

FINAL REPORT

SRINK-SWELL SOIL TEST

on

NIPPO-KADII JO PROJECT

Location

Kawasan Industri Surya Cipta
Kerawarang- Jawa Barat

FEBRUARY-MARCH 2016

Jakarta , 10March 2016
Ref.No: 029/FR/SST/NK/III/2016

To. Mr. Masayoshi Yamaguchi
NIPPO- KADII (Joint Operation)
J. Raya Kosambi Curug Km.2 Welahar,
Klari-Kerawang 41371
Jawa Barat

First of all we thank you for the trust that has been given to us to do the job "Srink-Swell Soil Testing" based on Purchasing Order which we have received Ref No. NKJO / 012/2016, dated February 12, 2016.

Here We will provide *final report* results of the work that we have done, such as making 9 samples in the field (which represents from 3-point testing sites) to complete the testing in the laboratory.

The methodologies and procedures that we have done in accordance with the technical documents that have been agreed previously, which is a requirement procedure when we received a purchasing order of NIPPO-KADII JO.

We are very glad if there are things that need to be discussed regarding the results of the test and do not hesitate to contact us.

Regards

Senior Geotechnical Engineer



Ir. Idrus Muhammad Alatas M.Sc
REG LPJK : .2..216.1.031.09.1002930

I. INTRODUCTION

In connection with the purchasing order that we have received from NIPPO-KADII JO Ref No. NKJO / 012/2016 dated 12 february 2016, we will report the final reports of the work that has been carried out according the procedure that we have received.

We will report the work of laboratory testing for swelling and shrinkage due to wetting drying process from nine undisturb samples representing for three different locations on the same project. Methodologies and testing procedures we do in accordance with the procedure that we received from NIPPO-KADII JO.

Field undisturbed soil sampling we have conducted on February 24, 2016, to do a "test pit" with a depth that has been determined by NIPPO-KADII JO. At the base of the pit Test level we taken three undisturbed samples into a Ring Test. Each sample is taken to do the weighing sample and the measurement sample to determine the index properties such as initial moisture content, bulk density. The undisturbed soil samples for further testing "swelling and shringkage" using oedometer cell.

The behavior of the soil due to the drying process (unsoaked) will shrinkage, and wetting process (soaked) will swelling. Three samples representing the same location, was observed a vertical soil deformation due to three different loading variations (10 kN/m², 20 kN/m² and 30 kN/ m²) on the conditions and circumstances unsoaked and soaked contion.

From observations carried out during the 18 days, has carried out three drying-wetting cycles. The end result of this test is a graph of changes in soil vertical deformation (shringkage and swelling) due to unsoaked process and soaked process for days of observation.

II. LITERATURE REVIEW

Many previous studies have researched specifically on 'Behaviour shrinkage and development' of an expansive soil. Research in the field on shrinkage and swelling behavior change for 7 years has been done by Fityus S.G et al (Fityus S.G, 2004). This study measures the continuous contraction and expansion during the summer and winter season for 7 years. