1.5	19.03	310	10.86
3	19.13	380	6.62

3.4 Unconfined compression Test

Unconfined compression tests constituted the main part of this research. The test program was designed to evaluate the effect of the sampling Height (H/D ratio) on the stress strain behavior of undrained shear strengths of red clay soils in Addis Ababa. The specimens were tested under strain-controlled conditions at a constant loading rate, according to the requirements of ASTM Designation D 2166-00 (ASTM 2002a).

3.4.1 Sample preparation

For this specific thesis the location of the sample area was selected on the basis of the previous research results. To get meaningful results on the effect of sampling height on stress-strain behavior of red clay soils in Addis Ababa both disturbed and undisturbed soil samples were collected from Bethel, in Kolfe-Keranyo subcity - Addis Ababa.

Compacted soil samples were used in the UCS tests in order to provide homogeneity, and elimination defects could not be determined visually before or after the tests. The red clay samples for unconfined compression testing were prepared with the optimum moisture content (OMC) in order to eliminate the effects of factors such as the moisture content (w), void ratio (e), and natural density (γ_n) on the UCS. Once sampled, the nominal moistures content of the sample was first determined by drying the sample at 110 C^0 for 24 hours. Then, soils were compacted using a Standard Proctor mold at the OMC and MDD (as obtained from the compaction curves) reducing the nominal moisture content from it. After compaction, a thin walled stainless steel sampling tube with an inner diameter of 38 mm, a length of 19 cm, and a wall thickness of 1.5 mm was driven into the soil in the Standard Proctor mold with a hydraulic jack. The soil was immediately extruded from the sampling

tube using another hydraulic jack and its ends were cut to make it the desired length. Side friction, which can damage soil samples during intrusion and extrusion, was minimized by lightly lubricating the inner surface of the sampling tube. Cylindrical soil samples with 4 different Height-to-diameter (H/D) ratios (from 1:1 to 2.5:1) were prepared from red clay soils in bethel of Addis Ababa in the manner explained above (see Fig. 3.6). The lengths of the cylindrical specimens of each soil type ranged from 38 mm to 95 mm. In each case, the diameter was 38 mm.

Following similar procedure with the compacted soil at its OMC, the soil samples were remoulded at the dry side and wet side of the optimum moisture content for both samples at 1.5m and 3m depth in order to see the effect of increasing and decreasing water content with varying sampling height on the stress strain behavior of undrained shear strength red clay soils.

Also, two undisturbed soil samples were collected from the selected site at both depths and the test was immediately done after the samples were carefully transported into the laboratory to reduce the disturbance in the natural properties of the soil samples and to keep the similarities of the natural properties of the soil including its natural moisture content in all of prepared sampling height. Because the change in moisture content and structure sample affects the stress-strain behavior of the clay soil samples.

Similar strain rate which is 0.8mm per minute was used for all samples done in this study.

In general, the unconfined compressive strength of a compacted soil tends to increase as the strain rate during loading is increased. However, to see a significant variation in the UCS, the strain rate must be increased at least tenfold (Hampton 1958; Kulhawy and Mayne 1990; Kim et al.2012). In this study, since the range of strain rate values selected were the same, the effect of the strain rate on the unconfined compressive strength was assumed to be negligible. Therefore, the strain rate was not included as a variable in the calculations and the equations.

3.4.2 Specimens size

In accordance with the earlier discussion (chapter 2), variation in height to diameter ratio lead to different results, in stress-strain behavior of soil and unconfined compressive strength. Consequently, these theses show how variation of height to diameter ratio affects the stress-

strain behavior of undrained shear strength of red clay soils collected from bethel in Addis Ababa.

The laboratory tests were conducted on four selected height to diameter ratio as shown in Table 3.7 and the thesis generally includes the study of such behaviors when the specimen has the same height with the sample diameter and when the specimen height is larger than specimen diameter (see figure 3.7)

Table 3.7 Selected heights-to- diameter ratio

No.	Height (mm)	Diameter (mm)	Height- to - diameter ratio
1	38	38	1
2	57	38	1.5
3	76	38	2
4	95	38	2.5

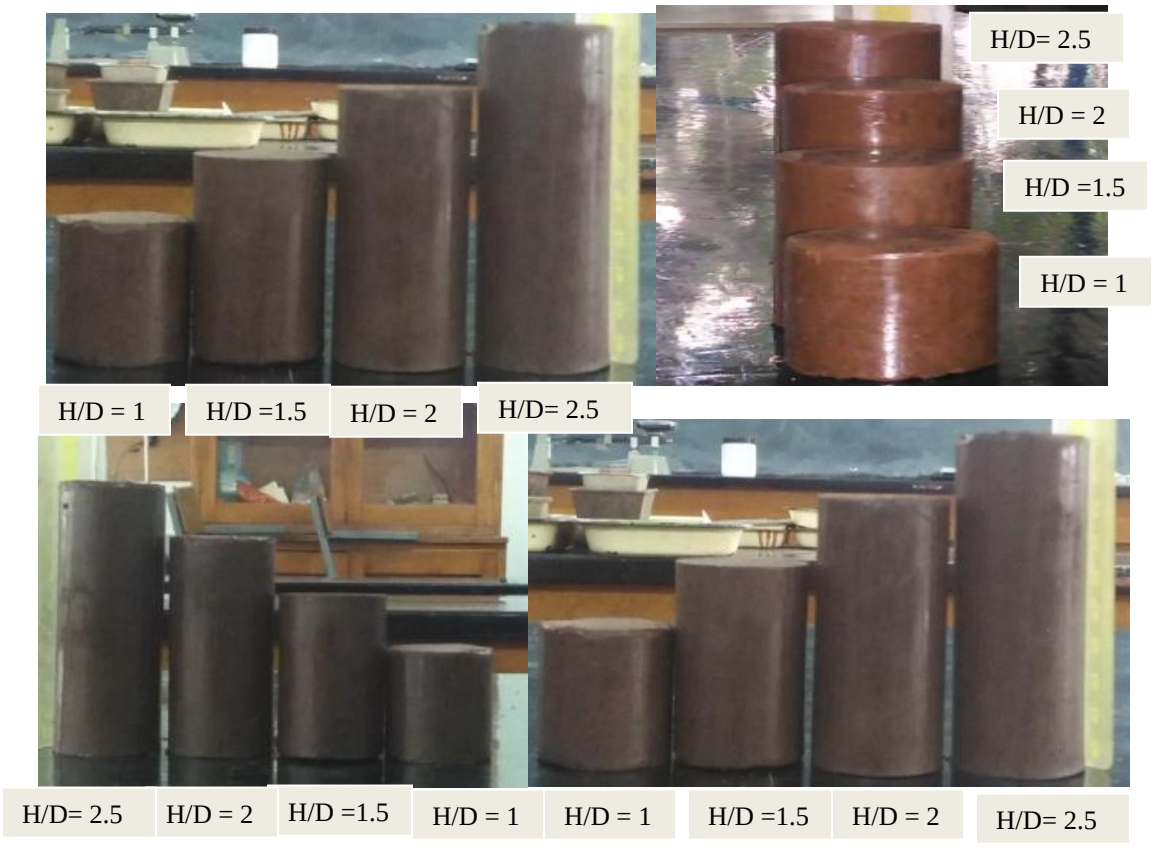


Fig. 3.7 Photograph of some of the specimens used in the UCS tests

In this study, unconfined compressive strength was taken as the maximum load attained per unit area (peak stress) or the load per unit area at 15 % axial strain, whichever was secured first during the performance of a test [4]. Accordingly, as shown on figure 3.8 the peak values were secured first and taken as the unconfined compressive strength values. For the other stress- strain curves refer to appendix A.

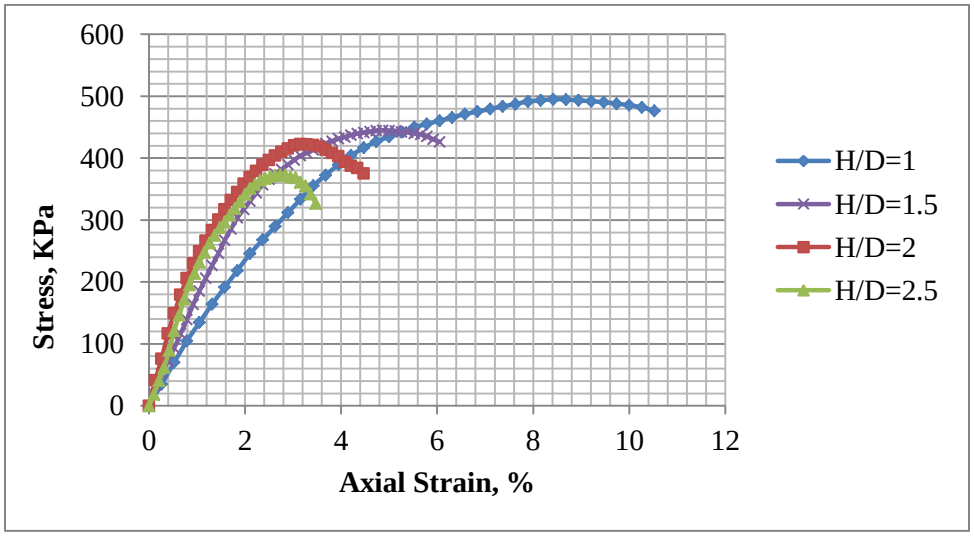


Figure 3.8: Plot of stress-strain curve for undisturbed sample with different specimen's height (sample No.1)

Accordingly, the unconfined compression tests were performed on the prepared samples at different conditions and the values of the unconfined compressive strength for each sample with different specimens height was given in Table 3.8.

Table 3.8 Unconfined compressive strength values of red clay soil samples in Addis Ababa (Bethel) with different sampling height to diameter (H/D) ratios.

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
1.5	1	495.098	500.101	497.60
	1.5	445.135	482.309	463.72
	2	422.476	431.218	426.85
	2.5	372.581	381.165	376.87

3	1	577.8797	583.663	580.771
	1.5	480.5068	492.153	486.330
	2	440.9985	429.278	435.138
	2.5	403.3943	386.736	395.065

i. Undisturbed sample (w = 28.06 % and 30.26 % for 1.5m and 3m respectively)

Depth (m)	H/D	Unconfined Compressive Strength (kPa)			
		Sample 1	Sample 2	sample 3	Average
1.5	1	525.0332	588.659	581.978	565.22
	1.5	448.5656	487.797	476.036	462.88
	2	419.7105	410.349	419.777	411.58
	2.5	392.3432	353.939	346.323	358.41
3	1	600.186	654.788	623.687	626.220
	1.5	525.408	543.784	559.203	542.798
	2	501.863	475.606	513.37	496.946
	2.5	441.271	434.734	400.789	425.598

ii. Sample remoulded at OMC (w = 26% and 25% for 1.5m and 3m respectively)

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
1.5	1	915.865	803.252	859.56
	1.5	841.969	740.318	791.14
	2	666.084	639.392	652.74
	2.5	642.134	569.495	605.81
3	1	1283.983	1228.245	1255.67
	1.5	1080.199	1220.279	1150.24
	2	999.301	1120.36	1059.83
	2.5	664.426	731.58	698.00

iii. Sample remoulded at dry side of OMC (w = 21.95 % and 20.41 % at 1.5m and 3m resp.)

Depth (m)	H/D	Unconfined Compressive Strength (KPa)
		Sample 1
1.5	1	305.147
	1.5	249.944
	2	198.291
	2.5	191.184
3	1	259.233
	1.5	253.041
	2	206.438
	2.5	197.731

iv. Sample remoulded at wet side of OMC (w =27.50 % and w = 28 % at 1.5m and 3m resp.)

As shown in Table 3.8, the unconfined compressive strength values of red clay soil collected from Bethel area exhibit higher values while compared with UCS values determined by different authors as discussed in typical shear strength of Addis Ababa red clay soil of chapter two for undisturbed and remoulded sample at its OMC with sample H/D = 2.

As per Taye, S. (1990) the unconfined compressive strength of red clay soil samples collected from Addisu Gebeya ranges from 86 – 107 kPa, while Yimer, S. (2005) determined UCS values of red clay soil in Kolfe area as it ranges between 127 – 317 kPa. But, from the current studies the UCS values for undisturbed sample collected from Bethel area ranges from 422.48 kPa – 431.22 kPa and 429.28 kPa – 440.99 kPa at 1.5m and 3m depth below the ground respectively. This indicates as the UCS values of red clay soil sample collected from Bethel area exhibit higher values while compared with previous studies. Because, the sample collected from Bethel is highly over-consolidated with OCR values of 10.86 and 6.62 for a sample collected from 1.5m and 3m depth respectively.

Depending on unconfined compressive strength value it is possible to determine the consistency of cohesive soils. According to the general relation between consistency and unconfined compression strength of clays [5], the red clay soil in Addis Ababa from Bethel area was categorized as hard clay soil.

Table 3.9: Consistency and unconfined compression strength of clays [5]

Consistency	Unconfined Compressive Strength (q_u), KN/m^2
Very soft	0-24
Soft	24-48
Medium	48-96
Stiff	96-192
Very stiff	192-383
Hard	>383

CHAPTER FOUR

DISCUSSION OF TEST RESULTS

4.1 Strength Properties

Since the aim of the research was to see the effect of sampling height, all the tests were conducted on samples having different heights but constant diameter using unconfined compression test.

Accordingly, average UCS values for the different H/D ratios of two undisturbed sample, three remoulded samples at OMC, two remoulded samples at dry side of OMC and a sample remoulded at wet side of OMC were tested in this study and they are given in Table 4.1.

Table 4.1 Unconfined compressive strength (q_u) values of red clay soil samples in Addis Ababa (Bethel) with different sampling height- to- diameter (H/D) ratios

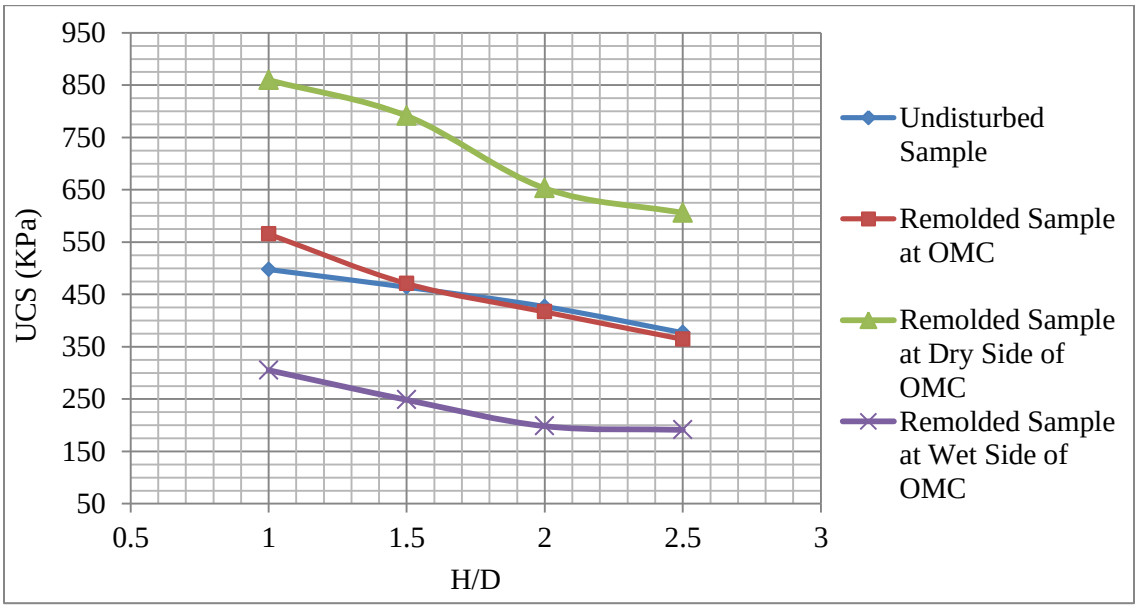
Depth (m)	H/D	Average value of unconfined compressive strength (kPa)			
		Undisturbed Sample	Remoulded sample at OMC	Remoulded sample at dry side of OMC	Remoulded sample at wet side of OMC
1.5	1	497.60	565.22	859.56	305.147
	1.5	463.72	462.88	791.14	249.944
	2	426.85	411.58	652.74	198.291
	2.5	376.87	358.41	605.81	191.184
3	1	580.771	626.220	1255.67	259.233
	1.5	486.330	542.798	1150.24	253.041
	2	435.138	496.946	1059.83	206.438
	2.5	395.065	425.598	698.00	197.731

The average unconfined compressive strength of red clay soil samples from bethel exhibits higher values. From the consolidation test results, the OCR values of red clay soil samples from Bethel is 10.68 and 6.8 at 1.5m and 3m depths respectively and the value indicates that,

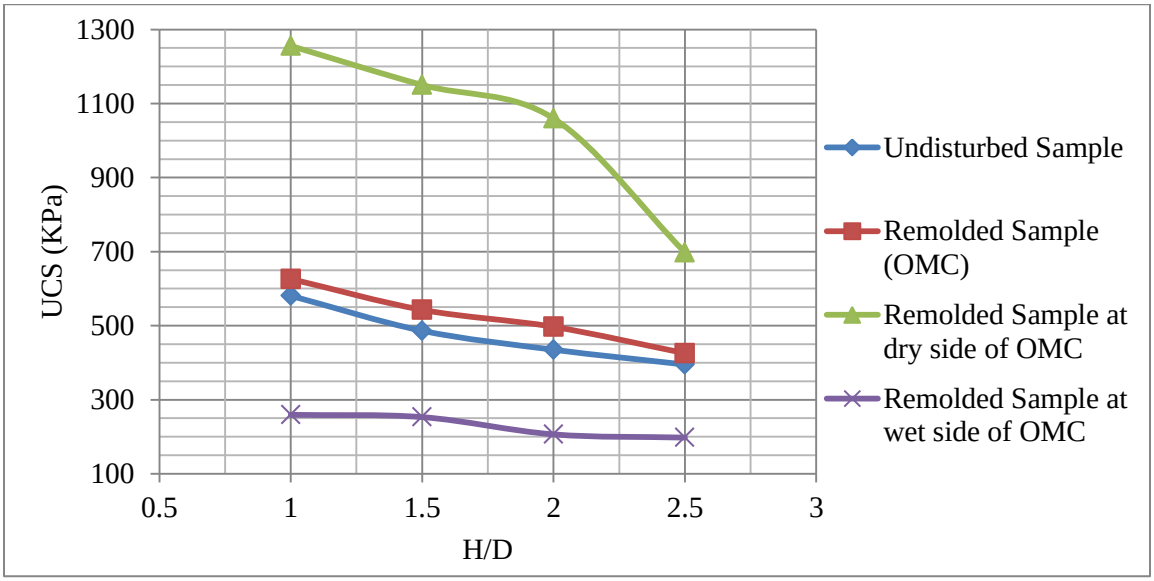
the sample is highly over-consolidated. When clay soil is highly over-consolidated, it attains high strength value at failure even with small axial strains.

Depending on the average values of unconfined compressive strength and H/D ratios given in table 4.1, the simple plots which show the effect of sampling heights on unconfined compressive strength were shown in figure 4.1(a, b). From the curves one can observe that, as sampling height increases the unconfined compressive strength of clay soil decreases.

The compressive strength of the clay soil without confinement was high when the specimen's height is too short. Because, if the specimens height is too long the sample easily fails since the stress is not equally distributed within the entire length of the specimens.



a. depth 1.5m



b. depth 3m

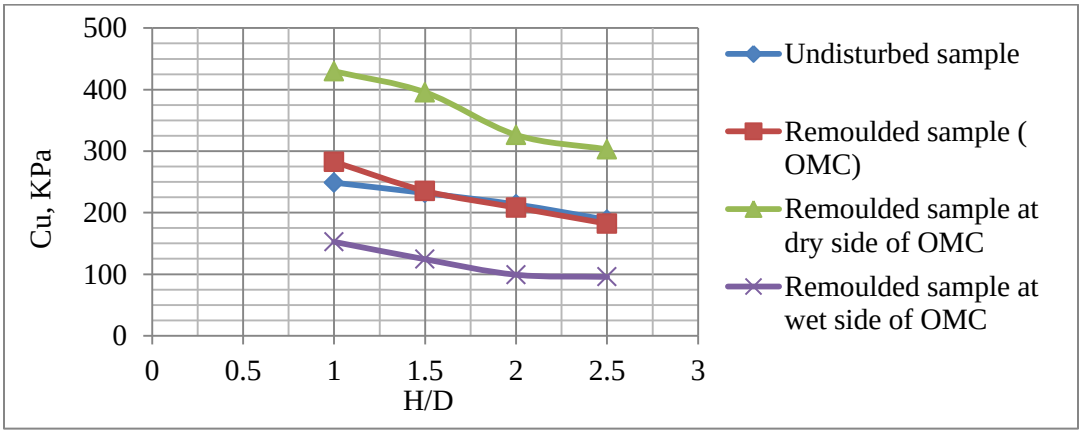
Figure 4.1 Graph showing the relationship between the UCS and the H/D ratio for each red clay samples

From the unconfined compression test results the undrained shear strengths (Cu) of the soil under investigation are computed and presented in table 4.2.

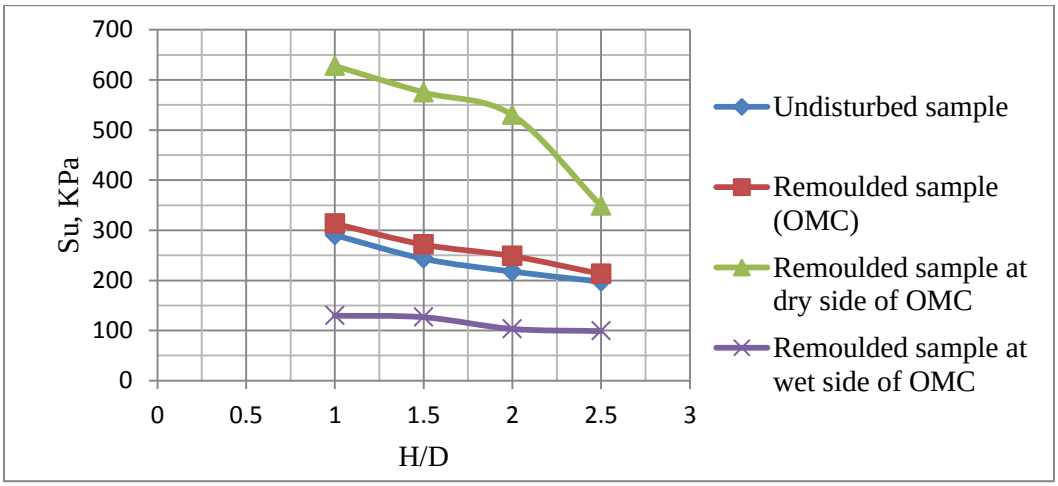
Table 4.2 Undrained shear strength (Su) values of red clay soil samples in Addis Ababa (Bethel) with different Sampling height- to- diameter (H/D) ratios

Depth (m)	H/D	Average value of Undrained Shear Strength (kPa)			
		Undisturbed sample	Remoulded sample at OMC	Remoulded sample at dry side of OMC	Remoulded sample at wet side of OMC
1.5	1	248.80	282.612	429.780	152.574
	1.5	231.86	235.300	395.570	124.262
	2	213.425	208.306	326.370	99.146
	2.5	188.435	182.101	302.905	95.592
3	1	290.386	313.150	627.835	129.617
	1.5	243.165	271.400	575.120	126.521
	2	217.569	248.473	529.915	103.219
	2.5	197.533	212.799	349.002	98.866

Depending on the average values of undrained shear strength at various H/D ratio of the sample given in Table 4.2, the simple plots of undrained shear strength versus H/D of the tested specimen was made. Accordingly, for all undisturbed and compacted samples at different moisture content including the dry side and wet side of optimum moisture content, the undrained shear strength of the sample decreases with increasing specimen's height. The difference is large for the shorter sampling height.



a. Depth 1.5m



b. Depth 3m

Figure 4.2 Graph showing the relationship between the undrained shear strength and the H/D ratio for each red clay samples in Addis Ababa

4.2 Failure Pattern

It was observed during and after the UCS tests that different failure characteristics developed in specimens of differing lengths but the same diameter.

Almost similar failure pattern was developed for undisturbed specimens, specimens remoulded at its OMC and dry side of OMC in the same height-to - diameter ratios for both samples at 1.5m and 3m depth as indicated on Figures 4.3.(a, b, c) and 4.4.(a, b, c).

The failure pattern for shorter clay specimen (H/D = 1) typically contains uniformly bulging and multi-shear failure planes which develop fully within the all specimens height. Mainly uniform bulging and multi shear planes usually develop together in this sampling height.

a) undisturbed sample

b) remoulded sample at OMC

c) sample remoulded at dry side of OMC

d) sample remoulded at wet side of OMC

Figure 4.3 General overview of the failure pattern of red clay soil samples in Addis Ababa (Bethel) at 1.5m depth

When sample height is increased to H/D = 1.5, the failure characteristics of the specimen is changed to a near vertical shear failure planes within the entire height of the sample and non-uniform bulging which localized to some portions of sample height.

The failure mechanism that occurs within longer specimens of H/D of 2 and 2.5 is a distinct failure plane, a single vertical and near vertical shear failures planes and localized bulging (barreling) in any part of the specimen or variation can form in the specimen during UCS test. Sometimes, only localized bulging with a little amount of cracks may occur. In other words, the specimen would fail in variety of complex ways. This complex deformation mechanism makes it easier for the specimen to fail. The decrease in strength observed is large when the specimens H/D ratio is increased to 2 and 2.5.

a) Undisturbed sample

b) remoulded sample at OMC

c) Sample remoulded at dry side of OMC

d) Sample remoulded at wet side of OMC

Figure 4.4 General overview of the failure pattern of red clay soil samples in Addis Ababa (Bethel) at 3m depth

Also, the deformation occurred in specimens H/D of 2 and 2.5 is due to applied compressive stress does not represent the true deformation that takes place within the total sampling height. This is because; the failure pattern is localized and occurred in some portions of the specimens.

The failure pattern develops in specimens compacted at wet side of OMC is different from specimens remoulded at its OMC and dry side of OMC.

As shown on Figure 4.2(d) and Figure 4.3(d) the failure characteristics takes place in all specimens H/D ratio of 1, 1.5, 2 and 2.5 when remoulded at wet side of OMC was quietly complex. A uniform bulging and vertical shear failures plane was developed in sampling height with H/D of 1 and 1.5, while a uniform like bulging with some of near vertical and diagonal shear failures was occurred in specimens with some exception of those showing only uniform like bulging shear failures pattern. Here the recorded deformation represents the deformation takes place in the total height of the specimens, since the failure pattern is all most the same. Since, the samples were remoulded with moisture content above the OMC the shear strength of the specimen was low while comparing with the specimens compacted at its optimum moisture content, dry side of optimum moisture content and undisturbed case. This shows as the soil compacted at wet side of OMC is soft and has low bondage and high void spaces.

Generally, the clay sample fails in one of two ways under unconfined compression test. In stiffer clays, a distinct failure plane forms. For this type of failure, it is likely that the point of failure will be indicated by the measurement of a peak and then a decrease in load. A "barreling" failure is more typical for softer clays. In this type of failure, a distinct failure plane doesn't form, rather the sample bulges in the middle [1]. Accordingly, the failure pattern developed in red clay soil samples from Bethel indicates that the sample is stiff clay soil. But, as per different sample height, the failure developed in specimens where different. The difference may occur due to sample height and end platen effect. End platen effect can increase or decreases the shear strength of soil.

Daichao Sheng, Bo Westerberg, H. Mattsson and K. Axelsson (1997) demonstrated effects of end restrain and strain rate in a triaxial tests using finite element model and simulated results show that both end restraint and insufficient drainage can cause the barrel-shape deformation

of the specimen. Stress-strain and strength properties based on global measurements are not a good representation of the true material behaviour of one single soil element at constitutive level [30].

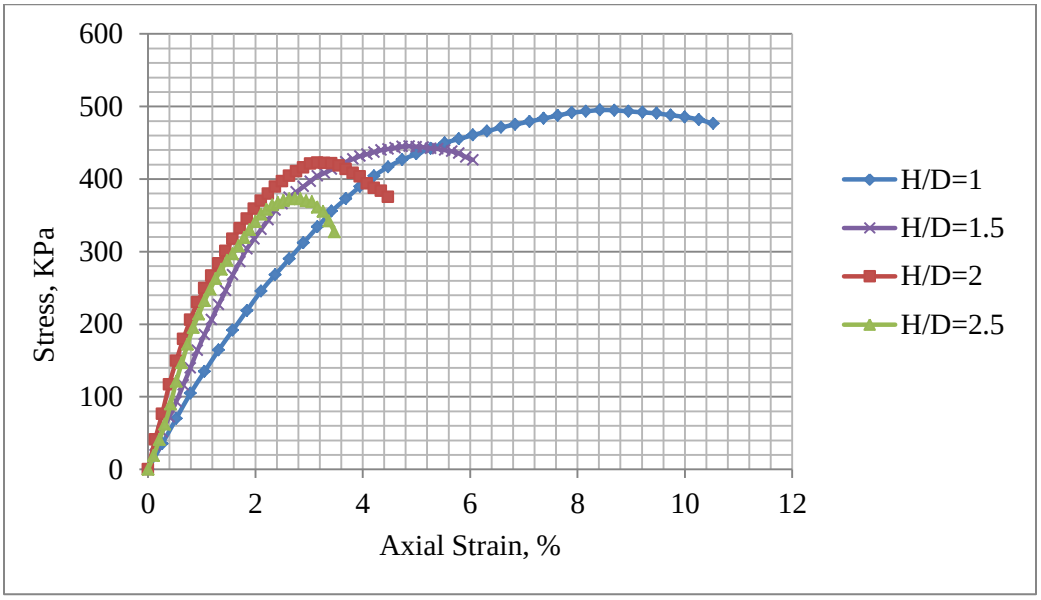
Accordingly, in red clay soil sample from Bethel vertical or near vertical multi shear failure pattern and uniform bulging was developed in short specimens and single diagonal and localized bulging was developed with in H/D ratios of 2 and 2.5. These localized bulging was may be the effect of end platen.

4.3 Stress-Strain Curve

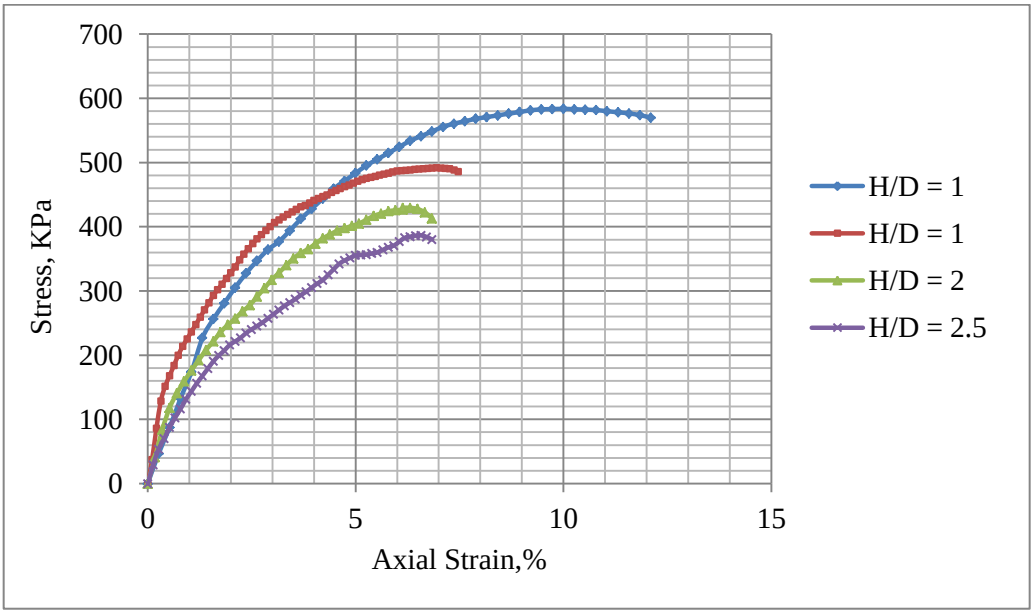
From the unconfined compression test results the stress- strain behavior of undrained shear strength of clay soil can be determined using the plot between the unconfined compressive stresses versus axial strain. Accordingly, the plot of stress-strain curve from the UCS tests of undisturbed specimens and compacted soil specimens at different moisture (i.e OMC, dry side of OMC and wet side of OMC) were made for each sample considering different sampling height as clearly shown on Figures 4.5, 4.6, 4.7 and 4.8. The values used for the plot of each sample and some of the others plot are given in Appendix A.

Since, the soil samples were highly over-consolidated clay, the sample can attain its high peak strength failure at small axial strains of 2% to 5%. But also, the failure pattern developed with in the specimen height can affect the stress-strain behavior of the sample. If failure is uniformly developed with in the specimen height, relatively that specimens attain its peak strength at large axial strains and vice versa.

It is clear from the stress-strain curves shown in Figures 4.5, 4.6, 4.7and 4.8 that the peak strengths of all specimens tended to increase with decreasing H/D ratio. The peak strength is large for H/D =1 and decreases as the specimen's height increases and the peak strength difference is small for the H/D ratio of 2 and 2.5.



a) 1.5m depth

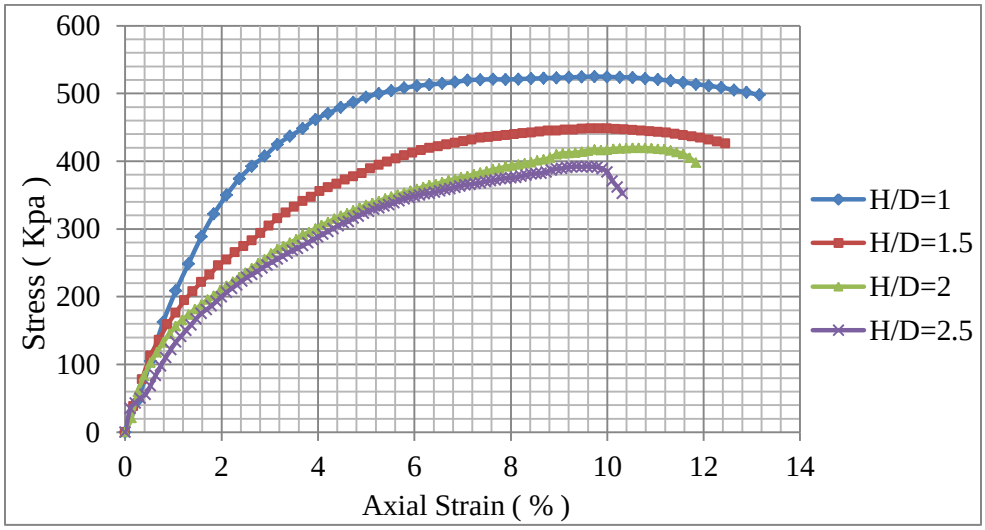


b) 3m depth

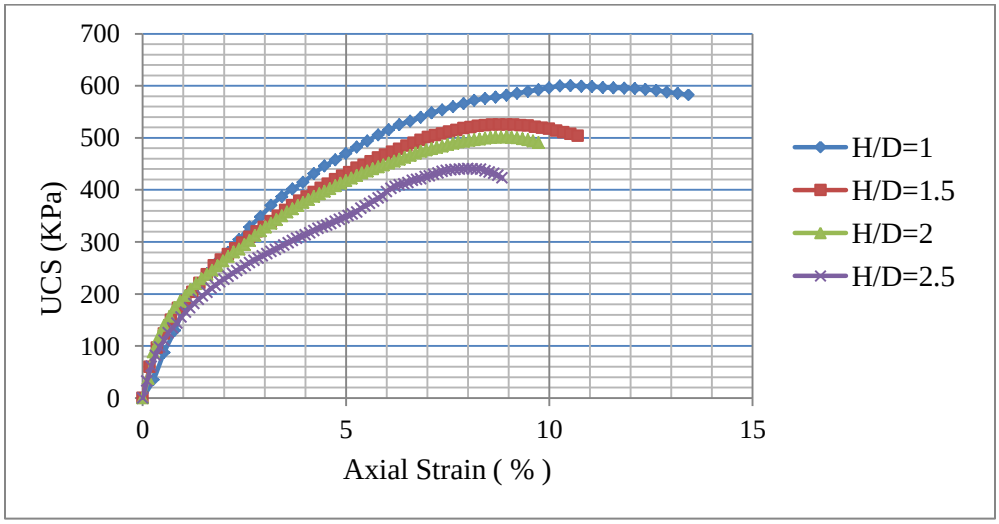
Figure 4.5 Stress–strain curves for undisturbed red clay samples with various Height-to-diameter (H/D) ratios at a depth of 1.5m and 3m

For the specimens with H/D = 1, the stress-strain curve is longer than the others. Here a sample failed as uniform deformation (uniformly bulging) and vertical or near vertiacal multi-shear failure within the total height of the specimen. When failures occurred in such mode, deformation and volume change occurred in the total height of the specimen and

therefore, the data measured represent the response of the whole specimen. Since, the calculated stress- strain represents the height of the entire specimen, as normally assumed, the stress-strain curves are too long and the sample attains its ultimate stress at large axial strains. This is true for undisturbed samples and remoulded samples at its optimum moisture content and dry side of optimum moisture content in this study.



a) 1.5m depth (w = 26%)

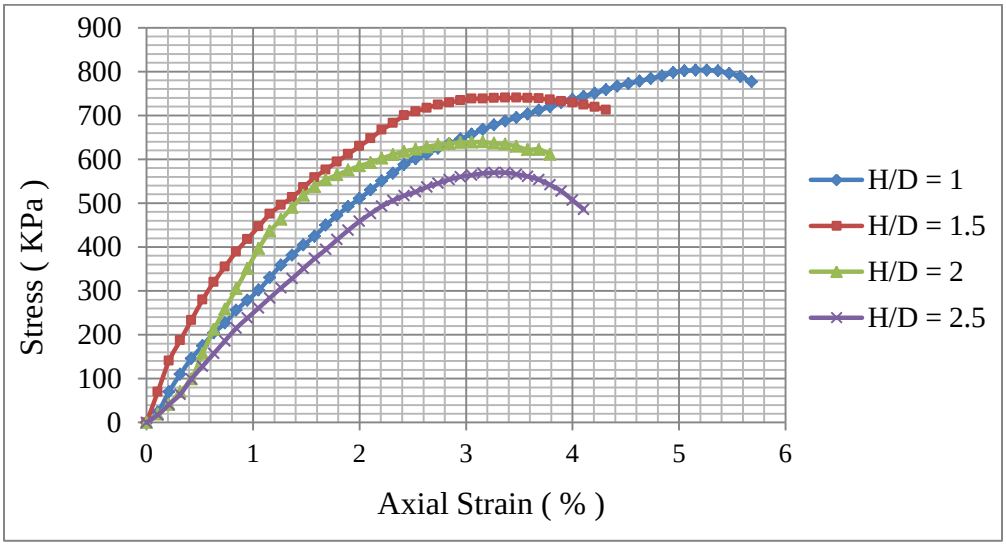


b) 3m depth (w =25%)

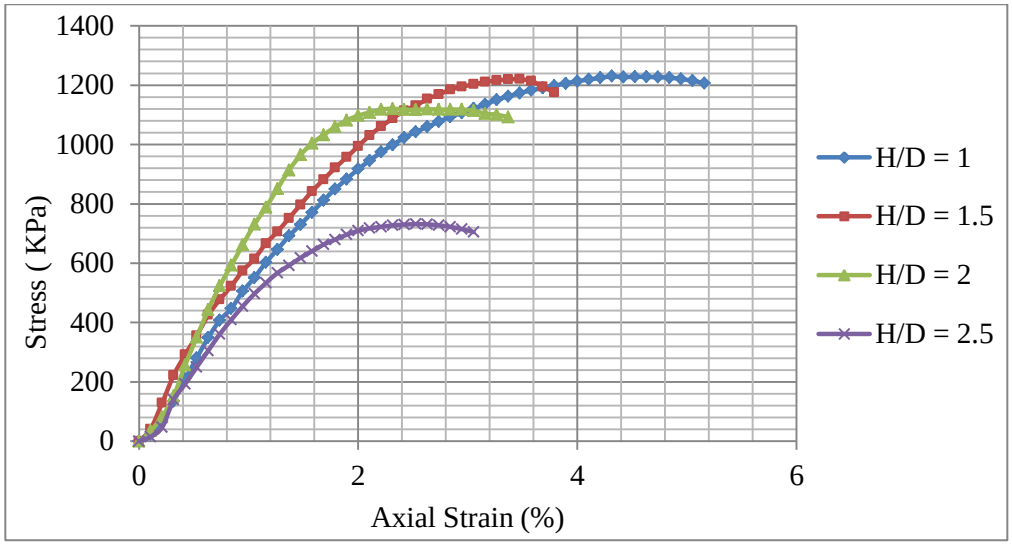
Figure 4.6 Stress–strain curves for red clay samples remoulded at OMC with various height-to-diameter (H/D) ratios at a depth of 1.5m and 3m

As clearly shown on the Figures 4.5, 4.6 and 4.7, the stress-strain curve for specimens with H/D ratio of 2 and 2.5 was too short and attained its peak stress at smaller axial strains. Particularly, for H/D = 2.5, there is an immediate drop of the curve after it reached its peak strength. Because, as discussion made under failure pattern indicates; in specimens with H/D ratios of 2 and 2.5, a distinct failure plane, which is a single vertical or near vertical failure planes and non-uniform bulging (barrel) which was localized to some portions of the specimen were developed. When shear failures occurred in such mode, deformation and volume change was limited to the localized zone. Therefore, the data measured did not represent the whole specimens' height as normally assumed. It only represents the material sheared in this localized zone, not the entire specimens' height.

Unfortunately, the height of localized zone was unknown, and the total height of the specimen is employed for calculation of strains. Consequently, the stress-strain curve was too short and the sample attains its ultimate stress at smaller strains than the actual one.



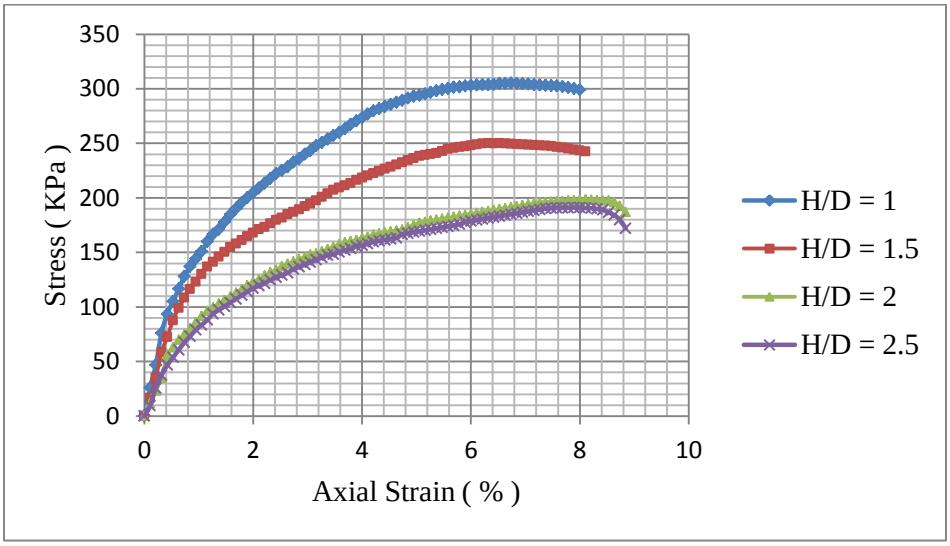
a) 1.5m depth (w = 21.95%)



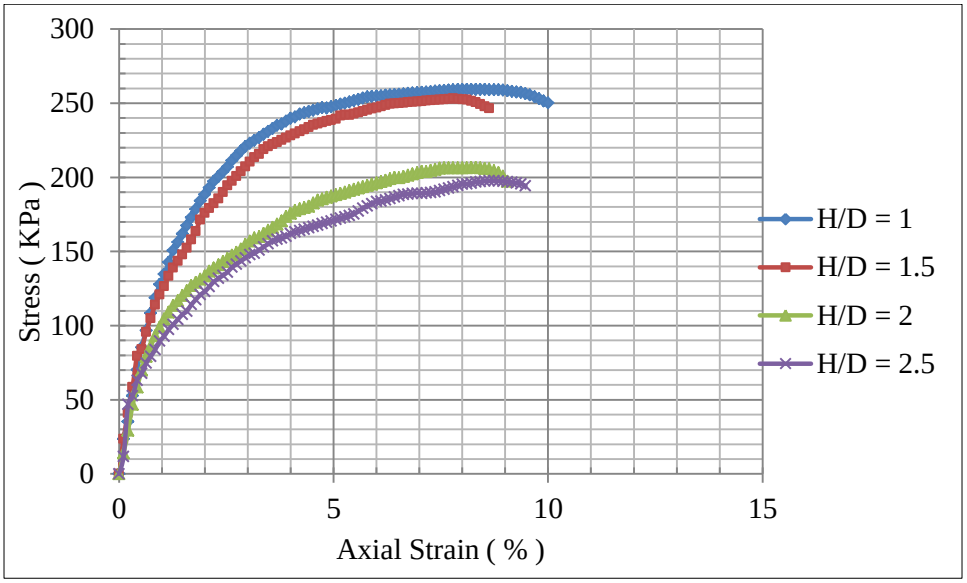
b) 3m depth (w = 20.41%)

Figure 4.7 Stress–strain curves for red clay samples remoulded at dry side of OMC with various Height-to-diameter (H/D) ratios at a depth of 1.5m and 3m

For the undisturbed and remoulded samples at optimum moisture content and dry side of optimum moisture content, the axial strain at which the sample failed increases with decreasing H/D ratio.



a. 1.5m depth (w = 27.5%)



a. 3m depth (w = 28%)

Figure 4.8 Stress–strain curves for red clay samples remoulded at wet side of OMC with various height-to-diameter (H/D) ratios at a depth of 1.5m and 3m

When the sample was remoulded at the wet side of optimum moisture content, the stress-strain curve was too long for all specimens with H/D ratio of 1, 1.5, 2 and 2.5, but the slope of the curve is decreases as the specimens H/D ratio increases. Because, the failure mechanism developed with in those samples were complex while comparing with undisturbed samples, remoulded samples at its OMC and dry side of OMC. The axial strain at failure was large even if the specimen height increases and the moisture within the sample also lead to fail at small stress while comparing with the other samples; because there was unvarying like bulging and diagonal shear failure within the entire height of the specimen. These also shows that, if the samples were remoulded at the wet side of optimum moisture content the stiffness of the material was decreased and it affects the stress-strain behavior of clay soil. Since the particle has parallel orientation and weak, the shear failure can easily develop within the entire height of the specimen and causes the stress- strain curve too long for all specimens with different H/D ratio.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the data and observations presented in this thesis, the following conclusions can be drawn.

1. From consolidation test results, red clay soil samples from Bethel, Addis Ababa were highly over consolidated clay with OCR values of 10.86 and 6.62 at depth of 1.5m and 3m, respectively.
2. Depending on the stress – strain curves and the observation of the specimens during and after UCS tests, the stress-strain curves for the samples with H/D = 1 were tended to reach its peak strengths at large axial strains. The specimen generally tended to reach its peak strengths at smaller axial strains as the H/D ratio of the specimens increased for the undisturbed sample and sample compacted at its optimum moisture content and dry side of optimum moisture content.
3. The sample attains its peak strength at axial strains between 2% - 5% and 10% - 15% for undisturbed sample and sample remoulded at its OMC respectively, since the sample is highly over-consolidated clay soil.
4. The sharpness of the peak and the drop after the peak in the stress-strain curve increases greatly with increasing H/D ratio, implying non-uniform failure pattern whether it is bulging, vertical or near vertical shear failure plane.
5. The deformation and shear failure plane developed within the specimen changes from uniform to non-uniform with increasing H/D ratio. Especially, in the specimen's height with H/D of 2 and 2.5 non-uniform deformation and shear failure plane was developed and localized to some portions of specimens' height.
6. Uniform developments of deformation results in a tendency towards multiple failure surfaces and general plastic failure, rather than the pre mature development of single failure (slip) surface. This means that measurements volume change refers to the entire sample rather than to one preferred zone.

7. From the results of unconfined compression tests conducted on the undisturbed and compacted red clay soils at different moisture content including (i.e. optimum moisture content and moisture content at dry and wet side of OMC), the unconfined compressive strength decreases with increasing height-to-diameter (H/D) ratio of the specimens. This point indicates that the H/D ratio of the specimen is one of the factors to be considering when measuring the compressive strength of a clay soil specimen in UCS test and it agrees with the concept written in literature review. The unconfined compressive strength value is larger at 3m than 1.5m depth.
8. The unconfined compressive strength of red clay soil samples collected from Bethel area exhibits higher values as compared with previous studies.
9. Finally, based on the uniformity of the stress-strain curve, the failure patterns developed within the entire specimens height and axial strain ranges at which sample attain its peak strength for the investigated ranges of H/D ratio, it is possible to use samples with H/D = 1 to H/D = 2 to determine undrained shear strength of red clay soil in Addis Ababa..

   NB: To verify the result H/D = 1 to H/D = 2 is appropriate sample size for red clay soil samples in Addis Ababa it needs further study on the effect of end platen.

5.2 Recommendations

As the problems related with sampling height-to-diameter ratio are very wide and causes foundation problem by affecting stress-strain behavior of soils and only very few can be said from results obtained from tests conducted, the research work should be extended further to cover many related matters for different clay soils in the country, such as;

- The influence of sample height and end restrain on the shape stress-strain curves and unconfined compressive strength on red clay soil, detail experiments should be performed to determine the appropriate sample height.
- The influence of specimen size on stress-strain behavior of clay soil by changing both height and diameter of the specimen proportionally if the sampler is available.

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APPENDIX A

DETAIL CALCULATION OF UNCONFINED COMPRESSIVE STRENGTH

For the entire performed unconfined compression test the same strain rate which is 0.8/min is used.

Load Dial: 1 unit = 1.33 N/Div

Deformation Dial: 1 unit = 0.01mm

The values in the table were calculated based on the formulas given below.

Sample Deformation = Deformation dial reading * 0.01mm

Axial Strain (ε) = $Sample\ Deformation\ /\ Initial\ Height\ of\ the\ sample = \frac{\Delta H}{H_0}$

Axial strain (ε), $\% = \frac{\Delta H}{H_0} * 100$

Corrected Area (mm^2), $A' = \frac{A_0}{1-\varepsilon}$

Load (N) = Load Dial Reading * 1.33

Load (KN) = Load (N)/ 1000

Stress (KPa) = $\frac{Load\ (N)}{A'(mm)^2} * 10^6$

Following the above procedures the unconfined compression test data for each of undisturbed sample, remoulded sample at its OMC, remoulded sample at dry and wet side of OMC including the stress-strain curve and unconfined compressive strength was given below for the samples at both 1.5m and 3m depth. All samples are collected from bethel.

A1. Sample from depth of 1.5m

A1.1 Undisturbed sample

Visual classification: Light Brown red clay soil

W = 28.08%

a. H/D = 1 Mass of sample: 88.7g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.0026316	0.2631579	1137.107388	0.0399	35.089034
20	60	0.2	0.0052632	0.5263158	1140.115608	0.0798	69.992902
30	90	0.3	0.0078947	0.7894737	1143.139788	0.1197	104.7116
40	116	0.4	0.0105263	1.0526316	1146.180053	0.15428	134.60363
50	142	0.5	0.0131579	1.3157895	1149.236533	0.18886	164.33519
60	166	0.6	0.0157895	1.5789474	1152.309358	0.22078	191.59785
70	190	0.7	0.0184211	1.8421053	1155.39866	0.2527	218.71239
80	214	0.8	0.0210526	2.1052632	1158.50457	0.28462	245.67879
90	234	0.9	0.0236842	2.3684211	1161.627224	0.31122	267.91727
100	254	1	0.0263158	2.6315789	1164.766757	0.33782	290.03232
110	274	1.1	0.0289474	2.8947368	1167.923306	0.36442	312.02391
120	294	1.2	0.0315789	3.1578947	1171.097011	0.39102	333.89207
130	314	1.3	0.0342105	3.4210526	1174.288011	0.41762	355.63677
140	330	1.4	0.0368421	3.6842105	1177.496448	0.4389	372.73998
150	346	1.5	0.0394737	3.9473684	1180.722466	0.46018	389.74443
160	360	1.6	0.0421053	4.2105263	1183.966209	0.4788	404.40343
170	372	1.7	0.0447368	4.4736842	1187.227824	0.49476	416.73552
180	382	1.8	0.0473684	4.7368421	1190.507459	0.50806	426.75919
190	390	1.9	0.05	5	1193.805263	0.5187	434.49297
200	398	2	0.0526316	5.2631579	1197.121389	0.52934	442.17738
210	406	2.1	0.0552632	5.5263158	1200.455989	0.53998	449.81241
220	412	2.2	0.0578947	5.7894737	1203.809218	0.54796	455.18841
230	418	2.3	0.0605263	6.0526316	1207.181232	0.55594	460.52737
240	424	2.4	0.0631579	6.3157895	1210.572191	0.56392	465.8293
250	430	2.5	0.0657895	6.5789474	1213.982254	0.5719	471.0942
260	435	2.6	0.0684211	6.8421053	1217.411582	0.57855	475.22958
270	440	2.7	0.0710526	7.1052632	1220.86034	0.5852	479.33411
280	445	2.8	0.0736842	7.3684211	1224.328693	0.59185	483.40777
290	450	2.9	0.0763158	7.6315789	1227.816809	0.5985	487.45057

300	455	3	0.0789474	7.8947368	1231.324857	0.60515	491.46251
310	458	3.1	0.0815789	8.1578947	1234.853009	0.60914	493.28948
320	461	3.2	0.0842105	8.4210526	1238.401437	0.61313	495.09794
330	462	3.3	0.0868421	8.6842105	1241.970317	0.61446	494.74612
340	462	3.4	0.0894737	8.9473684	1245.559827	0.61446	493.32034
350	462	3.5	0.0921053	9.2105263	1249.170145	0.61446	491.89456
360	462	3.6	0.0947368	9.4736842	1252.801453	0.61446	490.46878
370	461	3.7	0.0973684	9.7368421	1256.453936	0.61313	487.98446
380	460	3.8	0.1	10	1260.127778	0.6118	485.50632
390	458	3.9	0.1026316	10.263158	1263.823167	0.60914	481.98199
400	454	4	0.1052632	10.526316	1267.540294	0.60382	476.37144

b. H/D = 1.5 Mass = 128.2gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	28	0.1	0.0013158	0.1315789	1135.609223	0.03724	32.792971
20	44	0.2	0.0026316	0.2631579	1137.107388	0.05852	51.463917
30	62	0.3	0.0039474	0.3947368	1138.609511	0.08246	72.421668
40	80	0.4	0.0052632	0.5263158	1140.115608	0.1064	93.323869
50	100	0.5	0.0065789	0.6578947	1141.625695	0.133	116.50053
60	120	0.6	0.0078947	0.7894737	1143.139788	0.1596	139.61547
70	141	0.7	0.0092105	0.9210526	1144.657902	0.18753	163.83061
80	160	0.8	0.0105263	1.0526316	1146.180053	0.2128	185.66018
90	178	0.9	0.0118421	1.1842105	1147.706258	0.23674	206.27229
100	196	1	0.0131579	1.3157895	1149.236533	0.26068	226.82885
110	213	1.1	0.0144737	1.4473684	1150.770895	0.28329	246.17411
120	232	1.2	0.0157895	1.5789474	1152.309358	0.30856	267.77531
130	248	1.3	0.0171053	1.7105263	1153.851941	0.32984	285.8599
140	264	1.4	0.0184211	1.8421053	1155.39866	0.35112	303.89511
150	276	1.5	0.0197368	1.9736842	1156.94953	0.36708	317.28264
160	288	1.6	0.0210526	2.1052632	1158.50457	0.38304	330.63314
170	300	1.7	0.0223684	2.2368421	1160.063795	0.399	343.9466
180	312	1.8	0.0236842	2.3684211	1161.627224	0.41496	357.22303
190	320	1.9	0.025	2.5	1163.194872	0.4256	365.88882
200	328	2	0.0263158	2.6315789	1164.766757	0.43624	374.52992
210	335	2.1	0.0276316	2.7631579	1166.342896	0.44555	382.00601
220	342	2.2	0.0289474	2.8947368	1167.923306	0.45486	389.4605
230	349	2.3	0.0302632	3.0263158	1169.508005	0.46417	396.89339
240	356	2.4	0.0315789	3.1578947	1171.097011	0.47348	404.30468
250	360	2.5	0.0328947	3.2894737	1172.69034	0.4788	408.29193

260	365	2.6	0.0342105	3.4210526	1174.288011	0.48545	413.39943
270	370	2.7	0.0355263	3.5526316	1175.890041	0.4921	418.49151
280	375	2.8	0.0368421	3.6842105	1177.496448	0.49875	423.56816
290	379	2.9	0.0381579	3.8157895	1179.10725	0.50407	427.5014
300	383	3	0.0394737	3.9473684	1180.722466	0.50939	431.4223
310	386	3.1	0.0407895	4.0789474	1182.342112	0.51338	434.20597
320	389	3.2	0.0421053	4.2105263	1183.966209	0.51737	436.98038
330	392	3.3	0.0434211	4.3421053	1185.594773	0.52136	439.74553
340	394	3.4	0.0447368	4.4736842	1187.227824	0.52402	441.38117
350	396	3.5	0.0460526	4.6052632	1188.865379	0.52668	443.01063
360	398	3.6	0.0473684	4.7368421	1190.507459	0.52934	444.63392
370	399	3.7	0.0486842	4.8684211	1192.15408	0.53067	445.13541
380	399	3.8	0.05	5	1193.805263	0.53067	444.51974
390	399	3.9	0.0513158	5.1315789	1195.461026	0.53067	443.90406
400	398	4	0.0526316	5.2631579	1197.121389	0.52934	442.17738
410	398	4.1	0.0539474	5.3947368	1198.78637	0.52934	441.56325
420	397	4.2	0.0552632	5.5263158	1200.455989	0.52801	439.8412
430	396	4.3	0.0565789	5.6578947	1202.130265	0.52668	438.12224
440	394	4.4	0.0578947	5.7894737	1203.809218	0.52402	435.30153
450	390	4.5	0.0592105	5.9210526	1205.492867	0.5187	430.28044
460	387	4.6	0.0605263	6.0526316	1207.181232	0.51471	426.37343

c. H/D = 2 Mass = 170.3gm

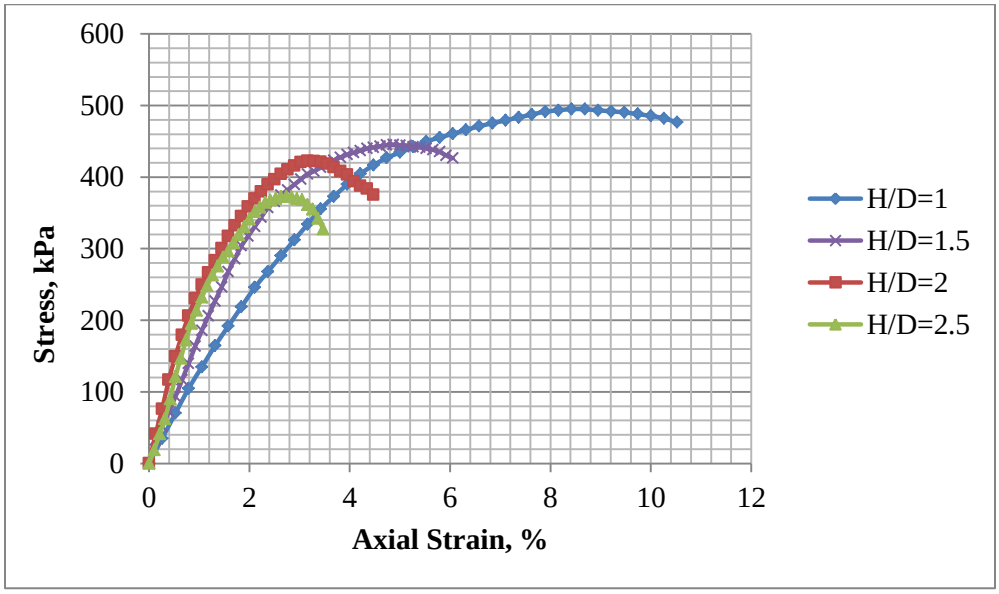
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	35	0.1	0.0013158	0.1315789	1135.609223	0.04655	40.991213
20	65	0.2	0.0026316	0.2631579	1137.107388	0.08645	76.026241
30	100	0.3	0.0039474	0.3947368	1138.609511	0.133	116.80914
40	128	0.4	0.0052632	0.5263158	1140.115608	0.17024	149.31819
50	154	0.5	0.0065789	0.6578947	1141.625695	0.20482	179.41082
60	177	0.6	0.0078947	0.7894737	1143.139788	0.23541	205.93282
70	198	0.7	0.0092105	0.9210526	1144.657902	0.26334	230.06
80	215	0.8	0.0105263	1.0526316	1146.180053	0.28595	249.48087
90	230	0.9	0.0118421	1.1842105	1147.706258	0.3059	266.53161
100	245	1	0.0131579	1.3157895	1149.236533	0.32585	283.53606
110	260	1.1	0.0144737	1.4473684	1150.770895	0.3458	300.49422
120	275	1.2	0.0157895	1.5789474	1152.309358	0.36575	317.40608
130	288	1.3	0.0171053	1.7105263	1153.851941	0.38304	331.96633
140	300	1.4	0.0184211	1.8421053	1155.39866	0.399	345.33535
150	312	1.5	0.0197368	1.9736842	1156.94953	0.41496	358.66733

160	322	1.6	0.0210526	2.1052632	1158.50457	0.42826	369.66622
170	331	1.7	0.0223684	2.2368421	1160.063795	0.44023	379.48775
180	340	1.8	0.0236842	2.3684211	1161.627224	0.4522	389.28151
190	347	1.9	0.025	2.5	1163.194872	0.46151	396.76069
200	354	2	0.0263158	2.6315789	1164.766757	0.47082	404.21827
210	360	2.1	0.0276316	2.7631579	1166.342896	0.4788	410.51392
220	365	2.2	0.0289474	2.8947368	1167.923306	0.48545	415.65229
230	370	2.3	0.0302632	3.0263158	1169.508005	0.4921	420.77523
240	372	2.4	0.0315789	3.1578947	1171.097011	0.49476	422.47567
250	372	2.5	0.0328947	3.2894737	1172.69034	0.49476	421.90166
260	372	2.6	0.0342105	3.4210526	1174.288011	0.49476	421.32764
270	370	2.7	0.0355263	3.5526316	1175.890041	0.4921	418.49151
280	366	2.8	0.0368421	3.6842105	1177.496448	0.48678	413.40252
290	362	2.9	0.0381579	3.8157895	1179.10725	0.48146	408.32588
300	358	3	0.0394737	3.9473684	1180.722466	0.47614	403.26157
310	350	3.1	0.0407895	4.0789474	1182.342112	0.4655	393.71007
320	345	3.2	0.0421053	4.2105263	1183.966209	0.45885	387.55329
330	342	3.3	0.0434211	4.3421053	1185.594773	0.45486	383.65554
340	335	3.4	0.0447368	4.4736842	1187.227824	0.44555	375.28602

d. H/D = 2.5 Mass = 198.8gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	16	0.1	0.0010526	0.1052632	1135.310063	0.02128	18.743778
20	35	0.2	0.0021053	0.2105263	1136.507648	0.04655	40.958809
30	53	0.3	0.0031579	0.3157895	1137.707761	0.07049	61.957914
40	77	0.4	0.0042105	0.4210526	1138.910412	0.10241	89.919276
50	104	0.5	0.0052632	0.5263158	1140.115608	0.13832	121.32103
60	126	0.6	0.0063158	0.6315789	1141.323358	0.16758	146.82955
70	148	0.7	0.0073684	0.7368421	1142.533669	0.19684	172.28376
80	168	0.8	0.0084211	0.8421053	1143.74655	0.22344	195.35797
90	184	0.9	0.0094737	0.9473684	1144.962009	0.24472	213.73635
100	200	1	0.0105263	1.0526316	1146.180053	0.266	232.07523
110	214	1.1	0.0115789	1.1578947	1147.400692	0.28462	248.05633
120	227	1.2	0.0126316	1.2631579	1148.623934	0.30191	262.84495
130	238	1.3	0.0136842	1.3684211	1149.849787	0.31654	275.28813
140	249	1.4	0.0147368	1.4736842	1151.078259	0.33117	287.70416
150	257	1.5	0.0157895	1.5789474	1152.309358	0.34181	296.63041
160	267	1.6	0.0168421	1.6842105	1153.543094	0.35511	307.84286
170	277	1.7	0.0178947	1.7894737	1154.779475	0.36841	319.03061
180	287	1.8	0.0189474	1.8947368	1156.018509	0.38171	330.19368

190	297	1.9	0.02	2	1157.260204	0.39501	341.33205
200	306	2	0.0210526	2.1052632	1158.50457	0.40698	351.29771
210	312	2.1	0.0221053	2.2105263	1159.751615	0.41496	357.80075
220	318	2.2	0.0231579	2.3157895	1161.001347	0.42294	364.28898
230	321	2.3	0.0242105	2.4210526	1162.253776	0.42693	367.32942
240	324	2.4	0.0252632	2.5263158	1163.508909	0.43092	370.36244
250	326	2.5	0.0263158	2.6315789	1164.766757	0.43358	372.2462
260	327	2.6	0.0273684	2.7368421	1166.027327	0.43491	372.9844
270	327	2.7	0.0284211	2.8421053	1167.290628	0.43491	372.58073
280	325	2.8	0.0294737	2.9473684	1168.55667	0.43225	369.90076
290	324	2.9	0.0305263	3.0526316	1169.825461	0.43092	368.36264
300	318	3	0.0315789	3.1578947	1171.097011	0.42294	361.14856
310	313	3.1	0.0326316	3.2631579	1172.371328	0.41629	355.08374
320	302	3.2	0.0336842	3.3684211	1173.64842	0.40166	342.23196
330	289	3.3	0.0347368	3.4736842	1174.928299	0.38437	327.14337



Plot of stress-strain curve for undisturbed sample with different specimen's height (samp No.1)

Sample No: 2

w = 28.05%

a. H/D= 1 mass of sample: 88.3g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.0026316	0.2631579	1137.107388	0.0399	35.089034
20	60	0.2	0.0052632	0.5263158	1140.115608	0.0798	69.992902
30	105	0.3	0.0078947	0.7894737	1143.139788	0.13965	122.16354
40	150	0.4	0.0105263	1.0526316	1146.180053	0.1995	174.05642
50	185	0.5	0.0131579	1.3157895	1149.236533	0.24605	214.09866
60	210	0.6	0.0157895	1.5789474	1152.309358	0.2793	242.38283
70	235	0.7	0.0184211	1.8421053	1155.39866	0.31255	270.51269
80	255	0.8	0.0210526	2.1052632	1158.50457	0.33915	292.74809
90	278	0.9	0.0236842	2.3684211	1161.627224	0.36974	318.29488
100	295	1	0.0263158	2.6315789	1164.766757	0.39235	336.84856
110	310	1.1	0.0289474	2.8947368	1167.923306	0.4123	353.01976
120	322	1.2	0.0315789	3.1578947	1171.097011	0.42826	365.69131
130	334	1.3	0.0342105	3.4210526	1174.288011	0.44422	378.2888
140	346	1.4	0.0368421	3.6842105	1177.496448	0.46018	390.81222
150	358	1.5	0.0394737	3.9473684	1180.722466	0.47614	403.26157
160	370	1.6	0.0421053	4.2105263	1183.966209	0.4921	415.63686
170	380	1.7	0.0447368	4.4736842	1187.227824	0.5054	425.69757
180	390	1.8	0.0473684	4.7368421	1190.507459	0.5187	435.69656
190	398	1.9	0.05	5	1193.805263	0.52934	443.40565
200	405	2	0.0526316	5.2631579	1197.121389	0.53865	449.95437
210	413	2.1	0.0552632	5.5263158	1200.455989	0.54929	457.5678
220	420	2.2	0.0578947	5.7894737	1203.809218	0.5586	464.02702
230	427	2.3	0.0605263	6.0526316	1207.181232	0.56791	470.44303
240	433	2.4	0.0631579	6.3157895	1210.572191	0.57589	475.71719
250	439	2.5	0.0657895	6.5789474	1213.982254	0.58387	480.95431
260	444	2.6	0.0684211	6.8421053	1217.411582	0.59052	485.06192
270	448	2.7	0.0710526	7.1052632	1220.86034	0.59584	488.04927
280	452	2.8	0.0736842	7.3684211	1224.328693	0.60116	491.01193
290	456	2.9	0.0763158	7.6315789	1227.816809	0.60648	493.94991
300	460	3	0.0789474	7.8947368	1231.324857	0.6118	496.86319
310	463	3.1	0.0815789	8.1578947	1234.853009	0.61579	498.67474
320	465	3.2	0.0842105	8.4210526	1238.401437	0.61845	499.3938
330	467	3.3	0.0868421	8.6842105	1241.970317	0.62111	500.10052
340	468	3.4	0.0894737	8.9473684	1245.559827	0.62244	499.7271

350	469	3.5	0.0921053	9.2105263	1249.170145	0.62377	499.34751
360	470	3.6	0.0947368	9.4736842	1252.801453	0.6251	498.96175
370	470.5	3.7	0.0973684	9.7368421	1256.453936	0.625765	498.04054
380	471	3.8	0.1	10	1260.127778	0.62643	497.11625
390	471	3.9	0.1026316	10.263158	1263.823167	0.62643	495.6627
400	470.5	4	0.1052632	10.526316	1267.540294	0.625765	493.6845
410	470.5	4.1	0.1078947	10.789474	1271.279351	0.625765	492.23249
420	470	4.2	0.1105263	11.052632	1275.040533	0.6251	490.25892
430	469	4.3	0.1131579	11.315789	1278.824036	0.62377	487.76844
440	468	4.4	0.1157895	11.578947	1282.63006	0.62244	485.28412
450	467	4.5	0.1184211	11.842105	1286.458806	0.62111	482.80598
460	466	4.6	0.1210526	12.105263	1290.310479	0.61978	480.334
470	465	4.7	0.1236842	12.368421	1294.185285	0.61845	477.86821

b. H/D = 1.5 mass of specimen = 127.8g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.0013158	0.1315789	1135.609223	0.0266	23.423551
20	60	0.2	0.0026316	0.2631579	1137.107388	0.0798	70.178068
30	90	0.3	0.0039474	0.3947368	1138.609511	0.1197	105.12823
40	115	0.4	0.0052632	0.5263158	1140.115608	0.15295	134.15306
50	135	0.5	0.0065789	0.6578947	1141.625695	0.17955	157.27572
60	155	0.6	0.0078947	0.7894737	1143.139788	0.20615	180.33665
70	170	0.7	0.0092105	0.9210526	1144.657902	0.2261	197.52626
80	185	0.8	0.0105263	1.0526316	1146.180053	0.24605	214.66959
90	198	0.9	0.0118421	1.1842105	1147.706258	0.26334	229.44895
100	210	1	0.0131579	1.3157895	1149.236533	0.2793	243.03091
110	222	1.1	0.0144737	1.4473684	1150.770895	0.29526	256.57583
120	230	1.2	0.0157895	1.5789474	1152.309358	0.3059	265.46691
130	242	1.3	0.0171053	1.7105263	1153.851941	0.32186	278.94393
140	252	1.4	0.0184211	1.8421053	1155.39866	0.33516	290.08169
150	263	1.5	0.0197368	1.9736842	1156.94953	0.34979	302.33817
160	272	1.6	0.0210526	2.1052632	1158.50457	0.36176	312.26463
170	282	1.7	0.0223684	2.2368421	1160.063795	0.37506	323.30981
180	290	1.8	0.0236842	2.3684211	1161.627224	0.3857	332.03423
190	299	1.9	0.025	2.5	1163.194872	0.39767	341.87737
200	307	2	0.0263158	2.6315789	1164.766757	0.40831	350.55087
210	313	2.1	0.0276316	2.7631579	1166.342896	0.41629	356.91905
220	320	2.2	0.0289474	2.8947368	1167.923306	0.4256	364.40749
230	327	2.3	0.0302632	3.0263158	1169.508005	0.43491	371.87432
240	334	2.4	0.0315789	3.1578947	1171.097011	0.44422	379.31956

250	341	2.5	0.0328947	3.2894737	1172.69034	0.45353	386.74319
260	348	2.6	0.0342105	3.4210526	1174.288011	0.46284	394.14521
270	356	2.7	0.0355263	3.5526316	1175.890041	0.47348	402.6567
280	362	2.8	0.0368421	3.6842105	1177.496448	0.48146	408.88446
290	368	2.9	0.0381579	3.8157895	1179.10725	0.48944	415.09371
300	375	3	0.0394737	3.9473684	1180.722466	0.49875	422.41087
310	381	3.1	0.0407895	4.0789474	1182.342112	0.50673	428.58154
320	387	3.2	0.0421053	4.2105263	1183.966209	0.51471	434.73369
330	392	3.3	0.0434211	4.3421053	1185.594773	0.52136	439.74553
340	397	3.4	0.0447368	4.4736842	1187.227824	0.52801	444.74194
350	401	3.5	0.0460526	4.6052632	1188.865379	0.53333	448.6042
360	406	3.6	0.0473684	4.7368421	1190.507459	0.53998	453.57129
370	410	3.7	0.0486842	4.8684211	1192.15408	0.5453	457.40732
380	415	3.8	0.05	5	1193.805263	0.55195	462.34509
390	419	3.9	0.0513158	5.1315789	1195.461026	0.55727	466.15489
400	422	4	0.0526316	5.2631579	1197.121389	0.56126	468.84134
410	427	4.1	0.0539474	5.3947368	1198.78637	0.56791	473.73745
420	430	4.2	0.0552632	5.5263158	1200.455989	0.5719	476.4023
430	432	4.3	0.0565789	5.6578947	1202.130265	0.57456	477.95153
440	434	4.4	0.0578947	5.7894737	1203.809218	0.57722	479.49458
450	436	4.5	0.0592105	5.9210526	1205.492867	0.57988	481.03147
460	437	4.6	0.0605263	6.0526316	1207.181232	0.58121	481.46043
470	438	4.7	0.0618421	6.1842105	1208.874334	0.58254	481.88632
480	439	4.8	0.0631579	6.3157895	1210.572191	0.58387	482.30911
490	439	4.9	0.0644737	6.4473684	1212.274824	0.58387	481.63171
500	438	5	0.0657895	6.5789474	1213.982254	0.58254	479.85874
510	437	5.1	0.0671053	6.7105263	1215.694499	0.58121	478.08886
520	435	5.2	0.0684211	6.8421053	1217.411582	0.57855	475.22958
530	433	5.3	0.0697368	6.9736842	1219.133522	0.57589	472.37648

c. H/D = 2 mass of specimen = 170.1g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.0010526	0.1052632	1135.310063	0.0266	23.429723
20	50	0.2	0.0021053	0.2105263	1136.507648	0.0665	58.512585
30	80	0.3	0.0031579	0.3157895	1137.707761	0.1064	93.52138
40	100	0.4	0.0042105	0.4210526	1138.910412	0.133	116.77828
50	118	0.5	0.0052632	0.5263158	1140.115608	0.15694	137.65271
60	134	0.6	0.0063158	0.6315789	1141.323358	0.17822	156.15207
70	148	0.7	0.0073684	0.7368421	1142.533669	0.19684	172.28376

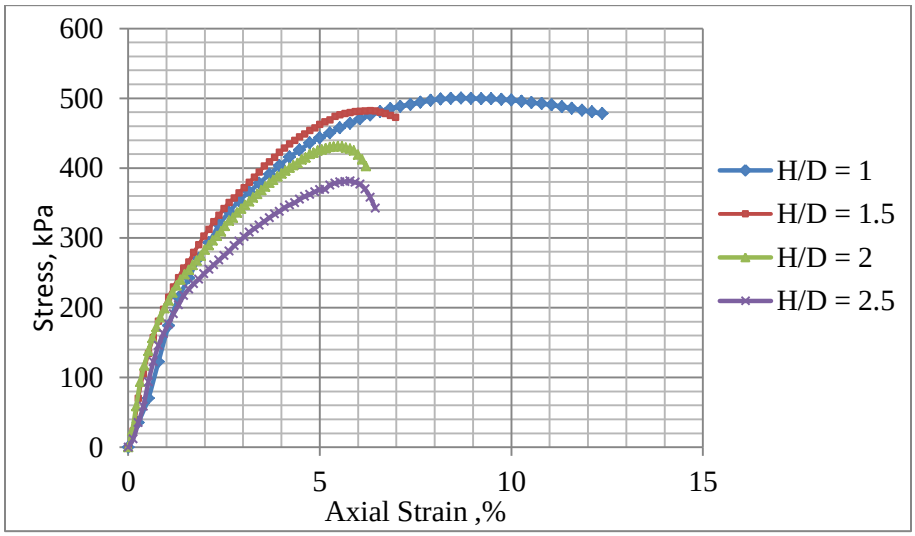
80	160	0.8	0.0084211	0.8421053	1143.74655	0.2128	186.05521
90	171	0.9	0.0094737	0.9473684	1144.962009	0.22743	198.63541
100	181	1	0.0105263	1.0526316	1146.180053	0.24073	210.02808
110	191	1.1	0.0115789	1.1578947	1147.400692	0.25403	221.39607
120	200	1.2	0.0126316	1.2631579	1148.623934	0.266	231.58145
130	207	1.3	0.0136842	1.3684211	1149.849787	0.27531	239.43127
140	214	1.4	0.0147368	1.4736842	1151.078259	0.28462	247.26381
150	220	1.5	0.0157895	1.5789474	1152.309358	0.2926	253.92487
160	226	1.6	0.0168421	1.6842105	1153.543094	0.30058	260.57111
170	232	1.7	0.0178947	1.7894737	1154.779475	0.30856	267.20253
180	238	1.8	0.0189474	1.8947368	1156.018509	0.31654	273.81915
190	246	1.9	0.02	2	1157.260204	0.32718	282.71948
200	252	2	0.0210526	2.1052632	1158.50457	0.33516	289.30399
210	258	2.1	0.0221053	2.2105263	1159.751615	0.34314	295.8737
220	264	2.2	0.0231579	2.3157895	1161.001347	0.35112	302.42859
230	270	2.3	0.0242105	2.4210526	1162.253776	0.3591	308.96867
240	277	2.4	0.0252632	2.5263158	1163.508909	0.36841	316.63703
250	284	2.5	0.0263158	2.6315789	1164.766757	0.37772	324.2881
260	288	2.6	0.0273684	2.7368421	1166.027327	0.38304	328.50002
270	295	2.7	0.0284211	2.8421053	1167.290628	0.39235	336.12023
280	300	2.8	0.0294737	2.9473684	1168.55667	0.399	341.44686
290	305	2.9	0.0305263	3.0526316	1169.825461	0.40565	346.76113
300	310	3	0.0315789	3.1578947	1171.097011	0.4123	352.06306
310	315	3.1	0.0326316	3.2631579	1172.371328	0.41895	357.35265
320	320	3.2	0.0336842	3.3684211	1173.64842	0.4256	362.62989
330	325	3.3	0.0347368	3.4736842	1174.928299	0.43225	367.89479
340	330	3.4	0.0357895	3.5789474	1176.210972	0.4389	373.14734
350	335	3.5	0.0368421	3.6842105	1177.496448	0.44555	378.38755
360	339	3.6	0.0378947	3.7894737	1178.784737	0.45087	382.48714
370	344	3.7	0.0389474	3.8947368	1180.075849	0.45752	387.70389
380	348	3.8	0.04	4	1181.369792	0.46284	391.78249
390	352	3.9	0.0410526	4.1052632	1182.666575	0.46816	395.85121
400	356	4	0.0421053	4.2105263	1183.966209	0.47348	399.91006
410	360	4.1	0.0431579	4.3157895	1185.268702	0.4788	403.95903
420	363	4.2	0.0442105	4.4210526	1186.574064	0.48279	406.87726
430	368	4.3	0.0452632	4.5263158	1187.882304	0.48944	412.02735
440	371	4.4	0.0463158	4.6315789	1189.193433	0.49343	414.92829
450	376	4.5	0.0473684	4.7368421	1190.507459	0.50008	420.05617
460	378	4.6	0.0484211	4.8421053	1191.824392	0.50274	421.82389
470	381	4.7	0.0494737	4.9473684	1193.144241	0.50673	424.70138
480	383	4.8	0.0505263	5.0526316	1194.467018	0.50939	426.45799
490	385	4.9	0.0515789	5.1578947	1195.79273	0.51205	428.20966
500	387	5	0.0526316	5.2631579	1197.121389	0.51471	429.9564
510	388	5.1	0.0536842	5.3684211	1198.453003	0.51604	430.58843

520	389	5.2	0.0547368	5.4736842	1199.787584	0.51737	431.218
530	389	5.3	0.0557895	5.5789474	1201.125139	0.51737	430.7378
540	388	5.4	0.0568421	5.6842105	1202.465681	0.51604	429.15154
550	387	5.5	0.0578947	5.7894737	1203.809218	0.51471	427.56775
560	385	5.6	0.0589474	5.8947368	1205.155761	0.51205	424.88284
570	380	5.7	0.06	6	1206.505319	0.5054	418.89579
580	374	5.8	0.0610526	6.1052632	1207.857904	0.49742	411.81997
590	366	5.9	0.0621053	6.2105263	1209.213524	0.48678	402.55918

d. H/D =2.5 mass of specimen = 198.4g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A'	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	10	0.1	0.0013158	0.1315789	1135.609223	0.0133	11.711775
20	30	0.2	0.0026316	0.2631579	1137.107388	0.0399	35.089034
30	50	0.3	0.0039474	0.3947368	1138.609511	0.0665	58.404571
40	80	0.4	0.0052632	0.5263158	1140.115608	0.1064	93.323869
50	105	0.5	0.0065789	0.6578947	1141.625695	0.13965	122.32556
60	125	0.6	0.0078947	0.7894737	1143.139788	0.16625	145.43278
70	140	0.7	0.0092105	0.9210526	1144.657902	0.1862	162.66869
80	152	0.8	0.0105263	1.0526316	1146.180053	0.20216	176.37718
90	165	0.9	0.0118421	1.1842105	1147.706258	0.21945	191.20746
100	176	1	0.0131579	1.3157895	1149.236533	0.23408	203.68305
110	188	1.1	0.0144737	1.4473684	1150.770895	0.25004	217.28043
120	196	1.2	0.0157895	1.5789474	1152.309358	0.26068	226.22397
130	203	1.3	0.0171053	1.7105263	1153.851941	0.26999	233.99016
140	209	1.4	0.0184211	1.8421053	1155.39866	0.27797	240.58363
150	216	1.5	0.0197368	1.9736842	1156.94953	0.28728	248.30815
160	222	1.6	0.0210526	2.1052632	1158.50457	0.29526	254.86304
170	228	1.7	0.0223684	2.2368421	1160.063795	0.30324	261.39942
180	234	1.8	0.0236842	2.3684211	1161.627224	0.31122	267.91727
190	240	1.9	0.025	2.5	1163.194872	0.3192	274.41662
200	246	2	0.0263158	2.6315789	1164.766757	0.32718	280.89744
210	253	2.1	0.0276316	2.7631579	1166.342896	0.33649	288.50006
220	259	2.2	0.0289474	2.8947368	1167.923306	0.34447	294.94231
230	265	2.3	0.0302632	3.0263158	1169.508005	0.35245	301.36604
240	271	2.4	0.0315789	3.1578947	1171.097011	0.36043	307.77126
250	276	2.5	0.0328947	3.2894737	1172.69034	0.36708	313.02381
260	281	2.6	0.0342105	3.4210526	1174.288011	0.37373	318.26093
270	286	2.7	0.0355263	3.5526316	1175.890041	0.38038	323.48263

280	291	2.8	0.0368421	3.6842105	1177.496448	0.38703	328.68889
290	296	2.9	0.0381579	3.8157895	1179.10725	0.39368	333.87972
300	300	3	0.0394737	3.9473684	1180.722466	0.399	337.92869
310	305	3.1	0.0407895	4.0789474	1182.342112	0.40565	343.09021
320	309	3.2	0.0421053	4.2105263	1183.966209	0.41097	347.11295
330	312	3.3	0.0434211	4.3421053	1185.594773	0.41496	350.00154
340	317	3.4	0.0447368	4.4736842	1187.227824	0.42161	355.12139
350	321	3.5	0.0460526	4.6052632	1188.865379	0.42693	359.1071
360	324	3.6	0.0473684	4.7368421	1190.507459	0.43092	361.96329
370	328	3.7	0.0486842	4.8684211	1192.15408	0.43624	365.92585
380	331	3.8	0.05	5	1193.805263	0.44023	368.76199
390	332	3.9	0.0513158	5.1315789	1195.461026	0.44156	369.36378
400	338	4	0.0526316	5.2631579	1197.121389	0.44954	375.51747
410	341	4.1	0.0539474	5.3947368	1198.78637	0.45353	378.32429
420	343	4.2	0.0552632	5.5263158	1200.455989	0.45619	380.01393
430	344	4.3	0.0565789	5.6578947	1202.130265	0.45752	380.59103
440	345	4.4	0.0578947	5.7894737	1203.809218	0.45885	381.16505
450	344	4.5	0.0592105	5.9210526	1205.492867	0.45752	379.52941
460	342	4.6	0.0605263	6.0526316	1207.181232	0.45486	376.79512
470	336	4.7	0.0618421	6.1842105	1208.874334	0.44688	369.66622
480	326	4.8	0.0631579	6.3157895	1210.572191	0.43358	358.16121
490	312	4.9	0.0644737	6.4473684	1212.274824	0.41496	342.29862



Plot of stress-strain curve for undisturbed sample no.2 with different specimen's height

Summary of unconfined compressive strength value of each undisturbed sample at different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
1.5	1	495.098	500.101	497.60
	1.5	445.135	482.309	463.72
	2	422.476	431.218	426.85
	2.5	372.581	381.165	376.87

A.1.2: For Sample Remolded at its Optimum Moisture Content (w = 26%)

Sample No. 1

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A'	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	40	0.1	0.002632	0.263158	1137.107388	0.0532	46.78538
20	90	0.2	0.005263	0.526316	1140.115608	0.1197	104.9894
30	140	0.3	0.007895	0.789474	1143.139788	0.1862	162.8847
40	180	0.4	0.010526	1.052632	1146.180053	0.2394	208.8677
50	215	0.5	0.013158	1.315789	1149.236533	0.28595	248.8174
60	250	0.6	0.015789	1.578947	1152.309358	0.3325	288.551
70	280	0.7	0.018421	1.842105	1155.39866	0.3724	322.313
80	305	0.8	0.021053	2.105263	1158.50457	0.40565	350.1497
90	327	0.9	0.023684	2.368421	1161.627224	0.43491	374.3972
100	344	1	0.026316	2.631579	1164.766757	0.45752	392.7997
110	358	1.1	0.028947	2.894737	1167.923306	0.47614	407.6809
120	374	1.2	0.031579	3.157895	1171.097011	0.49742	424.747
130	386	1.3	0.034211	3.421053	1174.288011	0.51338	437.1841
140	397	1.4	0.036842	3.684211	1177.496448	0.52801	448.4175
150	410	1.5	0.039474	3.947368	1180.722466	0.5453	461.8359
160	419	1.6	0.042105	4.210526	1183.966209	0.55727	470.6807
170	428	1.7	0.044737	4.473684	1187.227824	0.56924	479.4699
180	436	1.8	0.047368	4.736842	1190.507459	0.57988	487.0864
190	444	1.9	0.05	5	1193.805263	0.59052	494.6535
200	450	2	0.052632	5.263158	1197.121389	0.5985	499.9493
210	455	2.1	0.055263	5.526316	1200.455989	0.60515	504.1001
220	460	2.2	0.057895	5.789474	1203.809218	0.6118	508.2201

230	464	2.3	0.060526	6.052632	1207.181232	0.61712	511.2074
240	467	2.4	0.063158	6.315789	1210.572191	0.62111	513.0714
250	470	2.5	0.065789	6.578947	1213.982254	0.6251	514.9169
260	473	2.6	0.068421	6.842105	1217.411582	0.62909	516.7439
270	477	2.7	0.071053	7.105263	1220.86034	0.63441	519.6417
280	479	2.8	0.073684	7.368421	1224.328693	0.63707	520.3423
290	481	2.9	0.076316	7.631579	1227.816809	0.63973	521.0305
300	482	3	0.078947	7.894737	1231.324857	0.64106	520.6262
310	484	3.1	0.081579	8.157895	1234.853009	0.64372	521.2928
320	486	3.2	0.084211	8.421053	1238.401437	0.64638	521.9471
330	488	3.3	0.086842	8.684211	1241.970317	0.64904	522.589
340	490	3.4	0.089474	8.947368	1245.559827	0.6517	523.2185
350	492	3.5	0.092105	9.210526	1249.170145	0.65436	523.8358
360	494	3.6	0.094737	9.473684	1252.801453	0.65702	524.4406
370	496	3.7	0.097368	9.736842	1256.453936	0.65968	525.0332
380	497	3.8	0.1	10	1260.127778	0.66101	524.5579
390	498	3.9	0.102632	10.26316	1263.823167	0.66234	524.0765
400	499	4	0.105263	10.52632	1267.540294	0.66367	523.5889
410	499	4.1	0.107895	10.78947	1271.279351	0.66367	522.0489
420	499	4.2	0.110526	11.05263	1275.040533	0.66367	520.5089
430	499	4.3	0.113158	11.31579	1278.824036	0.66367	518.969
440	498	4.4	0.115789	11.57895	1282.63006	0.66234	516.3921
450	497	4.5	0.118421	11.84211	1286.458806	0.66101	513.8213
460	496	4.6	0.121053	12.10526	1290.310479	0.65968	511.2568
470	495	4.7	0.123684	12.36842	1294.185285	0.65835	508.6984
480	493	4.8	0.126316	12.63158	1298.083434	0.65569	505.1216
490	491	4.9	0.128947	12.89474	1302.005136	0.65303	501.5572
500	489	5	0.131579	13.15789	1305.950606	0.65037	498.0051

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	33	0.1	0.001754	0.175439	1136.108172	0.04389	38.63188
20	67	0.2	0.003509	0.350877	1138.108363	0.08911	78.29659
30	97	0.3	0.005263	0.526316	1140.115608	0.12901	113.1552
40	117	0.4	0.007018	0.701754	1142.129947	0.15561	136.2454
50	137	0.5	0.008772	0.877193	1144.151416	0.18221	159.2534
60	152	0.6	0.010526	1.052632	1146.180053	0.20216	176.3772
70	168	0.7	0.012281	1.22807	1148.215897	0.22344	194.5975

80	180	0.8	0.014035	1.403509	1150.258986	0.2394	208.127
90	192	0.9	0.015789	1.578947	1152.309358	0.25536	221.6072
100	202	1	0.017544	1.754386	1154.367054	0.26866	232.7336
110	214	1.1	0.019298	1.929825	1156.432111	0.28462	246.1191
120	222	1.2	0.021053	2.105263	1158.50457	0.29526	254.863
130	232	1.3	0.022807	2.280702	1160.58447	0.30856	265.866
140	240	1.4	0.024561	2.45614	1162.671853	0.3192	274.5401
150	248	1.5	0.026316	2.631579	1164.766757	0.32984	283.1812
160	258	1.6	0.02807	2.807018	1166.869224	0.34314	294.0689
170	268	1.7	0.029825	2.982456	1168.979295	0.35644	304.9156
180	278	1.8	0.031579	3.157895	1171.097011	0.36974	315.7211
190	286	1.9	0.033333	3.333333	1173.222414	0.38038	324.2181
200	294	2	0.035088	3.508772	1175.355545	0.39102	332.6823
210	302	2.1	0.036842	3.684211	1177.496448	0.40166	341.1136
220	308	2.2	0.038596	3.859649	1179.645164	0.40964	347.257
230	316	2.3	0.040351	4.035088	1181.801737	0.42028	355.6265
240	322	2.4	0.042105	4.210526	1183.966209	0.42826	361.7164
250	327	2.5	0.04386	4.385965	1186.138624	0.43491	366.6603
260	333	2.6	0.045614	4.561404	1188.319026	0.44289	372.7029
270	338	2.7	0.047368	4.736842	1190.507459	0.44954	377.6037
280	343	2.8	0.049123	4.912281	1192.703967	0.45619	382.4838
290	350	2.9	0.050877	5.087719	1194.908595	0.4655	389.5695
300	355	3	0.052632	5.263158	1197.121389	0.47215	394.4044
310	360	3.1	0.054386	5.438596	1199.342393	0.4788	399.2188
320	365	3.2	0.05614	5.614035	1201.571654	0.48545	404.0125
330	370	3.3	0.057895	5.789474	1203.809218	0.4921	408.7857
340	374	3.4	0.059649	5.964912	1206.055131	0.49742	412.4355
350	378	3.5	0.061404	6.140351	1208.309439	0.50274	416.0689
360	382	3.6	0.063158	6.315789	1210.572191	0.50806	419.6858
370	385	3.7	0.064912	6.491228	1212.843433	0.51205	422.1897
380	388	3.8	0.066667	6.666667	1215.123214	0.51604	424.6812
390	391	3.9	0.068421	6.842105	1217.411582	0.52003	427.1604
400	394	4	0.070175	7.017544	1219.708585	0.52402	429.6272
410	397	4.1	0.07193	7.192982	1222.014272	0.52801	432.0817
420	400	4.2	0.073684	7.368421	1224.328693	0.532	434.5238
430	402	4.3	0.075439	7.54386	1226.651898	0.53466	435.8694
440	404	4.4	0.077193	7.719298	1228.983935	0.53732	437.2067
450	406	4.5	0.078947	7.894737	1231.324857	0.53998	438.5358
460	408	4.6	0.080702	8.070175	1233.674714	0.54264	439.8566
470	410	4.7	0.082456	8.245614	1236.033556	0.5453	441.1693
480	412	4.8	0.084211	8.421053	1238.401437	0.54796	442.4736
490	414	4.9	0.085965	8.596491	1240.778407	0.55062	443.7698
500	416	5	0.087719	8.77193	1243.164519	0.55328	445.0577
510	417	5.1	0.089474	8.947368	1245.559827	0.55461	445.2697

520	419	5.2	0.091228	9.122807	1247.964382	0.55727	446.5432
530	420	5.3	0.092982	9.298246	1250.37824	0.5586	446.7448
540	422	5.4	0.094737	9.473684	1252.801453	0.56126	448.004
550	423	5.5	0.096491	9.649123	1255.234078	0.56259	448.1953
560	424	5.6	0.098246	9.824561	1257.676167	0.56392	448.3825
570	425	5.7	0.1	10	1260.127778	0.56525	448.5656
580	425	5.8	0.101754	10.17544	1262.588965	0.56525	447.6912
590	425	5.9	0.103509	10.35088	1265.059785	0.56525	446.8168
600	425	6	0.105263	10.52632	1267.540294	0.56525	445.9424
610	425	6.1	0.107018	10.70175	1270.03055	0.56525	445.068
620	425	6.2	0.108772	10.87719	1272.53061	0.56525	444.1936
630	425	6.3	0.110526	11.05263	1275.040533	0.56525	443.3192
640	425	6.4	0.112281	11.22807	1277.560375	0.56525	442.4448
650	424	6.5	0.114035	11.40351	1280.090198	0.56392	440.5315
660	423	6.6	0.115789	11.57895	1282.63006	0.56259	438.6222
670	422	6.7	0.117544	11.75439	1285.18002	0.56126	436.717
680	421	6.8	0.119298	11.92982	1287.740139	0.55993	434.816
690	419	6.9	0.121053	12.10526	1290.310479	0.55727	431.8883
700	417	7	0.122807	12.2807	1292.8911	0.55461	428.9688
710	415	7.1	0.124561	12.45614	1295.482064	0.55195	426.0576

b. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	18	0.1	0.001316	0.131579	1135.609223	0.02394	21.0812
20	51	0.2	0.002632	0.263158	1137.107388	0.06783	59.65136
30	71	0.3	0.003947	0.394737	1138.609511	0.09443	82.93449
40	88	0.4	0.005263	0.526316	1140.115608	0.11704	102.6563
50	101	0.5	0.006579	0.657895	1141.625695	0.13433	117.6655
60	114	0.6	0.007895	0.789474	1143.139788	0.15162	132.6347
70	125	0.7	0.009211	0.921053	1144.657902	0.16625	145.2399
80	135	0.8	0.010526	1.052632	1146.180053	0.17955	156.6508
90	143	0.9	0.011842	1.184211	1147.706258	0.19019	165.7131
100	150	1	0.013158	1.315789	1149.236533	0.1995	173.5935
110	157	1.1	0.014474	1.447368	1150.770895	0.20881	181.4523
120	163	1.2	0.015789	1.578947	1152.309358	0.21679	188.1352
130	170	1.3	0.017105	1.710526	1153.851941	0.2261	195.9524
140	175	1.4	0.018421	1.842105	1155.39866	0.23275	201.4456
150	182	1.5	0.019737	1.973684	1156.94953	0.24206	209.2226
160	188	1.6	0.021053	2.105263	1158.50457	0.25004	215.83
170	194	1.7	0.022368	2.236842	1160.063795	0.25802	222.4188

180	200	1.8	0.023684	2.368421	1161.627224	0.266	228.9891
190	206	1.9	0.025	2.5	1163.194872	0.27398	235.5409
200	212	2	0.026316	2.631579	1164.766757	0.28196	242.0742
210	219	2.1	0.027632	2.763158	1166.342896	0.29127	249.7293
220	224	2.2	0.028947	2.894737	1167.923306	0.29792	255.0852
230	232	2.3	0.030263	3.026316	1169.508005	0.30856	263.8374
240	238	2.4	0.031579	3.157895	1171.097011	0.31654	270.2936
250	242	2.5	0.032895	3.289474	1172.69034	0.32186	274.4629
260	247	2.6	0.034211	3.421053	1174.288011	0.32851	279.7525
270	252	2.7	0.035526	3.552632	1175.890041	0.33516	285.0267
280	258	2.8	0.036842	3.684211	1177.496448	0.34314	291.4149
290	262	2.9	0.038158	3.815789	1179.10725	0.34846	295.5287
300	267	3	0.039474	3.947368	1180.722466	0.35511	300.7565
310	272	3.1	0.040789	4.078947	1182.342112	0.36176	305.969
320	276	3.2	0.042105	4.210526	1183.966209	0.36708	310.0426
330	281	3.3	0.043421	4.342105	1185.594773	0.37373	315.2257
340	285	3.4	0.044737	4.473684	1187.227824	0.37905	319.2732
350	289	3.5	0.046053	4.605263	1188.865379	0.38437	323.3083
360	293	3.6	0.047368	4.736842	1190.507459	0.38969	327.331
370	297	3.7	0.048684	4.868421	1192.15408	0.39501	331.3414
380	301	3.8	0.05	5	1193.805263	0.40033	335.3394
390	304	3.9	0.051316	5.131579	1195.461026	0.40432	338.2126
400	307	4	0.052632	5.263158	1197.121389	0.40831	341.0765
410	311	4.1	0.053947	5.394737	1198.78637	0.41363	345.0406
420	314	4.2	0.055263	5.526316	1200.455989	0.41762	347.8845
430	317	4.3	0.056579	5.657895	1202.130265	0.42161	350.7191
440	320	4.4	0.057895	5.789474	1203.809218	0.4256	353.5444
450	323	4.5	0.059211	5.921053	1205.492867	0.42959	356.3605
460	326	4.6	0.060526	6.052632	1207.181232	0.43358	359.1673
470	329	4.7	0.061842	6.184211	1208.874334	0.43757	361.9648
480	332	4.8	0.063158	6.315789	1210.572191	0.44156	364.7531
490	334	4.9	0.064474	6.447368	1212.274824	0.44422	366.4351
500	337	5	0.065789	6.578947	1213.982254	0.44821	369.2064
510	340	5.1	0.067105	6.710526	1215.694499	0.4522	371.9685
520	342	5.2	0.068421	6.842105	1217.411582	0.45486	373.6288
530	345	5.3	0.069737	6.973684	1219.133522	0.45885	376.3739
540	347	5.4	0.071053	7.105263	1220.86034	0.46151	378.0203
550	350	5.5	0.072368	7.236842	1222.592057	0.4655	380.7484
560	353	5.6	0.073684	7.368421	1224.328693	0.46949	383.4673
570	355	5.7	0.075	7.5	1226.07027	0.47215	385.0921
580	358	5.8	0.076316	7.631579	1227.816809	0.47614	387.794
590	360	5.9	0.077632	7.763158	1229.568331	0.4788	389.405
600	363	6	0.078947	7.894737	1231.324857	0.48279	392.0899
610	365	6.1	0.080263	8.026316	1233.086409	0.48545	393.6869

620	367	6.2	0.081579	8.157895	1234.853009	0.48811	395.2778
630	369	6.3	0.082895	8.289474	1236.624677	0.49077	396.8625
640	371	6.4	0.084211	8.421053	1238.401437	0.49343	398.4411
650	374	6.5	0.085526	8.552632	1240.183309	0.49742	401.0859
660	376	6.6	0.086842	8.684211	1241.970317	0.50008	402.6505
670	379	6.7	0.088158	8.815789	1243.762482	0.50407	405.2783
680	384	6.8	0.089474	8.947368	1245.559827	0.51072	410.0325
690	386	6.9	0.090789	9.078947	1247.362373	0.51338	411.5725
700	387	7	0.092105	9.210526	1249.170145	0.51471	412.0415
710	388	7.1	0.093421	9.342105	1250.983164	0.51604	412.5075
720	390	7.2	0.094737	9.473684	1252.801453	0.5187	414.0321
730	392	7.3	0.096053	9.605263	1254.625036	0.52136	415.5505
740	394	7.4	0.097368	9.736842	1256.453936	0.52402	417.0626
750	394	7.5	0.098684	9.868421	1258.288175	0.52402	416.4547
760	395	7.6	0.1	10	1260.127778	0.52535	416.9022
770	397	7.7	0.101316	10.13158	1261.972767	0.52801	418.4005
780	398	7.8	0.102632	10.26316	1263.823167	0.52934	418.8402
790	399	7.9	0.103947	10.39474	1265.679001	0.53067	419.2769
800	400	8	0.105263	10.52632	1267.540294	0.532	419.7105
810	400.5	8.1	0.106579	10.65789	1269.407069	0.532665	419.6172
820	401	8.2	0.107895	10.78947	1271.279351	0.53333	419.5223
830	401	8.3	0.109211	10.92105	1273.157164	0.53333	418.9035
840	401	8.4	0.110526	11.05263	1275.040533	0.53333	418.2847
850	401	8.5	0.111842	11.18421	1276.929481	0.53333	417.666
860	400	8.6	0.113158	11.31579	1278.824036	0.532	416.0072
870	398	8.7	0.114474	11.44737	1280.72422	0.52934	413.313
880	396	8.8	0.115789	11.57895	1282.63006	0.52668	410.625
890	391	8.9	0.117105	11.71053	1284.54158	0.52003	404.837
900	385	9	0.118421	11.84211	1286.458806	0.51205	398.0306

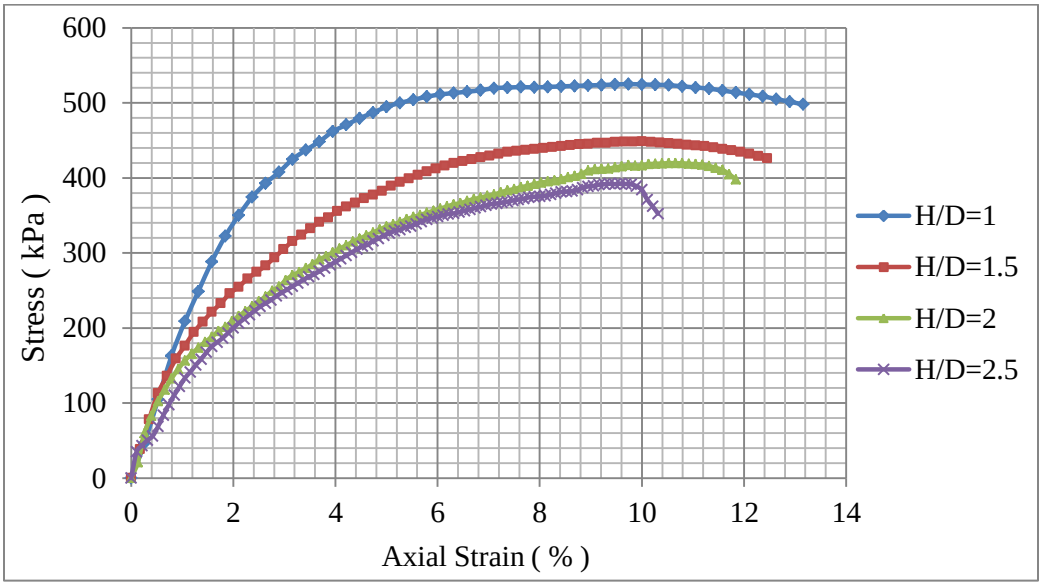
c. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.001053	0.105263	1135.310063	0.0399	35.14458
20	37	0.2	0.002105	0.210526	1136.507648	0.04921	43.29931
30	43	0.3	0.003158	0.315789	1137.707761	0.05719	50.26774
40	48	0.4	0.004211	0.421053	1138.910412	0.06384	56.05357
50	59	0.5	0.005263	0.526316	1140.115608	0.07847	68.82635
60	72	0.6	0.006316	0.631579	1141.323358	0.09576	83.9026

70	84	0.7	0.007368	0.736842	1142.533669	0.11172	97.78268
80	95	0.8	0.008421	0.842105	1143.74655	0.12635	110.4703
90	105	0.9	0.009474	0.947368	1144.962009	0.13965	121.9691
100	115	1	0.010526	1.052632	1146.180053	0.15295	133.4433
110	122	1.1	0.011579	1.157895	1147.400692	0.16226	141.4153
120	130	1.2	0.012632	1.263158	1148.623934	0.1729	150.5279
130	137	1.3	0.013684	1.368421	1149.849787	0.18221	158.4642
140	145	1.4	0.014737	1.473684	1151.078259	0.19285	167.5386
150	152	1.5	0.015789	1.578947	1152.309358	0.20216	175.439
160	157	1.6	0.016842	1.684211	1153.543094	0.20881	181.0162
170	162	1.7	0.017895	1.789474	1154.779475	0.21546	186.5811
180	168	1.8	0.018947	1.894737	1156.018509	0.22344	193.2841
190	174	1.9	0.02	2	1157.260204	0.23142	199.9723
200	180	2	0.021053	2.105263	1158.50457	0.2394	206.6457
210	185	2.1	0.022105	2.210526	1159.751615	0.24605	212.1575
220	190	2.2	0.023158	2.315789	1161.001347	0.2527	217.6569
230	195	2.3	0.024211	2.421053	1162.253776	0.25935	223.144
240	200	2.4	0.025263	2.526316	1163.508909	0.266	228.6188
250	204	2.5	0.026316	2.631579	1164.766757	0.27132	232.9393
260	208	2.6	0.027368	2.736842	1166.027327	0.27664	237.25
270	213	2.7	0.028421	2.842105	1167.290628	0.28329	242.6902
280	217	2.8	0.029474	2.947368	1168.55667	0.28861	246.9799
290	221	2.9	0.030526	3.052632	1169.825461	0.29393	251.2597
300	225	3	0.031579	3.157895	1171.097011	0.29925	255.5296
310	229	3.1	0.032632	3.263158	1172.371328	0.30457	259.7897
320	233	3.2	0.033684	3.368421	1173.64842	0.30989	264.0399
330	237	3.3	0.034737	3.473684	1174.928299	0.31521	268.2802
340	240	3.4	0.035789	3.578947	1176.210972	0.3192	271.3799
350	244	3.5	0.036842	3.684211	1177.496448	0.32452	275.6017
360	248	3.6	0.037895	3.789474	1178.784737	0.32984	279.8136
370	252	3.7	0.038947	3.894737	1180.075849	0.33516	284.0156
380	256	3.8	0.04	4	1181.369792	0.34048	288.2078
390	260	3.9	0.041053	4.105263	1182.666575	0.3458	292.3901
400	264	4	0.042105	4.210526	1183.966209	0.35112	296.5625
410	268	4.1	0.043158	4.315789	1185.268702	0.35644	300.7251
420	272	4.2	0.044211	4.421053	1186.574064	0.36176	304.8777
430	276	4.3	0.045263	4.526316	1187.882304	0.36708	309.0205
440	278	4.4	0.046316	4.631579	1189.193433	0.36974	310.9166
450	283	4.5	0.047368	4.736842	1190.507459	0.37639	316.1593
460	286	4.6	0.048421	4.842105	1191.824392	0.38038	319.1578
470	290	4.7	0.049474	4.947368	1193.144241	0.3857	323.2635
480	293	4.8	0.050526	5.052632	1194.467018	0.38969	326.2459
490	296	4.9	0.051579	5.157895	1195.79273	0.39368	329.2209
500	298	5	0.052632	5.263158	1197.121389	0.39634	331.0775

510	301	5.1	0.053684	5.368421	1198.453003	0.40033	334.039
520	303	5.2	0.054737	5.473684	1199.787584	0.40299	335.8845
530	306	5.3	0.055789	5.578947	1201.125139	0.40698	338.8323
540	309	5.4	0.056842	5.684211	1202.465681	0.41097	341.7727
550	312	5.5	0.057895	5.789474	1203.809218	0.41496	344.7058
560	314	5.6	0.058947	5.894737	1205.155761	0.41762	346.5278
570	316	5.7	0.06	6	1206.505319	0.42028	348.3449
580	318	5.8	0.061053	6.105263	1207.857904	0.42294	350.1571
590	320	5.9	0.062105	6.210526	1209.213524	0.4256	351.9643
600	321	6	0.063158	6.315789	1210.572191	0.42693	352.6679
610	323	6.1	0.064211	6.421053	1211.933915	0.42959	354.4665
620	325	6.2	0.065263	6.526316	1213.298705	0.43225	356.2602
630	327	6.3	0.066316	6.631579	1214.666573	0.43491	358.0489
640	329	6.4	0.067368	6.736842	1216.037528	0.43757	359.8326
650	331	6.5	0.068421	6.842105	1217.411582	0.44023	361.6115
660	333	6.6	0.069474	6.947368	1218.788744	0.44289	363.3854
670	335	6.7	0.070526	7.052632	1220.169026	0.44555	365.1543
680	336	6.8	0.071579	7.157895	1221.552438	0.44688	365.8296
690	337.5	6.9	0.072632	7.263158	1222.93899	0.448875	367.0461
700	339	7	0.073684	7.368421	1224.328693	0.45087	368.259
710	341	7.1	0.074737	7.473684	1225.721559	0.45353	370.0106
720	342.5	7.2	0.075789	7.578947	1227.117597	0.455525	371.2154
730	344	7.3	0.076842	7.684211	1228.516819	0.45752	372.4166
740	346	7.4	0.077895	7.789474	1229.919235	0.46018	374.1546
750	347	7.5	0.078947	7.894737	1231.324857	0.46151	374.8077
760	348	7.6	0.08	8	1232.733696	0.46284	375.4582
770	349	7.7	0.081053	8.105263	1234.145762	0.46417	376.1063
780	351	7.8	0.082105	8.210526	1235.561067	0.46683	377.8284
790	353	7.9	0.083158	8.315789	1236.979621	0.46949	379.5455
800	355	8	0.084211	8.421053	1238.401437	0.47215	381.2576
810	356	8.1	0.085263	8.526316	1239.826525	0.47348	381.8921
820	357	8.2	0.086316	8.631579	1241.254896	0.47481	382.5242
830	359	8.3	0.087368	8.736842	1242.686563	0.47747	384.224
840	362	8.4	0.088421	8.842105	1244.121536	0.48146	386.9879
850	364	8.5	0.089474	8.947368	1245.559827	0.48412	388.6766
860	365	8.6	0.090526	9.052632	1247.001447	0.48545	389.2939
870	367	8.7	0.091579	9.157895	1248.446408	0.48811	390.9739
880	368	8.8	0.092632	9.263158	1249.894722	0.48944	391.585
890	369	8.9	0.093684	9.368421	1251.3464	0.49077	392.1936
900	369	9	0.094737	9.473684	1252.801453	0.49077	391.7381
910	370	9.1	0.095789	9.578947	1254.259895	0.4921	392.3429
920	370	9.2	0.096842	9.684211	1255.721737	0.4921	391.8862
930	370	9.3	0.097895	9.789474	1257.186989	0.4921	391.4294
940	368	9.4	0.098947	9.894737	1258.655666	0.48944	388.8593

950	364	9.5	0.1	10	1260.127778	0.48412	384.1833
960	352	9.6	0.101053	10.10526	1261.603337	0.46816	371.0834
970	344	9.7	0.102105	10.21053	1263.082356	0.45752	362.225
980	335	9.8	0.103158	10.31579	1264.564847	0.44555	352.3346



Plot of stress-strain curve for remoulded sample at OMC with different specimen's height (sample No. 1)

Sample No. 2

w = 26%

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	34	0.1	0.001053	0.105263	1135.310063	0.04522	39.83053
20	80	0.2	0.002105	0.210526	1136.507648	0.1064	93.62014
30	120	0.3	0.003158	0.315789	1137.707761	0.1596	140.2821
40	150	0.4	0.004211	0.421053	1138.910412	0.1995	175.1674
50	175	0.5	0.005263	0.526316	1140.115608	0.23275	204.146
60	200	0.6	0.006316	0.631579	1141.323358	0.266	233.0628
70	220	0.7	0.007368	0.736842	1142.533669	0.2926	256.0975

80	240	0.8	0.008421	0.842105	1143.74655	0.3192	279.0828
90	264	0.9	0.009474	0.947368	1144.962009	0.35112	306.6652
100	280	1	0.010526	1.052632	1146.180053	0.3724	324.9053
110	295	1.1	0.011579	1.157895	1147.400692	0.39235	341.9468
120	308	1.2	0.012632	1.263158	1148.623934	0.40964	356.6354
130	320	1.3	0.013684	1.368421	1149.849787	0.4256	370.1353
140	332	1.4	0.014737	1.473684	1151.078259	0.44156	383.6055
150	344	1.5	0.015789	1.578947	1152.309358	0.45752	397.0462
160	356	1.6	0.016842	1.684211	1153.543094	0.47348	410.4571
170	368	1.7	0.017895	1.789474	1154.779475	0.48944	423.8385
180	378	1.8	0.018947	1.894737	1156.018509	0.50274	434.8892
190	388	1.9	0.02	2	1157.260204	0.51604	445.9153
200	398	2	0.021053	2.105263	1158.50457	0.52934	456.9166
210	408	2.1	0.022105	2.210526	1159.751615	0.54264	467.8933
220	418	2.2	0.023158	2.315789	1161.001347	0.55594	478.8453
230	428	2.3	0.024211	2.421053	1162.253776	0.56924	489.7726
240	437	2.4	0.025263	2.526316	1163.508909	0.58121	499.5321
250	444	2.5	0.026316	2.631579	1164.766757	0.59052	506.9856
260	451	2.6	0.027368	2.736842	1166.027327	0.59983	514.4219
270	458	2.7	0.028421	2.842105	1167.290628	0.60914	521.8409
280	464	2.8	0.029474	2.947368	1168.55667	0.61712	528.1045
290	470	2.9	0.030526	3.052632	1169.825461	0.6251	534.3532
300	475	3	0.031579	3.157895	1171.097011	0.63175	539.4515
310	480	3.1	0.032632	3.263158	1172.371328	0.6384	544.5374
320	485	3.2	0.033684	3.368421	1173.64842	0.64505	549.6109
330	489	3.3	0.034737	3.473684	1174.928299	0.65037	553.5402
340	493	3.4	0.035789	3.578947	1176.210972	0.65569	557.4595
350	497	3.5	0.036842	3.684211	1177.496448	0.66101	561.369
360	501	3.6	0.037895	3.789474	1178.784737	0.66633	565.2686
370	504	3.7	0.038947	3.894737	1180.075849	0.67032	568.0313
380	507	3.8	0.04	4	1181.369792	0.67431	570.7866
390	510	3.9	0.041053	4.105263	1182.666575	0.6783	573.5344
400	512	4	0.042105	4.210526	1183.966209	0.68096	575.1515
410	514	4.1	0.043158	4.315789	1185.268702	0.68362	576.7637
420	516	4.2	0.044211	4.421053	1186.574064	0.68628	578.371
430	518	4.3	0.045263	4.526316	1187.882304	0.68894	579.9733
440	520	4.4	0.046316	4.631579	1189.193433	0.6916	581.5707
450	522	4.5	0.047368	4.736842	1190.507459	0.69426	583.1631
460	523	4.6	0.048421	4.842105	1191.824392	0.69559	583.6346
470	524	4.7	0.049474	4.947368	1193.144241	0.69692	584.1037
480	525	4.8	0.050526	5.052632	1194.467018	0.69825	584.5703
490	526	4.9	0.051579	5.157895	1195.79273	0.69958	585.0345
500	527	5	0.052632	5.263158	1197.121389	0.70091	585.4962
510	528	5.1	0.053684	5.368421	1198.453003	0.70224	585.9554

520	529	5.2	0.054737	5.473684	1199.787584	0.70357	586.4121
530	530	5.3	0.055789	5.578947	1201.125139	0.7049	586.8664
540	531	5.4	0.056842	5.684211	1202.465681	0.70623	587.3182
550	532	5.5	0.057895	5.789474	1203.809218	0.70756	587.7676
560	533	5.6	0.058947	5.894737	1205.155761	0.70889	588.2144
570	534	5.7	0.06	6	1206.505319	0.71022	588.6588
580	534.5	5.8	0.061053	6.105263	1207.857904	0.710885	588.5502
590	535	5.9	0.062105	6.210526	1209.213524	0.71155	588.4403
600	535.5	6	0.063158	6.315789	1210.572191	0.712215	588.3292
610	536	6.1	0.064211	6.421053	1211.933915	0.71288	588.2169
620	536.5	6.2	0.065263	6.526316	1213.298705	0.713545	588.1033
630	537	6.3	0.066316	6.631579	1214.666573	0.71421	587.9885
630	537	6.3	0.066316	6.631579	1214.666573	0.71421	587.9885
640	537	6.4	0.067368	6.736842	1216.037528	0.71421	587.3256
650	537	6.5	0.068421	6.842105	1217.411582	0.71421	586.6627
660	536	6.6	0.069474	6.947368	1218.788744	0.71288	584.9086
670	535	6.7	0.070526	7.052632	1220.169026	0.71155	583.1569
680	533	6.8	0.071579	7.157895	1221.552438	0.70889	580.3189

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (N)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	29	0.1	0.001053	0.105263	1135.310063	38.57	33.9731
20	61	0.2	0.002105	0.210526	1136.507648	81.13	71.38535
30	94	0.3	0.003158	0.315789	1137.707761	125.02	109.8876
40	115	0.4	0.004211	0.421053	1138.910412	152.95	134.295
50	134	0.5	0.005263	0.526316	1140.115608	178.22	156.3175
60	150	0.6	0.006316	0.631579	1141.323358	199.5	174.7971
70	166	0.7	0.007368	0.736842	1142.533669	220.78	193.2372
80	182	0.8	0.008421	0.842105	1143.74655	242.06	211.6378
90	194	0.9	0.009474	0.947368	1144.962009	258.02	225.3525
100	206	1	0.010526	1.052632	1146.180053	273.98	239.0375
110	216	1.1	0.011579	1.157895	1147.400692	287.28	250.3746
120	226	1.2	0.012632	1.263158	1148.623934	300.58	261.687
130	236	1.3	0.013684	1.368421	1149.849787	313.88	272.9748
140	246	1.4	0.014737	1.473684	1151.078259	327.18	284.2378
150	255	1.5	0.015789	1.578947	1152.309358	339.15	294.322
160	264	1.6	0.016842	1.684211	1153.543094	351.12	304.3839
170	272	1.7	0.017895	1.789474	1154.779475	361.76	313.2719

180	280	1.8	0.018947	1.894737	1156.018509	372.4	322.1402
190	288	1.9	0.02	2	1157.260204	383.04	330.9887
200	296	2	0.021053	2.105263	1158.50457	393.68	339.8174
210	304	2.1	0.022105	2.210526	1159.751615	404.32	348.6264
220	312	2.2	0.023158	2.315789	1161.001347	414.96	357.4156
230	320	2.3	0.024211	2.421053	1162.253776	425.6	366.1851
240	327	2.4	0.025263	2.526316	1163.508909	434.91	373.7917
250	334	2.5	0.026316	2.631579	1164.766757	444.22	381.3811
260	340	2.6	0.027368	2.736842	1166.027327	452.2	387.8125
270	346	2.7	0.028421	2.842105	1167.290628	460.18	394.2292
280	352	2.8	0.029474	2.947368	1168.55667	468.16	400.631
290	358	2.9	0.030526	3.052632	1169.825461	476.14	407.018
300	363	3	0.031579	3.157895	1171.097011	482.79	412.2545
310	368	3.1	0.032632	3.263158	1172.371328	489.44	417.4787
320	373	3.2	0.033684	3.368421	1173.64842	496.09	422.6905
330	378	3.3	0.034737	3.473684	1174.928299	502.74	427.8899
340	383	3.4	0.035789	3.578947	1176.210972	509.39	433.0771
350	388	3.5	0.036842	3.684211	1177.496448	516.04	438.2519
360	393	3.6	0.037895	3.789474	1178.784737	522.69	443.4143
370	398	3.7	0.038947	3.894737	1180.075849	529.34	448.5644
380	403	3.8	0.04	4	1181.369792	535.99	453.7021
390	404	3.9	0.041053	4.105263	1182.666575	537.32	454.3292
400	408	4	0.042105	4.210526	1183.966209	542.64	458.3239
410	411	4.1	0.043158	4.315789	1185.268702	546.63	461.1866
420	414	4.2	0.044211	4.421053	1186.574064	550.62	464.0418
430	417	4.3	0.045263	4.526316	1187.882304	554.61	466.8897
440	420	4.4	0.046316	4.631579	1189.193433	558.6	469.7301
450	422	4.5	0.047368	4.736842	1190.507459	561.26	471.446
460	424	4.6	0.048421	4.842105	1191.824392	563.92	473.157
470	426	4.7	0.049474	4.947368	1193.144241	566.58	474.863
480	428	4.8	0.050526	5.052632	1194.467018	569.24	476.564
490	430	4.9	0.051579	5.157895	1195.79273	571.9	478.2601
500	432	5	0.052632	5.263158	1197.121389	574.56	479.9513
510	434	5.1	0.053684	5.368421	1198.453003	577.22	481.6376
520	436	5.2	0.054737	5.473684	1199.787584	579.88	483.3189
530	438	5.3	0.055789	5.578947	1201.125139	582.54	484.9953
540	439	5.4	0.056842	5.684211	1202.465681	583.87	485.5606
550	440	5.5	0.057895	5.789474	1203.809218	585.2	486.1235
560	441	5.6	0.058947	5.894737	1205.155761	586.53	486.684
570	442	5.7	0.06	6	1206.505319	587.86	487.2419
580	443	5.8	0.061053	6.105263	1207.857904	589.19	487.7974
590	443	5.9	0.062105	6.210526	1209.213524	589.19	487.2506
600	443	6	0.063158	6.315789	1210.572191	589.19	486.7037
610	442	6.1	0.064211	6.421053	1211.933915	587.86	485.0595

620	440	6.2	0.065263	6.526316	1213.298705	585.2	482.3215
630	437	6.3	0.066316	6.631579	1214.666573	581.21	478.4935

c. H/D = 2

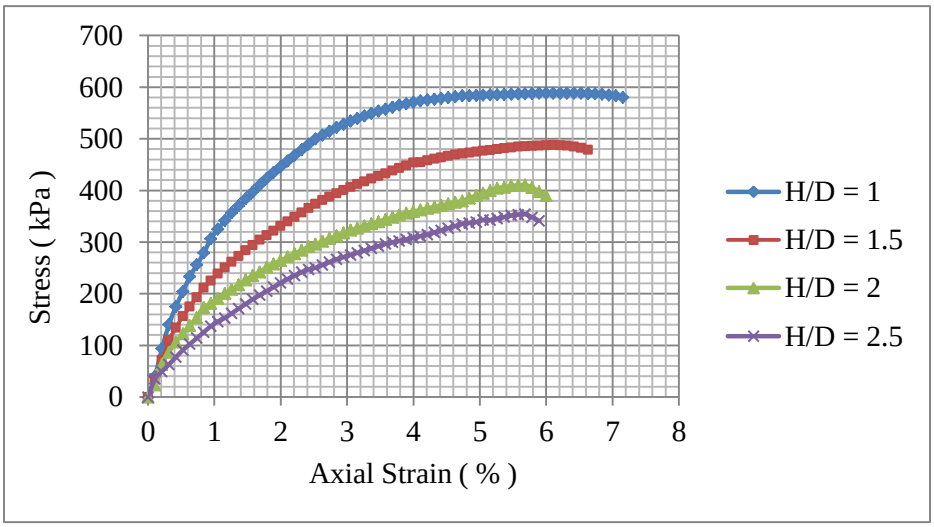
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	54	0.2	0.002105	0.210526	1136.507648	0.07182	63.19359
30	74	0.3	0.003158	0.315789	1137.707761	0.09842	86.50728
40	91	0.4	0.004211	0.421053	1138.910412	0.12103	106.2682
50	105	0.5	0.005263	0.526316	1140.115608	0.13965	122.4876
60	119	0.6	0.006316	0.631579	1141.323358	0.15827	138.6724
70	132	0.7	0.007368	0.736842	1142.533669	0.17556	153.6585
80	149	0.8	0.008421	0.842105	1143.74655	0.19817	173.2639
90	156	0.9	0.009474	0.947368	1144.962009	0.20748	181.2113
100	165	1	0.010526	1.052632	1146.180053	0.21945	191.4621
110	173	1.1	0.011579	1.157895	1147.400692	0.23009	200.5315
120	180	1.2	0.012632	1.263158	1148.623934	0.2394	208.4233
130	188	1.3	0.013684	1.368421	1149.849787	0.25004	217.4545
140	196	1.4	0.014737	1.473684	1151.078259	0.26068	226.4659
150	204	1.5	0.015789	1.578947	1152.309358	0.27132	235.4576
160	210	1.6	0.016842	1.684211	1153.543094	0.2793	242.1236
170	218	1.7	0.017895	1.789474	1154.779475	0.28994	251.0782
180	224	1.8	0.018947	1.894737	1156.018509	0.29792	257.7121
190	230	1.9	0.02	2	1157.260204	0.3059	264.3312
200	236	2	0.021053	2.105263	1158.50457	0.31388	270.9355
210	242	2.1	0.022105	2.210526	1159.751615	0.32186	277.5249
220	248	2.2	0.023158	2.315789	1161.001347	0.32984	284.0996
230	254	2.3	0.024211	2.421053	1162.253776	0.33782	290.6594
240	259	2.4	0.025263	2.526316	1163.508909	0.34447	296.0613
250	264	2.5	0.026316	2.631579	1164.766757	0.35112	301.4509
260	269	2.6	0.027368	2.736842	1166.027327	0.35777	306.8281
270	274	2.7	0.028421	2.842105	1167.290628	0.36442	312.193
280	279	2.8	0.029474	2.947368	1168.55667	0.37107	317.5456
290	284	2.9	0.030526	3.052632	1169.825461	0.37772	322.8858
300	288	3	0.031579	3.157895	1171.097011	0.38304	327.0779
310	292	3.1	0.032632	3.263158	1172.371328	0.38836	331.2602
320	296	3.2	0.033684	3.368421	1173.64842	0.39368	335.4327
330	300	3.3	0.034737	3.473684	1174.928299	0.399	339.5952
340	304	3.4	0.035789	3.578947	1176.210972	0.40432	343.7479

350	308	3.5	0.036842	3.684211	1177.496448	0.40964	347.8906
360	312	3.6	0.037895	3.789474	1178.784737	0.41496	352.0236
370	316	3.7	0.038947	3.894737	1180.075849	0.42028	356.1466
380	319	3.8	0.04	4	1181.369792	0.42427	359.134
390	322	3.9	0.041053	4.105263	1182.666575	0.42826	362.1139
400	325	4	0.042105	4.210526	1183.966209	0.43225	365.0864
410	328	4.1	0.043158	4.315789	1185.268702	0.43624	368.0516
420	331	4.2	0.044211	4.421053	1186.574064	0.44023	371.0093
430	334	4.3	0.045263	4.526316	1187.882304	0.44422	373.9596
440	337	4.4	0.046316	4.631579	1189.193433	0.44821	376.9025
450	340	4.5	0.047368	4.736842	1190.507459	0.4522	379.838
460	345	4.6	0.048421	4.842105	1191.824392	0.45885	384.998
470	350	4.7	0.049474	4.947368	1193.144241	0.4655	390.1456
480	354	4.8	0.050526	5.052632	1194.467018	0.47082	394.1674
490	359	4.9	0.051579	5.157895	1195.79273	0.47747	399.2916
500	364	5	0.052632	5.263158	1197.121389	0.48412	404.4034
510	366	5.1	0.053684	5.368421	1198.453003	0.48678	406.1736
520	369	5.2	0.054737	5.473684	1199.787584	0.49077	409.0474
530	370	5.3	0.055789	5.578947	1201.125139	0.4921	409.6992
540	371	5.4	0.056842	5.684211	1202.465681	0.49343	410.3485
550	367	5.5	0.057895	5.789474	1203.809218	0.48811	405.4712
560	360	5.6	0.058947	5.894737	1205.155761	0.4788	397.293
570	354	5.7	0.06	6	1206.505319	0.47082	390.2345

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.001053	0.105263	1135.310063	0.0399	35.14458
20	42	0.2	0.002105	0.210526	1136.507648	0.05586	49.15057
30	54	0.3	0.003158	0.315789	1137.707761	0.07182	63.12693
40	66	0.4	0.004211	0.421053	1138.910412	0.08778	77.07367
50	78	0.5	0.005263	0.526316	1140.115608	0.10374	90.99077
60	88	0.6	0.006316	0.631579	1141.323358	0.11704	102.5476
70	98	0.7	0.007368	0.736842	1142.533669	0.13034	114.0798
80	108	0.8	0.008421	0.842105	1143.74655	0.14364	125.5873
90	118	0.9	0.009474	0.947368	1144.962009	0.15694	137.0701
100	126	1	0.010526	1.052632	1146.180053	0.16758	146.2074
110	132	1.1	0.011579	1.157895	1147.400692	0.17556	153.0067
120	140	1.2	0.012632	1.263158	1148.623934	0.1862	162.107

130	148	1.3	0.013684	1.368421	1149.849787	0.19684	171.1876
140	156	1.4	0.014737	1.473684	1151.078259	0.20748	180.2484
150	164	1.5	0.015789	1.578947	1152.309358	0.21812	189.2894
160	171	1.6	0.016842	1.684211	1153.543094	0.22743	197.1578
170	178	1.7	0.017895	1.789474	1154.779475	0.23674	205.0088
180	185	1.8	0.018947	1.894737	1156.018509	0.24605	212.8426
190	192	1.9	0.02	2	1157.260204	0.25536	220.6591
200	199	2	0.021053	2.105263	1158.50457	0.26467	228.4583
210	205	2.1	0.022105	2.210526	1159.751615	0.27265	235.0934
220	211	2.2	0.023158	2.315789	1161.001347	0.28063	241.7138
230	216	2.3	0.024211	2.421053	1162.253776	0.28728	247.1749
240	219	2.4	0.025263	2.526316	1163.508909	0.29127	250.3376
250	224	2.5	0.026316	2.631579	1164.766757	0.29792	255.7765
260	229	2.6	0.027368	2.736842	1166.027327	0.30457	261.2031
270	234	2.7	0.028421	2.842105	1167.290628	0.31122	266.6174
280	238	2.8	0.029474	2.947368	1168.55667	0.31654	270.8812
290	242	2.9	0.030526	3.052632	1169.825461	0.32186	275.1351
300	246	3	0.031579	3.157895	1171.097011	0.32718	279.3791
310	250	3.1	0.032632	3.263158	1172.371328	0.3325	283.6132
320	254	3.2	0.033684	3.368421	1173.64842	0.33782	287.8375
330	258	3.3	0.034737	3.473684	1174.928299	0.34314	292.0519
340	262	3.4	0.035789	3.578947	1176.210972	0.34846	296.2564
350	265	3.5	0.036842	3.684211	1177.496448	0.35245	299.3215
360	268	3.6	0.037895	3.789474	1178.784737	0.35644	302.3792
370	271	3.7	0.038947	3.894737	1180.075849	0.36043	305.4295
380	274	3.8	0.04	4	1181.369792	0.36442	308.4724
390	277	3.9	0.041053	4.105263	1182.666575	0.36841	311.5079
400	280	4	0.042105	4.210526	1183.966209	0.3724	314.536
410	284	4.1	0.043158	4.315789	1185.268702	0.37772	318.6788
420	288	4.2	0.044211	4.421053	1186.574064	0.38304	322.8117
430	292	4.3	0.045263	4.526316	1187.882304	0.38836	326.9347
440	296	4.4	0.046316	4.631579	1189.193433	0.39368	331.0479
450	300	4.5	0.047368	4.736842	1190.507459	0.399	335.1512
460	302	4.6	0.048421	4.842105	1191.824392	0.40166	337.0127
470	304	4.7	0.049474	4.947368	1193.144241	0.40432	338.8693
480	308	4.8	0.050526	5.052632	1194.467018	0.40964	342.9479
490	308	4.9	0.051579	5.157895	1195.79273	0.40964	342.5677
500	311	5	0.052632	5.263158	1197.121389	0.41363	345.5205
510	314	5.1	0.053684	5.368421	1198.453003	0.41762	348.4659
520	317	5.2	0.054737	5.473684	1199.787584	0.42161	351.4039
530	319	5.3	0.055789	5.578947	1201.125139	0.42427	353.2271
540	320	5.4	0.056842	5.684211	1202.465681	0.4256	353.9394
550	315	5.5	0.057895	5.789474	1203.809218	0.41895	348.0203
560	309	5.6	0.058947	5.894737	1205.155761	0.41097	341.0099



Stress-strain curve for remoulded sample at OMC with different specimen's height (Sample No. 2)

Sample No. = 3

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	31	0.1	0.001053	0.105263	1135.310063	0.04123	36.31607
20	74	0.2	0.002105	0.210526	1136.507648	0.09842	86.59863
30	116	0.3	0.003158	0.315789	1137.707761	0.15428	135.606
40	144	0.4	0.004211	0.421053	1138.910412	0.19152	168.1607
50	168	0.5	0.005263	0.526316	1140.115608	0.22344	195.9801
60	192	0.6	0.006316	0.631579	1141.323358	0.25536	223.7403
70	214	0.7	0.007368	0.736842	1142.533669	0.28462	249.113
80	236	0.8	0.008421	0.842105	1143.74655	0.31388	274.4314
90	256	0.9	0.009474	0.947368	1144.962009	0.34048	297.3723
100	276	1	0.010526	1.052632	1146.180053	0.36708	320.2638
110	292	1.1	0.011579	1.157895	1147.400692	0.38836	338.4694
120	306	1.2	0.012632	1.263158	1148.623934	0.40698	354.3196
130	320	1.3	0.013684	1.368421	1149.849787	0.4256	370.1353
140	332	1.4	0.014737	1.473684	1151.078259	0.44156	383.6055
150	346	1.5	0.015789	1.578947	1152.309358	0.46018	399.3546
160	358	1.6	0.016842	1.684211	1153.543094	0.47614	412.7631

170	369	1.7	0.017895	1.789474	1154.779475	0.49077	424.9902
180	378	1.8	0.018947	1.894737	1156.018509	0.50274	434.8892
190	388	1.9	0.02	2	1157.260204	0.51604	445.9153
200	396	2	0.021053	2.105263	1158.50457	0.52668	454.6206
210	404	2.1	0.022105	2.210526	1159.751615	0.53732	463.3061
220	412	2.2	0.023158	2.315789	1161.001347	0.54796	471.9719
230	420	2.3	0.024211	2.421053	1162.253776	0.5586	480.6179
240	429	2.4	0.025263	2.526316	1163.508909	0.57057	490.3873
250	436	2.5	0.026316	2.631579	1164.766757	0.57988	497.8507
260	445	2.6	0.027368	2.736842	1166.027327	0.59185	507.5782
270	452	2.7	0.028421	2.842105	1167.290628	0.60116	515.0046
280	460	2.8	0.029474	2.947368	1168.55667	0.6118	523.5518
290	466	2.9	0.030526	3.052632	1169.825461	0.61978	529.8055
300	472	3	0.031579	3.157895	1171.097011	0.62776	536.0444
310	478	3.1	0.032632	3.263158	1172.371328	0.63574	542.2685
320	483	3.2	0.033684	3.368421	1173.64842	0.64239	547.3445
330	488	3.3	0.034737	3.473684	1174.928299	0.64904	552.4082
340	491	3.4	0.035789	3.578947	1176.210972	0.65303	555.198
350	494	3.5	0.036842	3.684211	1177.496448	0.65702	557.9805
360	498	3.6	0.037895	3.789474	1178.784737	0.66234	561.8838
370	501	3.7	0.038947	3.894737	1180.075849	0.66633	564.6501
380	504	3.8	0.04	4	1181.369792	0.67032	567.4091
390	507	3.9	0.041053	4.105263	1182.666575	0.67431	570.1607
400	509	4	0.042105	4.210526	1183.966209	0.67697	571.7815
410	511	4.1	0.043158	4.315789	1185.268702	0.67963	573.3974
420	513	4.2	0.044211	4.421053	1186.574064	0.68229	575.0084
430	515	4.3	0.045263	4.526316	1187.882304	0.68495	576.6144
440	517	4.4	0.046316	4.631579	1189.193433	0.68761	578.2154
450	518	4.5	0.047368	4.736842	1190.507459	0.68894	578.6944
460	519	4.6	0.048421	4.842105	1191.824392	0.69027	579.1709
470	520	4.7	0.049474	4.947368	1193.144241	0.6916	579.6449
480	521	4.8	0.050526	5.052632	1194.467018	0.69293	580.1165
490	522	4.9	0.051579	5.157895	1195.79273	0.69426	580.5856
500	523	5	0.052632	5.263158	1197.121389	0.69559	581.0522
510	524	5.1	0.053684	5.368421	1198.453003	0.69692	581.5163
520	525	5.2	0.054737	5.473684	1199.787584	0.69825	581.978
530	525	5.3	0.055789	5.578947	1201.125139	0.69825	581.3299
540	525	5.4	0.056842	5.684211	1202.465681	0.69825	580.6819
550	525	5.5	0.057895	5.789474	1203.809218	0.69825	580.0338
560	524	5.6	0.058947	5.894737	1205.155761	0.69692	578.2821
570	523	5.7	0.06	6	1206.505319	0.69559	576.5329
580	522	5.8	0.061053	6.105263	1207.857904	0.69426	574.7862
590	521	5.9	0.062105	6.210526	1209.213524	0.69293	573.0419
600	518	6	0.063158	6.315789	1210.572191	0.68894	569.1028

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (N)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	26	0.1	0.001053	0.105263	1135.310063	34.58	30.45864
20	62	0.2	0.002105	0.210526	1136.507648	82.46	72.55561
30	88	0.3	0.003158	0.315789	1137.707761	117.04	102.8735
40	108	0.4	0.004211	0.421053	1138.910412	143.64	126.1205
50	124	0.5	0.005263	0.526316	1140.115608	164.92	144.652
60	140	0.6	0.006316	0.631579	1141.323358	186.2	163.1439
70	166	0.7	0.007368	0.736842	1142.533669	220.78	193.2372
80	180	0.8	0.008421	0.842105	1143.74655	239.4	209.3121
90	194	0.9	0.009474	0.947368	1144.962009	258.02	225.3525
100	208	1	0.010526	1.052632	1146.180053	276.64	241.3582
110	220	1.1	0.011579	1.157895	1147.400692	292.6	255.0112
120	232	1.2	0.012632	1.263158	1148.623934	308.56	268.6345
130	243	1.3	0.013684	1.368421	1149.849787	323.19	281.0715
140	254	1.4	0.014737	1.473684	1151.078259	337.82	293.4813
150	264	1.5	0.015789	1.578947	1152.309358	351.12	304.7098
160	274	1.6	0.016842	1.684211	1153.543094	364.42	315.9136
170	282	1.7	0.017895	1.789474	1154.779475	375.06	324.7893
180	290	1.8	0.018947	1.894737	1156.018509	385.7	333.6452
190	298	1.9	0.02	2	1157.260204	396.34	342.4813
200	306	2	0.021053	2.105263	1158.50457	406.98	351.2977
210	314	2.1	0.022105	2.210526	1159.751615	417.62	360.0943
220	322	2.2	0.023158	2.315789	1161.001347	428.26	368.8712
230	328	2.3	0.024211	2.421053	1162.253776	436.24	375.3397
240	336	2.4	0.025263	2.526316	1163.508909	446.88	384.0796
250	342	2.5	0.026316	2.631579	1164.766757	454.86	390.516
260	348	2.6	0.027368	2.736842	1166.027327	462.84	396.9375
270	352	2.7	0.028421	2.842105	1167.290628	468.16	401.0655
280	358	2.8	0.029474	2.947368	1168.55667	476.14	407.4599
290	364	2.9	0.030526	3.052632	1169.825461	484.12	413.8395
300	369	3	0.031579	3.157895	1171.097011	490.77	419.0686
310	374	3.1	0.032632	3.263158	1172.371328	497.42	424.2854
320	378	3.2	0.033684	3.368421	1173.64842	502.74	428.3566
330	382	3.3	0.034737	3.473684	1174.928299	508.06	432.4179
340	386	3.4	0.035789	3.578947	1176.210972	513.38	436.4693
350	390	3.5	0.036842	3.684211	1177.496448	518.7	440.5109
360	394	3.6	0.037895	3.789474	1178.784737	524.02	444.5426

370	398	3.7	0.038947	3.894737	1180.075849	529.34	448.5644
380	402	3.8	0.04	4	1181.369792	534.66	452.5763
390	405	3.9	0.041053	4.105263	1182.666575	538.65	455.4538
400	408	4	0.042105	4.210526	1183.966209	542.64	458.3239
410	411	4.1	0.043158	4.315789	1185.268702	546.63	461.1866
420	414	4.2	0.044211	4.421053	1186.574064	550.62	464.0418
430	417	4.3	0.045263	4.526316	1187.882304	554.61	466.8897
440	420	4.4	0.046316	4.631579	1189.193433	558.6	469.7301
450	422	4.5	0.047368	4.736842	1190.507459	561.26	471.446
460	424	4.6	0.048421	4.842105	1191.824392	563.92	473.157
470	426	4.7	0.049474	4.947368	1193.144241	566.58	474.863
480	427	4.8	0.050526	5.052632	1194.467018	567.91	475.4505
490	428	4.9	0.051579	5.157895	1195.79273	569.24	476.0357
500	428	5	0.052632	5.263158	1197.121389	569.24	475.5073
510	428	5.1	0.053684	5.368421	1198.453003	569.24	474.979
520	428	5.2	0.054737	5.473684	1199.787584	569.24	474.4507
530	428	5.3	0.055789	5.578947	1201.125139	569.24	473.9223
540	427	5.4	0.056842	5.684211	1202.465681	567.91	472.2879
550	410	5.5	0.057895	5.789474	1203.809218	545.3	452.9788
560	408	5.6	0.058947	5.894737	1205.155761	542.64	450.2654

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	24	0.1	0.001053	0.105263	1135.310063	0.03192	28.11567
20	50	0.2	0.002105	0.210526	1136.507648	0.0665	58.51258
30	76	0.3	0.003158	0.315789	1137.707761	0.10108	88.84531
40	94	0.4	0.004211	0.421053	1138.910412	0.12502	109.7716
50	116	0.5	0.005263	0.526316	1140.115608	0.15428	135.3196
60	134	0.6	0.006316	0.631579	1141.323358	0.17822	156.1521
70	146	0.7	0.007368	0.736842	1142.533669	0.19418	169.9556
80	158	0.8	0.008421	0.842105	1143.74655	0.21014	183.7295
90	172	0.9	0.009474	0.947368	1144.962009	0.22876	199.797
100	182	1	0.010526	1.052632	1146.180053	0.24206	211.1885
110	191	1.1	0.011579	1.157895	1147.400692	0.25403	221.3961
120	200	1.2	0.012632	1.263158	1148.623934	0.266	231.5815
130	207	1.3	0.013684	1.368421	1149.849787	0.27531	239.4313
140	215	1.4	0.014737	1.473684	1151.078259	0.28595	248.4193
150	221	1.5	0.015789	1.578947	1152.309358	0.29393	255.0791
160	229	1.6	0.016842	1.684211	1153.543094	0.30457	264.03

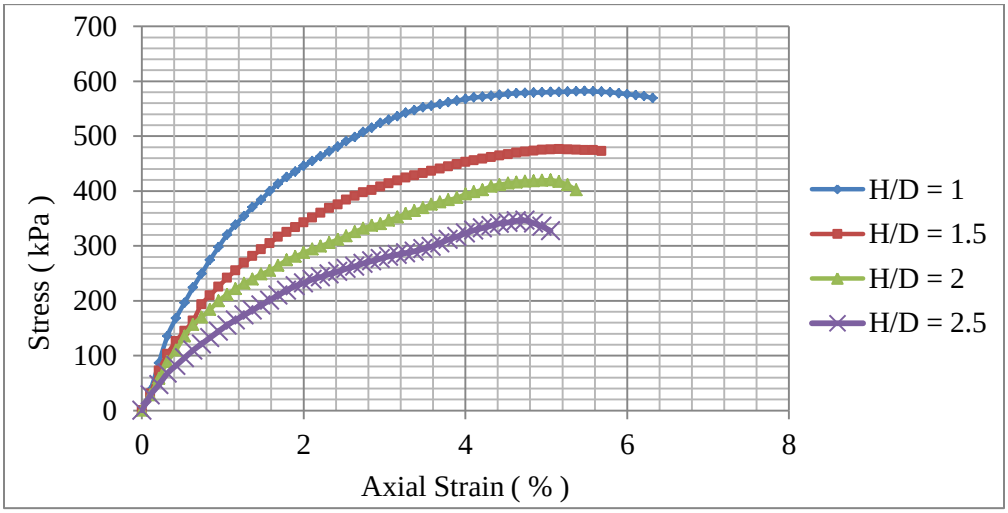
170	238	1.7	0.017895	1.789474	1154.779475	0.31654	274.1129
180	244	1.8	0.018947	1.894737	1156.018509	0.32452	280.7221
190	250	1.9	0.02	2	1157.260204	0.3325	287.3165
200	256	2	0.021053	2.105263	1158.50457	0.34048	293.8961
210	261	2.1	0.022105	2.210526	1159.751615	0.34713	299.3141
220	267	2.2	0.023158	2.315789	1161.001347	0.35511	305.8653
230	272	2.3	0.024211	2.421053	1162.253776	0.36176	311.2573
240	278	2.4	0.025263	2.526316	1163.508909	0.36974	317.7801
250	285	2.5	0.026316	2.631579	1164.766757	0.37905	325.43
260	291	2.6	0.027368	2.736842	1166.027327	0.38703	331.9219
270	296	2.7	0.028421	2.842105	1167.290628	0.39368	337.2596
280	299	2.8	0.029474	2.947368	1168.55667	0.39767	340.3087
290	305	2.9	0.030526	3.052632	1169.825461	0.40565	346.7611
300	310	3	0.031579	3.157895	1171.097011	0.4123	352.0631
310	316	3.1	0.032632	3.263158	1172.371328	0.42028	358.4871
320	321	3.2	0.033684	3.368421	1173.64842	0.42693	363.7631
330	326	3.3	0.034737	3.473684	1174.928299	0.43358	369.0268
340	332	3.4	0.035789	3.578947	1176.210972	0.44156	375.4088
350	336	3.5	0.036842	3.684211	1177.496448	0.44688	379.5171
360	340	3.6	0.037895	3.789474	1178.784737	0.4522	383.6154
370	344	3.7	0.038947	3.894737	1180.075849	0.45752	387.7039
380	350	3.8	0.04	4	1181.369792	0.4655	394.0341
390	354	3.9	0.041053	4.105263	1182.666575	0.47082	398.1004
400	358	4	0.042105	4.210526	1183.966209	0.47614	402.1567
410	364	4.1	0.043158	4.315789	1185.268702	0.48412	408.4475
420	367	4.2	0.044211	4.421053	1186.574064	0.48811	411.3608
430	370	4.3	0.045263	4.526316	1187.882304	0.4921	414.2666
440	372	4.4	0.046316	4.631579	1189.193433	0.49476	416.0467
450	374	4.5	0.047368	4.736842	1190.507459	0.49742	417.8218
460	375	4.6	0.048421	4.842105	1191.824392	0.49875	418.4761
470	376	4.7	0.049474	4.947368	1193.144241	0.50008	419.1279
480	377	4.8	0.050526	5.052632	1194.467018	0.50141	419.7772
490	375	4.9	0.051579	5.157895	1195.79273	0.49875	417.0873
500	370	5	0.052632	5.263158	1197.121389	0.4921	411.0694
510	362	5.1	0.053684	5.368421	1198.453003	0.48146	401.7346

d. H/D = 2.5

Deformation	Load Dial	Sample	strain				

Dial Reading	Reading	Deformation ΔL (mm)	(ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	24	0.1	0.001053	0.105263	1135.310063	0.03192	28.11567
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	58	0.3	0.003158	0.315789	1137.707761	0.07714	67.803
40	70	0.4	0.004211	0.421053	1138.910412	0.0931	81.7448
50	82	0.5	0.005263	0.526316	1140.115608	0.10906	95.65697
60	94	0.6	0.006316	0.631579	1141.323358	0.12502	109.5395
70	104	0.7	0.007368	0.736842	1142.533669	0.13832	121.0643
80	114	0.8	0.008421	0.842105	1143.74655	0.15162	132.5643
90	124	0.9	0.009474	0.947368	1144.962009	0.16492	144.0397
100	134	1	0.010526	1.052632	1146.180053	0.17822	155.4904
110	142	1.1	0.011579	1.157895	1147.400692	0.18886	164.5981
120	150	1.2	0.012632	1.263158	1148.623934	0.1995	173.6861
130	158	1.3	0.013684	1.368421	1149.849787	0.21014	182.7543
140	166	1.4	0.014737	1.473684	1151.078259	0.22078	191.8028
150	174	1.5	0.015789	1.578947	1152.309358	0.23142	200.8315
160	182	1.6	0.016842	1.684211	1153.543094	0.24206	209.8404
170	190	1.7	0.017895	1.789474	1154.779475	0.2527	218.8297
180	197	1.8	0.018947	1.894737	1156.018509	0.26201	226.6486
190	202	1.9	0.02	2	1157.260204	0.26866	232.1518
200	208	2	0.021053	2.105263	1158.50457	0.27664	238.7906
210	212	2.1	0.022105	2.210526	1159.751615	0.28196	243.121
220	217	2.2	0.023158	2.315789	1161.001347	0.28861	248.5871
230	221	2.3	0.024211	2.421053	1162.253776	0.29393	252.8966
240	226	2.4	0.025263	2.526316	1163.508909	0.30058	258.3392
250	230	2.5	0.026316	2.631579	1164.766757	0.3059	262.6277
260	235	2.6	0.027368	2.736842	1166.027327	0.31255	268.0469
270	239	2.7	0.028421	2.842105	1167.290628	0.31787	272.3144
280	243	2.8	0.029474	2.947368	1168.55667	0.32319	276.572
290	247	2.9	0.030526	3.052632	1169.825461	0.32851	280.8197
300	250	3	0.031579	3.157895	1171.097011	0.3325	283.9218
310	253	3.1	0.032632	3.263158	1172.371328	0.33649	287.0166
320	256	3.2	0.033684	3.368421	1173.64842	0.34048	290.1039
330	260	3.3	0.034737	3.473684	1174.928299	0.3458	294.3158
340	264	3.4	0.035789	3.578947	1176.210972	0.35112	298.5179
350	270	3.5	0.036842	3.684211	1177.496448	0.3591	304.9691
360	276	3.6	0.037895	3.789474	1178.784737	0.36708	311.4055
370	281	3.7	0.038947	3.894737	1180.075849	0.37373	316.7
380	287	3.8	0.04	4	1181.369792	0.38171	323.108
390	292	3.9	0.041053	4.105263	1182.666575	0.38836	328.3766
400	296	4	0.042105	4.210526	1183.966209	0.39368	332.5095

410	300	4.1	0.043158	4.315789	1185.268702	0.399	336.6325
420	304	4.2	0.044211	4.421053	1186.574064	0.40432	340.7457
430	306	4.3	0.045263	4.526316	1187.882304	0.40698	342.6097
440	309	4.4	0.046316	4.631579	1189.193433	0.41097	345.5872
450	310	4.5	0.047368	4.736842	1190.507459	0.4123	346.3229
460	306	4.6	0.048421	4.842105	1191.824392	0.40698	341.4765
470	301	4.7	0.049474	4.947368	1193.144241	0.40033	335.5252
480	294	4.8	0.050526	5.052632	1194.467018	0.39102	327.3594



Plot of stress-strain curve for remoulded sample at OMC with different specimen's height (sample No. 3)

Summary of unconfined compressive strength value of each remoulded sample at its OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)			
		Sample 1	Sample 2	sample 3	Average
1.5	1	525.0332	588.659	581.978	565.22
	1.5	448.5656	487.797	476.036	462.88
	2	419.7105	410.349	419.777	411.58
	2.5	392.3432	353.939	346.323	358.41

A.1.3: Sample Remolded at Dry Side of OMC (w = 21.95%)

Sample No. = 1

a. H/D =1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	28	0.1	0.001053	0.105263	1135.310063	0.03724	32.80161
20	60	0.2	0.002105	0.210526	1136.507648	0.0798	70.2151
30	90	0.3	0.003158	0.315789	1137.707761	0.1197	105.2116
40	125	0.4	0.004211	0.421053	1138.910412	0.16625	145.9729
50	185	0.5	0.005263	0.526316	1140.115608	0.24605	215.8114
60	250	0.6	0.006316	0.631579	1141.323358	0.3325	291.3285
70	310	0.7	0.007368	0.736842	1142.533669	0.4123	360.8646
80	360	0.8	0.008421	0.842105	1143.74655	0.4788	418.6242
90	400	0.9	0.009474	0.947368	1144.962009	0.532	464.6442
100	440	1	0.010526	1.052632	1146.180053	0.5852	510.5655
110	475	1.1	0.011579	1.157895	1147.400692	0.63175	550.5923
120	505	1.2	0.012632	1.263158	1148.623934	0.67165	584.7432
130	540	1.3	0.013684	1.368421	1149.849787	0.7182	624.6033
140	570	1.4	0.014737	1.473684	1151.078259	0.7581	658.5999
150	595	1.5	0.015789	1.578947	1152.309358	0.79135	686.7513
160	620	1.6	0.016842	1.684211	1153.543094	0.8246	714.8411
170	645	1.7	0.017895	1.789474	1154.779475	0.85785	742.8691
180	665	1.8	0.018947	1.894737	1156.018509	0.88445	765.0829
190	685	1.9	0.02	2	1157.260204	0.91105	787.2473
200	700	2	0.021053	2.105263	1158.50457	0.931	803.6222
210	715	2.1	0.022105	2.210526	1159.751615	0.95095	819.9601
220	730	2.2	0.023158	2.315789	1161.001347	0.9709	836.2609
230	740	2.3	0.024211	2.421053	1162.253776	0.9842	846.803
240	750	2.4	0.025263	2.526316	1163.508909	0.9975	857.3205
250	758	2.5	0.026316	2.631579	1164.766757	1.00814	865.5295
260	766	2.6	0.027368	2.736842	1166.027327	1.01878	873.7188
270	771	2.7	0.028421	2.842105	1167.290628	1.02543	878.4702
280	776	2.8	0.029474	2.947368	1168.55667	1.03208	883.2092
290	781	2.9	0.030526	3.052632	1169.825461	1.03873	887.9359
300	786	3	0.031579	3.157895	1171.097011	1.04538	892.6502
310	790	3.1	0.032632	3.263158	1172.371328	1.0507	896.2178
320	794	3.2	0.033684	3.368421	1173.64842	1.05602	899.7754
330	797	3.3	0.034737	3.473684	1174.928299	1.06001	902.1912
340	800	3.4	0.035789	3.578947	1176.210972	1.064	904.5996

350	803	3.5	0.036842	3.684211	1177.496448	1.06799	907.0006
340	805	3.4	0.035789	3.578947	1176.210972	1.07065	910.2534
350	807	3.5	0.036842	3.684211	1177.496448	1.07331	911.5187
360	809	3.6	0.037895	3.789474	1178.784737	1.07597	912.779
370	811	3.7	0.038947	3.894737	1180.075849	1.07863	914.0345
380	813	3.8	0.04	4	1181.369792	1.08129	915.285
390	814	3.9	0.041053	4.105263	1182.666575	1.08262	915.4059
400	815	4	0.042105	4.210526	1183.966209	1.08395	915.5244
410	816	4.1	0.043158	4.315789	1185.268702	1.08528	915.6405
420	817	4.2	0.044211	4.421053	1186.574064	1.08661	915.754
430	818	4.3	0.045263	4.526316	1187.882304	1.08794	915.8651
450	819	4.5	0.047368	4.736842	1190.507459	1.08927	914.9628
460	819	4.6	0.048421	4.842105	1191.824392	1.08927	913.9518
470	819	4.7	0.049474	4.947368	1193.144241	1.08927	912.9408
480	818	4.8	0.050526	5.052632	1194.467018	1.08794	910.8163
490	817	4.9	0.051579	5.157895	1195.79273	1.08661	908.6943
500	816	5	0.052632	5.263158	1197.121389	1.08528	906.5747
510	814	5.1	0.053684	5.368421	1198.453003	1.08262	903.3479

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.001053	0.105263	1135.310063	0.0399	35.14458
20	70	0.2	0.002105	0.210526	1136.507648	0.0931	81.91762
30	115	0.3	0.003158	0.315789	1137.707761	0.15295	134.437
40	145	0.4	0.004211	0.421053	1138.910412	0.19285	169.3285
50	175	0.5	0.005263	0.526316	1140.115608	0.23275	204.146
60	210	0.6	0.006316	0.631579	1141.323358	0.2793	244.7159
70	240	0.7	0.007368	0.736842	1142.533669	0.3192	279.3791
80	275	0.8	0.008421	0.842105	1143.74655	0.36575	319.7824
90	300	0.9	0.009474	0.947368	1144.962009	0.399	348.4832
100	325	1	0.010526	1.052632	1146.180053	0.43225	377.1222
110	347	1.1	0.011579	1.157895	1147.400692	0.46151	402.2222
120	367	1.2	0.012632	1.263158	1148.623934	0.48811	424.952
130	380	1.3	0.013684	1.368421	1149.849787	0.5054	439.5357
140	410	1.4	0.014737	1.473684	1151.078259	0.5453	473.7297
150	430	1.5	0.015789	1.578947	1152.309358	0.5719	496.3077
160	447	1.6	0.016842	1.684211	1153.543094	0.59451	515.3774
170	465	1.7	0.017895	1.789474	1154.779475	0.61845	535.5568

180	485	1.8	0.018947	1.894737	1156.018509	0.64505	557.9928
190	505	1.9	0.02	2	1157.260204	0.67165	580.3794
200	520	2	0.021053	2.105263	1158.50457	0.6916	596.9765
210	535	2.1	0.022105	2.210526	1159.751615	0.71155	613.5365
220	550	2.2	0.023158	2.315789	1161.001347	0.7315	630.0596
230	567	2.3	0.024211	2.421053	1162.253776	0.75411	648.8342
240	585	2.4	0.025263	2.526316	1163.508909	0.77805	668.71
250	597	2.5	0.026316	2.631579	1164.766757	0.79401	681.6901
260	612	2.6	0.027368	2.736842	1166.027327	0.81396	698.0625
270	625	2.7	0.028421	2.842105	1167.290628	0.83125	712.1191
280	635	2.8	0.029474	2.947368	1168.55667	0.84455	722.7292
290	650	2.9	0.030526	3.052632	1169.825461	0.8645	738.9991
300	658	3	0.031579	3.157895	1171.097011	0.87514	747.2822
310	668	3.1	0.032632	3.263158	1172.371328	0.88844	757.8145
320	678	3.2	0.033684	3.368421	1173.64842	0.90174	768.3221
330	688	3.3	0.034737	3.473684	1174.928299	0.91504	778.805
340	698	3.4	0.035789	3.578947	1176.210972	0.92834	789.2632
350	708	3.5	0.036842	3.684211	1177.496448	0.94164	799.6967
360	715	3.6	0.037895	3.789474	1178.784737	0.95095	806.7207
370	723	3.7	0.038947	3.894737	1180.075849	0.96159	814.8544
380	730	3.8	0.04	4	1181.369792	0.9709	821.8426
390	737	3.9	0.041053	4.105263	1182.666575	0.98021	828.8135
400	744	4	0.042105	4.210526	1183.966209	0.98952	835.7671
410	747	4.1	0.043158	4.315789	1185.268702	0.99351	838.215
420	750	4.2	0.044211	4.421053	1186.574064	0.9975	840.6555
430	752	4.3	0.045263	4.526316	1187.882304	1.00016	841.9689
440	752	4.4	0.046316	4.631579	1189.193433	1.00016	841.0406
450	750	4.5	0.047368	4.736842	1190.507459	0.9975	837.878
460	748	4.6	0.048421	4.842105	1191.824392	0.99484	834.7203
470	745	4.7	0.049474	4.947368	1193.144241	0.99085	830.4528
480	738	4.8	0.050526	5.052632	1194.467018	0.98154	821.7389

c. H/D = 2

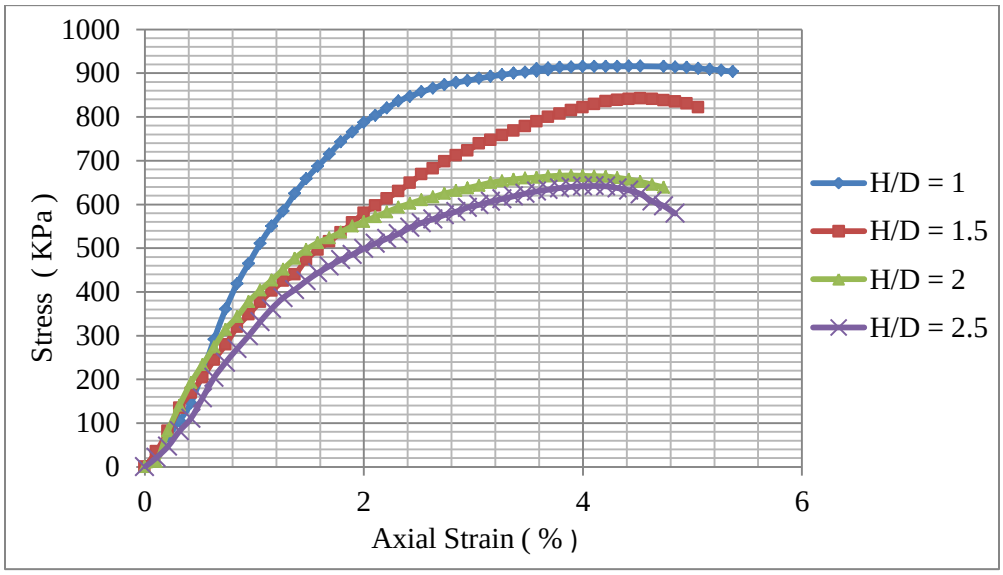
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	10	0.1	0.001053	0.105263	1135.310063	0.0133	11.71486
20	70	0.2	0.002105	0.210526	1136.507648	0.0931	81.91762
30	120	0.3	0.003158	0.315789	1137.707761	0.1596	140.2821
40	165	0.4	0.004211	0.421053	1138.910412	0.21945	192.6842
50	200	0.5	0.005263	0.526316	1140.115608	0.266	233.3097

60	235	0.6	0.006316	0.631579	1141.323358	0.31255	273.8488
70	270	0.7	0.007368	0.736842	1142.533669	0.3591	314.3015
80	295	0.8	0.008421	0.842105	1143.74655	0.39235	343.0393
90	325	0.9	0.009474	0.947368	1144.962009	0.43225	377.5234
100	348	1	0.010526	1.052632	1146.180053	0.46284	403.8109
110	368	1.1	0.011579	1.157895	1147.400692	0.48944	426.5641
120	390	1.2	0.012632	1.263158	1148.623934	0.5187	451.5838
130	412	1.3	0.013684	1.368421	1149.849787	0.54796	476.5492
140	430	1.4	0.014737	1.473684	1151.078259	0.5719	496.8385
150	444	1.5	0.015789	1.578947	1152.309358	0.59052	512.4665
160	454	1.6	0.016842	1.684211	1153.543094	0.60382	523.4482
170	466	1.7	0.017895	1.789474	1154.779475	0.61978	536.7085
180	478	1.8	0.018947	1.894737	1156.018509	0.63574	549.9393
190	488	1.9	0.02	2	1157.260204	0.64904	560.8419
200	498	2	0.021053	2.105263	1158.50457	0.66234	571.7198
210	508	2.1	0.022105	2.210526	1159.751615	0.67564	582.573
220	518	2.2	0.023158	2.315789	1161.001347	0.68894	593.4016
230	526	2.3	0.024211	2.421053	1162.253776	0.69958	601.9167
240	534	2.4	0.025263	2.526316	1163.508909	0.71022	610.4122
250	540	2.5	0.026316	2.631579	1164.766757	0.7182	616.6041
260	548	2.6	0.027368	2.736842	1166.027327	0.72884	625.0625
270	554	2.7	0.028421	2.842105	1167.290628	0.73682	631.2224
280	560	2.8	0.029474	2.947368	1168.55667	0.7448	637.3675
290	566	2.9	0.030526	3.052632	1169.825461	0.75278	643.4977
300	572	3	0.031579	3.157895	1171.097011	0.76076	649.6131
310	576	3.1	0.032632	3.263158	1172.371328	0.76608	653.4448
320	580	3.2	0.033684	3.368421	1173.64842	0.7714	657.2667
330	583	3.3	0.034737	3.473684	1174.928299	0.77539	659.9467
340	585	3.4	0.035789	3.578947	1176.210972	0.77805	661.4885
350	588	3.5	0.036842	3.684211	1177.496448	0.78204	664.1549
360	590	3.6	0.037895	3.789474	1178.784737	0.7847	665.6856
370	591	3.7	0.038947	3.894737	1180.075849	0.78603	666.0843
380	591	3.8	0.04	4	1181.369792	0.78603	665.3547
390	591	3.9	0.041053	4.105263	1182.666575	0.78603	664.6252
400	591	4	0.042105	4.210526	1183.966209	0.78603	663.8956
410	589	4.1	0.043158	4.315789	1185.268702	0.78337	660.9219
420	586	4.2	0.044211	4.421053	1186.574064	0.77938	656.8322
430	582	4.3	0.045263	4.526316	1187.882304	0.77406	651.6302
440	577	4.4	0.046316	4.631579	1189.193433	0.76741	645.3197
450	572	4.5	0.047368	4.736842	1190.507459	0.76076	639.0216

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	18	0.1	0.001053	0.105263	1135.310063	0.02394	21.08675
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	70	0.3	0.003158	0.315789	1137.707761	0.0931	81.83121
40	95	0.4	0.004211	0.421053	1138.910412	0.12635	110.9394
50	135	0.5	0.005263	0.526316	1140.115608	0.17955	157.484
60	175	0.6	0.006316	0.631579	1141.323358	0.23275	203.9299
70	205	0.7	0.007368	0.736842	1142.533669	0.27265	238.6363
80	232	0.8	0.008421	0.842105	1143.74655	0.30856	269.78
90	258	0.9	0.009474	0.947368	1144.962009	0.34314	299.6955
100	286	1	0.010526	1.052632	1146.180053	0.38038	331.8676
110	312	1.1	0.011579	1.157895	1147.400692	0.41496	361.6522
120	334	1.2	0.012632	1.263158	1148.623934	0.44422	386.741
130	350	1.3	0.013684	1.368421	1149.849787	0.4655	404.8355
140	368	1.4	0.014737	1.473684	1151.078259	0.48944	425.2013
150	384	1.5	0.015789	1.578947	1152.309358	0.51072	443.2143
160	398	1.6	0.016842	1.684211	1153.543094	0.52934	458.8819
170	411	1.7	0.017895	1.789474	1154.779475	0.54663	473.3631
180	422	1.8	0.018947	1.894737	1156.018509	0.56126	485.5113
190	434	1.9	0.02	2	1157.260204	0.57722	498.7815
200	445	2	0.021053	2.105263	1158.50457	0.59185	510.8741
210	455	2.1	0.022105	2.210526	1159.751615	0.60515	521.7928
220	465	2.2	0.023158	2.315789	1161.001347	0.61845	532.6867
230	478	2.3	0.024211	2.421053	1162.253776	0.63574	546.989
240	488	2.4	0.025263	2.526316	1163.508909	0.64904	557.8298
250	496	2.5	0.026316	2.631579	1164.766757	0.65968	566.3623
260	505	2.6	0.027368	2.736842	1166.027327	0.67165	576.0157
270	512	2.7	0.028421	2.842105	1167.290628	0.68096	583.368
280	521	2.8	0.029474	2.947368	1168.55667	0.69293	592.9794
290	527	2.9	0.030526	3.052632	1169.825461	0.70091	599.1578
300	534	3	0.031579	3.157895	1171.097011	0.71022	606.457
310	540	3.1	0.032632	3.263158	1172.371328	0.7182	612.6045
320	546	3.2	0.033684	3.368421	1173.64842	0.72618	618.7373
330	552	3.3	0.034737	3.473684	1174.928299	0.73416	624.8552
340	557	3.4	0.035789	3.578947	1176.210972	0.74081	629.8275
350	561	3.5	0.036842	3.684211	1177.496448	0.74613	633.658
360	565	3.6	0.037895	3.789474	1178.784737	0.75145	637.4786
370	568	3.7	0.038947	3.894737	1180.075849	0.75544	640.1622
380	570	3.8	0.04	4	1181.369792	0.7581	641.7127

390	571	3.9	0.041053	4.105263	1182.666575	0.75943	642.1336
400	571	4	0.042105	4.210526	1183.966209	0.75943	641.4288
410	568	4.1	0.043158	4.315789	1185.268702	0.75544	637.3576
420	564	4.2	0.044211	4.421053	1186.574064	0.75012	632.1729
430	557	4.3	0.045263	4.526316	1187.882304	0.74081	623.6392
440	543	4.4	0.046316	4.631579	1189.193433	0.72219	607.294
450	534	4.5	0.047368	4.736842	1190.507459	0.71022	596.5691
460	519	4.6	0.048421	4.842105	1191.824392	0.69027	579.1709



Plot of stress-strain curve for remoulded sample at dry side OMC with different specimen's height (sample No. 1)

Sample No: 2

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	60	0.2	0.002105	0.210526	1136.507648	0.0798	70.2151
30	94	0.3	0.003158	0.315789	1137.707761	0.12502	109.8876
40	125	0.4	0.004211	0.421053	1138.910412	0.16625	145.9729
50	150	0.5	0.005263	0.526316	1140.115608	0.1995	174.9823

60	175	0.6	0.006316	0.631579	1141.323358	0.23275	203.9299
70	195	0.7	0.007368	0.736842	1142.533669	0.25935	226.9955
80	220	0.8	0.008421	0.842105	1143.74655	0.2926	255.8259
90	240	0.9	0.009474	0.947368	1144.962009	0.3192	278.7865
100	260	1	0.010526	1.052632	1146.180053	0.3458	301.6978
110	285	1.1	0.011579	1.157895	1147.400692	0.37905	330.3554
120	310	1.2	0.012632	1.263158	1148.623934	0.4123	358.9513
130	330	1.3	0.013684	1.368421	1149.849787	0.4389	381.702
140	350	1.4	0.014737	1.473684	1151.078259	0.4655	404.4034
150	368	1.5	0.015789	1.578947	1152.309358	0.48944	424.747
160	390	1.6	0.016842	1.684211	1153.543094	0.5187	449.6581
170	410	1.7	0.017895	1.789474	1154.779475	0.5453	472.2114
180	428	1.8	0.018947	1.894737	1156.018509	0.56924	492.4143
190	444	1.9	0.02	2	1157.260204	0.59052	510.2742
200	462	2	0.021053	2.105263	1158.50457	0.61446	530.3907
210	480	2.1	0.022105	2.210526	1159.751615	0.6384	550.4627
220	496	2.2	0.023158	2.315789	1161.001347	0.65968	568.1992
230	514	2.3	0.024211	2.421053	1162.253776	0.68362	588.1848
240	526	2.4	0.025263	2.526316	1163.508909	0.69958	601.2674
250	536	2.5	0.026316	2.631579	1164.766757	0.71288	612.0367
260	548	2.6	0.027368	2.736842	1166.027327	0.72884	625.0625
270	558	2.7	0.028421	2.842105	1167.290628	0.74214	635.78
280	568	2.8	0.029474	2.947368	1168.55667	0.75544	646.4727
290	578	2.9	0.030526	3.052632	1169.825461	0.76874	657.1408
300	588	3	0.031579	3.157895	1171.097011	0.78204	667.7841
310	598	3.1	0.032632	3.263158	1172.371328	0.79534	678.4028
320	606	3.2	0.033684	3.368421	1173.64842	0.80598	686.7304
330	614	3.3	0.034737	3.473684	1174.928299	0.81662	695.0382
340	622	3.4	0.035789	3.578947	1176.210972	0.82726	703.3262
350	630	3.5	0.036842	3.684211	1177.496448	0.8379	711.5945
360	638	3.6	0.037895	3.789474	1178.784737	0.84854	719.843
370	647	3.7	0.038947	3.894737	1180.075849	0.86051	729.1989
380	654	3.8	0.04	4	1181.369792	0.86982	736.2809
390	661	3.9	0.041053	4.105263	1182.666575	0.87913	743.3456
400	668	4	0.042105	4.210526	1183.966209	0.88844	750.393
410	676	4.1	0.043158	4.315789	1185.268702	0.89908	758.5453
420	684	4.2	0.044211	4.421053	1186.574064	0.90972	766.6778
430	690	4.3	0.045263	4.526316	1187.882304	0.9177	772.5513
440	696	4.4	0.046316	4.631579	1189.193433	0.92568	778.4099
450	702	4.5	0.047368	4.736842	1190.507459	0.93366	784.2538
460	708	4.6	0.048421	4.842105	1191.824392	0.94164	790.0828
470	716	4.7	0.049474	4.947368	1193.144241	0.95228	798.1265
480	720	4.8	0.050526	5.052632	1194.467018	0.9576	801.6965
490	722	4.9	0.051579	5.157895	1195.79273	0.96026	803.0321

500	723	5	0.052632	5.263158	1197.121389	0.96159	803.2519
510	722	5.1	0.053684	5.368421	1198.453003	0.96026	801.2496
520	718	5.2	0.054737	5.473684	1199.787584	0.95494	795.9242
530	712	5.3	0.055789	5.578947	1201.125139	0.94696	788.3941
540	702	5.4	0.056842	5.684211	1202.465681	0.93366	776.4546

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	60	0.1	0.001053	0.105263	1135.310063	0.0798	70.28917
20	120	0.2	0.002105	0.210526	1136.507648	0.1596	140.4302
30	160	0.3	0.003158	0.315789	1137.707761	0.2128	187.0428
40	200	0.4	0.004211	0.421053	1138.910412	0.266	233.5566
50	240	0.5	0.005263	0.526316	1140.115608	0.3192	279.9716
60	275	0.6	0.006316	0.631579	1141.323358	0.36575	320.4613
70	305	0.7	0.007368	0.736842	1142.533669	0.40565	355.0442
80	335	0.8	0.008421	0.842105	1143.74655	0.44555	389.5531
90	360	0.9	0.009474	0.947368	1144.962009	0.4788	418.1798
100	385	1	0.010526	1.052632	1146.180053	0.51205	446.7448
110	410	1.1	0.011579	1.157895	1147.400692	0.5453	475.2481
120	428	1.2	0.012632	1.263158	1148.623934	0.56924	495.5843
130	444	1.3	0.013684	1.368421	1149.849787	0.59052	513.5627
140	464	1.4	0.014737	1.473684	1151.078259	0.61712	536.1234
150	484	1.5	0.015789	1.578947	1152.309358	0.64372	558.6347
160	500	1.6	0.016842	1.684211	1153.543094	0.665	576.4847
170	516	1.7	0.017895	1.789474	1154.779475	0.68628	594.2953
180	532	1.8	0.018947	1.894737	1156.018509	0.70756	612.0663
190	548	1.9	0.02	2	1157.260204	0.72884	629.7979
200	564	2	0.021053	2.105263	1158.50457	0.75012	647.4899
210	582	2.1	0.022105	2.210526	1159.751615	0.77406	667.436
220	596	2.2	0.023158	2.315789	1161.001347	0.79268	682.7555
230	612	2.3	0.024211	2.421053	1162.253776	0.81396	700.329
240	620	2.4	0.025263	2.526316	1163.508909	0.8246	708.7183
250	628	2.5	0.026316	2.631579	1164.766757	0.83524	717.0878
260	635	2.6	0.027368	2.736842	1166.027327	0.84455	724.2969
270	640	2.7	0.028421	2.842105	1167.290628	0.8512	729.21
280	645	2.8	0.029474	2.947368	1168.55667	0.85785	734.1107
290	649	2.9	0.030526	3.052632	1169.825461	0.86317	737.8622
300	650	3	0.031579	3.157895	1171.097011	0.8645	738.1967
310	652	3.1	0.032632	3.263158	1172.371328	0.86716	739.6633

320	653	3.2	0.033684	3.368421	1173.64842	0.86849	739.9916
330	654	3.3	0.034737	3.473684	1174.928299	0.86982	740.3175
340	654	3.4	0.035789	3.578947	1176.210972	0.86982	739.5102
350	654	3.5	0.036842	3.684211	1177.496448	0.86982	738.7029
360	652	3.6	0.037895	3.789474	1178.784737	0.86716	735.639
370	650	3.7	0.038947	3.894737	1180.075849	0.8645	732.58
380	648	3.8	0.04	4	1181.369792	0.86184	729.526
390	644	3.9	0.041053	4.105263	1182.666575	0.85652	724.2278
400	640	4	0.042105	4.210526	1183.966209	0.8512	718.9394
410	635	4.1	0.043158	4.315789	1185.268702	0.84455	712.5389

c. H/D = 2

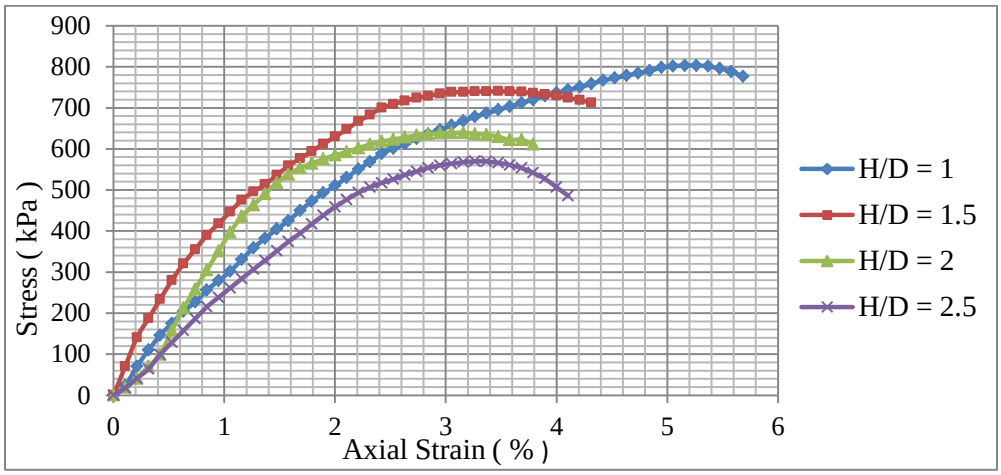
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	16	0.1	0.001053	0.105263	1135.310063	0.02128	18.74378
20	35	0.2	0.002105	0.210526	1136.507648	0.04655	40.95881
30	60	0.3	0.003158	0.315789	1137.707761	0.0798	70.14104
40	85	0.4	0.004211	0.421053	1138.910412	0.11305	99.26154
50	135	0.5	0.005263	0.526316	1140.115608	0.17955	157.484
60	182	0.6	0.006316	0.631579	1141.323358	0.24206	212.0871
70	222	0.7	0.007368	0.736842	1142.533669	0.29526	258.4256
80	262	0.8	0.008421	0.842105	1143.74655	0.34846	304.6654
90	302	0.9	0.009474	0.947368	1144.962009	0.40166	350.8064
100	342	1	0.010526	1.052632	1146.180053	0.45486	396.8486
110	376	1.1	0.011579	1.157895	1147.400692	0.50008	435.8373
120	400	1.2	0.012632	1.263158	1148.623934	0.532	463.1629
130	424	1.3	0.013684	1.368421	1149.849787	0.56392	490.4293
140	448	1.4	0.014737	1.473684	1151.078259	0.59584	517.6364
150	466	1.5	0.015789	1.578947	1152.309358	0.61978	537.859
160	480	1.6	0.016842	1.684211	1153.543094	0.6384	553.4254
170	490	1.7	0.017895	1.789474	1154.779475	0.6517	564.3502
180	500	1.8	0.018947	1.894737	1156.018509	0.665	575.2503
190	509	1.9	0.02	2	1157.260204	0.67697	584.9765
200	516	2	0.021053	2.105263	1158.50457	0.68628	592.3844
210	525	2.1	0.022105	2.210526	1159.751615	0.69825	602.0686
220	533	2.2	0.023158	2.315789	1161.001347	0.70889	610.585
230	540	2.3	0.024211	2.421053	1162.253776	0.7182	617.9373
240	545	2.4	0.025263	2.526316	1163.508909	0.72485	622.9862
250	550	2.5	0.026316	2.631579	1164.766757	0.7315	628.0227
260	555	2.6	0.027368	2.736842	1166.027327	0.73815	633.0469

270	558	2.7	0.028421	2.842105	1167.290628	0.74214	635.78
280	561	2.8	0.029474	2.947368	1168.55667	0.74613	638.5056
290	562	2.9	0.030526	3.052632	1169.825461	0.74746	638.95
300	563	3	0.031579	3.157895	1171.097011	0.74879	639.3919
310	561	3.1	0.032632	3.263158	1172.371328	0.74613	636.4281
320	560	3.2	0.033684	3.368421	1173.64842	0.7448	634.6023
330	556	3.3	0.034737	3.473684	1174.928299	0.73948	629.3831
340	550	3.4	0.035789	3.578947	1176.210972	0.7315	621.9122
350	551	3.5	0.036842	3.684211	1177.496448	0.73283	622.3628
360	542	3.6	0.037895	3.789474	1178.784737	0.72086	611.5281

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	15	0.1	0.001053	0.105263	1135.310063	0.01995	17.57229
20	35	0.2	0.002105	0.210526	1136.507648	0.04655	40.95881
30	55	0.3	0.003158	0.315789	1137.707761	0.07315	64.29595
40	85	0.4	0.004211	0.421053	1138.910412	0.11305	99.26154
50	110	0.5	0.005263	0.526316	1140.115608	0.1463	128.3203
60	135	0.6	0.006316	0.631579	1141.323358	0.17955	157.3174
70	160	0.7	0.007368	0.736842	1142.533669	0.2128	186.2527
80	185	0.8	0.008421	0.842105	1143.74655	0.24605	215.1263
90	205	0.9	0.009474	0.947368	1144.962009	0.27265	238.1302
100	225	1	0.010526	1.052632	1146.180053	0.29925	261.0846
110	245	1.1	0.011579	1.157895	1147.400692	0.32585	283.9897
120	265	1.2	0.012632	1.263158	1148.623934	0.35245	306.8454
130	284	1.3	0.013684	1.368421	1149.849787	0.37772	328.4951
140	304	1.4	0.014737	1.473684	1151.078259	0.40432	351.2533
150	324	1.5	0.015789	1.578947	1152.309358	0.43092	373.9621
160	342	1.6	0.016842	1.684211	1153.543094	0.45486	394.3156
170	362	1.7	0.017895	1.789474	1154.779475	0.48146	416.9281
180	381	1.8	0.018947	1.894737	1156.018509	0.50673	438.3407
190	399	1.9	0.02	2	1157.260204	0.53067	458.5572
200	415	2	0.021053	2.105263	1158.50457	0.55195	476.4332
210	430	2.1	0.022105	2.210526	1159.751615	0.5719	493.1228
220	442	2.2	0.023158	2.315789	1161.001347	0.58786	506.3388
230	452	2.3	0.024211	2.421053	1162.253776	0.60116	517.2364
240	460	2.4	0.025263	2.526316	1163.508909	0.6118	525.8232
250	470	2.5	0.026316	2.631579	1164.766757	0.6251	536.674
260	478	2.6	0.027368	2.736842	1166.027327	0.63574	545.2188

270	486	2.7	0.028421	2.842105	1167.290628	0.64638	553.7438
280	492	2.8	0.029474	2.947368	1168.55667	0.65436	559.9728
290	496	2.9	0.030526	3.052632	1169.825461	0.65968	563.9132
300	500	3	0.031579	3.157895	1171.097011	0.665	567.8436
310	502	3.1	0.032632	3.263158	1172.371328	0.66766	569.4953
320	502.5	3.2	0.033684	3.368421	1173.64842	0.668325	569.4423
330	500	3.3	0.034737	3.473684	1174.928299	0.665	565.992
340	496	3.4	0.035789	3.578947	1176.210972	0.65968	560.8518
350	490	3.5	0.036842	3.684211	1177.496448	0.6517	553.4624
360	480	3.6	0.037895	3.789474	1178.784737	0.6384	541.5747
370	468	3.7	0.038947	3.894737	1180.075849	0.62244	527.4576
380	450	3.8	0.04	4	1181.369792	0.5985	506.6153
390	432	3.9	0.041053	4.105263	1182.666575	0.57456	485.8174



Plot of stress-strain curve for remoulded sample at dry side OMC with different specimen's height (sample No. 2)

Summary of unconfined compressive strength value of each remoulded sample at dry side of OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
1.5	1	915.865	803.252	859.56
	1.5	841.969	740.318	791.14
	2	666.084	639.392	652.74
	2.5	642.134	569.495	605.81

A.1.4: For Sample Remoulded at Wet Side of OMC (w= 27.5%)

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	22	0.1	0.001053	0.105263	1135.310063	0.02926	25.7727
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	65	0.3	0.003158	0.315789	1137.707761	0.08645	75.98612
40	80	0.4	0.004211	0.421053	1138.910412	0.1064	93.42262
50	90	0.5	0.005263	0.526316	1140.115608	0.1197	104.9894
60	100	0.6	0.006316	0.631579	1141.323358	0.133	116.5314
70	110	0.7	0.007368	0.736842	1142.533669	0.1463	128.0487
80	118	0.8	0.008421	0.842105	1143.74655	0.15694	137.2157
90	124	0.9	0.009474	0.947368	1144.962009	0.16492	144.0397
100	130	1	0.010526	1.052632	1146.180053	0.1729	150.8489
110	138	1.1	0.011579	1.157895	1147.400692	0.18354	159.9616
120	144	1.2	0.012632	1.263158	1148.623934	0.19152	166.7386
130	148	1.3	0.013684	1.368421	1149.849787	0.19684	171.1876
140	154	1.4	0.014737	1.473684	1151.078259	0.20482	177.9375
150	160	1.5	0.015789	1.578947	1152.309358	0.2128	184.6726
160	165	1.6	0.016842	1.684211	1153.543094	0.21945	190.24
170	170	1.7	0.017895	1.789474	1154.779475	0.2261	195.795
180	174	1.8	0.018947	1.894737	1156.018509	0.23142	200.1871
190	178	1.9	0.02	2	1157.260204	0.23674	204.5694
200	182	2	0.021053	2.105263	1158.50457	0.24206	208.9418
210	186	2.1	0.022105	2.210526	1159.751615	0.24738	213.3043
220	190	2.2	0.023158	2.315789	1161.001347	0.2527	217.6569
230	194	2.3	0.024211	2.421053	1162.253776	0.25802	221.9997
240	197	2.4	0.025263	2.526316	1163.508909	0.26201	225.1895
250	200	2.5	0.026316	2.631579	1164.766757	0.266	228.3719
260	204	2.6	0.027368	2.736842	1166.027327	0.27132	232.6875
270	207	2.7	0.028421	2.842105	1167.290628	0.27531	235.8539
280	211	2.8	0.029474	2.947368	1168.55667	0.28063	240.151
290	214	2.9	0.030526	3.052632	1169.825461	0.28462	243.3013
300	218	3	0.031579	3.157895	1171.097011	0.28994	247.5798
310	221	3.1	0.032632	3.263158	1172.371328	0.29393	250.7141
320	224	3.2	0.033684	3.368421	1173.64842	0.29792	253.8409
330	227	3.3	0.034737	3.473684	1174.928299	0.30191	256.9604
340	230	3.4	0.035789	3.578947	1176.210972	0.3059	260.0724
350	233	3.5	0.036842	3.684211	1177.496448	0.30989	263.177
360	237	3.6	0.037895	3.789474	1178.784737	0.31521	267.4025

370	240	3.7	0.038947	3.894737	1180.075849	0.3192	270.4911
380	243	3.8	0.04	4	1181.369792	0.32319	273.5723
390	246	3.9	0.041053	4.105263	1182.666575	0.32718	276.646
400	249	4	0.042105	4.210526	1183.966209	0.33117	279.7124
410	251	4.1	0.043158	4.315789	1185.268702	0.33383	281.6492
420	253	4.2	0.044211	4.421053	1186.574064	0.33649	283.5811
430	255	4.3	0.045263	4.526316	1187.882304	0.33915	285.5081
440	257	4.4	0.046316	4.631579	1189.193433	0.34181	287.4301
450	259	4.5	0.047368	4.736842	1190.507459	0.34447	289.3472
460	261	4.6	0.048421	4.842105	1191.824392	0.34713	291.2594
470	263	4.7	0.049474	4.947368	1193.144241	0.34979	293.1666
480	264	4.8	0.050526	5.052632	1194.467018	0.35112	293.9554
490	265.5	4.9	0.051579	5.157895	1195.79273	0.353115	295.2978
500	267	5	0.052632	5.263158	1197.121389	0.35511	296.6366
510	268.5	5.1	0.053684	5.368421	1198.453003	0.357105	297.9716
520	270	5.2	0.054737	5.473684	1199.787584	0.3591	299.303
530	271	5.3	0.055789	5.578947	1201.125139	0.36043	300.077
540	272.5	5.4	0.056842	5.684211	1202.465681	0.362425	301.4015
550	273	5.5	0.057895	5.789474	1203.809218	0.36309	301.6176
560	274	5.6	0.058947	5.894737	1205.155761	0.36442	302.3841
570	275	5.7	0.06	6	1206.505319	0.36575	303.1483
580	275.5	5.8	0.061053	6.105263	1207.857904	0.366415	303.3594
590	276	5.9	0.062105	6.210526	1209.213524	0.36708	303.5692
600	276.5	6	0.063158	6.315789	1210.572191	0.367745	303.7778
610	277	6.1	0.064211	6.421053	1211.933915	0.36841	303.9852
620	278	6.2	0.065263	6.526316	1213.298705	0.36974	304.7395
630	278.5	6.3	0.066316	6.631579	1214.666573	0.370405	304.9438
640	279	6.4	0.067368	6.736842	1216.037528	0.37107	305.1468
650	279	6.5	0.068421	6.842105	1217.411582	0.37107	304.8024
660	279	6.6	0.069474	6.947368	1218.788744	0.37107	304.458
670	279	6.7	0.070526	7.052632	1220.169026	0.37107	304.1136
680	279	6.8	0.071579	7.157895	1221.552438	0.37107	303.7692
690	279	6.9	0.072632	7.263158	1222.93899	0.37107	303.4248
700	279	7	0.073684	7.368421	1224.328693	0.37107	303.0804
710	279	7.1	0.074737	7.473684	1225.721559	0.37107	302.736
720	279	7.2	0.075789	7.578947	1227.117597	0.37107	302.3916
730	279	7.3	0.076842	7.684211	1228.516819	0.37107	302.0471
740	278.5	7.4	0.077895	7.789474	1229.919235	0.370405	301.1621
750	278	7.5	0.078947	7.894737	1231.324857	0.36974	300.2782
760	277	7.6	0.08	8	1232.733696	0.36841	298.8561

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A'(mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	14	0.1	0.001053	0.105263	1135.310063	0.01862	16.40081
20	30	0.2	0.002105	0.210526	1136.507648	0.0399	35.10755
30	50	0.3	0.003158	0.315789	1137.707761	0.0665	58.45086
40	62	0.4	0.004211	0.421053	1138.910412	0.08246	72.40253
50	75	0.5	0.005263	0.526316	1140.115608	0.09975	87.49113
60	85	0.6	0.006316	0.631579	1141.323358	0.11305	99.05168
70	93	0.7	0.007368	0.736842	1142.533669	0.12369	108.2594
80	100	0.8	0.008421	0.842105	1143.74655	0.133	116.2845
90	106	0.9	0.009474	0.947368	1144.962009	0.14098	123.1307
100	112	1	0.010526	1.052632	1146.180053	0.14896	129.9621
110	118	1.1	0.011579	1.157895	1147.400692	0.15694	136.7787
120	122	1.2	0.012632	1.263158	1148.623934	0.16226	141.2647
130	126	1.3	0.013684	1.368421	1149.849787	0.16758	145.7408
140	130	1.4	0.014737	1.473684	1151.078259	0.1729	150.207
150	134	1.5	0.015789	1.578947	1152.309358	0.17822	154.6633
160	137	1.6	0.016842	1.684211	1153.543094	0.18221	157.9568
170	140	1.7	0.017895	1.789474	1154.779475	0.1862	161.2429
180	143	1.8	0.018947	1.894737	1156.018509	0.19019	164.5216
190	146	1.9	0.02	2	1157.260204	0.19418	167.7929
200	149	2	0.021053	2.105263	1158.50457	0.19817	171.0567
210	151	2.1	0.022105	2.210526	1159.751615	0.20083	173.1664
220	154	2.2	0.023158	2.315789	1161.001347	0.20482	176.4167
230	157	2.3	0.024211	2.421053	1162.253776	0.20881	179.6596
240	159	2.4	0.025263	2.526316	1163.508909	0.21147	181.7519
250	162	2.5	0.026316	2.631579	1164.766757	0.21546	184.9812
260	164	2.6	0.027368	2.736842	1166.027327	0.21812	187.0625
270	166	2.7	0.028421	2.842105	1167.290628	0.22078	189.1388
280	169	2.8	0.029474	2.947368	1168.55667	0.22477	192.3484
290	171	2.9	0.030526	3.052632	1169.825461	0.22743	194.4136
300	174	3	0.031579	3.157895	1171.097011	0.23142	197.6096
310	177	3.1	0.032632	3.263158	1172.371328	0.23541	200.7982
320	180	3.2	0.033684	3.368421	1173.64842	0.2394	203.9793
330	183	3.3	0.034737	3.473684	1174.928299	0.24339	207.1531
340	185	3.4	0.035789	3.578947	1176.210972	0.24605	209.1887
350	187	3.5	0.036842	3.684211	1177.496448	0.24871	211.2193
360	189	3.6	0.037895	3.789474	1178.784737	0.25137	213.245
370	192	3.7	0.038947	3.894737	1180.075849	0.25536	216.3929

380	194	3.8	0.04	4	1181.369792	0.25802	218.4075
390	196	3.9	0.041053	4.105263	1182.666575	0.26068	220.4172
400	198	4	0.042105	4.210526	1183.966209	0.26334	222.4219
410	200	4.1	0.043158	4.315789	1185.268702	0.266	224.4217
420	202	4.2	0.044211	4.421053	1186.574064	0.26866	226.4165
430	204	4.3	0.045263	4.526316	1187.882304	0.27132	228.4065
440	206	4.4	0.046316	4.631579	1189.193433	0.27398	230.3915
450	208	4.5	0.047368	4.736842	1190.507459	0.27664	232.3715
460	210	4.6	0.048421	4.842105	1191.824392	0.2793	234.3466
470	212	4.7	0.049474	4.947368	1193.144241	0.28196	236.3168
480	214	4.8	0.050526	5.052632	1194.467018	0.28462	238.282
490	215	4.9	0.051579	5.157895	1195.79273	0.28595	239.1301
500	216	5	0.052632	5.263158	1197.121389	0.28728	239.9757
510	217	5.1	0.053684	5.368421	1198.453003	0.28861	240.8188
520	219	5.2	0.054737	5.473684	1199.787584	0.29127	242.768
530	221	5.3	0.055789	5.578947	1201.125139	0.29393	244.7122
540	222	5.4	0.056842	5.684211	1202.465681	0.29526	245.5455
550	223	5.5	0.057895	5.789474	1203.809218	0.29659	246.3762
560	224	5.6	0.058947	5.894737	1205.155761	0.29792	247.2046
570	225	5.7	0.06	6	1206.505319	0.29925	248.0304
580	226	5.8	0.061053	6.105263	1207.857904	0.30058	248.8538
590	227	5.9	0.062105	6.210526	1209.213524	0.30191	249.6747
600	227.5	6	0.063158	6.315789	1210.572191	0.302575	249.9438
610	227.5	6.1	0.064211	6.421053	1211.933915	0.302575	249.663
620	228	6.2	0.065263	6.526316	1213.298705	0.30324	249.9302
630	228	6.3	0.066316	6.631579	1214.666573	0.30324	249.6488
640	228	6.4	0.067368	6.736842	1216.037528	0.30324	249.3673
650	228	6.5	0.068421	6.842105	1217.411582	0.30324	249.0859
660	228	6.6	0.069474	6.947368	1218.788744	0.30324	248.8044
670	228	6.7	0.070526	7.052632	1220.169026	0.30324	248.5229
680	228	6.8	0.071579	7.157895	1221.552438	0.30324	248.2415
690	228	6.9	0.072632	7.263158	1222.93899	0.30324	247.96
700	228	7	0.073684	7.368421	1224.328693	0.30324	247.6786
710	228	7.1	0.074737	7.473684	1225.721559	0.30324	247.3971
720	227.5	7.2	0.075789	7.578947	1227.117597	0.302575	246.5738
730	227	7.3	0.076842	7.684211	1228.516819	0.30191	245.7516
740	226.5	7.4	0.077895	7.789474	1229.919235	0.301245	244.9307
750	226	7.5	0.078947	7.894737	1231.324857	0.30058	244.111
760	225.5	7.6	0.08	8	1232.733696	0.299915	243.2926
770	225	7.7	0.081053	8.105263	1234.145762	0.29925	242.4754

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	10	0.1	0.001053	0.105263	1135.310063	0.0133	11.71486
20	20	0.2	0.002105	0.210526	1136.507648	0.0266	23.40503
30	30	0.3	0.003158	0.315789	1137.707761	0.0399	35.07052
40	48	0.4	0.004211	0.421053	1138.910412	0.06384	56.05357
50	54	0.5	0.005263	0.526316	1140.115608	0.07182	62.99361
60	60	0.6	0.006316	0.631579	1141.323358	0.0798	69.91884
70	64	0.7	0.007368	0.736842	1142.533669	0.08512	74.50109
80	69	0.8	0.008421	0.842105	1143.74655	0.09177	80.23631
90	74	0.9	0.009474	0.947368	1144.962009	0.09842	85.95918
100	79	1	0.010526	1.052632	1146.180053	0.10507	91.66972
110	83	1.1	0.011579	1.157895	1147.400692	0.11039	96.20876
120	86	1.2	0.012632	1.263158	1148.623934	0.11438	99.58002
130	89	1.3	0.013684	1.368421	1149.849787	0.11837	102.9439
140	92	1.4	0.014737	1.473684	1151.078259	0.12236	106.3003
150	95	1.5	0.015789	1.578947	1152.309358	0.12635	109.6494
160	98	1.6	0.016842	1.684211	1153.543094	0.13034	112.991
170	101	1.7	0.017895	1.789474	1154.779475	0.13433	116.3252
180	104	1.8	0.018947	1.894737	1156.018509	0.13832	119.6521
190	107	1.9	0.02	2	1157.260204	0.14231	122.9715
200	109	2	0.021053	2.105263	1158.50457	0.14497	125.1355
210	112	2.1	0.022105	2.210526	1159.751615	0.14896	128.4413
220	115	2.2	0.023158	2.315789	1161.001347	0.15295	131.7397
230	117	2.3	0.024211	2.421053	1162.253776	0.15561	133.8864
240	120	2.4	0.025263	2.526316	1163.508909	0.1596	137.1713
250	122	2.5	0.026316	2.631579	1164.766757	0.16226	139.3069
260	124	2.6	0.027368	2.736842	1166.027327	0.16492	141.4375
270	126	2.7	0.028421	2.842105	1167.290628	0.16758	143.5632
280	128	2.8	0.029474	2.947368	1168.55667	0.17024	145.684
290	130	2.9	0.030526	3.052632	1169.825461	0.1729	147.7998
300	131	3	0.031579	3.157895	1171.097011	0.17423	148.775
310	133	3.1	0.032632	3.263158	1172.371328	0.17689	150.8822
320	135	3.2	0.033684	3.368421	1173.64842	0.17955	152.9845
330	137	3.3	0.034737	3.473684	1174.928299	0.18221	155.0818
340	139	3.4	0.035789	3.578947	1176.210972	0.18487	157.1742
350	141	3.5	0.036842	3.684211	1177.496448	0.18753	159.2616
360	142	3.6	0.037895	3.789474	1178.784737	0.18886	160.2159
370	143	3.7	0.038947	3.894737	1180.075849	0.19019	161.1676
380	145	3.8	0.04	4	1181.369792	0.19285	163.2427

390	146	3.9	0.041053	4.105263	1182.666575	0.19418	164.1883
400	148	4	0.042105	4.210526	1183.966209	0.19684	166.2547
410	149	4.1	0.043158	4.315789	1185.268702	0.19817	167.1942
420	150	4.2	0.044211	4.421053	1186.574064	0.1995	168.1311
430	151	4.3	0.045263	4.526316	1187.882304	0.20083	169.0656
440	152	4.4	0.046316	4.631579	1189.193433	0.20216	169.9976
450	153	4.5	0.047368	4.736842	1190.507459	0.20349	170.9271
460	155	4.6	0.048421	4.842105	1191.824392	0.20615	172.9701
470	157	4.7	0.049474	4.947368	1193.144241	0.20881	175.0082
480	159	4.8	0.050526	5.052632	1194.467018	0.21147	177.0413
490	160	4.9	0.051579	5.157895	1195.79273	0.2128	177.9573
500	161	5	0.052632	5.263158	1197.121389	0.21413	178.8707
510	162	5.1	0.053684	5.368421	1198.453003	0.21546	179.7818
520	163	5.2	0.054737	5.473684	1199.787584	0.21679	180.6903
530	164	5.3	0.055789	5.578947	1201.125139	0.21812	181.5964
540	165	5.4	0.056842	5.684211	1202.465681	0.21945	182.5
550	166	5.5	0.057895	5.789474	1203.809218	0.22078	183.4012
560	167	5.6	0.058947	5.894737	1205.155761	0.22211	184.2998
570	168	5.7	0.06	6	1206.505319	0.22344	185.196
580	169	5.8	0.061053	6.105263	1207.857904	0.22477	186.0898
590	170	5.9	0.062105	6.210526	1209.213524	0.2261	186.981
600	171	6	0.063158	6.315789	1210.572191	0.22743	187.8698
610	172	6.1	0.064211	6.421053	1211.933915	0.22876	188.7562
620	173	6.2	0.065263	6.526316	1213.298705	0.23009	189.64
630	174	6.3	0.066316	6.631579	1214.666573	0.23142	190.5214
640	175	6.4	0.067368	6.736842	1216.037528	0.23275	191.4003
650	176	6.5	0.068421	6.842105	1217.411582	0.23408	192.2768
660	177	6.6	0.069474	6.947368	1218.788744	0.23541	193.1508
670	178	6.7	0.070526	7.052632	1220.169026	0.23674	194.0223
680	179	6.8	0.071579	7.157895	1221.552438	0.23807	194.8913
690	180	6.9	0.072632	7.263158	1222.93899	0.2394	195.7579
700	180.5	7	0.073684	7.368421	1224.328693	0.240065	196.0789
710	181	7.1	0.074737	7.473684	1225.721559	0.24073	196.3986
720	181.5	7.2	0.075789	7.578947	1227.117597	0.241395	196.7171
730	182	7.3	0.076842	7.684211	1228.516819	0.24206	197.0343
740	182.5	7.4	0.077895	7.789474	1229.919235	0.242725	197.3504
750	183	7.5	0.078947	7.894737	1231.324857	0.24339	197.6651
760	183.5	7.6	0.08	8	1232.733696	0.244055	197.9787
770	184	7.7	0.081053	8.105263	1234.145762	0.24472	198.291
780	184	7.8	0.082105	8.210526	1235.561067	0.24472	198.0639
790	184	7.9	0.083158	8.315789	1236.979621	0.24472	197.8367
800	184	8	0.084211	8.421053	1238.401437	0.24472	197.6096
810	184	8.1	0.085263	8.526316	1239.826525	0.24472	197.3825
820	183	8.2	0.086316	8.631579	1241.254896	0.24339	196.0838

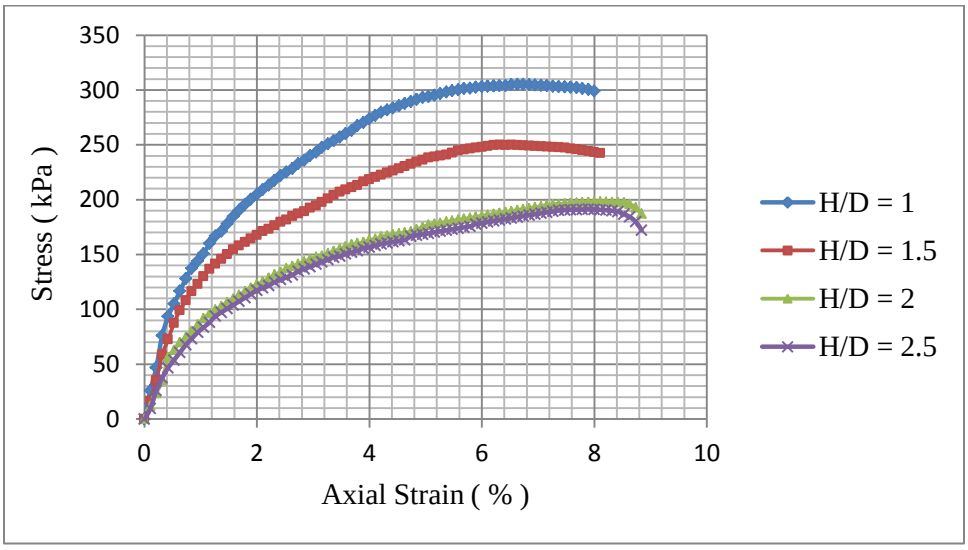
830	180	8.3	0.087368	8.736842	1242.686563	0.2394	192.6471
840	175	8.4	0.088421	8.842105	1244.121536	0.23275	187.0798

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	8	0.1	0.001053	0.105263	1135.310063	0.01064	9.371889
20	22	0.2	0.002105	0.210526	1136.507648	0.02926	25.74554
30	32	0.3	0.003158	0.315789	1137.707761	0.04256	37.40855
40	40	0.4	0.004211	0.421053	1138.910412	0.0532	46.71131
50	46	0.5	0.005263	0.526316	1140.115608	0.06118	53.66122
60	52	0.6	0.006316	0.631579	1141.323358	0.06916	60.59632
70	58	0.7	0.007368	0.736842	1142.533669	0.07714	67.51661
80	63	0.8	0.008421	0.842105	1143.74655	0.08379	73.25924
90	68	0.9	0.009474	0.947368	1144.962009	0.09044	78.98952
100	72	1	0.010526	1.052632	1146.180053	0.09576	83.54708
110	76	1.1	0.011579	1.157895	1147.400692	0.10108	88.09477
120	81	1.2	0.012632	1.263158	1148.623934	0.10773	93.79049
130	84	1.3	0.013684	1.368421	1149.849787	0.11172	97.16052
140	87	1.4	0.014737	1.473684	1151.078259	0.11571	100.5231
150	90	1.5	0.015789	1.578947	1152.309358	0.1197	103.8784
160	93	1.6	0.016842	1.684211	1153.543094	0.12369	107.2262
170	96	1.7	0.017895	1.789474	1154.779475	0.12768	110.5666
180	99	1.8	0.018947	1.894737	1156.018509	0.13167	113.8996
190	102	1.9	0.02	2	1157.260204	0.13566	117.2251
200	104	2	0.021053	2.105263	1158.50457	0.13832	119.3953
210	106	2.1	0.022105	2.210526	1159.751615	0.14098	121.5605
220	109	2.2	0.023158	2.315789	1161.001347	0.14497	124.8663
230	111	2.3	0.024211	2.421053	1162.253776	0.14763	127.0205
240	113	2.4	0.025263	2.526316	1163.508909	0.15029	129.1696
250	115	2.5	0.026316	2.631579	1164.766757	0.15295	131.3138
260	118	2.6	0.027368	2.736842	1166.027327	0.15694	134.5938
270	120	2.7	0.028421	2.842105	1167.290628	0.1596	136.7269
280	122	2.8	0.029474	2.947368	1168.55667	0.16226	138.8551
290	124	2.9	0.030526	3.052632	1169.825461	0.16492	140.9783
300	126	3	0.031579	3.157895	1171.097011	0.16758	143.0966
310	128	3.1	0.032632	3.263158	1172.371328	0.17024	145.21
320	130	3.2	0.033684	3.368421	1173.64842	0.1729	147.3184
330	131	3.3	0.034737	3.473684	1174.928299	0.17423	148.2899
340	133	3.4	0.035789	3.578947	1176.210972	0.17689	150.3897

350	134.5	3.5	0.036842	3.684211	1177.496448	0.178885	151.9198
360	136	3.6	0.037895	3.789474	1178.784737	0.18088	153.4462
370	138	3.7	0.038947	3.894737	1180.075849	0.18354	155.5324
380	139	3.8	0.04	4	1181.369792	0.18487	156.4878
390	140.5	3.9	0.041053	4.105263	1182.666575	0.186865	158.0031
400	142	4	0.042105	4.210526	1183.966209	0.18886	159.5147
410	143	4.1	0.043158	4.315789	1185.268702	0.19019	160.4615
420	144	4.2	0.044211	4.421053	1186.574064	0.19152	161.4059
430	145	4.3	0.045263	4.526316	1187.882304	0.19285	162.3477
440	146	4.4	0.046316	4.631579	1189.193433	0.19418	163.2871
450	149	4.5	0.047368	4.736842	1190.507459	0.19817	166.4584
460	150	4.6	0.048421	4.842105	1191.824392	0.1995	167.3904
470	151	4.7	0.049474	4.947368	1193.144241	0.20083	168.32
480	152	4.8	0.050526	5.052632	1194.467018	0.20216	169.247
490	153	4.9	0.051579	5.157895	1195.79273	0.20349	170.1716
500	154	5	0.052632	5.263158	1197.121389	0.20482	171.0938
510	155	5.1	0.053684	5.368421	1198.453003	0.20615	172.0134
520	156	5.2	0.054737	5.473684	1199.787584	0.20748	172.9306
530	157	5.3	0.055789	5.578947	1201.125139	0.20881	173.8453
540	158	5.4	0.056842	5.684211	1202.465681	0.21014	174.7576
550	159	5.5	0.057895	5.789474	1203.809218	0.21147	175.6674
560	161	5.6	0.058947	5.894737	1205.155761	0.21413	177.6783
570	162	5.7	0.06	6	1206.505319	0.21546	178.5819
580	163	5.8	0.061053	6.105263	1207.857904	0.21679	179.483
590	164	5.9	0.062105	6.210526	1209.213524	0.21812	180.3817
600	165	6	0.063158	6.315789	1210.572191	0.21945	181.2779
610	166	6.1	0.064211	6.421053	1211.933915	0.22078	182.1716
620	167	6.2	0.065263	6.526316	1213.298705	0.22211	183.0629
630	168	6.3	0.066316	6.631579	1214.666573	0.22344	183.9517
640	169	6.4	0.067368	6.736842	1216.037528	0.22477	184.838
650	170	6.5	0.068421	6.842105	1217.411582	0.2261	185.7219
660	171	6.6	0.069474	6.947368	1218.788744	0.22743	186.6033
670	172	6.7	0.070526	7.052632	1220.169026	0.22876	187.4822
680	173	6.8	0.071579	7.157895	1221.552438	0.23009	188.3587
690	174	6.9	0.072632	7.263158	1222.93899	0.23142	189.2327
700	175	7	0.073684	7.368421	1224.328693	0.23275	190.1042
710	175.5	7.1	0.074737	7.473684	1225.721559	0.233415	190.4307
720	176	7.2	0.075789	7.578947	1227.117597	0.23408	190.756
730	176.25	7.3	0.076842	7.684211	1228.516819	0.234413	190.8094
740	176.5	7.4	0.077895	7.789474	1229.919235	0.234745	190.8621
750	177	7.5	0.078947	7.894737	1231.324857	0.23541	191.1843
760	177	7.6	0.08	8	1232.733696	0.23541	190.9658
770	177	7.7	0.081053	8.105263	1234.145762	0.23541	190.7473
780	177	7.8	0.082105	8.210526	1235.561067	0.23541	190.5288

790	176.5	7.9	0.083158	8.315789	1236.979621	0.234745	189.7727
800	176	8	0.084211	8.421053	1238.401437	0.23408	189.0179
810	174	8.1	0.085263	8.526316	1239.826525	0.23142	186.6551
820	172	8.2	0.086316	8.631579	1241.254896	0.22876	184.2974
830	168	8.3	0.087368	8.736842	1242.686563	0.22344	179.804
840	161	8.4	0.088421	8.842105	1244.121536	0.21413	172.1134



Plot of stress-strain curve for remoulded sample at wet side OMC with different specimen's height

Summary of unconfined compressive strength value of remoulded sample at wet side of OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)
		Sample 1
1.5	1	305.147
	1.5	249.944
	2	198.291
	2.5	191.184

A2. Sample from depth of 3m

A2.1 Undisturbed Sample

Visual classification: dark brown red clay soil

Sample No. = 1

w = 30.29%

a. H/D = 1 Mass = 89.1gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	46	0.1	0.002632	0.263158	1137.107388	0.06118	53.80319
20	70	0.2	0.005263	0.526316	1140.115608	0.0931	81.65839
30	112	0.3	0.007895	0.789474	1143.139788	0.14896	130.3078
40	144	0.4	0.010526	1.052632	1146.180053	0.19152	167.0942
50	174	0.5	0.013158	1.315789	1149.236533	0.23142	201.3685
60	198	0.6	0.015789	1.578947	1152.309358	0.26334	228.5324
70	224	0.7	0.018421	1.842105	1155.39866	0.29792	257.8504
80	245	0.8	0.021053	2.105263	1158.50457	0.32585	281.2678
90	267	0.9	0.023684	2.368421	1161.627224	0.35511	305.7005
100	286	1	0.026316	2.631579	1164.766757	0.38038	326.5718
110	305	1.1	0.028947	2.894737	1167.923306	0.40565	347.3259
120	320	1.2	0.031579	3.157895	1171.097011	0.4256	363.4199
130	331	1.3	0.034211	3.421053	1174.288011	0.44023	374.891
140	347	1.4	0.036842	3.684211	1177.496448	0.46151	391.9417
150	364	1.5	0.039474	3.947368	1180.722466	0.48412	410.0201
160	380	1.6	0.042105	4.210526	1183.966209	0.5054	426.8703
170	394	1.7	0.044737	4.473684	1187.227824	0.52402	441.3812
180	410	1.8	0.047368	4.736842	1190.507459	0.5453	458.04
190	420	1.9	0.05	5	1193.805263	0.5586	467.9155
200	434	2	0.052632	5.263158	1197.121389	0.57722	482.1733
210	446	2.1	0.055263	5.526316	1200.455989	0.59318	494.1289
220	458	2.2	0.057895	5.789474	1203.809218	0.60914	506.0104
230	467	2.3	0.060526	6.052632	1207.181232	0.62111	514.5126
240	478	2.4	0.063158	6.315789	1210.572191	0.63574	525.1566
250	485	2.5	0.065789	6.578947	1213.982254	0.64505	531.3504
260	492	2.6	0.068421	6.842105	1217.411582	0.65436	537.501
270	497	2.7	0.071053	7.105263	1220.86034	0.66101	541.4297
280	504	2.8	0.073684	7.368421	1224.328693	0.67032	547.5

290	510	2.9	0.076316	7.631579	1227.816809	0.6783	552.444
300	515	3	0.078947	7.894737	1231.324857	0.68495	556.2707
310	520	3.1	0.081579	8.157895	1234.853009	0.6916	560.0667
320	524	3.2	0.084211	8.421053	1238.401437	0.69692	562.7577
330	528	3.3	0.086842	8.684211	1241.970317	0.70224	565.4241
340	532	3.4	0.089474	8.947368	1245.559827	0.70756	568.0658
350	536	3.5	0.092105	9.210526	1249.170145	0.71288	570.6829
360	539	3.6	0.094737	9.473684	1252.801453	0.71687	572.2136
370	542	3.7	0.097368	9.736842	1256.453936	0.72086	573.7258
380	545	3.8	0.1	10	1260.127778	0.72485	575.2194
390	548	3.9	0.102632	10.26316	1263.823167	0.72884	576.6946
400	550	4	0.105263	10.52632	1267.540294	0.7315	577.102
410	552	4.1	0.107895	10.78947	1271.279351	0.73416	577.497
420	554	4.2	0.110526	11.05263	1275.040533	0.73682	577.8797
430	555	4.3	0.113158	11.31579	1278.824036	0.73815	577.21
440	556	4.4	0.115789	11.57895	1282.63006	0.73948	576.5341
450	557	4.5	0.118421	11.84211	1286.458806	0.74081	575.8521
460	558	4.6	0.121053	12.10526	1290.310479	0.74214	575.1639
470	559	4.7	0.123684	12.36842	1294.185285	0.74347	574.4695
480	560	4.8	0.126316	12.63158	1298.083434	0.7448	573.769
490	560	4.9	0.128947	12.89474	1302.005136	0.7448	572.0408
500	560	5	0.131579	13.15789	1305.950606	0.7448	570.3125
510	561	5.1	0.134211	13.42105	1309.920061	0.74613	569.5996
520	561	5.2	0.136842	13.68421	1313.91372	0.74613	567.8683
530	561	5.3	0.139474	13.94737	1317.931804	0.74613	566.137
540	561	5.4	0.142105	14.21053	1321.97454	0.74613	564.4057
550	560	5.5	0.144737	14.47368	1326.042154	0.7448	561.6714
560	558	5.6	0.147368	14.73684	1330.134877	0.74214	557.9434
570	556	5.7	0.15	15	1334.252941	0.73948	554.2277
580	554	5.8	0.152632	15.26316	1338.396584	0.73682	550.5244
590	552	5.9	0.155263	15.52632	1342.566044	0.73416	546.8334
600	549	6	0.157895	15.78947	1346.761563	0.73017	542.1672

b. H/D = 1.5 Mass = 132gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	22	0.1	0.001053	0.105263	1135.310063	0.02926	25.7727
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	75	0.3	0.003158	0.315789	1137.707761	0.09975	87.67629

40	95	0.4	0.004211	0.421053	1138.910412	0.12635	110.9394
50	115	0.5	0.005263	0.526316	1140.115608	0.15295	134.1531
60	130	0.6	0.006316	0.631579	1141.323358	0.1729	151.4908
70	145	0.7	0.007368	0.736842	1142.533669	0.19285	168.7915
80	160	0.8	0.008421	0.842105	1143.74655	0.2128	186.0552
90	174	0.9	0.009474	0.947368	1144.962009	0.23142	202.1202
100	184	1	0.010526	1.052632	1146.180053	0.24472	213.5092
110	194	1.1	0.011579	1.157895	1147.400692	0.25802	224.8735
120	204	1.2	0.012632	1.263158	1148.623934	0.27132	236.2131
130	213	1.3	0.013684	1.368421	1149.849787	0.28329	246.3713
140	218	1.4	0.014737	1.473684	1151.078259	0.28994	251.8856
150	226	1.5	0.015789	1.578947	1152.309358	0.30058	260.8501
160	234	1.6	0.016842	1.684211	1153.543094	0.31122	269.7949
170	240	1.7	0.017895	1.789474	1154.779475	0.3192	276.4164
180	247	1.8	0.018947	1.894737	1156.018509	0.32851	284.1737
190	255	1.9	0.02	2	1157.260204	0.33915	293.0629
200	262	2	0.021053	2.105263	1158.50457	0.34846	300.7843
210	268	2.1	0.022105	2.210526	1159.751615	0.35644	307.3417
220	275	2.2	0.023158	2.315789	1161.001347	0.36575	315.0298
230	281	2.3	0.024211	2.421053	1162.253776	0.37373	321.5563
240	287	2.4	0.025263	2.526316	1163.508909	0.38171	328.068
250	292	2.5	0.026316	2.631579	1164.766757	0.38836	333.423
260	298	2.6	0.027368	2.736842	1166.027327	0.39634	339.9063
270	305	2.7	0.028421	2.842105	1167.290628	0.40565	347.5141
280	310	2.8	0.029474	2.947368	1168.55667	0.4123	352.8284
290	315	2.9	0.030526	3.052632	1169.825461	0.41895	358.1303
300	321	3	0.031579	3.157895	1171.097011	0.42693	364.5556
310	326	3.1	0.032632	3.263158	1172.371328	0.43358	369.8316
320	331	3.2	0.033684	3.368421	1173.64842	0.44023	375.0953
330	335	3.3	0.034737	3.473684	1174.928299	0.44555	379.2146
340	340	3.4	0.035789	3.578947	1176.210972	0.4522	384.4548
350	345	3.5	0.036842	3.684211	1177.496448	0.45885	389.6827
360	348	3.6	0.037895	3.789474	1178.784737	0.46284	392.6417
370	353	3.7	0.038947	3.894737	1180.075849	0.46949	397.8473
380	356	3.8	0.04	4	1181.369792	0.47348	400.789
390	361	3.9	0.041053	4.105263	1182.666575	0.48013	405.9724
400	365	4	0.042105	4.210526	1183.966209	0.48545	410.0201
410	370	4.1	0.043158	4.315789	1185.268702	0.4921	415.1801
420	373	4.2	0.044211	4.421053	1186.574064	0.49609	418.086
430	376	4.3	0.045263	4.526316	1187.882304	0.50008	420.9845
440	380	4.4	0.046316	4.631579	1189.193433	0.5054	424.9939
450	384	4.5	0.047368	4.736842	1190.507459	0.51072	428.9935
460	387	4.6	0.048421	4.842105	1191.824392	0.51471	431.8673
470	390	4.7	0.049474	4.947368	1193.144241	0.5187	434.7337

480	394	4.8	0.050526	5.052632	1194.467018	0.52402	438.7061
490	398	4.9	0.051579	5.157895	1195.79273	0.52934	442.6687
500	402	5	0.052632	5.263158	1197.121389	0.53466	446.6214
510	406	5.1	0.053684	5.368421	1198.453003	0.53998	450.5642
520	410	5.2	0.054737	5.473684	1199.787584	0.5453	454.4971
530	413	5.3	0.055789	5.578947	1201.125139	0.54929	457.3129
540	416	5.4	0.056842	5.684211	1202.465681	0.55328	460.1212
550	420	5.5	0.057895	5.789474	1203.809218	0.5586	464.027
580	424	5.8	0.061053	6.105263	1207.857904	0.56392	466.8761
610	428	6.1	0.064211	6.421053	1211.933915	0.56924	469.6956
640	432	6.4	0.067368	6.736842	1216.037528	0.57456	472.4854
670	436	6.7	0.070526	7.052632	1220.169026	0.57988	475.2456
700	440	7	0.073684	7.368421	1224.328693	0.5852	477.9762
750	444	7.5	0.078947	7.894737	1231.324857	0.59052	479.581
800	447	8	0.084211	8.421053	1238.401437	0.59451	480.0624
850	450	8.5	0.089474	8.947368	1245.559827	0.5985	480.5068
900	452	9	0.094737	9.473684	1252.801453	0.60116	479.8526
950	454	9.5	0.1	10	1260.127778	0.60382	479.1736
1000	456	10	0.105263	10.52632	1267.540294	0.60648	478.47
1050	457	10.5	0.110526	11.05263	1275.040533	0.60781	476.6986
1100	456	11	0.115789	11.57895	1282.63006	0.60648	472.8409
1150	454	11.5	0.121053	12.10526	1290.310479	0.60382	467.9649
1200	450	12	0.126316	12.63158	1298.083434	0.5985	461.0644
1250	445	12.5	0.131579	13.15789	1305.950606	0.59185	453.1948
1300	438	13	0.136842	13.68421	1313.91372	0.58254	443.3624

c. H/D = 2 Mass = 170.7gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	35	0.1	0.001754	0.175439	1136.108172	0.04655	40.97321
20	51	0.2	0.003509	0.350877	1138.108363	0.06783	59.59889
30	71	0.3	0.005263	0.526316	1140.115608	0.09443	82.82493
40	91	0.4	0.007018	0.701754	1142.129947	0.12103	105.9687
50	111	0.5	0.008772	0.877193	1144.151416	0.14763	129.0301
60	131	0.6	0.010526	1.052632	1146.180053	0.17423	152.0093
70	147	0.7	0.012281	1.22807	1148.215897	0.19551	170.2729
80	163	0.8	0.014035	1.403509	1150.258986	0.21679	188.4706
90	177	0.9	0.015789	1.578947	1152.309358	0.23541	204.2941
100	189	1	0.017544	1.754386	1154.367054	0.25137	217.7557
110	201	1.1	0.019298	1.929825	1156.432111	0.26733	231.1679

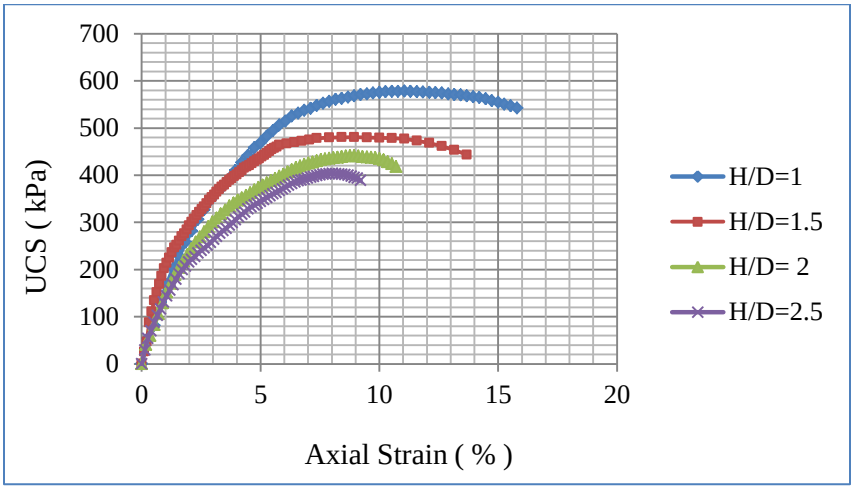
120	213	1.2	0.021053	2.105263	1158.50457	0.28329	244.5308
130	225	1.3	0.022807	2.280702	1160.58447	0.29925	257.8442
140	235	1.4	0.024561	2.45614	1162.671853	0.31255	268.8205
150	245	1.5	0.026316	2.631579	1164.766757	0.32585	279.7556
160	255	1.6	0.02807	2.807018	1166.869224	0.33915	290.6495
170	264	1.7	0.029825	2.982456	1168.979295	0.35112	300.3646
180	272	1.8	0.031579	3.157895	1171.097011	0.36176	308.9069
190	280	1.9	0.033333	3.333333	1173.222414	0.3724	317.4164
200	288	2	0.035088	3.508772	1175.355545	0.38304	325.8929
210	296	2.1	0.036842	3.684211	1177.496448	0.39368	334.3365
220	302	2.2	0.038596	3.859649	1179.645164	0.40166	340.4922
230	308	2.3	0.040351	4.035088	1181.801737	0.40964	346.6233
240	313	2.4	0.042105	4.210526	1183.966209	0.41629	351.6063
250	318	2.5	0.04386	4.385965	1186.138624	0.42294	356.5688
260	324	2.6	0.045614	4.561404	1188.319026	0.43092	362.6299
270	330	2.7	0.047368	4.736842	1190.507459	0.4389	368.6663
280	335	2.8	0.049123	4.912281	1192.703967	0.44555	373.5629
290	340	2.9	0.050877	5.087719	1194.908595	0.4522	378.439
300	345	3	0.052632	5.263158	1197.121389	0.45885	383.2945
310	350	3.1	0.054386	5.438596	1199.342393	0.4655	388.1294
320	355	3.2	0.05614	5.614035	1201.571654	0.47215	392.9437
330	360	3.3	0.057895	5.789474	1203.809218	0.4788	397.7374
340	364	3.4	0.059649	5.964912	1206.055131	0.48412	401.4079
350	369	3.5	0.061404	6.140351	1208.309439	0.49077	406.1625
360	374	3.6	0.063158	6.315789	1210.572191	0.49742	410.8966
370	379	3.7	0.064912	6.491228	1212.843433	0.50407	415.6101
380	383	3.8	0.066667	6.666667	1215.123214	0.50939	419.2085
390	387	3.9	0.068421	6.842105	1217.411582	0.51471	422.7905
400	390	4	0.070175	7.017544	1219.708585	0.5187	425.2655
410	393	4.1	0.07193	7.192982	1222.014272	0.52269	427.7282
420	396	4.2	0.073684	7.368421	1224.328693	0.52668	430.1786
430	399	4.3	0.075439	7.54386	1226.651898	0.53067	432.6166
440	401	4.4	0.077193	7.719298	1228.983935	0.53333	433.9601
450	403	4.5	0.078947	7.894737	1231.324857	0.53599	435.2954
460	405	4.6	0.080702	8.070175	1233.674714	0.53865	436.6224
470	407	4.7	0.082456	8.245614	1236.033556	0.54131	437.9412
480	409	4.8	0.084211	8.421053	1238.401437	0.54397	439.2518
490	411	4.9	0.085965	8.596491	1240.778407	0.54663	440.5541
500	412	5	0.087719	8.77193	1243.164519	0.54796	440.7783
510	413	5.1	0.089474	8.947368	1245.559827	0.54929	440.9985
520	413	5.2	0.091228	9.122807	1247.964382	0.54929	440.1488
530	413	5.3	0.092982	9.298246	1250.37824	0.54929	439.2991
540	413	5.4	0.094737	9.473684	1252.801453	0.54929	438.4494
550	413	5.5	0.096491	9.649123	1255.234078	0.54929	437.5997

560	413	5.6	0.098246	9.824561	1257.676167	0.54929	436.7499
570	412	5.7	0.1	10	1260.127778	0.54796	434.8448
580	410	5.8	0.101754	10.17544	1262.588965	0.5453	431.8904
590	407	5.9	0.103509	10.35088	1265.059785	0.54131	427.8928
600	404	6	0.105263	10.52632	1267.540294	0.53732	423.9076
610	399	6.1	0.107018	10.70175	1270.03055	0.53067	417.8403

d. H/D = 2.5 Mass = 217.9gm

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	25	0.1	0.001316	0.131579	1135.609223	0.03325	29.27944
20	46	0.2	0.002632	0.263158	1137.107388	0.06118	53.80319
30	60	0.3	0.003947	0.394737	1138.609511	0.0798	70.08549
40	75	0.4	0.005263	0.526316	1140.115608	0.09975	87.49113
50	88	0.5	0.006579	0.657895	1141.625695	0.11704	102.5205
60	100	0.6	0.007895	0.789474	1143.139788	0.133	116.3462
70	113	0.7	0.009211	0.921053	1144.657902	0.15029	131.2969
80	124	0.8	0.010526	1.052632	1146.180053	0.16492	143.8866
90	135	0.9	0.011842	1.184211	1147.706258	0.17955	156.4425
100	145	1	0.013158	1.315789	1149.236533	0.19285	167.8071
110	155	1.1	0.014474	1.447368	1150.770895	0.20615	179.1408
120	165	1.2	0.015789	1.578947	1152.309358	0.21945	190.4436
130	173	1.3	0.017105	1.710526	1153.851941	0.23009	199.4103
140	180	1.4	0.018421	1.842105	1155.39866	0.2394	207.2012
150	188	1.5	0.019737	1.973684	1156.94953	0.25004	216.1201
160	193	1.6	0.021053	2.105263	1158.50457	0.25669	221.5701
170	198	1.7	0.022368	2.236842	1160.063795	0.26334	227.0048
180	205	1.8	0.023684	2.368421	1161.627224	0.27265	234.7139
190	210	1.9	0.025	2.5	1163.194872	0.2793	240.1145
200	215	2	0.026316	2.631579	1164.766757	0.28595	245.4998
210	220	2.1	0.027632	2.763158	1166.342896	0.2926	250.8696
220	226	2.2	0.028947	2.894737	1167.923306	0.30058	257.3628
230	232	2.3	0.030263	3.026316	1169.508005	0.30856	263.8374
240	238	2.4	0.031579	3.157895	1171.097011	0.31654	270.2936
250	244	2.5	0.032895	3.289474	1172.69034	0.32452	276.7312
260	249	2.6	0.034211	3.421053	1174.288011	0.33117	282.0177
270	254	2.7	0.035526	3.552632	1175.890041	0.33782	287.2888
280	260	2.8	0.036842	3.684211	1177.496448	0.3458	293.6739
290	265	2.9	0.038158	3.815789	1179.10725	0.35245	298.9126

300	271	3	0.039474	3.947368	1180.722466	0.36043	305.2623
310	277	3.1	0.040789	4.078947	1182.342112	0.36841	311.5934
320	282	3.2	0.042105	4.210526	1183.966209	0.37506	316.7827
330	287	3.3	0.043421	4.342105	1185.594773	0.38171	321.9565
340	293	3.4	0.044737	4.473684	1187.227824	0.38969	328.2352
350	297	3.5	0.046053	4.605263	1188.865379	0.39501	332.258
360	301	3.6	0.047368	4.736842	1190.507459	0.40033	336.2684
370	305	3.7	0.048684	4.868421	1192.15408	0.40565	340.2664
380	309	3.8	0.05	5	1193.805263	0.41097	344.2521
390	313	3.9	0.051316	5.131579	1195.461026	0.41629	348.2255
400	317	4	0.052632	5.263158	1197.121389	0.42161	352.1865
410	321	4.1	0.053947	5.394737	1198.78637	0.42693	356.1352
420	325	4.2	0.055263	5.526316	1200.455989	0.43225	360.0715
430	328	4.3	0.056579	5.657895	1202.130265	0.43624	362.8891
440	332	4.4	0.057895	5.789474	1203.809218	0.44156	366.8023
450	336	4.5	0.059211	5.921053	1205.492867	0.44688	370.7031
460	340	4.6	0.060526	6.052632	1207.181232	0.4522	374.5916
470	344	4.7	0.061842	6.184211	1208.874334	0.45752	378.4678
480	348	4.8	0.063158	6.315789	1210.572191	0.46284	382.3316
490	351	4.9	0.064474	6.447368	1212.274824	0.46683	385.0859
500	354	5	0.065789	6.578947	1213.982254	0.47082	387.831
510	356	5.1	0.067105	6.710526	1215.694499	0.47348	389.4728
520	358	5.2	0.068421	6.842105	1217.411582	0.47614	391.1085
530	361	5.3	0.069737	6.973684	1219.133522	0.48013	393.8289
540	363	5.4	0.071053	7.105263	1220.86034	0.48279	395.4506
550	365	5.5	0.072368	7.236842	1222.592057	0.48545	397.0662
560	367	5.6	0.073684	7.368421	1224.328693	0.48811	398.6756
570	369	5.7	0.075	7.5	1226.07027	0.49077	400.2789
580	371	5.8	0.076316	7.631579	1227.816809	0.49343	401.8759
590	372	5.9	0.077632	7.763158	1229.568331	0.49476	402.3851
600	373	6	0.078947	7.894737	1231.324857	0.49609	402.8912
610	374	6.1	0.080263	8.026316	1233.086409	0.49742	403.3943
620	374	6.2	0.081579	8.157895	1234.853009	0.49742	402.8172
630	374	6.3	0.082895	8.289474	1236.624677	0.49742	402.2401
640	374	6.4	0.084211	8.421053	1238.401437	0.49742	401.663
650	374	6.5	0.085526	8.552632	1240.183309	0.49742	401.0859
660	373	6.6	0.086842	8.684211	1241.970317	0.49609	399.4379
670	372	6.7	0.088158	8.815789	1243.762482	0.49476	397.793
680	370	6.8	0.089474	8.947368	1245.559827	0.4921	395.0834
690	369	6.9	0.090789	9.078947	1247.362373	0.49077	393.4462
700	365	7	0.092105	9.210526	1249.170145	0.48545	388.618



Plot of stress-strain curve for undisturbed sample with different specimen's height (sample No.1)

Sample No. = 2

w = 30.24%

a. H/D = 1 specimen mass = 89.3g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	40	0.1	0.002632	0.263158	1137.107388	0.0532	46.78538
20	75	0.2	0.005263	0.526316	1140.115608	0.09975	87.49113
30	114	0.3	0.007895	0.789474	1143.139788	0.15162	132.6347
40	150	0.4	0.010526	1.052632	1146.180053	0.1995	174.0564
50	196	0.5	0.013158	1.315789	1149.236533	0.26068	226.8288
60	222	0.6	0.015789	1.578947	1152.309358	0.29526	256.2333
70	244	0.7	0.018421	1.842105	1155.39866	0.32452	280.8728
80	266	0.8	0.021053	2.105263	1158.50457	0.35378	305.3764
90	286	0.9	0.023684	2.368421	1161.627224	0.38038	327.4544
100	304	1	0.026316	2.631579	1164.766757	0.40432	347.1253
110	320	1.1	0.028947	2.894737	1167.923306	0.4256	364.4075
120	332	1.2	0.031579	3.157895	1171.097011	0.44156	377.0482
130	348	1.3	0.034211	3.421053	1174.288011	0.46284	394.1452
140	365	1.4	0.036842	3.684211	1177.496448	0.48545	412.273
150	380	1.5	0.039474	3.947368	1180.722466	0.5054	428.043
160	395	1.6	0.042105	4.210526	1183.966209	0.52535	443.7204
170	410	1.7	0.044737	4.473684	1187.227824	0.5453	459.3053

180	422	1.8	0.047368	4.736842	1190.507459	0.56126	471.446
190	434	1.9	0.05	5	1193.805263	0.57722	483.5127
200	446	2	0.052632	5.263158	1197.121389	0.59318	495.5053
210	456	2.1	0.055263	5.526316	1200.455989	0.60648	505.208
220	466	2.2	0.057895	5.789474	1203.809218	0.61978	514.849
230	476	2.3	0.060526	6.052632	1207.181232	0.63308	524.4283
240	486	2.4	0.063158	6.315789	1210.572191	0.64638	533.9459
250	494	2.5	0.065789	6.578947	1213.982254	0.65702	541.2105
260	502	2.6	0.068421	6.842105	1217.411582	0.66766	548.4259
270	510	2.7	0.071053	7.105263	1220.86034	0.6783	555.5918
280	516	2.8	0.073684	7.368421	1224.328693	0.68628	560.5357
290	521	2.9	0.076316	7.631579	1227.816809	0.69293	564.3594
300	526	3	0.078947	7.894737	1231.324857	0.69958	568.1523
310	530	3.1	0.081579	8.157895	1234.853009	0.7049	570.8372
320	534	3.2	0.084211	8.421053	1238.401437	0.71022	573.4974
330	538	3.3	0.086842	8.684211	1241.970317	0.71554	576.1329
340	542	3.4	0.089474	8.947368	1245.559827	0.72086	578.7438
350	546	3.5	0.092105	9.210526	1249.170145	0.72618	581.3299
360	549	3.6	0.094737	9.473684	1252.801453	0.73017	582.8298
370	551	3.7	0.097368	9.736842	1256.453936	0.73283	583.2526
380	553	3.8	0.1	10	1260.127778	0.73549	583.663
390	554	3.9	0.102632	10.26316	1263.823167	0.73682	583.0088
400	555	4	0.105263	10.52632	1267.540294	0.73815	582.3484
410	556	4.1	0.107895	10.78947	1271.279351	0.73948	581.6818
420	556	4.2	0.110526	11.05263	1275.040533	0.73948	579.9659
430	556	4.3	0.113158	11.31579	1278.824036	0.73948	578.25
440	556	4.4	0.115789	11.57895	1282.63006	0.73948	576.5341
450	555	4.5	0.118421	11.84211	1286.458806	0.73815	573.7844
460	553	4.6	0.121053	12.10526	1290.310479	0.73549	570.0101

b. H/D = 1.5 Specimen mass = 132.6g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	32	0.1	0.001053	0.105263	1135.310063	0.04256	37.48756
20	74	0.2	0.002105	0.210526	1136.507648	0.09842	86.59863
30	110	0.3	0.003158	0.315789	1137.707761	0.1463	128.5919
40	130	0.4	0.004211	0.421053	1138.910412	0.1729	151.8118
50	144	0.5	0.005263	0.526316	1140.115608	0.19152	167.983
60	158	0.6	0.006316	0.631579	1141.323358	0.21014	184.1196
70	172	0.7	0.007368	0.736842	1142.533669	0.22876	200.2217

80	184	0.8	0.008421	0.842105	1143.74655	0.24472	213.9635
90	194	0.9	0.009474	0.947368	1144.962009	0.25802	225.3525
100	204	1	0.010526	1.052632	1146.180053	0.27132	236.7167
110	214	1.1	0.011579	1.157895	1147.400692	0.28462	248.0563
120	224	1.2	0.012632	1.263158	1148.623934	0.29792	259.3712
130	234	1.3	0.013684	1.368421	1149.849787	0.31122	270.6614
140	244	1.4	0.014737	1.473684	1151.078259	0.32452	281.927
150	254	1.5	0.015789	1.578947	1152.309358	0.33782	293.1678
160	262	1.6	0.016842	1.684211	1153.543094	0.34846	302.078
170	270	1.7	0.017895	1.789474	1154.779475	0.3591	310.9685
180	278	1.8	0.018947	1.894737	1156.018509	0.36974	319.8392
190	286	1.9	0.02	2	1157.260204	0.38038	328.6901
200	294	2	0.021053	2.105263	1158.50457	0.39102	337.5213
210	304	2.1	0.022105	2.210526	1159.751615	0.40432	348.6264
220	312	2.2	0.023158	2.315789	1161.001347	0.41496	357.4156
230	320	2.3	0.024211	2.421053	1162.253776	0.4256	366.1851
240	327	2.4	0.025263	2.526316	1163.508909	0.43491	373.7917
250	334	2.5	0.026316	2.631579	1164.766757	0.44422	381.3811
260	340	2.6	0.027368	2.736842	1166.027327	0.4522	387.8125
270	346	2.7	0.028421	2.842105	1167.290628	0.46018	394.2292
280	352	2.8	0.029474	2.947368	1168.55667	0.46816	400.631
290	358	2.9	0.030526	3.052632	1169.825461	0.47614	407.018
300	362	3	0.031579	3.157895	1171.097011	0.48146	411.1188
310	366	3.1	0.032632	3.263158	1172.371328	0.48678	415.2097
320	370	3.2	0.033684	3.368421	1173.64842	0.4921	419.2908
330	374	3.3	0.034737	3.473684	1174.928299	0.49742	423.362
340	378	3.4	0.035789	3.578947	1176.210972	0.50274	427.4233
350	382	3.5	0.036842	3.684211	1177.496448	0.50806	431.4748
360	384	3.6	0.037895	3.789474	1178.784737	0.51072	433.2598
370	388	3.7	0.038947	3.894737	1180.075849	0.51604	437.2939
380	392	3.8	0.04	4	1181.369792	0.52136	441.3182
390	395	3.9	0.041053	4.105263	1182.666575	0.52535	444.208
400	398	4	0.042105	4.210526	1183.966209	0.52934	447.0905
410	401	4.1	0.043158	4.315789	1185.268702	0.53333	449.9655
420	405	4.2	0.044211	4.421053	1186.574064	0.53865	453.954
430	408	4.3	0.045263	4.526316	1187.882304	0.54264	456.8129
440	411	4.4	0.046316	4.631579	1189.193433	0.54663	459.6645
450	414	4.5	0.047368	4.736842	1190.507459	0.55062	462.5087
460	417	4.6	0.048421	4.842105	1191.824392	0.55461	465.3454
470	420	4.7	0.049474	4.947368	1193.144241	0.5586	468.1747
480	423	4.8	0.050526	5.052632	1194.467018	0.56259	470.9967
490	426	4.9	0.051579	5.157895	1195.79273	0.56658	473.8112
500	428	5	0.052632	5.263158	1197.121389	0.56924	475.5073
510	430	5.1	0.053684	5.368421	1198.453003	0.5719	477.1985

520	432	5.2	0.054737	5.473684	1199.787584	0.57456	478.8848
530	434	5.3	0.055789	5.578947	1201.125139	0.57722	480.5661
540	436	5.4	0.056842	5.684211	1202.465681	0.57988	482.2425
550	438	5.5	0.057895	5.789474	1203.809218	0.58254	483.9139
560	440	5.6	0.058947	5.894737	1205.155761	0.5852	485.5804
570	442	5.7	0.06	6	1206.505319	0.58786	487.2419
580	443	5.8	0.061053	6.105263	1207.857904	0.58919	487.7974
590	444	5.9	0.062105	6.210526	1209.213524	0.59052	488.3505
600	445	6	0.063158	6.315789	1210.572191	0.59185	488.901
610	446	6.1	0.064211	6.421053	1211.933915	0.59318	489.4491
620	447	6.2	0.065263	6.526316	1213.298705	0.59451	489.9948
630	448	6.3	0.066316	6.631579	1214.666573	0.59584	490.5379
640	449	6.4	0.067368	6.736842	1216.037528	0.59717	491.0786
650	450	6.5	0.068421	6.842105	1217.411582	0.5985	491.6168
660	451	6.6	0.069474	6.947368	1218.788744	0.59983	492.1526
670	451	6.7	0.070526	7.052632	1220.169026	0.59983	491.5958
680	451	6.8	0.071579	7.157895	1221.552438	0.59983	491.0391
690	451	6.9	0.072632	7.263158	1222.93899	0.59983	490.4824
700	450	7	0.073684	7.368421	1224.328693	0.5985	488.8393
710	448	7.1	0.074737	7.473684	1225.721559	0.59584	486.1137

c. H/D = 2 mass of specimen = 171.2g

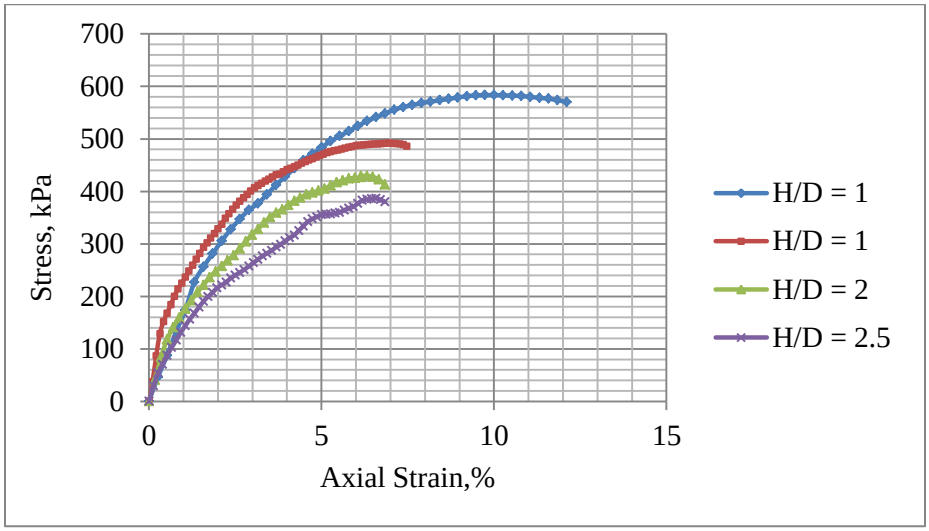
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	35	0.1	0.001754	0.175439	1136.108172	0.04655	40.97321
20	72	0.2	0.003509	0.350877	1138.108363	0.09576	84.13962
30	101	0.3	0.005263	0.526316	1140.115608	0.13433	117.8214
40	121	0.4	0.007018	0.701754	1142.129947	0.16093	140.9034
50	137	0.5	0.008772	0.877193	1144.151416	0.18221	159.2534
60	152	0.6	0.010526	1.052632	1146.180053	0.20216	176.3772
70	166	0.7	0.012281	1.22807	1148.215897	0.22078	192.2809
80	180	0.8	0.014035	1.403509	1150.258986	0.2394	208.127
90	192	0.9	0.015789	1.578947	1152.309358	0.25536	221.6072
100	205	1	0.017544	1.754386	1154.367054	0.27265	236.19
110	215	1.1	0.019298	1.929825	1156.432111	0.28595	247.2692
120	224	1.2	0.021053	2.105263	1158.50457	0.29792	257.1591
130	234	1.3	0.022807	2.280702	1160.58447	0.31122	268.158
140	243	1.4	0.024561	2.45614	1162.671853	0.32319	277.9718
150	255	1.5	0.026316	2.631579	1164.766757	0.33915	291.1742
160	267	1.6	0.02807	2.807018	1166.869224	0.35511	304.3272

170	279	1.7	0.029825	2.982456	1168.979295	0.37107	317.4308
180	289	1.8	0.031579	3.157895	1171.097011	0.38437	328.2136
190	300	1.9	0.033333	3.333333	1173.222414	0.399	340.089
200	310	2	0.035088	3.508772	1175.355545	0.4123	350.7875
210	318	2.1	0.036842	3.684211	1177.496448	0.42294	359.1858
220	324	2.2	0.038596	3.859649	1179.645164	0.43092	365.2963
230	332	2.3	0.040351	4.035088	1181.801737	0.44156	373.6329
240	340	2.4	0.042105	4.210526	1183.966209	0.4522	381.9366
250	346	2.5	0.04386	4.385965	1186.138624	0.46018	387.9648
260	352	2.6	0.045614	4.561404	1188.319026	0.46816	393.9683
270	356	2.7	0.047368	4.736842	1190.507459	0.47348	397.7128
280	360	2.8	0.049123	4.912281	1192.703967	0.4788	401.4408
290	364	2.9	0.050877	5.087719	1194.908595	0.48412	405.1523
300	370	3	0.052632	5.263158	1197.121389	0.4921	411.0694
310	376	3.1	0.054386	5.438596	1199.342393	0.50008	416.9618
320	380	3.2	0.05614	5.614035	1201.571654	0.5054	420.6158
330	384	3.3	0.057895	5.789474	1203.809218	0.51072	424.2533
340	386	3.4	0.059649	5.964912	1206.055131	0.51338	425.6688
350	388	3.5	0.061404	6.140351	1208.309439	0.51604	427.076
350	390	3.5	0.061404	6.140351	1208.309439	0.5187	429.2775
360	391	3.6	0.063158	6.315789	1210.572191	0.52003	429.5737
370	390	3.7	0.064912	6.491228	1212.843433	0.5187	427.6727
380	386	3.8	0.066667	6.666667	1215.123214	0.51338	422.4921
390	378	3.9	0.068421	6.842105	1217.411582	0.50274	412.9581

d. H/D = 2.5 mass of specimen = 218.1g

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	25	0.1	0.001316	0.131579	1135.609223	0.03325	29.27944
20	46	0.2	0.002632	0.263158	1137.107388	0.06118	53.80319
30	60	0.3	0.003947	0.394737	1138.609511	0.0798	70.08549
40	75	0.4	0.005263	0.526316	1140.115608	0.09975	87.49113
50	88	0.5	0.006579	0.657895	1141.625695	0.11704	102.5205
60	100	0.6	0.007895	0.789474	1143.139788	0.133	116.3462
70	113	0.7	0.009211	0.921053	1144.657902	0.15029	131.2969
80	124	0.8	0.010526	1.052632	1146.180053	0.16492	143.8866
90	135	0.9	0.011842	1.184211	1147.706258	0.17955	156.4425
100	145	1	0.013158	1.315789	1149.236533	0.19285	167.8071
110	155	1.1	0.014474	1.447368	1150.770895	0.20615	179.1408
120	165	1.2	0.015789	1.578947	1152.309358	0.21945	190.4436

130	173	1.3	0.017105	1.710526	1153.851941	0.23009	199.4103
140	180	1.4	0.018421	1.842105	1155.39866	0.2394	207.2012
150	188	1.5	0.019737	1.973684	1156.94953	0.25004	216.1201
160	193	1.6	0.021053	2.105263	1158.50457	0.25669	221.5701
170	198	1.7	0.022368	2.236842	1160.063795	0.26334	227.0048
180	205	1.8	0.023684	2.368421	1161.627224	0.27265	234.7139
190	210	1.9	0.025	2.5	1163.194872	0.2793	240.1145
200	215	2	0.026316	2.631579	1164.766757	0.28595	245.4998
210	220	2.1	0.027632	2.763158	1166.342896	0.2926	250.8696
220	226	2.2	0.028947	2.894737	1167.923306	0.30058	257.3628
230	232	2.3	0.030263	3.026316	1169.508005	0.30856	263.8374
240	238	2.4	0.031579	3.157895	1171.097011	0.31654	270.2936
250	244	2.5	0.032895	3.289474	1172.69034	0.32452	276.7312
260	249	2.6	0.034211	3.421053	1174.288011	0.33117	282.0177
270	254	2.7	0.035526	3.552632	1175.890041	0.33782	287.2888
280	260	2.8	0.036842	3.684211	1177.496448	0.3458	293.6739
290	265	2.9	0.038158	3.815789	1179.10725	0.35245	298.9126
300	271	3	0.039474	3.947368	1180.722466	0.36043	305.2623
310	277	3.1	0.040789	4.078947	1182.342112	0.36841	311.5934
320	282	3.2	0.042105	4.210526	1183.966209	0.37506	316.7827
330	290	3.3	0.043421	4.342105	1185.594773	0.3857	325.3219
340	298	3.4	0.044737	4.473684	1187.227824	0.39634	333.8365
350	306	3.5	0.046053	4.605263	1188.865379	0.40698	342.3264
360	311	3.6	0.047368	4.736842	1190.507459	0.41363	347.4401
370	315	3.7	0.048684	4.868421	1192.15408	0.41895	351.4227
380	319	3.8	0.05	5	1193.805263	0.42427	355.393
390	320	3.9	0.051316	5.131579	1195.461026	0.4256	356.0133
400	321	4	0.052632	5.263158	1197.121389	0.42693	356.6305
410	323	4.1	0.053947	5.394737	1198.78637	0.42959	358.3541
420	325	4.2	0.055263	5.526316	1200.455989	0.43225	360.0715
430	329	4.3	0.056579	5.657895	1202.130265	0.43757	363.9955
440	333	4.4	0.057895	5.789474	1203.809218	0.44289	367.9071
450	336	4.5	0.059211	5.921053	1205.492867	0.44688	370.7031
460	342	4.6	0.060526	6.052632	1207.181232	0.45486	376.7951
470	348	4.7	0.061842	6.184211	1208.874334	0.46284	382.8686
480	350	4.8	0.063158	6.315789	1210.572191	0.4655	384.5289
490	352	4.9	0.064474	6.447368	1212.274824	0.46816	386.1831
500	353	5	0.065789	6.578947	1213.982254	0.46949	386.7355
510	351	5.1	0.067105	6.710526	1215.694499	0.46683	384.0027
520	348	5.2	0.068421	6.842105	1217.411582	0.46284	380.1837
530	344	5.3	0.069737	6.973684	1219.133522	0.45752	375.2829



Plot of stress-strain curve for undisturbed sample with different specimen's height (sample No.2)

Summary of unconfined compressive strength value of undisturbed sample with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
3	1	577.8797	583.663	580.771
	1.5	480.5068	492.153	486.330
	2	440.9985	429.278	435.138
	2.5	403.3943	386.736	395.065

A2.2: For Sample Remoulded at its OMC (W= 25%)

Sample No. 1

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.002632	0.263158	1137.107388	0.0399	35.08903
20	75	0.2	0.005263	0.526316	1140.115608	0.09975	87.49113
30	112	0.3	0.007895	0.789474	1143.139788	0.14896	130.3078
40	155	0.4	0.010526	1.052632	1146.180053	0.20615	179.8583
50	185	0.5	0.013158	1.315789	1149.236533	0.24605	214.0987
60	207	0.6	0.015789	1.578947	1152.309358	0.27531	238.9202
70	228	0.7	0.018421	1.842105	1155.39866	0.30324	262.4549
80	244	0.8	0.021053	2.105263	1158.50457	0.32452	280.1197
90	266	0.9	0.023684	2.368421	1161.627224	0.35378	304.5555
100	288	1	0.026316	2.631579	1164.766757	0.38304	328.8555
110	306	1.1	0.028947	2.894737	1167.923306	0.40698	348.4647
120	326	1.2	0.031579	3.157895	1171.097011	0.43358	370.2341
130	342	1.3	0.034211	3.421053	1174.288011	0.45486	387.3496
140	356	1.4	0.036842	3.684211	1177.496448	0.47348	402.1074
150	368	1.5	0.039474	3.947368	1180.722466	0.48944	414.5259
160	384	1.6	0.042105	4.210526	1183.966209	0.51072	431.3637
170	398	1.7	0.044737	4.473684	1187.227824	0.52934	445.8622
180	410	1.8	0.047368	4.736842	1190.507459	0.5453	458.04
190	422	1.9	0.05	5	1193.805263	0.56126	470.1437
200	434	2	0.052632	5.263158	1197.121389	0.57722	482.1733
210	446	2.1	0.055263	5.526316	1200.455989	0.59318	494.1289
220	458	2.2	0.057895	5.789474	1203.809218	0.60914	506.0104
230	468	2.3	0.060526	6.052632	1207.181232	0.62244	515.6144
240	478	2.4	0.063158	6.315789	1210.572191	0.63574	525.1566
250	486	2.5	0.065789	6.578947	1213.982254	0.64638	532.446
260	494	2.6	0.068421	6.842105	1217.411582	0.65702	539.686
270	503	2.7	0.071053	7.105263	1220.86034	0.66899	547.966
280	510	2.8	0.073684	7.368421	1224.328693	0.6783	554.0179
290	517	2.9	0.076316	7.631579	1227.816809	0.68761	560.0265
300	524	3	0.078947	7.894737	1231.324857	0.69692	565.992
310	531	3.1	0.081579	8.157895	1234.853009	0.70623	571.9142
320	536	3.2	0.084211	8.421053	1238.401437	0.71288	575.6453
330	540	3.3	0.086842	8.684211	1241.970317	0.7182	578.2747
340	545	3.4	0.089474	8.947368	1245.559827	0.72485	581.9472

350	550	3.5	0.092105	9.210526	1249.170145	0.7315	585.5888
360	555	3.6	0.094737	9.473684	1252.801453	0.73815	589.1995
370	560	3.7	0.097368	9.736842	1256.453936	0.7448	592.7794
380	565	3.8	0.1	10	1260.127778	0.75145	596.3284
390	570	3.9	0.102632	10.26316	1263.823167	0.7581	599.8466
400	572	4	0.105263	10.52632	1267.540294	0.76076	600.186
410	573	4.1	0.107895	10.78947	1271.279351	0.76209	599.467
420	574	4.2	0.110526	11.05263	1275.040533	0.76342	598.7418
430	574	4.3	0.113158	11.31579	1278.824036	0.76342	596.9703
440	575	4.4	0.115789	11.57895	1282.63006	0.76475	596.2358
450	576	4.5	0.118421	11.84211	1286.458806	0.76608	595.4952
460	577	4.6	0.121053	12.10526	1290.310479	0.76741	594.7483
470	577	4.7	0.123684	12.36842	1294.185285	0.76741	592.9676
480	577	4.8	0.126316	12.63158	1298.083434	0.76741	591.187
490	576	4.9	0.128947	12.89474	1302.005136	0.76608	588.3848
500	575	5	0.131579	13.15789	1305.950606	0.76475	585.5888

b. H/D =1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	51	0.1	0.001754	0.175439	1136.108172	0.06783	59.70382
20	83	0.2	0.003509	0.350877	1138.108363	0.11039	96.99428
30	106	0.3	0.005263	0.526316	1140.115608	0.14098	123.6541
40	129	0.4	0.007018	0.701754	1142.129947	0.17157	150.2193
50	149	0.5	0.008772	0.877193	1144.151416	0.19817	173.2026
60	161	0.6	0.010526	1.052632	1146.180053	0.21413	186.8206
70	176	0.7	0.012281	1.22807	1148.215897	0.23408	203.8641
80	191	0.8	0.014035	1.403509	1150.258986	0.25403	220.8459
90	206	0.9	0.015789	1.578947	1152.309358	0.27398	237.766
100	221	1	0.017544	1.754386	1154.367054	0.29393	254.6244
110	231	1.1	0.019298	1.929825	1156.432111	0.30723	265.6706
120	241	1.2	0.021053	2.105263	1158.50457	0.32053	276.6756
130	251	1.3	0.022807	2.280702	1160.58447	0.33383	287.6396
140	261	1.4	0.024561	2.45614	1162.671853	0.34713	298.5623
150	271	1.5	0.026316	2.631579	1164.766757	0.36043	309.4439
160	281	1.6	0.02807	2.807018	1166.869224	0.37373	320.2844
170	289	1.7	0.029825	2.982456	1168.979295	0.38437	328.8082
180	299	1.8	0.031579	3.157895	1171.097011	0.39767	339.5705
190	309	1.9	0.033333	3.333333	1173.222414	0.41097	350.2916
200	319	2	0.035088	3.508772	1175.355545	0.42427	360.9716
210	328	2.1	0.036842	3.684211	1177.496448	0.43624	370.4809

220	336	2.2	0.038596	3.859649	1179.645164	0.44688	378.8258
230	344	2.3	0.040351	4.035088	1181.801737	0.45752	387.1377
240	352	2.4	0.042105	4.210526	1183.966209	0.46816	395.4167
250	360	2.5	0.04386	4.385965	1186.138624	0.4788	403.6628
260	368	2.6	0.045614	4.561404	1188.319026	0.48944	411.8759
270	376	2.7	0.047368	4.736842	1190.507459	0.50008	420.0562
280	383	2.8	0.049123	4.912281	1192.703967	0.50939	427.0884
290	390	2.9	0.050877	5.087719	1194.908595	0.5187	434.0918
300	398	3	0.052632	5.263158	1197.121389	0.52934	442.1774
310	404	3.1	0.054386	5.438596	1199.342393	0.53732	448.0122
320	411	3.2	0.05614	5.614035	1201.571654	0.54663	454.9292
330	418	3.3	0.057895	5.789474	1203.809218	0.55594	461.8174
340	424	3.4	0.059649	5.964912	1206.055131	0.56392	467.574
350	430	3.5	0.061404	6.140351	1208.309439	0.5719	473.3059
360	436	3.6	0.063158	6.315789	1210.572191	0.57988	479.0132
370	442	3.7	0.064912	6.491228	1212.843433	0.58786	484.6957
380	448	3.8	0.066667	6.666667	1215.123214	0.59584	490.3536
390	454	3.9	0.068421	6.842105	1217.411582	0.60382	495.9867
400	460	4	0.070175	7.017544	1219.708585	0.6118	501.5952
410	464	4.1	0.07193	7.192982	1222.014272	0.61712	505.0023
420	468	4.2	0.073684	7.368421	1224.328693	0.62244	508.3929
430	472	4.3	0.075439	7.54386	1226.651898	0.62776	511.767
440	476	4.4	0.077193	7.719298	1228.983935	0.63308	515.1247
450	480	4.5	0.078947	7.894737	1231.324857	0.6384	518.4659
460	483	4.6	0.080702	8.070175	1233.674714	0.64239	520.7126
470	486	4.7	0.082456	8.245614	1236.033556	0.64638	522.947
480	488	4.8	0.084211	8.421053	1238.401437	0.64904	524.095
490	490	4.9	0.085965	8.596491	1240.778407	0.6517	525.2348
500	491	5	0.087719	8.77193	1243.164519	0.65303	525.2965
510	492	5.1	0.089474	8.947368	1245.559827	0.65436	525.3541
520	493	5.2	0.091228	9.122807	1247.964382	0.65569	525.4076
530	493	5.3	0.092982	9.298246	1250.37824	0.65569	524.3933
540	493	5.4	0.094737	9.473684	1252.801453	0.65569	523.379
550	492	5.5	0.096491	9.649123	1255.234078	0.65436	521.3052
560	491	5.6	0.098246	9.824561	1257.676167	0.65303	519.2354
570	490	5.7	0.1	10	1260.127778	0.6517	517.1698
580	488	5.8	0.101754	10.17544	1262.588965	0.64904	514.0549
590	486	5.9	0.103509	10.35088	1265.059785	0.64638	510.9482
600	484	6	0.105263	10.52632	1267.540294	0.64372	507.8497
610	481	6.1	0.107018	10.70175	1270.03055	0.63973	503.7123

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	32	0.1	0.001316	0.131579	1135.609223	0.04256	37.47768
20	76	0.2	0.002632	0.263158	1137.107388	0.10108	88.89222
30	100	0.3	0.003947	0.394737	1138.609511	0.133	116.8091
40	120	0.4	0.005263	0.526316	1140.115608	0.1596	139.9858
50	135	0.5	0.006579	0.657895	1141.625695	0.17955	157.2757
60	150	0.6	0.007895	0.789474	1143.139788	0.1995	174.5193
70	160	0.7	0.009211	0.921053	1144.657902	0.2128	185.9071
80	170	0.8	0.010526	1.052632	1146.180053	0.2261	197.2639
90	180	0.9	0.011842	1.184211	1147.706258	0.2394	208.59
100	190	1	0.013158	1.315789	1149.236533	0.2527	219.8851
110	198	1.1	0.014474	1.447368	1150.770895	0.26334	228.8379
120	206	1.2	0.015789	1.578947	1152.309358	0.27398	237.766
130	213	1.3	0.017105	1.710526	1153.851941	0.28329	245.5168
140	221	1.4	0.018421	1.842105	1155.39866	0.29393	254.397
150	229	1.5	0.019737	1.973684	1156.94953	0.30457	263.2526
160	237	1.6	0.021053	2.105263	1158.50457	0.31521	272.0835
170	245	1.7	0.022368	2.236842	1160.063795	0.32585	280.8897
180	250	1.8	0.023684	2.368421	1161.627224	0.3325	286.2364
190	258	1.9	0.025	2.5	1163.194872	0.34314	294.9979
200	265	2	0.026316	2.631579	1164.766757	0.35245	302.5928
210	274	2.1	0.027632	2.763158	1166.342896	0.36442	312.4467
220	282	2.2	0.028947	2.894737	1167.923306	0.37506	321.1341
230	289	2.3	0.030263	3.026316	1169.508005	0.38437	328.6596
240	296	2.4	0.031579	3.157895	1171.097011	0.39368	336.1634
250	302	2.5	0.032895	3.289474	1172.69034	0.40166	342.5116
260	309	2.6	0.034211	3.421053	1174.288011	0.41097	349.9738
270	316	2.7	0.035526	3.552632	1175.890041	0.42028	357.4144
280	322	2.8	0.036842	3.684211	1177.496448	0.42826	363.7039
290	328	2.9	0.038158	3.815789	1179.10725	0.43624	369.9748
300	334	3	0.039474	3.947368	1180.722466	0.44422	376.2273
310	339	3.1	0.040789	4.078947	1182.342112	0.45087	381.3363
320	345	3.2	0.042105	4.210526	1183.966209	0.45885	387.5533
330	350	3.3	0.043421	4.342105	1185.594773	0.4655	392.6299
340	355	3.4	0.044737	4.473684	1187.227824	0.47215	397.6912
350	360	3.5	0.046053	4.605263	1188.865379	0.4788	402.7369
360	365	3.6	0.047368	4.736842	1190.507459	0.48545	407.7673
370	370	3.7	0.048684	4.868421	1192.15408	0.4921	412.7822
380	375	3.8	0.05	5	1193.805263	0.49875	417.7817

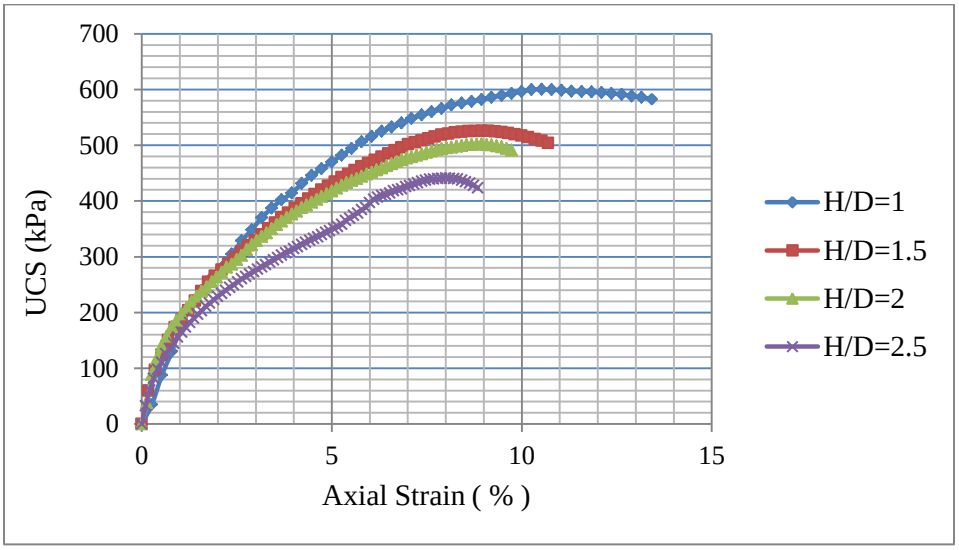
390	380	3.9	0.051316	5.131579	1195.461026	0.5054	422.7658
400	385	4	0.052632	5.263158	1197.121389	0.51205	427.7344
410	390	4.1	0.053947	5.394737	1198.78637	0.5187	432.6876
420	394	4.2	0.055263	5.526316	1200.455989	0.52402	436.5175
430	398	4.3	0.056579	5.657895	1202.130265	0.52934	440.335
440	402	4.4	0.057895	5.789474	1203.809218	0.53466	444.1401
450	406	4.5	0.059211	5.921053	1205.492867	0.53998	447.933
460	410	4.6	0.060526	6.052632	1207.181232	0.5453	451.7135
470	414	4.7	0.061842	6.184211	1208.874334	0.55062	455.4816
480	418	4.8	0.063158	6.315789	1210.572191	0.55594	459.2374
490	422	4.9	0.064474	6.447368	1212.274824	0.56126	462.9808
500	426	5	0.065789	6.578947	1213.982254	0.56658	466.7119
510	430	5.1	0.067105	6.710526	1215.694499	0.5719	470.4307
520	434	5.2	0.068421	6.842105	1217.411582	0.57722	474.1371
530	437	5.3	0.069737	6.973684	1219.133522	0.58121	476.7402
540	440	5.4	0.071053	7.105263	1220.86034	0.5852	479.3341
550	443	5.5	0.072368	7.236842	1222.592057	0.58919	481.9187
560	446	5.6	0.073684	7.368421	1224.328693	0.59318	484.4941
570	449	5.7	0.075	7.5	1226.07027	0.59717	487.0602
580	452	5.8	0.076316	7.631579	1227.816809	0.60116	489.617
590	455	5.9	0.077632	7.763158	1229.568331	0.60515	492.1646
600	457	6	0.078947	7.894737	1231.324857	0.60781	493.6228
610	459	6.1	0.080263	8.026316	1233.086409	0.61047	495.0748
620	461	6.2	0.081579	8.157895	1234.853009	0.61313	496.5206
630	463	6.3	0.082895	8.289474	1236.624677	0.61579	497.9603
640	465	6.4	0.084211	8.421053	1238.401437	0.61845	499.3938
650	467	6.5	0.085526	8.552632	1240.183309	0.62111	500.8211
660	468	6.6	0.086842	8.684211	1241.970317	0.62244	501.1714
670	469	6.7	0.088158	8.815789	1243.762482	0.62377	501.5186
680	470	6.8	0.089474	8.947368	1245.559827	0.6251	501.8627
690	470	6.9	0.090789	9.078947	1247.362373	0.6251	501.1375
700	470	7	0.092105	9.210526	1249.170145	0.6251	500.4122
710	469	7.1	0.093421	9.342105	1250.983164	0.62377	498.6238
720	468	7.2	0.094737	9.473684	1252.801453	0.62244	496.8385
730	466	7.3	0.096053	9.605263	1254.625036	0.61978	493.9962
740	464	7.4	0.097368	9.736842	1256.453936	0.61712	491.1601

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	28	0.1	0.001053	0.105263	1135.310063	0.03724	32.80161
20	52	0.2	0.002105	0.210526	1136.507648	0.06916	60.85309
30	70	0.3	0.003158	0.315789	1137.707761	0.0931	81.83121
40	84	0.4	0.004211	0.421053	1138.910412	0.11172	98.09376
50	95	0.5	0.005263	0.526316	1140.115608	0.12635	110.8221
60	108	0.6	0.006316	0.631579	1141.323358	0.14364	125.8539
70	116	0.7	0.007368	0.736842	1142.533669	0.15428	135.0332
80	124	0.8	0.008421	0.842105	1143.74655	0.16492	144.1928
90	134	0.9	0.009474	0.947368	1144.962009	0.17822	155.6558
100	142	1	0.010526	1.052632	1146.180053	0.18886	164.7734
110	150	1.1	0.011579	1.157895	1147.400692	0.1995	173.8713
120	157	1.2	0.012632	1.263158	1148.623934	0.20881	181.7914
130	164	1.3	0.013684	1.368421	1149.849787	0.21812	189.6943
140	170	1.4	0.014737	1.473684	1151.078259	0.2261	196.4245
150	176	1.5	0.015789	1.578947	1152.309358	0.23408	203.1399
160	183	1.6	0.016842	1.684211	1153.543094	0.24339	210.9934
170	188	1.7	0.017895	1.789474	1154.779475	0.25004	216.5262
180	194	1.8	0.018947	1.894737	1156.018509	0.25802	223.1971
190	199	1.9	0.02	2	1157.260204	0.26467	228.704
200	204	2	0.021053	2.105263	1158.50457	0.27132	234.1985
210	209	2.1	0.022105	2.210526	1159.751615	0.27797	239.6806
220	214	2.2	0.023158	2.315789	1161.001347	0.28462	245.1504
230	218	2.3	0.024211	2.421053	1162.253776	0.28994	249.4636
240	223	2.4	0.025263	2.526316	1163.508909	0.29659	254.91
250	228	2.5	0.026316	2.631579	1164.766757	0.30324	260.344
260	232	2.6	0.027368	2.736842	1166.027327	0.30856	264.625
270	236	2.7	0.028421	2.842105	1167.290628	0.31388	268.8962
280	240	2.8	0.029474	2.947368	1168.55667	0.3192	273.1575
290	244	2.9	0.030526	3.052632	1169.825461	0.32452	277.4089
300	248	3	0.031579	3.157895	1171.097011	0.32984	281.6504
310	252	3.1	0.032632	3.263158	1172.371328	0.33516	285.8821
320	256	3.2	0.033684	3.368421	1173.64842	0.34048	290.1039
330	260	3.3	0.034737	3.473684	1174.928299	0.3458	294.3158
340	264	3.4	0.035789	3.578947	1176.210972	0.35112	298.5179
350	268	3.5	0.036842	3.684211	1177.496448	0.35644	302.71
360	272	3.6	0.037895	3.789474	1178.784737	0.36176	306.8923
370	275	3.7	0.038947	3.894737	1180.075849	0.36575	309.9377
380	279	3.8	0.04	4	1181.369792	0.37107	314.1015

390	282.5	3.9	0.041053	4.105263	1182.666575	0.375725	317.6931
400	286.5	4	0.042105	4.210526	1183.966209	0.381045	321.8377
410	290.5	4.1	0.043158	4.315789	1185.268702	0.386365	325.9725
420	294	4.2	0.044211	4.421053	1186.574064	0.39102	329.537
430	297	4.3	0.045263	4.526316	1187.882304	0.39501	332.5329
440	300	4.4	0.046316	4.631579	1189.193433	0.399	335.5215
450	304	4.5	0.047368	4.736842	1190.507459	0.40432	339.6199
460	308	4.6	0.048421	4.842105	1191.824392	0.40964	343.7084
470	311	4.7	0.049474	4.947368	1193.144241	0.41363	346.6723
480	315	4.8	0.050526	5.052632	1194.467018	0.41895	350.7422
490	318	4.9	0.051579	5.157895	1195.79273	0.42294	353.6901
500	322	5	0.052632	5.263158	1197.121389	0.42826	357.7415
510	329	5.1	0.053684	5.368421	1198.453003	0.43757	365.1124
520	333	5.2	0.054737	5.473684	1199.787584	0.44289	369.1403
530	338	5.3	0.055789	5.578947	1201.125139	0.44954	374.2657
540	342	5.4	0.056842	5.684211	1202.465681	0.45486	378.2728
550	348	5.5	0.057895	5.789474	1203.809218	0.46284	384.4795
560	352	5.6	0.058947	5.894737	1205.155761	0.46816	388.4643
570	360	5.7	0.06	6	1206.505319	0.4788	396.8486
580	366	5.8	0.061053	6.105263	1207.857904	0.48678	403.011
590	370	5.9	0.062105	6.210526	1209.213524	0.4921	406.9587
600	373	6	0.063158	6.315789	1210.572191	0.49609	409.7979
610	375	6.1	0.064211	6.421053	1211.933915	0.49875	411.5323
620	378	6.2	0.065263	6.526316	1213.298705	0.50274	414.358
630	382	6.3	0.066316	6.631579	1214.666573	0.50806	418.2712
640	384	6.4	0.067368	6.736842	1216.037528	0.51072	419.987
650	386	6.5	0.068421	6.842105	1217.411582	0.51338	421.698
660	390	6.6	0.069474	6.947368	1218.788744	0.5187	425.5865
670	392	6.7	0.070526	7.052632	1220.169026	0.52136	427.2851
680	395	6.8	0.071579	7.157895	1221.552438	0.52535	430.0675
690	398	6.9	0.072632	7.263158	1222.93899	0.52934	432.8425
700	401	7	0.073684	7.368421	1224.328693	0.53333	435.6101
710	403	7.1	0.074737	7.473684	1225.721559	0.53599	437.2853
720	405	7.2	0.075789	7.578947	1227.117597	0.53865	438.9555
730	406	7.3	0.076842	7.684211	1228.516819	0.53998	439.5381
740	407	7.4	0.077895	7.789474	1229.919235	0.54131	440.1183
750	408	7.5	0.078947	7.894737	1231.324857	0.54264	440.696
760	409	7.6	0.08	8	1232.733696	0.54397	441.2713
770	409	7.7	0.081053	8.105263	1234.145762	0.54397	440.7664
780	409	7.8	0.082105	8.210526	1235.561067	0.54397	440.2615
790	409	7.9	0.083158	8.315789	1236.979621	0.54397	439.7566
800	407	8	0.084211	8.421053	1238.401437	0.54131	437.1038
810	405	8.1	0.085263	8.526316	1239.826525	0.53865	434.4559
820	403	8.2	0.086316	8.631579	1241.254896	0.53599	431.813

830	400	8.3	0.087368	8.736842	1242.686563	0.532	428.1047
840	396	8.4	0.088421	8.842105	1244.121536	0.52668	423.3348



Plot of stress-strain curve for remoulded sample at OMC with different specimen's height (sample No. 1)

Sample No. = 2

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	58	0.1	0.001053	0.105263	1135.310063	0.07714	67.9462
20	114	0.2	0.002105	0.210526	1136.507648	0.15162	133.4087
30	156	0.3	0.003158	0.315789	1137.707761	0.20748	182.3667
40	188	0.4	0.004211	0.421053	1138.910412	0.25004	219.5432
50	222	0.5	0.005263	0.526316	1140.115608	0.29526	258.9737
60	250	0.6	0.006316	0.631579	1141.323358	0.3325	291.3285
70	275	0.7	0.007368	0.736842	1142.533669	0.36575	320.1219
80	295	0.8	0.008421	0.842105	1143.74655	0.39235	343.0393
90	314	0.9	0.009474	0.947368	1144.962009	0.41762	364.7457
100	332	1	0.010526	1.052632	1146.180053	0.44156	385.2449
110	348	1.1	0.011579	1.157895	1147.400692	0.46284	403.3813
120	364	1.2	0.012632	1.263158	1148.623934	0.48412	421.4782
130	380	1.3	0.013684	1.368421	1149.849787	0.5054	439.5357

140	393	1.4	0.014737	1.473684	1151.078259	0.52269	454.0873
150	405	1.5	0.015789	1.578947	1152.309358	0.53865	467.4526
160	418	1.6	0.016842	1.684211	1153.543094	0.55594	481.9412
170	430	1.7	0.017895	1.789474	1154.779475	0.5719	495.2461
180	442	1.8	0.018947	1.894737	1156.018509	0.58786	508.5213
190	454	1.9	0.02	2	1157.260204	0.60382	521.7668
200	464	2	0.021053	2.105263	1158.50457	0.61712	532.6867
210	472	2.1	0.022105	2.210526	1159.751615	0.62776	541.2883
220	480	2.2	0.023158	2.315789	1161.001347	0.6384	549.8702
230	488	2.3	0.024211	2.421053	1162.253776	0.64904	558.4323
240	496	2.4	0.025263	2.526316	1163.508909	0.65968	566.9746
250	504	2.5	0.026316	2.631579	1164.766757	0.67032	575.4972
260	512	2.6	0.027368	2.736842	1166.027327	0.68096	584
270	518	2.7	0.028421	2.842105	1167.290628	0.68894	590.2043
280	524	2.8	0.029474	2.947368	1168.55667	0.69692	596.3938
290	530	2.9	0.030526	3.052632	1169.825461	0.7049	602.5685
300	535	3	0.031579	3.157895	1171.097011	0.71155	607.5927
310	540	3.1	0.032632	3.263158	1172.371328	0.7182	612.6045
320	544	3.2	0.033684	3.368421	1173.64842	0.72352	616.4708
330	548	3.3	0.034737	3.473684	1174.928299	0.72884	620.3272
340	552	3.4	0.035789	3.578947	1176.210972	0.73416	624.1737
350	555	3.5	0.036842	3.684211	1177.496448	0.73815	626.8809
360	558	3.6	0.037895	3.789474	1178.784737	0.74214	629.5806
370	561	3.7	0.038947	3.894737	1180.075849	0.74613	632.2729
380	564	3.8	0.04	4	1181.369792	0.75012	634.9578
390	567	3.9	0.041053	4.105263	1182.666575	0.75411	637.6353
400	572	4	0.042105	4.210526	1183.966209	0.76076	642.5521
410	574	4.1	0.043158	4.315789	1185.268702	0.76342	644.0902
420	576	4.2	0.044211	4.421053	1186.574064	0.76608	645.6234
430	578	4.3	0.045263	4.526316	1187.882304	0.76874	647.1517
440	580	4.4	0.046316	4.631579	1189.193433	0.7714	648.675
450	582	4.5	0.047368	4.736842	1190.507459	0.77406	650.1933
460	584	4.6	0.048421	4.842105	1191.824392	0.77672	651.7067
470	585	4.7	0.049474	4.947368	1193.144241	0.77805	652.1005
480	586	4.8	0.050526	5.052632	1194.467018	0.77938	652.4919
490	587	4.9	0.051579	5.157895	1195.79273	0.78071	652.8807
500	588	5	0.052632	5.263158	1197.121389	0.78204	653.2671
510	589	5.1	0.053684	5.368421	1198.453003	0.78337	653.6510
520	590	5.2	0.054737	5.473684	1199.787584	0.7847	654.0324
530	591	5.3	0.055789	5.578947	1201.125139	0.78603	654.4114
540	592	5.4	0.056842	5.684211	1202.465681	0.78736	654.7879
550	592	5.5	0.057895	5.789474	1203.809218	0.78736	654.0571
560	592	5.6	0.058947	5.894737	1205.155761	0.78736	653.3263
570	592	5.7	0.06	6	1206.505319	0.78736	652.5955

580	591	5.8	0.061053	6.105263	1207.857904	0.78603	650.7636
590	590	5.9	0.062105	6.210526	1209.213524	0.7847	648.9342
600	588	6	0.063158	6.315789	1210.572191	0.78204	646.0086
610	586	6.1	0.064211	6.421053	1211.933915	0.77938	643.0879
620	582	6.2	0.065263	6.526316	1213.298705	0.77406	637.9797

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	24	0.1	0.001053	0.105263	1135.310063	0.03192	28.11567
20	52	0.2	0.002105	0.210526	1136.507648	0.06916	60.85309
30	68	0.3	0.003158	0.315789	1137.707761	0.09044	79.49317
40	82	0.4	0.004211	0.421053	1138.910412	0.10906	95.75819
50	98	0.5	0.005263	0.526316	1140.115608	0.13034	114.3217
60	116	0.6	0.006316	0.631579	1141.323358	0.15428	135.1764
70	134	0.7	0.007368	0.736842	1142.533669	0.17822	155.9867
80	152	0.8	0.008421	0.842105	1143.74655	0.20216	176.7524
90	170	0.9	0.009474	0.947368	1144.962009	0.2261	197.4738
100	188	1	0.010526	1.052632	1146.180053	0.25004	218.1507
110	204	1.1	0.011579	1.157895	1147.400692	0.27132	236.4649
120	218	1.2	0.012632	1.263158	1148.623934	0.28994	252.4238
130	232	1.3	0.013684	1.368421	1149.849787	0.30856	268.3481
140	245	1.4	0.014737	1.473684	1151.078259	0.32585	283.0824
150	258	1.5	0.015789	1.578947	1152.309358	0.34314	297.7846
160	271	1.6	0.016842	1.684211	1153.543094	0.36043	312.4547
170	282	1.7	0.017895	1.789474	1154.779475	0.37506	324.7893
180	295	1.8	0.018947	1.894737	1156.018509	0.39235	339.3977
190	306	1.9	0.02	2	1157.260204	0.40698	351.6754
200	318	2	0.021053	2.105263	1158.50457	0.42294	365.0741
210	328	2.1	0.022105	2.210526	1159.751615	0.43624	376.1495
220	338	2.2	0.023158	2.315789	1161.001347	0.44954	387.2002
230	348	2.3	0.024211	2.421053	1162.253776	0.46284	398.2263
240	356	2.4	0.025263	2.526316	1163.508909	0.47348	406.9414
250	364	2.5	0.026316	2.631579	1164.766757	0.48412	415.6369
260	372	2.6	0.027368	2.736842	1166.027327	0.49476	424.3125
270	380	2.7	0.028421	2.842105	1167.290628	0.5054	432.9684
280	388	2.8	0.029474	2.947368	1168.55667	0.51604	441.6046
290	395	2.9	0.030526	3.052632	1169.825461	0.52535	449.0841
300	402	3	0.031579	3.157895	1171.097011	0.53466	456.5463
310	408	3.1	0.032632	3.263158	1172.371328	0.54264	462.8568

320	415	3.2	0.033684	3.368421	1173.64842	0.55195	470.2856
330	421	3.3	0.034737	3.473684	1174.928299	0.55993	476.5653
340	427	3.4	0.035789	3.578947	1176.210972	0.56791	482.83
350	432	3.5	0.036842	3.684211	1177.496448	0.57456	487.9505
360	436	3.6	0.037895	3.789474	1178.784737	0.57988	491.9304
370	442	3.7	0.038947	3.894737	1180.075849	0.58786	498.1544
380	448	3.8	0.04	4	1181.369792	0.59584	504.3637
390	452	3.9	0.041053	4.105263	1182.666575	0.60116	508.3089
400	456	4	0.042105	4.210526	1183.966209	0.60648	512.2443
410	462	4.1	0.043158	4.315789	1185.268702	0.61446	518.4141
420	466	4.2	0.044211	4.421053	1186.574064	0.61978	522.3273
430	470	4.3	0.045263	4.526316	1187.882304	0.6251	526.2306
440	474	4.4	0.046316	4.631579	1189.193433	0.63042	530.124
450	477	4.5	0.047368	4.736842	1190.507459	0.63441	532.8904
460	480	4.6	0.048421	4.842105	1191.824392	0.6384	535.6494
470	483	4.7	0.049474	4.947368	1193.144241	0.64239	538.401
480	486	4.8	0.050526	5.052632	1194.467018	0.64638	541.1451
490	487	4.9	0.051579	5.157895	1195.79273	0.64771	541.6574
500	488	5	0.052632	5.263158	1197.121389	0.64904	542.1672
510	490	5.1	0.053684	5.368421	1198.453003	0.6517	543.7844
520	490.5	5.2	0.054737	5.473684	1199.787584	0.652365	543.7337
530	491	5.3	0.055789	5.578947	1201.125139	0.65303	543.6819
540	491.5	5.4	0.056842	5.684211	1202.465681	0.653695	543.6288
550	491.5	5.5	0.057895	5.789474	1203.809218	0.653695	543.0221
560	491.5	5.6	0.058947	5.894737	1205.155761	0.653695	542.4154
570	491.5	5.7	0.06	6	1206.505319	0.653695	541.8086
580	490	5.8	0.061053	6.105263	1207.857904	0.6517	539.5502
590	487	5.9	0.062105	6.210526	1209.213524	0.64771	535.6457
600	484	6	0.063158	6.315789	1210.572191	0.64372	531.7485
610	478	6.1	0.064211	6.421053	1211.933915	0.63574	524.5666

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	16	0.1	0.001053	0.105263	1135.310063	0.02128	18.74378
20	28	0.2	0.002105	0.210526	1136.507648	0.03724	32.76705
30	50	0.3	0.003158	0.315789	1137.707761	0.0665	58.45086
40	75	0.4	0.004211	0.421053	1138.910412	0.09975	87.58371
50	100	0.5	0.005263	0.526316	1140.115608	0.133	116.6548
60	122	0.6	0.006316	0.631579	1141.323358	0.16226	142.1683

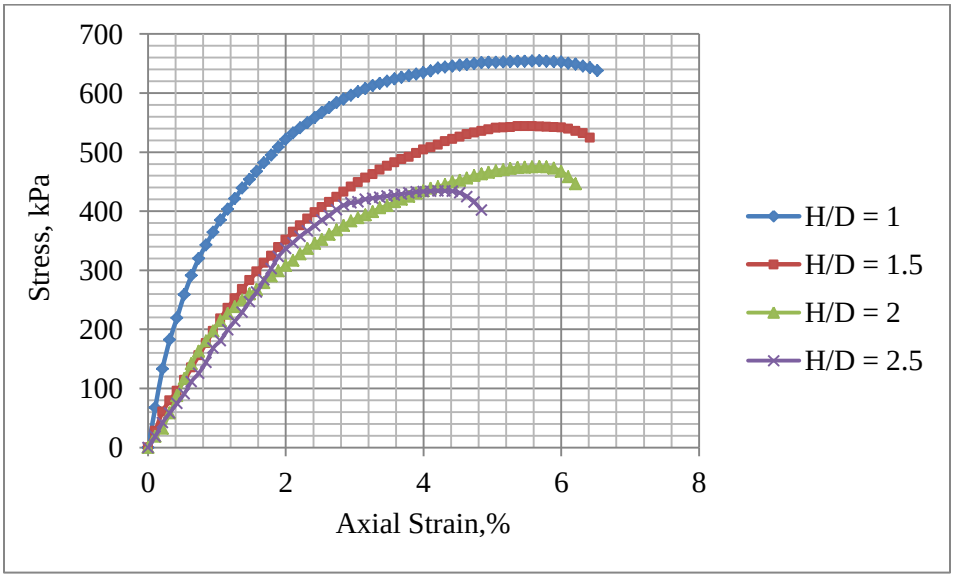
70	140	0.7	0.007368	0.736842	1142.533669	0.1862	162.9711
80	155	0.8	0.008421	0.842105	1143.74655	0.20615	180.241
90	170	0.9	0.009474	0.947368	1144.962009	0.2261	197.4738
100	185	1	0.010526	1.052632	1146.180053	0.24605	214.6696
110	196	1.1	0.011579	1.157895	1147.400692	0.26068	227.1918
120	206	1.2	0.012632	1.263158	1148.623934	0.27398	238.5289
130	216	1.3	0.013684	1.368421	1149.849787	0.28728	249.8413
140	225	1.4	0.014737	1.473684	1151.078259	0.29925	259.9736
150	232	1.5	0.015789	1.578947	1152.309358	0.30856	267.7753
160	242	1.6	0.016842	1.684211	1153.543094	0.32186	279.0186
170	252	1.7	0.017895	1.789474	1154.779475	0.33516	290.2372
180	260	1.8	0.018947	1.894737	1156.018509	0.3458	299.1302
190	268	1.9	0.02	2	1157.260204	0.35644	308.0033
200	276	2	0.021053	2.105263	1158.50457	0.36708	316.8568
210	286	2.1	0.022105	2.210526	1159.751615	0.38038	327.984
220	294	2.2	0.023158	2.315789	1161.001347	0.39102	336.7955
230	302	2.3	0.024211	2.421053	1162.253776	0.40166	345.5872
240	308	2.4	0.025263	2.526316	1163.508909	0.40964	352.0729
250	316	2.5	0.026316	2.631579	1164.766757	0.42028	360.8276
260	323	2.6	0.027368	2.736842	1166.027327	0.42959	368.4219
270	330	2.7	0.028421	2.842105	1167.290628	0.4389	375.9989
280	337	2.8	0.029474	2.947368	1168.55667	0.44821	383.5586
290	342	2.9	0.030526	3.052632	1169.825461	0.45486	388.8272
300	347	3	0.031579	3.157895	1171.097011	0.46151	394.0835
310	352	3.1	0.032632	3.263158	1172.371328	0.46816	399.3274
320	358	3.2	0.033684	3.368421	1173.64842	0.47614	405.6922
330	362	3.3	0.034737	3.473684	1174.928299	0.48146	409.7782
340	368	3.4	0.035789	3.578947	1176.210972	0.48944	416.1158
350	372	3.5	0.036842	3.684211	1177.496448	0.49476	420.1796
360	377	3.6	0.037895	3.789474	1178.784737	0.50141	425.3618
370	382	3.7	0.038947	3.894737	1180.075849	0.50806	430.5316
380	386	3.8	0.04	4	1181.369792	0.51338	434.5633
390	390	3.9	0.041053	4.105263	1182.666575	0.5187	438.5852
400	393	4	0.042105	4.210526	1183.966209	0.52269	441.4737
410	397	4.1	0.043158	4.315789	1185.268702	0.52801	445.477
420	401	4.2	0.044211	4.421053	1186.574064	0.53333	449.4705
430	404	4.3	0.045263	4.526316	1187.882304	0.53732	452.3344
440	408	4.4	0.046316	4.631579	1189.193433	0.54264	456.3093
450	412	4.5	0.047368	4.736842	1190.507459	0.54796	460.2743
460	415	4.6	0.048421	4.842105	1191.824392	0.55195	463.1135
470	418	4.7	0.049474	4.947368	1193.144241	0.55594	465.9453
480	421	4.8	0.050526	5.052632	1194.467018	0.55993	468.7697
490	423	4.9	0.051579	5.157895	1195.79273	0.56259	470.4745
500	425	5	0.052632	5.263158	1197.121389	0.56525	472.1743

510	427	5.1	0.053684	5.368421	1198.453003	0.56791	473.8692
520	428	5.2	0.054737	5.473684	1199.787584	0.56924	474.4507
530	429	5.3	0.055789	5.578947	1201.125139	0.57057	475.0296
540	430	5.4	0.056842	5.684211	1202.465681	0.5719	475.6061
550	430	5.5	0.057895	5.789474	1203.809218	0.5719	475.0753
560	428.5	5.6	0.058947	5.894737	1205.155761	0.569905	472.8891
570	424	5.7	0.06	6	1206.505319	0.56392	467.3995
580	416	5.8	0.061053	6.105263	1207.857904	0.55328	458.0671
590	406	5.9	0.062105	6.210526	1209.213524	0.53998	446.5547

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	16	0.1	0.001053	0.105263	1135.310063	0.02128	18.74378
20	36	0.2	0.002105	0.210526	1136.507648	0.04788	42.12906
30	50	0.3	0.003158	0.315789	1137.707761	0.0665	58.45086
40	64	0.4	0.004211	0.421053	1138.910412	0.08512	74.7381
50	78	0.5	0.005263	0.526316	1140.115608	0.10374	90.99077
60	96	0.6	0.006316	0.631579	1141.323358	0.12768	111.8701
70	108	0.7	0.007368	0.736842	1142.533669	0.14364	125.7206
80	124	0.8	0.008421	0.842105	1143.74655	0.16492	144.1928
90	145	0.9	0.009474	0.947368	1144.962009	0.19285	168.4335
100	156	1	0.010526	1.052632	1146.180053	0.20748	181.0187
110	172	1.1	0.011579	1.157895	1147.400692	0.22876	199.3724
120	185	1.2	0.012632	1.263158	1148.623934	0.24605	214.2128
130	198	1.3	0.013684	1.368421	1149.849787	0.26334	229.0212
140	214	1.4	0.014737	1.473684	1151.078259	0.28462	247.2638
150	228	1.5	0.015789	1.578947	1152.309358	0.30324	263.1585
160	246	1.6	0.016842	1.684211	1153.543094	0.32718	283.6305
170	263	1.7	0.017895	1.789474	1154.779475	0.34979	302.9063
180	281	1.8	0.018947	1.894737	1156.018509	0.37373	323.2907
190	293	1.9	0.02	2	1157.260204	0.38969	336.735
200	302	2	0.021053	2.105263	1158.50457	0.40166	346.7056
210	312	2.1	0.022105	2.210526	1159.751615	0.41496	357.8008
220	320	2.2	0.023158	2.315789	1161.001347	0.4256	366.5801
230	328	2.3	0.024211	2.421053	1162.253776	0.43624	375.3397
240	337	2.4	0.025263	2.526316	1163.508909	0.44821	385.2227
250	344	2.5	0.026316	2.631579	1164.766757	0.45752	392.7997
260	353	2.6	0.027368	2.736842	1166.027327	0.46949	402.6406
270	360	2.7	0.028421	2.842105	1167.290628	0.4788	410.1806

280	364	2.8	0.029474	2.947368	1168.55667	0.48412	414.2889
290	366	2.9	0.030526	3.052632	1169.825461	0.48678	416.1134
300	370	3	0.031579	3.157895	1171.097011	0.4921	420.2043
310	372	3.1	0.032632	3.263158	1172.371328	0.49476	422.0165
320	374	3.2	0.033684	3.368421	1173.64842	0.49742	423.8237
330	376	3.3	0.034737	3.473684	1174.928299	0.50008	425.626
340	378	3.4	0.035789	3.578947	1176.210972	0.50274	427.4233
350	380	3.5	0.036842	3.684211	1177.496448	0.5054	429.2157
360	382	3.6	0.037895	3.789474	1178.784737	0.50806	431.0032
370	384	3.7	0.038947	3.894737	1180.075849	0.51072	432.7857
380	385	3.8	0.04	4	1181.369792	0.51205	433.4375
390	386	3.9	0.041053	4.105263	1182.666575	0.51338	434.0868
400	387	4	0.042105	4.210526	1183.966209	0.51471	434.7337
410	387	4.1	0.043158	4.315789	1185.268702	0.51471	434.256
420	387	4.2	0.044211	4.421053	1186.574064	0.51471	433.7782
430	385	4.3	0.045263	4.526316	1187.882304	0.51205	431.0612
440	380	4.4	0.046316	4.631579	1189.193433	0.5054	424.9939
450	372	4.5	0.047368	4.736842	1190.507459	0.49476	415.5875
460	360	4.6	0.048421	4.842105	1191.824392	0.4788	401.737



Plot of stress-strain curve for remoulded sample at OMC with different specimen's height (sample No. 2)

Sample No. = 3

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	37	0.1	0.001053	0.105263	1135.310063	0.04921	43.34499
20	90	0.2	0.002105	0.210526	1136.507648	0.1197	105.3227
30	130	0.3	0.003158	0.315789	1137.707761	0.1729	151.9722
40	165	0.4	0.004211	0.421053	1138.910412	0.21945	192.6842
50	195	0.5	0.005263	0.526316	1140.115608	0.25935	227.4769
60	225	0.6	0.006316	0.631579	1141.323358	0.29925	262.1956
70	250	0.7	0.007368	0.736842	1142.533669	0.3325	291.0199
80	275	0.8	0.008421	0.842105	1143.74655	0.36575	319.7824
90	300	0.9	0.009474	0.947368	1144.962009	0.399	348.4832
100	320	1	0.010526	1.052632	1146.180053	0.4256	371.3204
110	338	1.1	0.011579	1.157895	1147.400692	0.44954	391.7899
120	354	1.2	0.012632	1.263158	1148.623934	0.47082	409.8992
130	368	1.3	0.013684	1.368421	1149.849787	0.48944	425.6556
140	382	1.4	0.014737	1.473684	1151.078259	0.50806	441.3775
150	396	1.5	0.015789	1.578947	1152.309358	0.52668	457.0648
160	408	1.6	0.016842	1.684211	1153.543094	0.54264	470.4116
170	418	1.7	0.017895	1.789474	1154.779475	0.55594	481.4253
180	430	1.8	0.018947	1.894737	1156.018509	0.5719	494.7153
190	440	1.9	0.02	2	1157.260204	0.5852	505.6771
200	450	2	0.021053	2.105263	1158.50457	0.5985	516.6143
210	458	2.1	0.022105	2.210526	1159.751615	0.60914	525.2332
220	465	2.2	0.023158	2.315789	1161.001347	0.61845	532.6867
230	472	2.3	0.024211	2.421053	1162.253776	0.62776	540.123
240	478	2.4	0.025263	2.526316	1163.508909	0.63574	546.3989
250	485	2.5	0.026316	2.631579	1164.766757	0.64505	553.8019
260	491	2.6	0.027368	2.736842	1166.027327	0.65303	560.0469
270	496	2.7	0.028421	2.842105	1167.290628	0.65968	565.1378
280	501	2.8	0.029474	2.947368	1168.55667	0.66633	570.2162
290	506	2.9	0.030526	3.052632	1169.825461	0.67298	575.2824
300	510	3	0.031579	3.157895	1171.097011	0.6783	579.2005
310	514	3.1	0.032632	3.263158	1172.371328	0.68362	583.1088
320	518	3.2	0.033684	3.368421	1173.64842	0.68894	587.0071
330	522	3.3	0.034737	3.473684	1174.928299	0.69426	590.8956
340	526	3.4	0.035789	3.578947	1176.210972	0.69958	594.7743
350	530	3.5	0.036842	3.684211	1177.496448	0.7049	598.643
360	533	3.6	0.037895	3.789474	1178.784737	0.70889	601.3736

370	536	3.7	0.038947	3.894737	1180.075849	0.71288	604.0968
380	539	3.8	0.04	4	1181.369792	0.71687	606.8125
390	542	3.9	0.041053	4.105263	1182.666575	0.72086	609.5209
400	545	4	0.042105	4.210526	1183.966209	0.72485	612.2219
410	547	4.1	0.043158	4.315789	1185.268702	0.72751	613.7933
420	549	4.2	0.044211	4.421053	1186.574064	0.73017	615.3598
430	551	4.3	0.045263	4.526316	1187.882304	0.73283	616.9214
440	553	4.4	0.046316	4.631579	1189.193433	0.73549	618.478
450	555	4.5	0.047368	4.736842	1190.507459	0.73815	620.0297
460	556.5	4.6	0.048421	4.842105	1191.824392	0.740145	621.0185
470	558	4.7	0.049474	4.947368	1193.144241	0.74214	622.0036
480	559	4.8	0.050526	5.052632	1194.467018	0.74347	622.4282
490	560	4.9	0.051579	5.157895	1195.79273	0.7448	622.8504
500	561	5	0.052632	5.263158	1197.121389	0.74613	623.2701
510	562	5.1	0.053684	5.368421	1198.453003	0.74746	623.6874
520	563	5.2	0.054737	5.473684	1199.787584	0.74879	624.1021
530	563	5.3	0.055789	5.578947	1201.125139	0.74879	623.4072
540	563	5.4	0.056842	5.684211	1202.465681	0.74879	622.7122
550	562	5.5	0.057895	5.789474	1203.809218	0.74746	620.9123

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	36	0.1	0.001053	0.105263	1135.310063	0.04788	42.1735
20	72	0.2	0.002105	0.210526	1136.507648	0.09576	84.25812
30	106	0.3	0.003158	0.315789	1137.707761	0.14098	123.9158
40	132	0.4	0.004211	0.421053	1138.910412	0.17556	154.1473
50	158	0.5	0.005263	0.526316	1140.115608	0.21014	184.3146
60	180	0.6	0.006316	0.631579	1141.323358	0.2394	209.7565
70	200	0.7	0.007368	0.736842	1142.533669	0.266	232.8159
80	216	0.8	0.008421	0.842105	1143.74655	0.28728	251.1745
90	234	0.9	0.009474	0.947368	1144.962009	0.31122	271.8169
100	250	1	0.010526	1.052632	1146.180053	0.3325	290.094
110	266	1.1	0.011579	1.157895	1147.400692	0.35378	308.3317
120	282	1.2	0.012632	1.263158	1148.623934	0.37506	326.5298
130	298	1.3	0.013684	1.368421	1149.849787	0.39634	344.6885
140	312	1.4	0.014737	1.473684	1151.078259	0.41496	360.4968
150	324	1.5	0.015789	1.578947	1152.309358	0.43092	373.9621
160	340	1.6	0.016842	1.684211	1153.543094	0.4522	392.0096
170	350	1.7	0.017895	1.789474	1154.779475	0.4655	403.1073

180	362	1.8	0.018947	1.894737	1156.018509	0.48146	416.4812
190	372	1.9	0.02	2	1157.260204	0.49476	427.527
200	384	2	0.021053	2.105263	1158.50457	0.51072	440.8442
210	394	2.1	0.022105	2.210526	1159.751615	0.52402	451.8381
220	404	2.2	0.023158	2.315789	1161.001347	0.53732	462.8074
230	412	2.3	0.024211	2.421053	1162.253776	0.54796	471.4633
240	420	2.4	0.025263	2.526316	1163.508909	0.5586	480.0995
250	428	2.5	0.026316	2.631579	1164.766757	0.56924	488.7159
260	436	2.6	0.027368	2.736842	1166.027327	0.57988	497.3125
270	442	2.7	0.028421	2.842105	1167.290628	0.58786	503.6107
280	448	2.8	0.029474	2.947368	1168.55667	0.59584	509.894
290	454	2.9	0.030526	3.052632	1169.825461	0.60382	516.1625
300	460	3	0.031579	3.157895	1171.097011	0.6118	522.4162
310	464	3.1	0.032632	3.263158	1172.371328	0.61712	526.3861
320	469	3.2	0.033684	3.368421	1173.64842	0.62377	531.4794
330	473	3.3	0.034737	3.473684	1174.928299	0.62909	535.4284
340	478	3.4	0.035789	3.578947	1176.210972	0.63574	540.4983
350	481	3.5	0.036842	3.684211	1177.496448	0.63973	543.2968
360	484	3.6	0.037895	3.789474	1178.784737	0.64372	546.0878
370	486	3.7	0.038947	3.894737	1180.075849	0.64638	547.7445
380	488	3.8	0.04	4	1181.369792	0.64904	549.3961
390	491	3.9	0.041053	4.105263	1182.666575	0.65303	552.1675
400	493	4	0.042105	4.210526	1183.966209	0.65569	553.808
410	495	4.1	0.043158	4.315789	1185.268702	0.65835	555.4437
420	497	4.2	0.044211	4.421053	1186.574064	0.66101	557.0744
430	498	4.3	0.045263	4.526316	1187.882304	0.66234	557.5805
440	500	4.4	0.046316	4.631579	1189.193433	0.665	559.2026
450	500.5	4.5	0.047368	4.736842	1190.507459	0.665665	559.1439
460	500.5	4.6	0.048421	4.842105	1191.824392	0.665665	558.5261
470	500.5	4.7	0.049474	4.947368	1193.144241	0.665665	557.9082
480	500.5	4.8	0.050526	5.052632	1194.467018	0.665665	557.2904
490	500	4.9	0.051579	5.157895	1195.79273	0.665	556.1164
500	499	5	0.052632	5.263158	1197.121389	0.66367	554.3882
510	498	5.1	0.053684	5.368421	1198.453003	0.66234	552.6625
520	496	5.2	0.054737	5.473684	1199.787584	0.65968	549.8307
530	493	5.3	0.055789	5.578947	1201.125139	0.65569	545.8965

c. H/D = 2

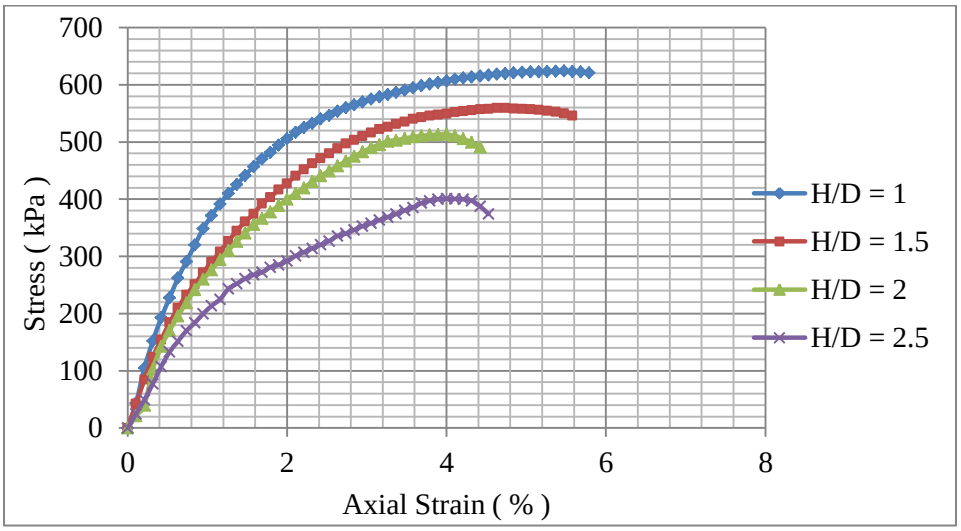
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	18	0.1	0.001053	0.105263	1135.310063	0.02394	21.08675
20	34	0.2	0.002105	0.210526	1136.507648	0.04522	39.78856
30	88	0.3	0.003158	0.315789	1137.707761	0.11704	102.8735
40	122	0.4	0.004211	0.421053	1138.910412	0.16226	142.4695
50	146	0.5	0.005263	0.526316	1140.115608	0.19418	170.3161
60	168	0.6	0.006316	0.631579	1141.323358	0.22344	195.7727
70	188	0.7	0.007368	0.736842	1142.533669	0.25004	218.8469
80	208	0.8	0.008421	0.842105	1143.74655	0.27664	241.8718
90	224	0.9	0.009474	0.947368	1144.962009	0.29792	260.2008
100	238	1	0.010526	1.052632	1146.180053	0.31654	276.1695
110	254	1.1	0.011579	1.157895	1147.400692	0.33782	294.422
120	268	1.2	0.012632	1.263158	1148.623934	0.35644	310.3191
130	282	1.3	0.013684	1.368421	1149.849787	0.37506	326.1817
140	295	1.4	0.014737	1.473684	1151.078259	0.39235	340.8543
150	308	1.5	0.015789	1.578947	1152.309358	0.40964	355.4948
160	318	1.6	0.016842	1.684211	1153.543094	0.42294	366.6443
170	328	1.7	0.017895	1.789474	1154.779475	0.43624	377.7691
180	338	1.8	0.018947	1.894737	1156.018509	0.44954	388.8692
190	348	1.9	0.02	2	1157.260204	0.46284	399.9446
200	357	2	0.021053	2.105263	1158.50457	0.47481	409.8473
210	366	2.1	0.022105	2.210526	1159.751615	0.48678	419.7278
220	376	2.2	0.023158	2.315789	1161.001347	0.50008	430.7316
230	385	2.3	0.024211	2.421053	1162.253776	0.51205	440.5664
240	393	2.4	0.025263	2.526316	1163.508909	0.52269	449.2359
250	401	2.5	0.026316	2.631579	1164.766757	0.53333	457.8857
260	409	2.6	0.027368	2.736842	1166.027327	0.54397	466.5157
270	417	2.7	0.028421	2.842105	1167.290628	0.55461	475.1259
280	424	2.8	0.029474	2.947368	1168.55667	0.56392	482.5782
290	431	2.9	0.030526	3.052632	1169.825461	0.57323	490.0133
300	436	3	0.031579	3.157895	1171.097011	0.57988	495.1597
310	442	3.1	0.032632	3.263158	1172.371328	0.58786	501.4282
320	444	3.2	0.033684	3.368421	1173.64842	0.59052	503.149
330	447	3.3	0.034737	3.473684	1174.928299	0.59451	505.9968
340	450	3.4	0.035789	3.578947	1176.210972	0.5985	508.8373
350	452	3.5	0.036842	3.684211	1177.496448	0.60116	510.5408
360	454	3.6	0.037895	3.789474	1178.784737	0.60382	512.2394
370	455	3.7	0.038947	3.894737	1180.075849	0.60515	512.806
380	456	3.8	0.04	4	1181.369792	0.60648	513.3702

390	454	3.9	0.041053	4.105263	1182.666575	0.60382	510.5581
400	450	4	0.042105	4.210526	1183.966209	0.5985	505.5043
410	445	4.1	0.043158	4.315789	1185.268702	0.59185	499.3383
420	438	4.2	0.044211	4.421053	1186.574064	0.58254	490.9428

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	21	0.1	0.001053	0.105263	1135.310063	0.02793	24.60121
20	42	0.2	0.002105	0.210526	1136.507648	0.05586	49.15057
30	66	0.3	0.003158	0.315789	1137.707761	0.08778	77.15514
40	92	0.4	0.004211	0.421053	1138.910412	0.12236	107.436
50	114	0.5	0.005263	0.526316	1140.115608	0.15162	132.9865
60	130	0.6	0.006316	0.631579	1141.323358	0.1729	151.4908
70	146	0.7	0.007368	0.736842	1142.533669	0.19418	169.9556
80	158	0.8	0.008421	0.842105	1143.74655	0.21014	183.7295
90	172	0.9	0.009474	0.947368	1144.962009	0.22876	199.797
100	184	1	0.010526	1.052632	1146.180053	0.24472	213.5092
110	194	1.1	0.011579	1.157895	1147.400692	0.25802	224.8735
120	210	1.2	0.012632	1.263158	1148.623934	0.2793	243.1605
130	218	1.3	0.013684	1.368421	1149.849787	0.28994	252.1547
140	226	1.4	0.014737	1.473684	1151.078259	0.30058	261.1291
150	232	1.5	0.015789	1.578947	1152.309358	0.30856	267.7753
160	236	1.6	0.016842	1.684211	1153.543094	0.31388	272.1008
170	244	1.7	0.017895	1.789474	1154.779475	0.32452	281.0234
180	248	1.8	0.018947	1.894737	1156.018509	0.32984	285.3242
190	254	1.9	0.02	2	1157.260204	0.33782	291.9136
200	262	2	0.021053	2.105263	1158.50457	0.34846	300.7843
210	268	2.1	0.022105	2.210526	1159.751615	0.35644	307.3417
220	274	2.2	0.023158	2.315789	1161.001347	0.36442	313.8842
230	280	2.3	0.024211	2.421053	1162.253776	0.3724	320.412
240	286	2.4	0.025263	2.526316	1163.508909	0.38038	326.9249
250	294	2.5	0.026316	2.631579	1164.766757	0.39102	335.7067
260	298	2.6	0.027368	2.736842	1166.027327	0.39634	339.9063
270	304	2.7	0.028421	2.842105	1167.290628	0.40432	346.3748
280	310	2.8	0.029474	2.947368	1168.55667	0.4123	352.8284
290	315	2.9	0.030526	3.052632	1169.825461	0.41895	358.1303
300	320	3	0.031579	3.157895	1171.097011	0.4256	363.4199
310	325	3.1	0.032632	3.263158	1172.371328	0.43225	368.6972
320	330	3.2	0.033684	3.368421	1173.64842	0.4389	373.9621

330	336	3.3	0.034737	3.473684	1174.928299	0.44688	380.3466
340	341	3.4	0.035789	3.578947	1176.210972	0.45353	385.5856
350	348	3.5	0.036842	3.684211	1177.496448	0.46284	393.0712
360	352	3.6	0.037895	3.789474	1178.784737	0.46816	397.1548
370	355	3.7	0.038947	3.894737	1180.075849	0.47215	400.1014
380	356	3.8	0.04	4	1181.369792	0.47348	400.789
390	356	3.9	0.041053	4.105263	1182.666575	0.47348	400.3495
400	356	4	0.042105	4.210526	1183.966209	0.47348	399.9101
410	354	4.1	0.043158	4.315789	1185.268702	0.47082	397.2264
420	346	4.2	0.044211	4.421053	1186.574064	0.46018	387.8224
430	334	4.3	0.045263	4.526316	1187.882304	0.44422	373.9596



Plot of stress-strain curve for remoulded sample at OMC with different specimen's height (sample No. 3)

Summary of unconfined compressive strength value of remoulded sample at its OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)			
		Sample 1	Sample 2	sample 3	Average
3	1	600.186	654.788	623.687	626.220
	1.5	525.408	543.784	559.203	542.798
	2	501.863	475.606	513.37	496.946
	2.5	441.271	434.734	400.789	425.598

A2.3: For Sample Remoulded at Dry Side of OMC (w = 20.41)

Sample No. = 1

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	75	0.3	0.003158	0.315789	1137.707761	0.09975	87.67629
40	145	0.4	0.004211	0.421053	1138.910412	0.19285	169.3285
50	225	0.5	0.005263	0.526316	1140.115608	0.29925	262.4734
60	310	0.6	0.006316	0.631579	1141.323358	0.4123	361.2473
70	380	0.7	0.007368	0.736842	1142.533669	0.5054	442.3502
80	435	0.8	0.008421	0.842105	1143.74655	0.57855	505.8376
90	500	0.9	0.009474	0.947368	1144.962009	0.665	580.8053
100	550	1	0.010526	1.052632	1146.180053	0.7315	638.2069
110	595	1.1	0.011579	1.157895	1147.400692	0.79135	689.6893
120	640	1.2	0.012632	1.263158	1148.623934	0.8512	741.0607
130	685	1.3	0.013684	1.368421	1149.849787	0.91105	792.3209
140	730	1.4	0.014737	1.473684	1151.078259	0.9709	843.47
150	775	1.5	0.015789	1.578947	1152.309358	1.03075	894.5081
160	810	1.6	0.016842	1.684211	1153.543094	1.0773	933.9053
170	845	1.7	0.017895	1.789474	1154.779475	1.12385	973.2161
180	875	1.8	0.018947	1.894737	1156.018509	1.16375	1006.688
190	900	1.9	0.02	2	1157.260204	1.197	1034.34
200	930	2	0.021053	2.105263	1158.50457	1.2369	1067.67
210	955	2.1	0.022105	2.210526	1159.751615	1.27015	1095.191
220	980	2.2	0.023158	2.315789	1161.001347	1.3034	1122.652
230	1000	2.3	0.024211	2.421053	1162.253776	1.33	1144.328
240	1020	2.4	0.025263	2.526316	1163.508909	1.3566	1165.956
250	1035	2.5	0.026316	2.631579	1164.766757	1.37655	1181.825
260	1054	2.6	0.027368	2.736842	1166.027327	1.40182	1202.219
270	1066	2.7	0.028421	2.842105	1167.290628	1.41778	1214.59
280	1080	2.8	0.029474	2.947368	1168.55667	1.4364	1229.209
290	1094	2.9	0.030526	3.052632	1169.825461	1.45502	1243.792
300	1106	3	0.031579	3.157895	1171.097011	1.47098	1256.07
310	1116	3.1	0.032632	3.263158	1172.371328	1.48428	1266.049
320	1124	3.2	0.033684	3.368421	1173.64842	1.49492	1273.737
330	1130	3.3	0.034737	3.473684	1174.928299	1.5029	1279.142
340	1134	3.4	0.035789	3.578947	1176.210972	1.50822	1282.27

350	1136	3.5	0.036842	3.684211	1177.496448	1.51088	1283.129
360	1138	3.6	0.037895	3.789474	1178.784737	1.51354	1283.983
370	1132	3.7	0.038947	3.894737	1180.075849	1.50556	1275.816
380	1126	3.8	0.04	4	1181.369792	1.49758	1267.664
390	1116	3.9	0.041053	4.105263	1182.666575	1.48428	1255.028
400	1104	4	0.042105	4.210526	1183.966209	1.46832	1240.171

b. H/D = 1.5

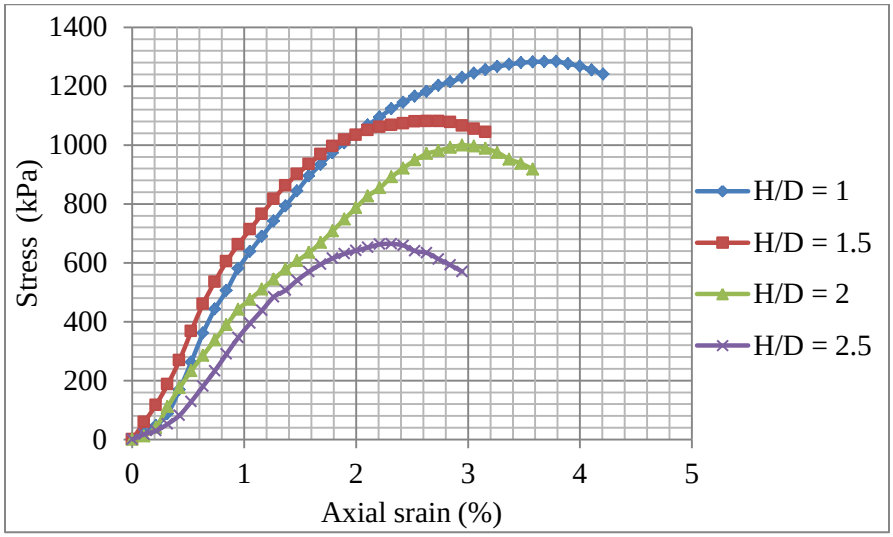
Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	50	0.1	0.001053	0.105263	1135.310063	0.0665	58.57431
20	100	0.2	0.002105	0.210526	1136.507648	0.133	117.0252
30	160	0.3	0.003158	0.315789	1137.707761	0.2128	187.0428
40	230	0.4	0.004211	0.421053	1138.910412	0.3059	268.59
50	315	0.5	0.005263	0.526316	1140.115608	0.41895	367.4627
60	395	0.6	0.006316	0.631579	1141.323358	0.52535	460.299
70	460	0.7	0.007368	0.736842	1142.533669	0.6118	535.4766
80	520	0.8	0.008421	0.842105	1143.74655	0.6916	604.6794
90	570	0.9	0.009474	0.947368	1144.962009	0.7581	662.118
100	615	1	0.010526	1.052632	1146.180053	0.81795	713.6313
110	660	1.1	0.011579	1.157895	1147.400692	0.8778	765.0335
120	705	1.2	0.012632	1.263158	1148.623934	0.93765	816.3246
130	745	1.3	0.013684	1.368421	1149.849787	0.99085	861.7213
140	780	1.4	0.014737	1.473684	1151.078259	1.0374	901.2419
150	810	1.5	0.015789	1.578947	1152.309358	1.0773	934.9052
160	840	1.6	0.016842	1.684211	1153.543094	1.1172	968.4944
170	865	1.7	0.017895	1.789474	1154.779475	1.15045	996.2508
180	885	1.8	0.018947	1.894737	1156.018509	1.17705	1018.193
190	900	1.9	0.02	2	1157.260204	1.197	1034.34
200	915	2	0.021053	2.105263	1158.50457	1.21695	1050.449
210	925	2.1	0.022105	2.210526	1159.751615	1.23025	1060.787
220	932	2.2	0.023158	2.315789	1161.001347	1.23956	1067.665
230	938	2.3	0.024211	2.421053	1162.253776	1.24754	1073.38
240	944	2.4	0.025263	2.526316	1163.508909	1.25552	1079.081
250	946	2.5	0.026316	2.631579	1164.766757	1.25818	1080.199
260	947	2.6	0.027368	2.736842	1166.027327	1.25951	1080.172
270	946	2.7	0.028421	2.842105	1167.290628	1.25818	1077.864
280	936	2.8	0.029474	2.947368	1168.55667	1.24488	1065.314
290	928	2.9	0.030526	3.052632	1169.825461	1.23424	1055.063
300	919	3	0.031579	3.157895	1171.097011	1.22227	1043.697

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	10	0.1	0.001053	0.105263	1135.310063	0.0133	11.71486
20	35	0.2	0.002105	0.210526	1136.507648	0.04655	40.95881
30	95	0.3	0.003158	0.315789	1137.707761	0.12635	111.0566
40	150	0.4	0.004211	0.421053	1138.910412	0.1995	175.1674
50	200	0.5	0.005263	0.526316	1140.115608	0.266	233.3097
60	245	0.6	0.006316	0.631579	1141.323358	0.32585	285.5019
70	290	0.7	0.007368	0.736842	1142.533669	0.3857	337.583
80	335	0.8	0.008421	0.842105	1143.74655	0.44555	389.5531
90	380	0.9	0.009474	0.947368	1144.962009	0.5054	441.412
100	410	1	0.010526	1.052632	1146.180053	0.5453	475.7542
110	440	1.1	0.011579	1.157895	1147.400692	0.5852	510.0224
120	470	1.2	0.012632	1.263158	1148.623934	0.6251	544.2164
130	500	1.3	0.013684	1.368421	1149.849787	0.665	578.3364
140	525	1.4	0.014737	1.473684	1151.078259	0.69825	606.6052
150	550	1.5	0.015789	1.578947	1152.309358	0.7315	634.8122
160	580	1.6	0.016842	1.684211	1153.543094	0.7714	668.7223
170	615	1.7	0.017895	1.789474	1154.779475	0.81795	708.3171
180	650	1.8	0.018947	1.894737	1156.018509	0.8645	747.8254
190	685	1.9	0.02	2	1157.260204	0.91105	787.2473
200	720	2	0.021053	2.105263	1158.50457	0.9576	826.5828
210	745	2.1	0.022105	2.210526	1159.751615	0.99085	854.364
220	778	2.2	0.023158	2.315789	1161.001347	1.03474	891.2479
230	805	2.3	0.024211	2.421053	1162.253776	1.07065	921.1844
240	830	2.4	0.025263	2.526316	1163.508909	1.1039	948.768
250	850	2.5	0.026316	2.631579	1164.766757	1.1305	970.5806
260	860	2.6	0.027368	2.736842	1166.027327	1.1438	980.9376
270	870	2.7	0.028421	2.842105	1167.290628	1.1571	991.2698
280	878	2.8	0.029474	2.947368	1168.55667	1.16774	999.3011
290	876	2.9	0.030526	3.052632	1169.825461	1.16508	995.9434
300	870	3	0.031579	3.157895	1171.097011	1.1571	988.0479
310	859	3.1	0.032632	3.263158	1172.371328	1.14247	974.495
320	840	3.2	0.033684	3.368421	1173.64842	1.1172	951.9035
330	828	3.3	0.034737	3.473684	1174.928299	1.10124	937.2827
340	812	3.4	0.035789	3.578947	1176.210972	1.07996	918.1686

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	15	0.1	0.001053	0.105263	1135.310063	0.01995	17.57229
20	25	0.2	0.002105	0.210526	1136.507648	0.03325	29.25629
30	45	0.3	0.003158	0.315789	1137.707761	0.05985	52.60578
40	70	0.4	0.004211	0.421053	1138.910412	0.0931	81.7448
50	110	0.5	0.005263	0.526316	1140.115608	0.1463	128.3203
60	155	0.6	0.006316	0.631579	1141.323358	0.20615	180.6237
70	200	0.7	0.007368	0.736842	1142.533669	0.266	232.8159
80	250	0.8	0.008421	0.842105	1143.74655	0.3325	290.7113
90	298	0.9	0.009474	0.947368	1144.962009	0.39634	346.16
100	340	1	0.010526	1.052632	1146.180053	0.4522	394.5279
110	378	1.1	0.011579	1.157895	1147.400692	0.50274	438.1556
120	418	1.2	0.012632	1.263158	1148.623934	0.55594	484.0052
130	438	1.3	0.013684	1.368421	1149.849787	0.58254	506.6227
140	468	1.4	0.014737	1.473684	1151.078259	0.62244	540.7452
150	494	1.5	0.015789	1.578947	1152.309358	0.65702	570.1767
160	516	1.6	0.016842	1.684211	1153.543094	0.68628	594.9323
170	534	1.7	0.017895	1.789474	1154.779475	0.71022	615.0265
180	548	1.8	0.018947	1.894737	1156.018509	0.72884	630.4743
190	558	1.9	0.02	2	1157.260204	0.74214	641.2905
200	568	2	0.021053	2.105263	1158.50457	0.75544	652.082
210	578	2.1	0.022105	2.210526	1159.751615	0.76874	662.8488
220	580	2.2	0.023158	2.315789	1161.001347	0.7714	664.4264
230	576	2.3	0.024211	2.421053	1162.253776	0.76608	659.1332
240	560	2.4	0.025263	2.526316	1163.508909	0.7448	640.1326
250	555	2.5	0.026316	2.631579	1164.766757	0.73815	633.732
260	537	2.6	0.027368	2.736842	1166.027327	0.71421	612.5157
270	520	2.7	0.028421	2.842105	1167.290628	0.6916	592.4831
280	501	2.8	0.029474	2.947368	1168.55667	0.66633	570.2162



Plot of stress-strain curve for remoulded sample at dry side OMC with different specimen's height (sample No. 1)

Sample No. = 2

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	60	0.2	0.002105	0.210526	1136.507648	0.0798	70.2151
30	115	0.3	0.003158	0.315789	1137.707761	0.15295	134.437
40	180	0.4	0.004211	0.421053	1138.910412	0.2394	210.2009
50	240	0.5	0.005263	0.526316	1140.115608	0.3192	279.9716
60	300	0.6	0.006316	0.631579	1141.323358	0.399	349.5942
70	350	0.7	0.007368	0.736842	1142.533669	0.4655	407.4278
80	385	0.8	0.008421	0.842105	1143.74655	0.51205	447.6953
90	435	0.9	0.009474	0.947368	1144.962009	0.57855	505.3006
100	475	1	0.010526	1.052632	1146.180053	0.63175	551.1787
110	520	1.1	0.011579	1.157895	1147.400692	0.6916	602.7537
120	558	1.2	0.012632	1.263158	1148.623934	0.74214	646.1123
130	598	1.3	0.013684	1.368421	1149.849787	0.79534	691.6903
140	632	1.4	0.014737	1.473684	1151.078259	0.84056	730.2371
150	668	1.5	0.015789	1.578947	1152.309358	0.88844	771.0082
160	704	1.6	0.016842	1.684211	1153.543094	0.93632	811.6905

170	738	1.7	0.017895	1.789474	1154.779475	0.98154	849.9805
180	768	1.8	0.018947	1.894737	1156.018509	1.02144	883.5845
190	798	1.9	0.02	2	1157.260204	1.06134	917.1144
200	824	2	0.021053	2.105263	1158.50457	1.09592	945.9781
210	850	2.1	0.022105	2.210526	1159.751615	1.1305	974.7777
220	872	2.2	0.023158	2.315789	1161.001347	1.15976	998.9308
230	894	2.3	0.024211	2.421053	1162.253776	1.18902	1023.03
240	912	2.4	0.025263	2.526316	1163.508909	1.21296	1042.502
250	928	2.5	0.026316	2.631579	1164.766757	1.23424	1059.646
260	944	2.6	0.027368	2.736842	1166.027327	1.25552	1076.75
270	960	2.7	0.028421	2.842105	1167.290628	1.2768	1093.815
280	972	2.8	0.029474	2.947368	1168.55667	1.29276	1106.288
290	986	2.9	0.030526	3.052632	1169.825461	1.31138	1121.005
300	1000	3	0.031579	3.157895	1171.097011	1.33	1135.687
310	1014	3.1	0.032632	3.263158	1172.371328	1.34862	1150.335
320	1026	3.2	0.033684	3.368421	1173.64842	1.36458	1162.682
330	1036	3.3	0.034737	3.473684	1174.928299	1.37788	1172.735
340	1046	3.4	0.035789	3.578947	1176.210972	1.39118	1182.764
350	1054	3.5	0.036842	3.684211	1177.496448	1.40182	1190.509
360	1062	3.6	0.037895	3.789474	1178.784737	1.41246	1198.234
370	1070	3.7	0.038947	3.894737	1180.075849	1.4231	1205.939
380	1078	3.8	0.04	4	1181.369792	1.43374	1213.625
390	1084	3.9	0.041053	4.105263	1182.666575	1.44172	1219.042
400	1090	4	0.042105	4.210526	1183.966209	1.4497	1224.444
410	1096	4.1	0.043158	4.315789	1185.268702	1.45768	1229.831
420	1095	4.2	0.044211	4.421053	1186.574064	1.45635	1227.357
430	1097	4.3	0.045263	4.526316	1187.882304	1.45901	1228.245
440	1098	4.4	0.046316	4.631579	1189.193433	1.46034	1228.009
450	1098	4.5	0.047368	4.736842	1190.507459	1.46034	1226.653
460	1098	4.6	0.048421	4.842105	1191.824392	1.46034	1225.298
470	1095	4.7	0.049474	4.947368	1193.144241	1.45635	1220.598
480	1091	4.8	0.050526	5.052632	1194.467018	1.45103	1214.793
490	1085	4.9	0.051579	5.157895	1195.79273	1.44305	1206.773

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	35	0.1	0.001053	0.105263	1135.310063	0.04655	41.00201
20	110	0.2	0.002105	0.210526	1136.507648	0.1463	128.7277
30	190	0.3	0.003158	0.315789	1137.707761	0.2527	222.1133

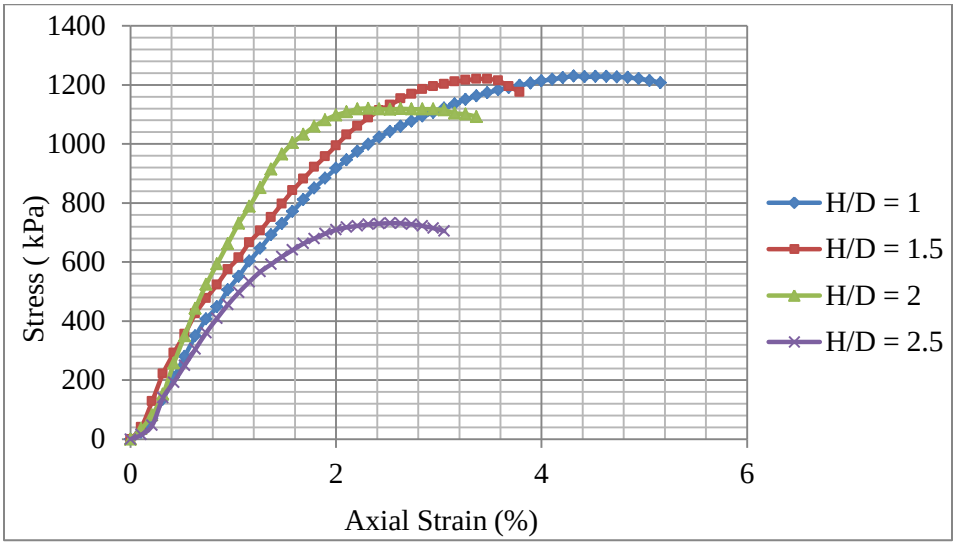
40	250	0.4	0.004211	0.421053	1138.910412	0.3325	291.9457
50	305	0.5	0.005263	0.526316	1140.115608	0.40565	355.7973
60	365	0.6	0.006316	0.631579	1141.323358	0.48545	425.3396
70	410	0.7	0.007368	0.736842	1142.533669	0.5453	477.2726
80	450	0.8	0.008421	0.842105	1143.74655	0.5985	523.2803
90	495	0.9	0.009474	0.947368	1144.962009	0.65835	574.9972
100	530	1	0.010526	1.052632	1146.180053	0.7049	614.9994
110	575	1.1	0.011579	1.157895	1147.400692	0.76475	666.5065
120	610	1.2	0.012632	1.263158	1148.623934	0.8113	706.3234
130	650	1.3	0.013684	1.368421	1149.849787	0.8645	751.8373
140	690	1.4	0.014737	1.473684	1151.078259	0.9177	797.2525
150	730	1.5	0.015789	1.578947	1152.309358	0.9709	842.5689
160	765	1.6	0.016842	1.684211	1153.543094	1.01745	882.0217
170	800	1.7	0.017895	1.789474	1154.779475	1.064	921.388
180	832	1.8	0.018947	1.894737	1156.018509	1.10656	957.2165
190	865	1.9	0.02	2	1157.260204	1.15045	994.1152
200	898	2	0.021053	2.105263	1158.50457	1.19434	1030.932
210	925	2.1	0.022105	2.210526	1159.751615	1.23025	1060.787
220	950	2.2	0.023158	2.315789	1161.001347	1.2635	1088.285
230	973	2.3	0.024211	2.421053	1162.253776	1.29409	1113.432
240	990	2.4	0.025263	2.526316	1163.508909	1.3167	1131.663
250	1010	2.5	0.026316	2.631579	1164.766757	1.3433	1153.278
260	1025	2.6	0.027368	2.736842	1166.027327	1.36325	1169.141
270	1040	2.7	0.028421	2.842105	1167.290628	1.3832	1184.966
280	1050	2.8	0.029474	2.947368	1168.55667	1.3965	1195.064
290	1058	2.9	0.030526	3.052632	1169.825461	1.40714	1202.863
300	1066	3	0.031579	3.157895	1171.097011	1.41778	1210.643
310	1072	3.1	0.032632	3.263158	1172.371328	1.42576	1216.133
320	1076	3.2	0.033684	3.368421	1173.64842	1.43108	1219.343
330	1078	3.3	0.034737	3.473684	1174.928299	1.43374	1220.279
340	1074	3.4	0.035789	3.578947	1176.210972	1.42842	1214.425
350	1058	3.5	0.036842	3.684211	1177.496448	1.40714	1195.027
360	1042	3.6	0.037895	3.789474	1178.784737	1.38586	1175.668

c. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	30	0.1	0.001053	0.105263	1135.310063	0.0399	35.14458
20	70	0.2	0.002105	0.210526	1136.507648	0.0931	81.91762
30	130	0.3	0.003158	0.315789	1137.707761	0.1729	151.9722
40	220	0.4	0.004211	0.421053	1138.910412	0.2926	256.9122
50	300	0.5	0.005263	0.526316	1140.115608	0.399	349.9645
60	380	0.6	0.006316	0.631579	1141.323358	0.5054	442.8193
70	450	0.7	0.007368	0.736842	1142.533669	0.5985	523.8358
80	510	0.8	0.008421	0.842105	1143.74655	0.6783	593.051
90	570	0.9	0.009474	0.947368	1144.962009	0.7581	662.118
100	630	1	0.010526	1.052632	1146.180053	0.8379	731.037
110	680	1.1	0.011579	1.157895	1147.400692	0.9044	788.2164
120	735	1.2	0.012632	1.263158	1148.623934	0.97755	851.0618
130	790	1.3	0.013684	1.368421	1149.849787	1.0507	913.7715
140	835	1.4	0.014737	1.473684	1151.078259	1.11055	964.791
150	870	1.5	0.015789	1.578947	1152.309358	1.1571	1004.157
160	895	1.6	0.016842	1.684211	1153.543094	1.19035	1031.908
170	920	1.7	0.017895	1.789474	1154.779475	1.2236	1059.596
180	940	1.8	0.018947	1.894737	1156.018509	1.2502	1081.471
190	955	1.9	0.02	2	1157.260204	1.27015	1097.549
200	965	2	0.021053	2.105263	1158.50457	1.28345	1107.851
210	975	2.1	0.022105	2.210526	1159.751615	1.29675	1118.127
220	978	2.2	0.023158	2.315789	1161.001347	1.30074	1120.36
230	977	2.3	0.024211	2.421053	1162.253776	1.29941	1118.009
240	977	2.4	0.025263	2.526316	1163.508909	1.29941	1116.803
250	980	2.5	0.026316	2.631579	1164.766757	1.3034	1119.022
260	980	2.6	0.027368	2.736842	1166.027327	1.3034	1117.813
270	981	2.7	0.028421	2.842105	1167.290628	1.30473	1117.742
280	982	2.8	0.029474	2.947368	1168.55667	1.30606	1117.669
290	980	2.9	0.030526	3.052632	1169.825461	1.3034	1114.183
300	972	3	0.031579	3.157895	1171.097011	1.29276	1103.888
310	970	3.1	0.032632	3.263158	1172.371328	1.2901	1100.419
320	964	3.2	0.033684	3.368421	1173.64842	1.28212	1092.423

d. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	13	0.1	0.001053	0.105263	1135.310063	0.01729	15.22932
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	120	0.3	0.003158	0.315789	1137.707761	0.1596	140.2821
40	165	0.4	0.004211	0.421053	1138.910412	0.21945	192.6842
50	214	0.5	0.005263	0.526316	1140.115608	0.28462	249.6414
60	262	0.6	0.006316	0.631579	1141.323358	0.34846	305.3122
70	310	0.7	0.007368	0.736842	1142.533669	0.4123	360.8646
80	352	0.8	0.008421	0.842105	1143.74655	0.46816	409.3215
90	392	0.9	0.009474	0.947368	1144.962009	0.52136	455.3514
100	428	1	0.010526	1.052632	1146.180053	0.56924	496.641
110	460	1.1	0.011579	1.157895	1147.400692	0.6118	533.2052
120	490	1.2	0.012632	1.263158	1148.623934	0.6517	567.3746
130	512	1.3	0.013684	1.368421	1149.849787	0.68096	592.2165
140	535	1.4	0.014737	1.473684	1151.078259	0.71155	618.1595
150	555	1.5	0.015789	1.578947	1152.309358	0.73815	640.5832
160	575	1.6	0.016842	1.684211	1153.543094	0.76475	662.9575
170	590	1.7	0.017895	1.789474	1154.779475	0.7847	679.5237
180	605	1.8	0.018947	1.894737	1156.018509	0.80465	696.0529
190	617	1.9	0.02	2	1157.260204	0.82061	709.0972
200	625	2	0.021053	2.105263	1158.50457	0.83125	717.5198
210	630	2.1	0.022105	2.210526	1159.751615	0.8379	722.4823
220	635	2.2	0.023158	2.315789	1161.001347	0.84455	727.4324
230	638	2.3	0.024211	2.421053	1162.253776	0.84854	730.0815
240	640	2.4	0.025263	2.526316	1163.508909	0.8512	731.5801
250	640	2.5	0.026316	2.631579	1164.766757	0.8512	730.7901
260	638	2.6	0.027368	2.736842	1166.027327	0.84854	727.7188
270	634	2.7	0.028421	2.842105	1167.290628	0.84322	722.3737
280	628	2.8	0.029474	2.947368	1168.55667	0.83524	714.7621
290	620	2.9	0.030526	3.052632	1169.825461	0.8246	704.8915



Plot of stress-strain curve for remoulded sample at dry side OMC with different specimen's height (sample No. 2)

Summary of unconfined compressive strength value of remoulded sample at dry side of OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)		
		Sample 1	Sample 2	Average
3	1	1283.983	1228.245	1255.67
	1.5	1080.199	1220.279	1150.24
	2	999.301	1120.36	1059.83
	2.5	664.426	731.58	698.00

A2.4: For Samples Compacted at its Wet Side of OMC (W = 28%)

a. H/D = 1

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (KPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	30	0.2	0.002105	0.210526	1136.507648	0.0399	35.10755
30	45	0.3	0.003158	0.315789	1137.707761	0.05985	52.60578
40	60	0.4	0.004211	0.421053	1138.910412	0.0798	70.06697
50	73	0.5	0.005263	0.526316	1140.115608	0.09709	85.15803
60	83	0.6	0.006316	0.631579	1141.323358	0.11039	96.72106
70	93	0.7	0.007368	0.736842	1142.533669	0.12369	108.2594
80	102	0.8	0.008421	0.842105	1143.74655	0.13566	118.6102
90	110	0.9	0.009474	0.947368	1144.962009	0.1463	127.7772
100	116	1	0.010526	1.052632	1146.180053	0.15428	134.6036
110	123	1.1	0.011579	1.157895	1147.400692	0.16359	142.5744
120	130	1.2	0.012632	1.263158	1148.623934	0.1729	150.5279
130	135	1.3	0.013684	1.368421	1149.849787	0.17955	156.1508
140	140	1.4	0.014737	1.473684	1151.078259	0.1862	161.7614
150	145	1.5	0.015789	1.578947	1152.309358	0.19285	167.3596
160	150	1.6	0.016842	1.684211	1153.543094	0.1995	172.9454
170	155	1.7	0.017895	1.789474	1154.779475	0.20615	178.5189
180	160	1.8	0.018947	1.894737	1156.018509	0.2128	184.0801
190	164	1.9	0.02	2	1157.260204	0.21812	188.4797
200	168	2	0.021053	2.105263	1158.50457	0.22344	192.8693
210	172	2.1	0.022105	2.210526	1159.751615	0.22876	197.2491
220	175	2.2	0.023158	2.315789	1161.001347	0.23275	200.4735
230	178	2.3	0.024211	2.421053	1162.253776	0.23674	203.6905
240	181	2.4	0.025263	2.526316	1163.508909	0.24073	206.9
250	185	2.5	0.026316	2.631579	1164.766757	0.24605	211.244
260	188	2.6	0.027368	2.736842	1166.027327	0.25004	214.4375
270	191	2.7	0.028421	2.842105	1167.290628	0.25403	217.6236
280	194	2.8	0.029474	2.947368	1168.55667	0.25802	220.8023
290	196	2.9	0.030526	3.052632	1169.825461	0.26068	222.8367
300	198	3	0.031579	3.157895	1171.097011	0.26334	224.8661
310	200	3.1	0.032632	3.263158	1172.371328	0.266	226.8906
320	202	3.2	0.033684	3.368421	1173.64842	0.26866	228.9101
330	204	3.3	0.034737	3.473684	1174.928299	0.27132	230.9247
340	206	3.4	0.035789	3.578947	1176.210972	0.27398	232.9344
350	208	3.5	0.036842	3.684211	1177.496448	0.27664	234.9391
360	209	3.6	0.037895	3.789474	1178.784737	0.27797	235.8107

370	211	3.7	0.038947	3.894737	1180.075849	0.28063	237.8067
380	213	3.8	0.04	4	1181.369792	0.28329	239.7979
390	214	3.9	0.041053	4.105263	1182.666575	0.28462	240.6595
400	216	4	0.042105	4.210526	1183.966209	0.28728	242.6421
410	217	4.1	0.043158	4.315789	1185.268702	0.28861	243.4975
420	218	4.2	0.044211	4.421053	1186.574064	0.28994	244.3505
430	219	4.3	0.045263	4.526316	1187.882304	0.29127	245.2011
440	220	4.4	0.046316	4.631579	1189.193433	0.2926	246.0491
450	221	4.5	0.047368	4.736842	1190.507459	0.29393	246.8947
460	221	4.6	0.048421	4.842105	1191.824392	0.29393	246.6219
470	222	4.7	0.049474	4.947368	1193.144241	0.29526	247.4638
480	223	4.8	0.050526	5.052632	1194.467018	0.29659	248.3032
490	224	4.9	0.051579	5.157895	1195.79273	0.29792	249.1402
500	225	5	0.052632	5.263158	1197.121389	0.29925	249.9746
510	226	5.1	0.053684	5.368421	1198.453003	0.30058	250.8067
520	227	5.2	0.054737	5.473684	1199.787584	0.30191	251.6362
530	228	5.3	0.055789	5.578947	1201.125139	0.30324	252.4633
540	229	5.4	0.056842	5.684211	1202.465681	0.30457	253.2879
550	230	5.5	0.057895	5.789474	1203.809218	0.3059	254.11
560	230.5	5.6	0.058947	5.894737	1205.155761	0.306565	254.3779
570	231	5.7	0.06	6	1206.505319	0.30723	254.6445
580	231.5	5.8	0.061053	6.105263	1207.857904	0.307895	254.91
590	232	5.9	0.062105	6.210526	1209.213524	0.30856	255.1741
600	232.5	6	0.063158	6.315789	1210.572191	0.309225	255.4371
610	233	6.1	0.064211	6.421053	1211.933915	0.30989	255.6988
620	233.5	6.2	0.065263	6.526316	1213.298705	0.310555	255.9592
630	234	6.3	0.066316	6.631579	1214.666573	0.31122	256.2185
640	234.5	6.4	0.067368	6.736842	1216.037528	0.311885	256.4765
650	235	6.5	0.068421	6.842105	1217.411582	0.31255	256.7332
660	235.5	6.6	0.069474	6.947368	1218.788744	0.313215	256.9888
670	236	6.7	0.070526	7.052632	1220.169026	0.31388	257.243
680	236.5	6.8	0.071579	7.157895	1221.552438	0.314545	257.4961
690	237	6.9	0.072632	7.263158	1222.93899	0.31521	257.7479
700	237.5	7	0.073684	7.368421	1224.328693	0.315875	257.9985
710	238	7.1	0.074737	7.473684	1225.721559	0.31654	258.2479
720	238.5	7.2	0.075789	7.578947	1227.117597	0.317205	258.496
730	239	7.3	0.076842	7.684211	1228.516819	0.31787	258.7429
740	239.5	7.4	0.077895	7.789474	1229.919235	0.318535	258.9886
750	240	7.5	0.078947	7.894737	1231.324857	0.3192	259.233
760	240.25	7.6	0.08	8	1232.733696	0.319533	259.2064
770	240.5	7.7	0.081053	8.105263	1234.145762	0.319865	259.1793
780	240.75	7.8	0.082105	8.210526	1235.561067	0.320198	259.1515
790	241	7.9	0.083158	8.315789	1236.979621	0.32053	259.1231
800	241.25	8	0.084211	8.421053	1238.401437	0.320863	259.0941

810	241.5	8.1	0.085263	8.526316	1239.826525	0.321195	259.0645
820	241.75	8.2	0.086316	8.631579	1241.254896	0.321528	259.0342
830	242	8.3	0.087368	8.736842	1242.686563	0.32186	259.0034
840	242.25	8.4	0.088421	8.842105	1244.121536	0.322193	258.9719
850	242.25	8.5	0.089474	8.947368	1245.559827	0.322193	258.6728
860	242.25	8.6	0.090526	9.052632	1247.001447	0.322193	258.3738
870	242	8.7	0.091579	9.157895	1248.446408	0.32186	257.8084
880	242	8.8	0.092632	9.263158	1249.894722	0.32186	257.5097
890	242	8.9	0.093684	9.368421	1251.3464	0.32186	257.211
900	241.5	9	0.094737	9.473684	1252.801453	0.321195	256.3814
910	241	9.1	0.095789	9.578947	1254.259895	0.32053	255.5531
920	240	9.2	0.096842	9.684211	1255.721737	0.3192	254.1964
930	239	9.3	0.097895	9.789474	1257.186989	0.31787	252.8423
940	238	9.4	0.098947	9.894737	1258.655666	0.31654	251.4905
950	237	9.5	0.1	10	1260.127778	0.31521	250.1413
960	236.5	9.6	0.101053	10.10526	1261.603337	0.314545	249.3216

b. H/D = 1.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	20	0.1	0.001053	0.105263	1135.310063	0.0266	23.42972
20	35	0.2	0.002105	0.210526	1136.507648	0.04655	40.95881
30	50	0.3	0.003158	0.315789	1137.707761	0.0665	58.45086
40	68	0.4	0.004211	0.421053	1138.910412	0.09044	79.40923
50	72	0.5	0.005263	0.526316	1140.115608	0.09576	83.99148
60	82	0.6	0.006316	0.631579	1141.323358	0.10906	95.55574
70	90	0.7	0.007368	0.736842	1142.533669	0.1197	104.7672
80	98	0.8	0.008421	0.842105	1143.74655	0.13034	113.9588
90	104	0.9	0.009474	0.947368	1144.962009	0.13832	120.8075
100	109	1	0.010526	1.052632	1146.180053	0.14497	126.481
110	115	1.1	0.011579	1.157895	1147.400692	0.15295	133.3013
120	120	1.2	0.012632	1.263158	1148.623934	0.1596	138.9489
130	124	1.3	0.013684	1.368421	1149.849787	0.16492	143.4274
140	128	1.4	0.014737	1.473684	1151.078259	0.17024	147.8961
150	132	1.5	0.015789	1.578947	1152.309358	0.17556	152.3549
160	137	1.6	0.016842	1.684211	1153.543094	0.18221	157.9568
170	142	1.7	0.017895	1.789474	1154.779475	0.18886	163.5464
180	149	1.8	0.018947	1.894737	1156.018509	0.19817	171.4246
190	153	1.9	0.02	2	1157.260204	0.20349	175.8377
200	156	2	0.021053	2.105263	1158.50457	0.20748	179.0929

210	159	2.1	0.022105	2.210526	1159.751615	0.21147	182.3408
220	162	2.2	0.023158	2.315789	1161.001347	0.21546	185.5812
230	166	2.3	0.024211	2.421053	1162.253776	0.22078	189.9585
240	170	2.4	0.025263	2.526316	1163.508909	0.2261	194.326
250	173	2.5	0.026316	2.631579	1164.766757	0.23009	197.5417
260	176	2.6	0.027368	2.736842	1166.027327	0.23408	200.75
270	179	2.7	0.028421	2.842105	1167.290628	0.23807	203.9509
280	182	2.8	0.029474	2.947368	1168.55667	0.24206	207.1444
290	185	2.9	0.030526	3.052632	1169.825461	0.24605	210.3305
300	188	3	0.031579	3.157895	1171.097011	0.25004	213.5092
310	190	3.1	0.032632	3.263158	1172.371328	0.2527	215.546
320	193	3.2	0.033684	3.368421	1173.64842	0.25669	218.7112
330	195	3.3	0.034737	3.473684	1174.928299	0.25935	220.7369
340	196.5	3.4	0.035789	3.578947	1176.210972	0.261345	222.1923
350	198	3.5	0.036842	3.684211	1177.496448	0.26334	223.644
360	199.5	3.6	0.037895	3.789474	1178.784737	0.265335	225.092
370	201	3.7	0.038947	3.894737	1180.075849	0.26733	226.5363
380	202.5	3.8	0.04	4	1181.369792	0.269325	227.9769
390	204	3.9	0.041053	4.105263	1182.666575	0.27132	229.4138
400	205.5	4	0.042105	4.210526	1183.966209	0.273315	230.847
410	207	4.1	0.043158	4.315789	1185.268702	0.27531	232.2764
420	208.5	4.2	0.044211	4.421053	1186.574064	0.277305	233.7022
430	210	4.3	0.045263	4.526316	1187.882304	0.2793	235.1243
440	211	4.4	0.046316	4.631579	1189.193433	0.28063	235.9835
450	212	4.5	0.047368	4.736842	1190.507459	0.28196	236.8402
460	213	4.6	0.048421	4.842105	1191.824392	0.28329	237.6944
470	214	4.7	0.049474	4.947368	1193.144241	0.28462	238.5462
480	215	4.8	0.050526	5.052632	1194.467018	0.28595	239.3955
490	217	4.9	0.051579	5.157895	1195.79273	0.28861	241.3545
500	218	5	0.052632	5.263158	1197.121389	0.28994	242.1977
510	218	5.1	0.053684	5.368421	1198.453003	0.28994	241.9286
520	219	5.2	0.054737	5.473684	1199.787584	0.29127	242.768
530	220	5.3	0.055789	5.578947	1201.125139	0.2926	243.6049
540	221	5.4	0.056842	5.684211	1202.465681	0.29393	244.4394
550	222	5.5	0.057895	5.789474	1203.809218	0.29526	245.2714
560	223	5.6	0.058947	5.894737	1205.155761	0.29659	246.101
570	224	5.7	0.06	6	1206.505319	0.29792	246.928
580	225	5.8	0.061053	6.105263	1207.857904	0.29925	247.7527
590	226	5.9	0.062105	6.210526	1209.213524	0.30058	248.5748
600	227	6	0.063158	6.315789	1210.572191	0.30191	249.3945
610	227.5	6.1	0.064211	6.421053	1211.933915	0.302575	249.663
620	228	6.2	0.065263	6.526316	1213.298705	0.30324	249.9302
630	228.5	6.3	0.066316	6.631579	1214.666573	0.303905	250.1962
640	229	6.4	0.067368	6.736842	1216.037528	0.30457	250.461

650	229.5	6.5	0.068421	6.842105	1217.411582	0.305235	250.7246
660	230	6.6	0.069474	6.947368	1218.788744	0.3059	250.9869
670	230.5	6.7	0.070526	7.052632	1220.169026	0.306565	251.248
680	231	6.8	0.071579	7.157895	1221.552438	0.30723	251.5078
690	231.5	6.9	0.072632	7.263158	1222.93899	0.307895	251.7664
700	232	7	0.073684	7.368421	1224.328693	0.30856	252.0238
710	232.5	7.1	0.074737	7.473684	1225.721559	0.309225	252.28
720	233	7.2	0.075789	7.578947	1227.117597	0.30989	252.5349
730	233.5	7.3	0.076842	7.684211	1228.516819	0.310555	252.7886
740	234	7.4	0.077895	7.789474	1229.919235	0.31122	253.041
750	234	7.5	0.078947	7.894737	1231.324857	0.31122	252.7521
760	234	7.6	0.08	8	1232.733696	0.31122	252.4633
770	234	7.7	0.081053	8.105263	1234.145762	0.31122	252.1744
780	233.5	7.8	0.082105	8.210526	1235.561067	0.310555	251.3474
790	233	7.9	0.083158	8.315789	1236.979621	0.30989	250.5215
800	232	8	0.084211	8.421053	1238.401437	0.30856	249.1599
810	231	8.1	0.085263	8.526316	1239.826525	0.30723	247.8008
820	230	8.2	0.086316	8.631579	1241.254896	0.3059	246.4441

b. H/D = 2

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	12	0.1	0.001053	0.105263	1135.310063	0.01596	14.05783
20	25	0.2	0.002105	0.210526	1136.507648	0.03325	29.25629
30	40	0.3	0.003158	0.315789	1137.707761	0.0532	46.76069
40	50	0.4	0.004211	0.421053	1138.910412	0.0665	58.38914
50	60	0.5	0.005263	0.526316	1140.115608	0.0798	69.9929
60	68	0.6	0.006316	0.631579	1141.323358	0.09044	79.24135
70	74	0.7	0.007368	0.736842	1142.533669	0.09842	86.14188
80	80	0.8	0.008421	0.842105	1143.74655	0.1064	93.0276
90	85	0.9	0.009474	0.947368	1144.962009	0.11305	98.7369
100	90	1	0.010526	1.052632	1146.180053	0.1197	104.4339
110	94	1.1	0.011579	1.157895	1147.400692	0.12502	108.9593
120	98	1.2	0.012632	1.263158	1148.623934	0.13034	113.4749
130	101	1.3	0.013684	1.368421	1149.849787	0.13433	116.824
140	104	1.4	0.014737	1.473684	1151.078259	0.13832	120.1656
150	107	1.5	0.015789	1.578947	1152.309358	0.14231	123.4998
160	110	1.6	0.016842	1.684211	1153.543094	0.1463	126.8266
170	112	1.7	0.017895	1.789474	1154.779475	0.14896	128.9943
180	114	1.8	0.018947	1.894737	1156.018509	0.15162	131.1571

190	116	1.9	0.02	2	1157.260204	0.15428	133.3149
200	119	2	0.021053	2.105263	1158.50457	0.15827	136.6158
210	121	2.1	0.022105	2.210526	1159.751615	0.16093	138.7625
220	123	2.2	0.023158	2.315789	1161.001347	0.16359	140.9042
230	125	2.3	0.024211	2.421053	1162.253776	0.16625	143.041
240	127	2.4	0.025263	2.526316	1163.508909	0.16891	145.1729
250	129	2.5	0.026316	2.631579	1164.766757	0.17157	147.2999
260	131	2.6	0.027368	2.736842	1166.027327	0.17423	149.4219
270	133	2.7	0.028421	2.842105	1167.290628	0.17689	151.539
280	136	2.8	0.029474	2.947368	1168.55667	0.18088	154.7892
290	138	2.9	0.030526	3.052632	1169.825461	0.18354	156.8952
300	140	3	0.031579	3.157895	1171.097011	0.1862	158.9962
310	141	3.1	0.032632	3.263158	1172.371328	0.18753	159.9579
320	143	3.2	0.033684	3.368421	1173.64842	0.19019	162.0502
330	145	3.3	0.034737	3.473684	1174.928299	0.19285	164.1377
340	147	3.4	0.035789	3.578947	1176.210972	0.19551	166.2202
350	149	3.5	0.036842	3.684211	1177.496448	0.19817	168.2977
360	151	3.6	0.037895	3.789474	1178.784737	0.20083	170.3704
370	154	3.7	0.038947	3.894737	1180.075849	0.20482	173.5651
380	156	3.8	0.04	4	1181.369792	0.20748	175.6266
390	158	3.9	0.041053	4.105263	1182.666575	0.21014	177.6832
400	159	4	0.042105	4.210526	1183.966209	0.21147	178.6115
410	160	4.1	0.043158	4.315789	1185.268702	0.2128	179.5373
420	161	4.2	0.044211	4.421053	1186.574064	0.21413	180.4607
430	163	4.3	0.045263	4.526316	1187.882304	0.21679	182.5012
440	165	4.4	0.046316	4.631579	1189.193433	0.21945	184.5368
450	166	4.5	0.047368	4.736842	1190.507459	0.22078	185.4503
460	167	4.6	0.048421	4.842105	1191.824392	0.22211	186.3613
470	168	4.7	0.049474	4.947368	1193.144241	0.22344	187.2699
480	169	4.8	0.050526	5.052632	1194.467018	0.22477	188.176
490	170	4.9	0.051579	5.157895	1195.79273	0.2261	189.0796
500	171	5	0.052632	5.263158	1197.121389	0.22743	189.9807
510	172	5.1	0.053684	5.368421	1198.453003	0.22876	190.8794
520	173	5.2	0.054737	5.473684	1199.787584	0.23009	191.7756
530	174	5.3	0.055789	5.578947	1201.125139	0.23142	192.6694
540	175	5.4	0.056842	5.684211	1202.465681	0.23275	193.5606
550	176	5.5	0.057895	5.789474	1203.809218	0.23408	194.4494
560	177	5.6	0.058947	5.894737	1205.155761	0.23541	195.3357
570	178	5.7	0.06	6	1206.505319	0.23674	196.2196
580	179	5.8	0.061053	6.105263	1207.857904	0.23807	197.101
590	180	5.9	0.062105	6.210526	1209.213524	0.2394	197.9799
600	181	6	0.063158	6.315789	1210.572191	0.24073	198.8564
610	182	6.1	0.064211	6.421053	1211.933915	0.24206	199.7304
620	182	6.2	0.065263	6.526316	1213.298705	0.24206	199.5057

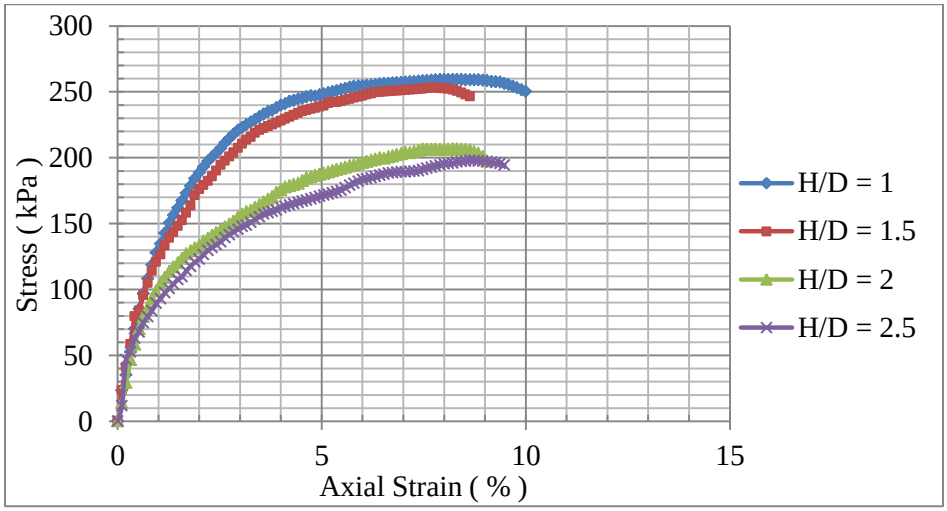
630	183	6.3	0.066316	6.631579	1214.666573	0.24339	200.376
640	184	6.4	0.067368	6.736842	1216.037528	0.24472	201.2438
650	185	6.5	0.068421	6.842105	1217.411582	0.24605	202.1091
660	186	6.6	0.069474	6.947368	1218.788744	0.24738	202.972
670	187	6.7	0.070526	7.052632	1220.169026	0.24871	203.8324
680	187	6.8	0.071579	7.157895	1221.552438	0.24871	203.6016
690	188	6.9	0.072632	7.263158	1222.93899	0.25004	204.4583
700	189	7	0.073684	7.368421	1224.328693	0.25137	205.3125
710	190	7.1	0.074737	7.473684	1225.721559	0.2527	206.1643
720	190.25	7.2	0.075789	7.578947	1227.117597	0.253033	206.2007
730	190.5	7.3	0.076842	7.684211	1228.516819	0.253365	206.2365
740	190.75	7.4	0.077895	7.789474	1229.919235	0.253698	206.2717
750	191	7.5	0.078947	7.894737	1231.324857	0.25403	206.3062
760	191.25	7.6	0.08	8	1232.733696	0.254363	206.3402
770	191.5	7.7	0.081053	8.105263	1234.145762	0.254695	206.3735
780	191.75	7.8	0.082105	8.210526	1235.561067	0.255028	206.4062
790	192	7.9	0.083158	8.315789	1236.979621	0.25536	206.4383
800	192	8	0.084211	8.421053	1238.401437	0.25536	206.2013
810	192	8.1	0.085263	8.526316	1239.826525	0.25536	205.9643
820	192	8.2	0.086316	8.631579	1241.254896	0.25536	205.7273
830	191	8.3	0.087368	8.736842	1242.686563	0.25403	204.42
840	190	8.4	0.088421	8.842105	1244.121536	0.2527	203.1152
850	188	8.5	0.089474	8.947368	1245.559827	0.25004	200.7451
860	185	8.6	0.090526	9.052632	1247.001447	0.24605	197.3133

c. H/D = 2.5

Deformation Dial Reading	Load Dial Reading	Sample Deformation ΔL (mm)	strain (ε)	% Strain	Corrected Area, A' (mm2)	Load (kN)	Stress (kPa)
0	0	0	0	0	1134.115	0	0
10	10	0.1	0.001053	0.105263	1135.310063	0.0133	11.71486
20	40	0.2	0.002105	0.210526	1136.507648	0.0532	46.81007
30	45	0.3	0.003158	0.315789	1137.707761	0.05985	52.60578
40	54	0.4	0.004211	0.421053	1138.910412	0.07182	63.06027
50	58	0.5	0.005263	0.526316	1140.115608	0.07714	67.65981
60	64	0.6	0.006316	0.631579	1141.323358	0.08512	74.58009
70	68	0.7	0.007368	0.736842	1142.533669	0.09044	79.1574
80	72	0.8	0.008421	0.842105	1143.74655	0.09576	83.72484
90	77	0.9	0.009474	0.947368	1144.962009	0.10241	89.44402
100	80	1	0.010526	1.052632	1146.180053	0.1064	92.83009
110	84	1.1	0.011579	1.157895	1147.400692	0.11172	97.3679
120	87	1.2	0.012632	1.263158	1148.623934	0.11571	100.7379

130	90	1.3	0.013684	1.368421	1149.849787	0.1197	104.1006
140	93	1.4	0.014737	1.473684	1151.078259	0.12369	107.4558
150	95	1.5	0.015789	1.578947	1152.309358	0.12635	109.6494
160	99	1.6	0.016842	1.684211	1153.543094	0.13167	114.144
170	102	1.7	0.017895	1.789474	1154.779475	0.13566	117.477
180	105	1.8	0.018947	1.894737	1156.018509	0.13965	120.8026
190	107	1.9	0.02	2	1157.260204	0.14231	122.9715
200	110	2	0.021053	2.105263	1158.50457	0.1463	126.2835
210	113	2.1	0.022105	2.210526	1159.751615	0.15029	129.5881
220	115	2.2	0.023158	2.315789	1161.001347	0.15295	131.7397
230	117	2.3	0.024211	2.421053	1162.253776	0.15561	133.8864
240	119	2.4	0.025263	2.526316	1163.508909	0.15827	136.0282
250	122	2.5	0.026316	2.631579	1164.766757	0.16226	139.3069
260	124	2.6	0.027368	2.736842	1166.027327	0.16492	141.4375
270	126	2.7	0.028421	2.842105	1167.290628	0.16758	143.5632
280	128	2.8	0.029474	2.947368	1168.55667	0.17024	145.684
290	130	2.9	0.030526	3.052632	1169.825461	0.1729	147.7998
300	131	3	0.031579	3.157895	1171.097011	0.17423	148.775
310	133	3.1	0.032632	3.263158	1172.371328	0.17689	150.8822
320	135	3.2	0.033684	3.368421	1173.64842	0.17955	152.9845
330	137	3.3	0.034737	3.473684	1174.928299	0.18221	155.0818
340	139	3.4	0.035789	3.578947	1176.210972	0.18487	157.1742
350	140	3.5	0.036842	3.684211	1177.496448	0.1862	158.1321
360	141	3.6	0.037895	3.789474	1178.784737	0.18753	159.0876
370	142	3.7	0.038947	3.894737	1180.075849	0.18886	160.0406
380	144	3.8	0.04	4	1181.369792	0.19152	162.1169
390	145	3.9	0.041053	4.105263	1182.666575	0.19285	163.0637
400	146	4	0.042105	4.210526	1183.966209	0.19418	164.0081
410	147	4.1	0.043158	4.315789	1185.268702	0.19551	164.9499
420	148	4.2	0.044211	4.421053	1186.574064	0.19684	165.8893
430	149	4.3	0.045263	4.526316	1187.882304	0.19817	166.8263
440	150	4.4	0.046316	4.631579	1189.193433	0.1995	167.7608
450	151	4.5	0.047368	4.736842	1190.507459	0.20083	168.6928
460	152	4.6	0.048421	4.842105	1191.824392	0.20216	169.6223
470	153	4.7	0.049474	4.947368	1193.144241	0.20349	170.5494
480	154	4.8	0.050526	5.052632	1194.467018	0.20482	171.474
490	155	4.9	0.051579	5.157895	1195.79273	0.20615	172.3961
500	156	5	0.052632	5.263158	1197.121389	0.20748	173.3158
510	157	5.1	0.053684	5.368421	1198.453003	0.20881	174.2329
520	158	5.2	0.054737	5.473684	1199.787584	0.21014	175.1477
530	160	5.3	0.055789	5.578947	1201.125139	0.2128	177.1672
540	162	5.4	0.056842	5.684211	1202.465681	0.21546	179.1818
550	163.5	5.5	0.057895	5.789474	1203.809218	0.217455	180.6391
560	165	5.6	0.058947	5.894737	1205.155761	0.21945	182.0926

570	166.5	5.7	0.06	6	1206.505319	0.221445	183.5425
580	167	5.8	0.061053	6.105263	1207.857904	0.22211	183.8875
590	168	5.9	0.062105	6.210526	1209.213524	0.22344	184.7813
600	169	6	0.063158	6.315789	1210.572191	0.22477	185.6725
610	170	6.1	0.064211	6.421053	1211.933915	0.2261	186.5613
620	171	6.2	0.065263	6.526316	1213.298705	0.22743	187.4477
630	172	6.3	0.066316	6.631579	1214.666573	0.22876	188.3315
640	172.5	6.4	0.067368	6.736842	1216.037528	0.229425	188.6661
650	173	6.5	0.068421	6.842105	1217.411582	0.23009	188.9994
660	173.5	6.6	0.069474	6.947368	1218.788744	0.230755	189.3314
670	173.5	6.7	0.070526	7.052632	1220.169026	0.230755	189.1172
680	174	6.8	0.071579	7.157895	1221.552438	0.23142	189.4475
690	174.5	6.9	0.072632	7.263158	1222.93899	0.232085	189.7764
700	175	7	0.073684	7.368421	1224.328693	0.23275	190.1042
710	176	7.1	0.074737	7.473684	1225.721559	0.23408	190.9732
720	177	7.2	0.075789	7.578947	1227.117597	0.23541	191.8398
730	178	7.3	0.076842	7.684211	1228.516819	0.23674	192.7039
740	179	7.4	0.077895	7.789474	1229.919235	0.23807	193.5656
750	180	7.5	0.078947	7.894737	1231.324857	0.2394	194.4247
760	181	7.6	0.08	8	1232.733696	0.24073	195.2814
770	181.5	7.7	0.081053	8.105263	1234.145762	0.241395	195.5968
780	182	7.8	0.082105	8.210526	1235.561067	0.24206	195.911
790	183	7.9	0.083158	8.315789	1236.979621	0.24339	196.7615
800	183.5	8	0.084211	8.421053	1238.401437	0.244055	197.0726
810	184	8.1	0.085263	8.526316	1239.826525	0.24472	197.3825
820	184.5	8.2	0.086316	8.631579	1241.254896	0.245385	197.6911
830	184.75	8.3	0.087368	8.736842	1242.686563	0.245718	197.7309
840	184.75	8.4	0.088421	8.842105	1244.121536	0.245718	197.5028
850	184.75	8.5	0.089474	8.947368	1245.559827	0.245718	197.2747
860	184.75	8.6	0.090526	9.052632	1247.001447	0.245718	197.0467
870	184.5	8.7	0.091579	9.157895	1248.446408	0.245385	196.5523
880	184.25	8.8	0.092632	9.263158	1249.894722	0.245053	196.0585
890	184	8.9	0.093684	9.368421	1251.3464	0.24472	195.5654
900	183	9	0.094737	9.473684	1252.801453	0.24339	194.2766



Plot of stress-strain curve for remoulded sample at wet side OMC with different specimen's height

Summary of unconfined compressive strength value of remoulded sample at wet side of OMC with different specimen's height

Depth (m)	H/D	Unconfined Compressive Strength (kPa)
		Sample 1
3	1	259.233
	1.5	253.041
	2	206.438
	2.5	197.731

APPENDIX B

DETAIL CALCULATION OF INDEX PROPERTIES IN TABULAR FORM

B1. Details of Index Properties Calculation in a tabular form

B1.1 Computation of specific gravity

Sample location	Addis Ababa, Bethel site
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D 854 - 98
Date Tested	08 /4/2016

a. 1.5m depth

Description	**Test Trials**	
	1	2
Pycnometer Bottle Number	A6	B7
Weight Empty Pycnometer, Wp (g)	47.4	44.6
Weight of Pycnometer and Dry Soil, W1 (g)	72.4	69.6
Weight of Pycnometer ,Soil and Water, W2 (g)	162.6	158.9
Weight of Pycnometer Full Water, W3 (g)	146.9	143.3
Weight of Dry Soil, Ws = W1 - Wp (g)	25	25
Weight of Equal Volume of Displaced Water, Ww = (W1-Wp) - (W2-W3)	9.3	9.4
Tx, Suspension Temperatue, 0C	25.7	25.7
correction factor value, K	0.9987	0.9987
Specific Gravity, Gs = Ws/Ww	2.68	2.66
Average Specific Gravity , Gs	2.67	

b. 3m depth

Description	Test Trials	
	1	2
Pycnometer Bottle Number	9A	MR
Weight Empty pycnometer, Wp (g)	43.3	48.9
Weight of Pycnometer and Dry Soil, W1 (g)	68.3	73.9
Weight of Pycnometer ,Soil and Water, W2 (g)	158.8	164.4
Weight of Pycnometer Full Water, W3 (g)	142.9	148.5
Weight of Dry Soil, Ws = W1 - Wp (g)	25	25
Weight of Equal Volume of Displaced Water, Ww = (W1-Wp) - (W2-W3)	9.1	9.1
Tx, Suspension Temperatue, 0C	25.8	25.8
correction factor value, K	0.9987	0.9987
Specific Gravity, Gs = Ws/Ww	2.74	2.74
Average Specific Gravity , Gs	2.74	

B1.2 Grain size analysis computation

Sample location	Addis Ababa, Bethel site @ 1.5m Depth
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D 4318 - 98
Date Tested	16/4/2016

Wet sieve analysis

Total Weight of sample = 500 gm

Seine No.	Sieve Size mm	Mass Retained (gm)	% Retained	% Cumulative Retained	% passing
4	4.75	0	0	0	100
10	2	0.4	0.08	0.08	99.92
20	0.85	0.5	0.1	0.18	99.82
40	0.425	2	0.4	0.58	99.42
60	0.25	4.5	0.9	1.48	98.52
100	0.15	5.7	1.14	2.62	97.38
200	0.075	6.2	1.24	3.86	96.14
pan	pan	480.7	96.14	100	0
Total		500	100		

Hydrometer analysis

Specific gravity = 2.67

Elapsed Time (min)	Actual Hydrometer Reading	Composite Correction	Corrected Hydrometer Reading	Effective Depth (cm)	Coefficient K	Grain Size (mm)	Percent Finer (%)	Percent Finer Combined (%)	Test Temp., deg.c
0.5	1.0333	-0.0029	1.0304	7.49	0.01374	0.0532	97.21	0.00	19
1	1.0331	-0.0029	1.0302	7.54	0.01374	0.0377	96.57	92.84	19
2	1.0325	-0.0029	1.0296	7.70	0.01374	0.0270	94.65	91.00	19
4	1.0310	-0.0029	1.0281	8.10	0.01374	0.0196	89.85	86.38	19
8	1.0298	-0.0029	1.0269	8.42	0.01374	0.0141	86.02	82.70	19
15	1.0290	-0.0029	1.0261	8.63	0.01374	0.0104	83.46	80.24	19
30	1.0273	-0.0029	1.0244	9.08	0.01374	0.0076	78.02	75.01	19
60	1.0260	-0.0029	1.0231	9.42	0.01374	0.0054	73.86	71.01	19
120	1.0246	-0.0029	1.0217	9.79	0.01374	0.0039	69.39	66.71	19
240	1.0232	-0.0027	1.0205	10.16	0.01357	0.0028	65.55	63.02	20
480	1.0220	-0.00236	1.0196	10.48	0.01329	0.0020	62.80	60.38	21.7
1440	1.0205	-0.00248	1.0180	10.88	0.01338	0.0012	57.62	55.40	21.1

Sample location	Addis Ababa, Bethel site @ 3m Depth
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D 4318 - 98
Date Tested	16/4/2016

Hydrometer Analysis

Specific Gravity, G_s = 2.74

Elapsed Time (min)	Actual Hydrometer Reading	Composite Correction	Corrected Hydrometer Reading	Effective Depth (cm)	Coefficient K	Grain Size (mm)	Percent Finer (%)	Percent Finer Combined (%)	Test Temp, deg.c
0.5	1.0330	-0.0029	1.0301	7.57	0.01346	0.0524	94.80	89.34	19
1	1.0325	-0.0029	1.0296	7.70	0.01346	0.0374	93.22	87.85	19
2	1.0314	-0.0029	1.0285	7.99	0.01346	0.0269	89.76	84.59	19
4	1.0305	-0.0029	1.0276	8.23	0.01346	0.0193	86.92	81.92	19
8	1.0290	-0.0029	1.0261	8.63	0.01346	0.0140	82.20	77.47	19
15	1.0283	-0.0029	1.0254	8.81	0.01346	0.0103	80.00	75.39	19
30	1.0270	-0.0029	1.0241	9.16	0.01346	0.0074	75.90	71.53	19
60	1.0256	-0.0029	1.0227	9.53	0.01346	0.0054	71.49	67.37	19
120	1.0245	-0.0029	1.0216	9.82	0.01346	0.0039	68.03	64.11	19
240	1.0231	-0.0027	1.0204	10.19	0.01329	0.0027	64.25	60.55	20
480	1.0221	-0.00248	1.0196	10.45	0.01302	0.0019	61.79	58.23	21.7
1440	1.0210	-0.00236	1.0186	10.75	0.01311	0.0011	58.71	55.32	21.1

Computation of Atterberg Limits

Sample location	Addis Ababa, Bethel site
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D 4318 - 98

a. Depth 1.5m

Plastic Limit Determination

Description	**Test Trials**	
	1	2
Container No.	142	136
Weight of Container, Wc(gm)	33.6	33.7
Weight of Wet Soil and Container, W1 (g)	47.2	48.1
Weight of Dry Soil and Container, W2 (g)	44.5	45.2
Weight of Water, Ww = W1-W2 (g)	2.7	2.9
Weight of Dry Soil , Ws = W2 - Wc (g)	10.9	11.5
Water Content, w (%) = (Ww/Ws)	24.77	25.22
Average Plastic Limit (%)	24.99	

Liquid Limit Determination

Description	**Test Trials**			
	1	2	3	4
Container No.	106	141	135	178
Number of Blows, N	35	27	21	19
Weight of Container,Wc (gm)	33.1	33.4	33.2	33.6
Weight of Wet Soil and Container, W1 (g)	52.5	52.4	55.5	54.8
Weight of Dry Soil and Container, W2 (g)	45.3	45.3	47.1	46.8
Weight of Water, Ww = W1-W2 (g)	7.2	7.1	8.4	8
Weight of Dry Soil , Ws = W2 - Wc (g)	12.2	11.9	13.9	13.2
Water Content, w (%) = (Ww/Ws)	59.02	59.66	60.43	60.61
From Curve, Liquid Limit (%)	59.91			

b. Depth 3m

Plastic Limit Determination

Description	Test Trials	
	1	2
Container No.	128	101
Weight of Container, Wc (gm)	32.8	32.9
Weight of Wet Soil and Container, W1 (g)	40.4	39.8
Weight of Dry Soil and Container, W2 (g)	38.6	38.1
Weight of Water, Ww = W1-W2 (g)	1.8	1.7
Weight of Dry Soil , Ws = W2 - Wc (g)	5.8	5.2
Water Content, w (%) = (Ww/Ws)	31.03	32.69
Average Plastic Limit (%)	31.86	

Liquid Limit Determination

Description	Test Trials			
	1	2	3	4
Container No.	112	168	147	94
Number of Blows, N	34	28	22	17
Weight of Container, Wc (gm)	32.9	33.7	33.2	34
Weight of Wet Soil and Container, W1 (g)	54.4	52.7	51.1	54.6
Weight of Dry Soil and Container, W2 (g)	45.4	44.7	43.5	45.8
Weight of Water, Ww = W1-W2 (g)	9	8	7.6	8.8
Weight of Dry Soil , Ws = W2 - Wc (g)	12.5	11	10.3	11.8
Water Content, w (%) = (Ww/Ws)	72.00	72.73	73.79	74.58
From Curve, Liquid Limit (%)	73.14			

Free swell test

Sample Depth	cylinder No.	Initial Volume	Final volume	Swell Volume	Free Swell (%)	Average Free swell
1.5	1	10	14.6	4.6	46	44
	2	10	14.2	4.2	42	
3	1	10	14.6	4.6	46	47.5
	2	10	14.9	14.9	49	

APPENDIX C

COMPUTATION OF COMPACTION AND ONE DIMENSIONAL CONSOLIDATION TEST

C1. Compaction test

Sample location	Addis Ababa, Bethel site
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D- 698-91

a. Depth 1.5m

Description	**Test Trials**				
	1	2	3	4	5
Weight of Compacted Soil + Mould (gm)	5850.4	6224.9	6349.7	6232.2	6103.2
Weight of Mould (gm)	4574.4	4574.4	4574.4	4574.4	4574.400
Weight of Compacted Soil (g)	1276	1650.5	1775.3	1657.8	1528.8
Volume of Mould (cm3)	944	944	944	944	944
Bulk Unit Weight of soil (g/cm3)	1.352	1.748	1.881	1.756	1.619
For Moisture Content					
Container No.	92	166	32	98	76
Weight of Container, Wc (gm)	32.6	33.8	33.5	33.5	33.8
Weight of Wet Soil and Container, W1 (g)	169	146.6	136.6	180	195
Weight of Dry Soil and Container, W2 (g)	152.8	126.3	112.5	138.6	145
Weight of Water, Ww = W1-W2 (g)	16.2	20.3	24.1	41.4	50
Weight of Dry Soil , Ws = W2 - Wc (g)	120.2	92.5	79	105.1	111.2
Water Content, w = (Ww/Ws) %	13.478	21.946	30.506	39.391	44.964
Dry Unit Weight of Soil, (g/cc)	1.191	1.434	1.441	1.260	1.117
From Curve, MDD (g/cc)	MDD = 1.47g/cc				
From Curve, OMC (%)	OMC = 26				

b. Depth 3m

Description	Test Trials				
	1	2	3	4	5
Weight of Compacted Soil + Mould (gm)	5974.9	6289.6	6381.6	6337.9	6294.5
Weight of Mould (gm)	4574.4	4574.4	4574.4	4574.4	4574.40
Weight of Compacted Soil (g)	1400.5	1715.2	1807.2	1763.5	1720.1
Volume of Mould (cm3)	944	944	944	944	944
Bulk Unit Weight of soil (g/cm3)	1.484	1.817	1.914	1.868	1.822
For Moisture Content					
Container No.	91	90	124	86	160
Weight of Container, Wc (gm)	32.2	33.8	33.6	32.9	33.8
Weight of Wet Soil and Container, W1 (g)	154.5	146.5	137.3	138.3	142.3
Weight of Dry Soil and Container, W2 (g)	137.4	125.6	116.3	112.4	112.5
Weight of Water, Ww = W1-W2 (g)	17.1	20.9	21	25.9	29.8
Weight of Dry Soil , Ws = W2 - Wc (g)	105.2	91.8	82.7	79.5	78.7
Water Content, w = (Ww/Ws) %	16.255	22.767	25.393	32.579	37.865
Dry Unit Weight of Soil, (g/cc)	1.276	1.480	1.527	1.409	1.322
From Curve, MDD (g/cc)	MDD = 1.53 g/cc				
From Curve, OMC (%)	OMC = 25				

C2. One dimensional consolidation test

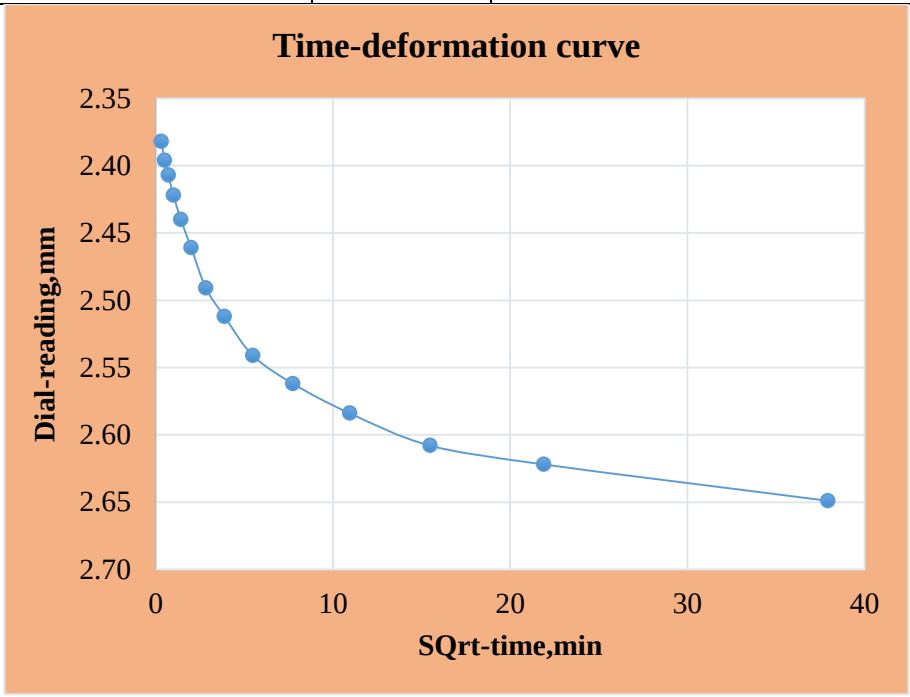
Sample location	Addis Ababa, Bethel site
Sample Description	Red Clay soil
Method of Test Procedures	ASTM D- 698-91

a. 1.5m depth

Load increment: 50 kPa

Elapsed Time (min)	Deformation Dial Reading (mm)
0	2.25
0.1	2.382
0.25	2.396
0.5	2.407
1	2.422
2	2.44
4	2.461
8	2.491
15	2.512
30	2.541
60	2.562
120	2.584
240	2.608
480	2.622
1440	2.649

Initial Height, H_O	20mm
Final height, H_f	19.601mm
Deformation	0.399mm

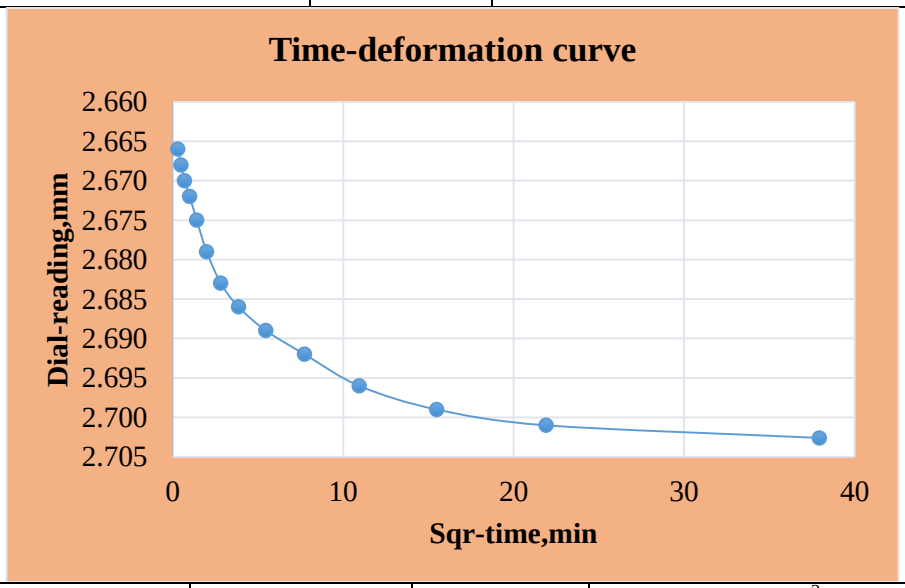


	d_o	=2.39mm	$\sqrt{t_{90}}$=4=16min	T=0.848	$C_V=(0.848* H_{avg}^2)/ t_{90}$
	d_{90}	=2.515mm	H_{avg}=19.8005mm		C_V=0.003463cm^2/sec

Load increment: 100 kPa

Elapsed Time (min)	Deformation Dial Reading (mm)
0	2.649
0.1	2.666
0.25	2.668
0.5	2.671
1	2.674
2	2.677
4	2.68
8	2.683
15	2.686
30	2.689
60	2.692
120	2.695
240	2.698
480	2.701
1440	2.7026

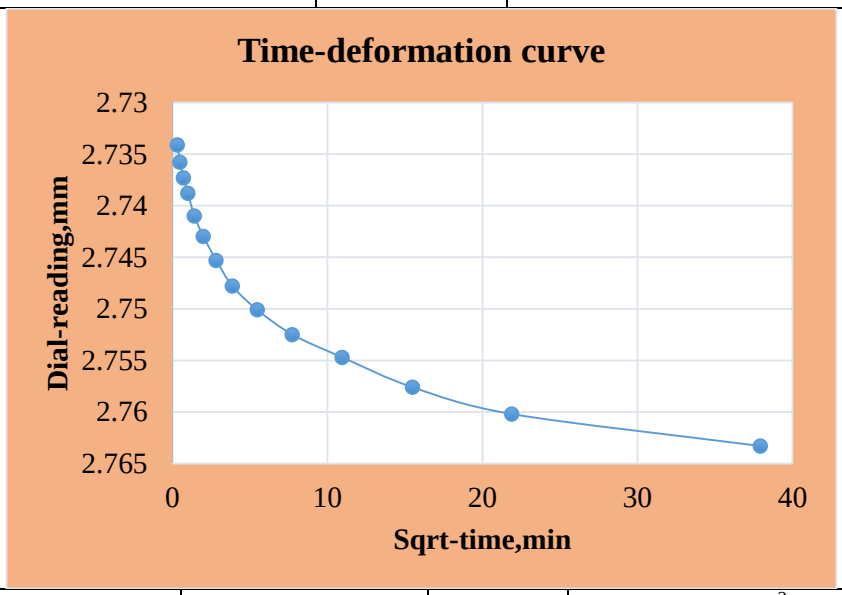
Initial Height, H_O	19.601mm
Final height, H_f	19.5474mm
Deformation	0.0536mm



	d_o	= 2.665mm	$\sqrt{t_{90}}$ = 3.87=15min	T = 0.848	$C_V = (0.848 * H_{avg}^2)/ t_{90}$
	d_{90}	= 2.685mm	H_{avg} = 19.5742mm		C_V=0.003610cm^2/sec

Load increment: 200 kPa

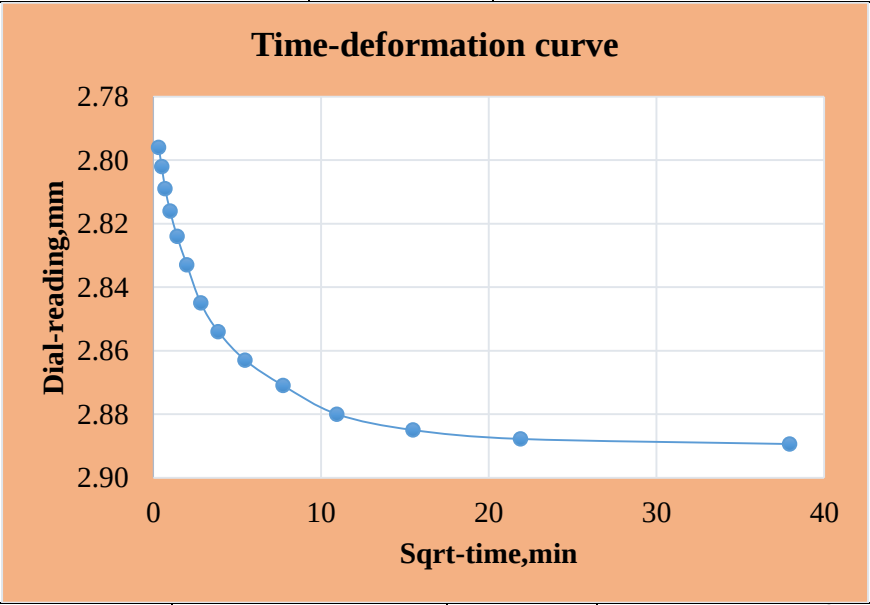
Elapsed Time (min)	Deformation Dial Reading (mm)		
		Initial Height, H_O	19.5474mm
		Final height, H_f	19.4867mm
		Deformation	0.0607mm
0	2.7026		
0.1	2.7341		
0.25	2.7358		
0.5	2.7373		
1	2.7388		
2	2.7412		
4	2.743		
8	2.7453		
15	2.7472		
30	2.7492		
60	2.7519		
120	2.7543		
240	2.7576		
480	2.7602		
1440	2.7633		



	d_o	= 2.736mm	$\sqrt{t_{90}}$=4.6=21.2mi	T=0.848	$C_V=(0.848* H_{avg}^2)/ t_{90}$
	d_{90}	= 2.749mm	H_{avg}= 19.517mm		C_V=0.002544cm^2/sec

Load increment: 400 kPa

Elapsed Time (min)	Deformation Dial Reading (mm)	Initial Height, H_O	19.4867mm	
		Final height, H_f	19.3606mm	
		Deformation	0.1261mm	
0	2.7633			
0.1	2.796			
0.25	2.802			
0.5	2.809			
1	2.816			
2	2.826			
4	2.836			
8	2.847			
15	2.855			
30	2.863			
60	2.871			
120	2.88			
240	2.885			
480	2.8878			
1440	2.8894			

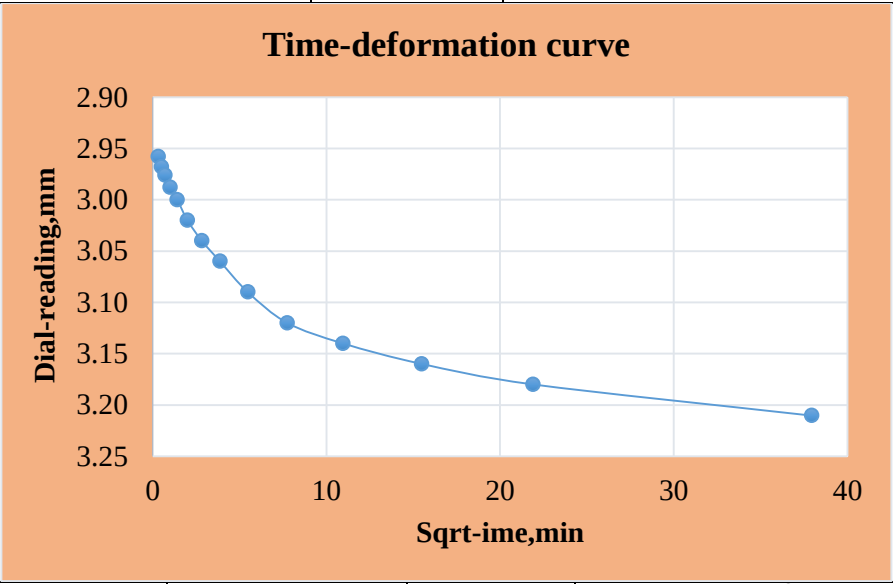


	d_o	= 2.808mm	$\sqrt{t_{90}}$=5.35=28.6min	T=0.848	$C_V=(0.848* H_{avg}^2)/t_{90}$
	d_{90}	= 2.86mm	H_{avg} = 19.4236mm		C_V=0.001863cm^2/sec

Load increment: 800 kPa

Elapsed Time (min)	Deformation Dial Reading (mm)
0	2.8894
0.1	2.958
0.25	2.968
0.5	2.976
1	2.988
2	3.000
4	3.020
8	3.040
15	3.060
30	3.090
60	3.120
120	3.140
240	3.160
480	3.180
1440	3.2104

Initial Height, H_O	19.3606mm
Final height, H_f	19.0396mm
Deformation	0.321mm

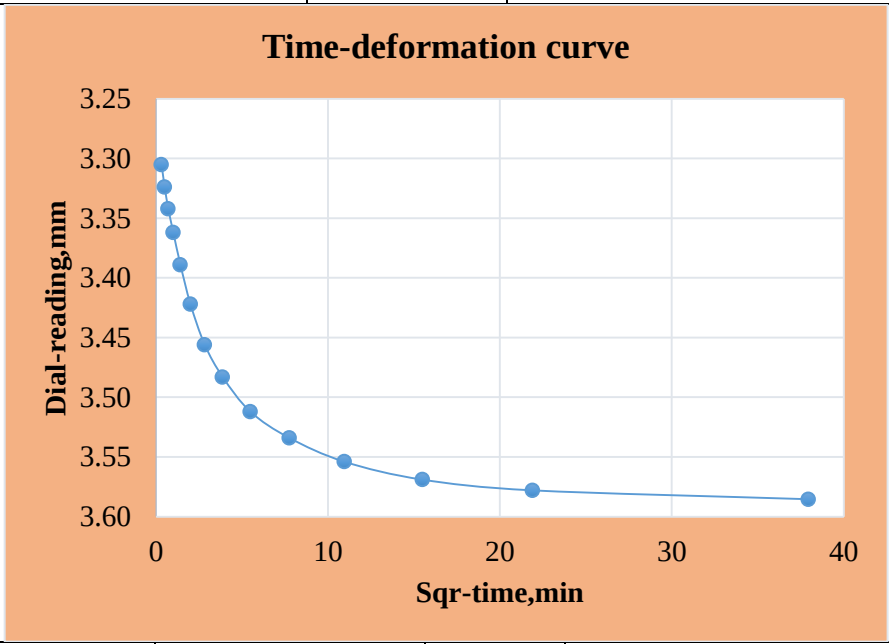


	d_o	=2.96mm	$\sqrt{t_{90}}$=4.3=17.6	T=0.848	$C_V=(0.848* H_{avg}^2)/ t_{90}$
	d_{90}	=3.070mm	H_{avg}=19.2mm		C_V=0.002954cm^2/sec

Load increment: 1600 kPa

Elapsed Time (min)	Deformation Dial Reading (mm)
0	3.2104
0.1	3.305
0.25	3.324
0.5	3.342
1	3.362
2	3.389
4	3.422
8	3.456
15	3.483
30	3.512
60	3.534
120	3.554
240	3.569
480	3.578
1440	3.5854

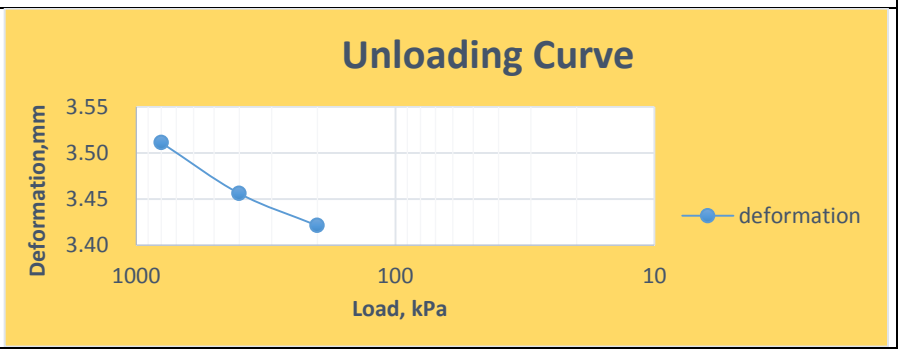
Initial Height, H_O	19.0396mm
Final height, H_f	18.6646mm
Deformation	0.375mm



	d_o	=3.31mm	$\sqrt{t_{90}}$=3.87=15min	T=0.848	C_V=(0.848* H_{avg}^2)/ t_{90}
	d_{90}	=3.48mm	H_{avg}=18.852mm		C_V=0.003348cm^2/sec

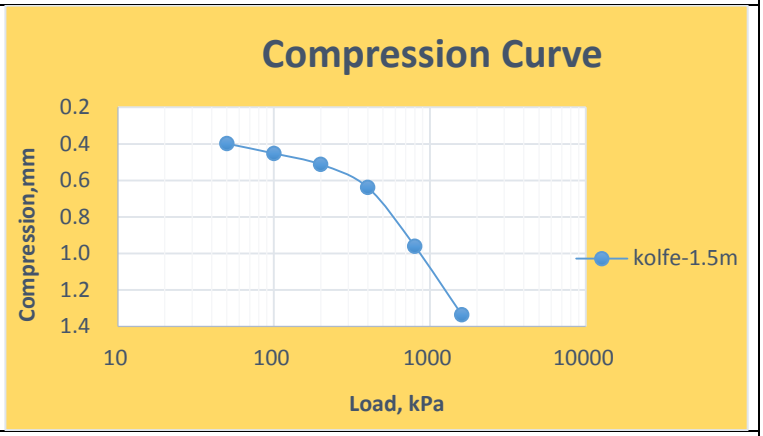
unloading

Load Decrement, kPa	Def. Dial Reading (mm)
800	3.5112
400	3.4561
200	3.4213
100	



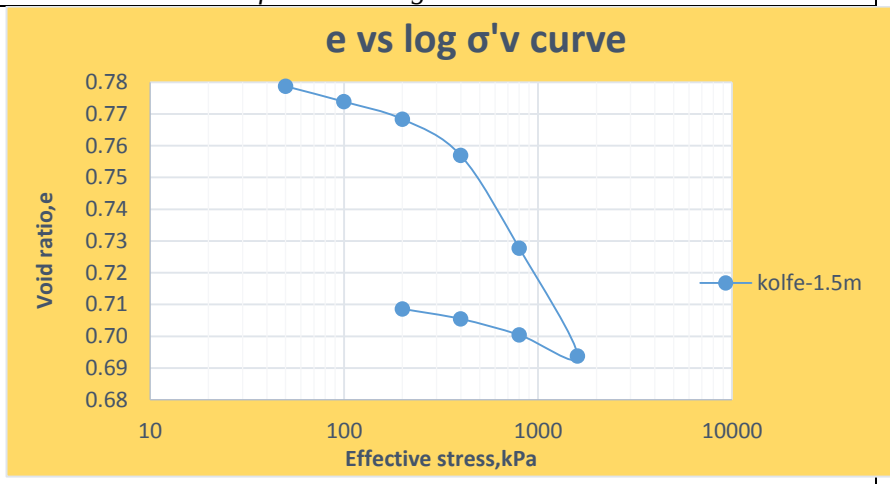
Compression at the end of each loading

Loading, kPa	Deformation, mm	Height of Specimen, mm
50	0.3986	19.601
100	0.4522	19.5478
200	0.5129	19.4871
400	0.639	19.361
800	0.96	19.04
1600	1.3352	18.6648



Void ratio at the end of each loading

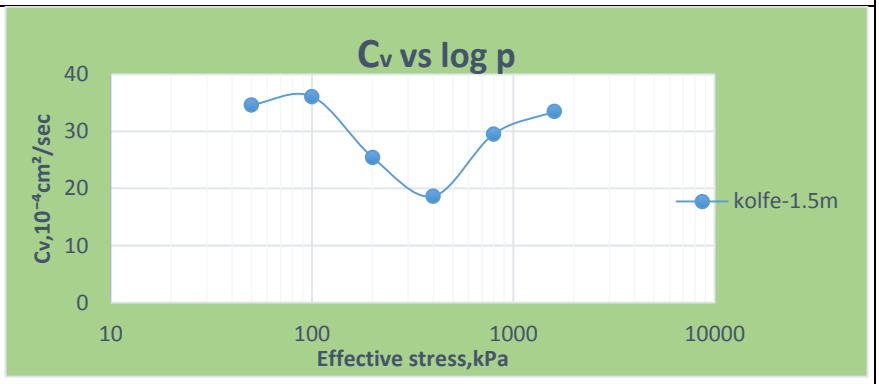
Loading, kPa	Void ratio, e
50	0.778712256
100	0.773847247
200	0.768341032
400	0.756895204
800	0.727760213
1600	0.693719723
800	0.700455563
400	0.705460036
200	0.708621253



$e = (H-H_S)/H_S$	$H_S = H_O/(1+e_O)$	$C_C = (e_1-e_2)/\log(\sigma_2/\sigma_1)$	e_1= 0.756895204	σ_2 = 1600 kPa
		C_C = 0.105	e_2= 0.693719723	σ_1 = 400 kPa

Compression coefficient					
Load, kpa	Void ratio, e	$a_V = (e_1-e_2)/(\sigma_2-\sigma_1)$	$m_V = a_V/(1+e_1)$	C_V (cm2/sec)	Pc, kPa
50	0.7787122	9.73002E-05	5.47026E-05	0.003463	310
100	0.7738472	5.50622E-05	3.10411E-05	0.003610	
200	0.7683410	5.72291E-05	3.23632E-05	0.002544	
400	0.7568952	7.28375E-05	4.14581E-05	0.001863	
800	0.7277602	4.2550E-05	2.46276E-05	0.002954	
1600	0.6937197			0.003348	

Load, kPa	Cv,10^{-4}cm²/sec
50	34.63
100	36.10
200	25.44
400	18.63
800	29.54
1600	33.48



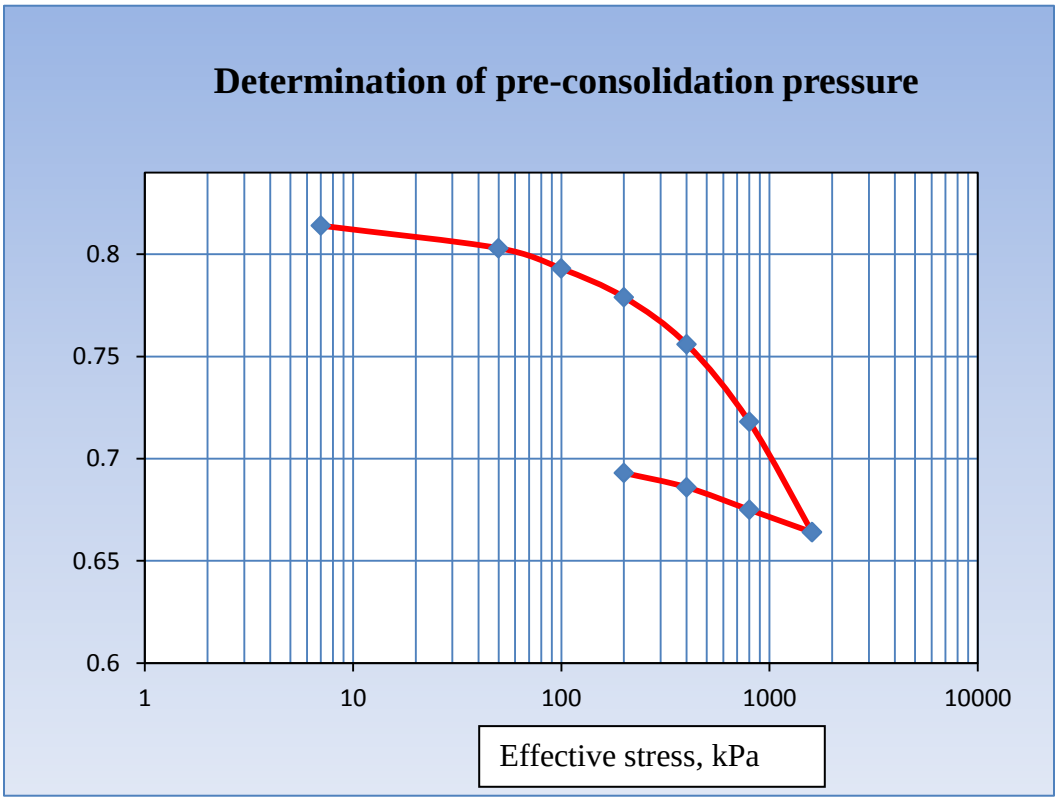
b. 3m depth

Following similar procedures at 1.5m depth, the compression coefficient and the plot of void ratio versus log effective pressure was given below.

Loading , kPa	Cumulative change in height of sample at the end of loading, mm	Void ratio	Cv, m^2 /yr	Mv, m^2/ Min	Ec, MN/m^2
50	0.282	0.816	64.37	0.3643	2.7447
100	0.432	0.801	57.59	0.1693	5.9060
200	0.615	0.782	51.37	0.1042	9.6000
400	0.918	0.751	42.26	0.0871	11.4752
800	1.365	0.705	35.45	0.0654	15.2859
1600	2.065	0.634	26.76	0.0526	19.0114
Cc	0.195	Pc, kPa	380	OCR	8.2

Loading and unloading with void ratio

Load, kPa	7	50	100	200	400	800	1600	1600	800	400
Void ratio, e	0.845	0.816	0.801	0.782	0.751	0.705	0.634	0.634	0.643	0.651



Plot of void ratio versus log effective stress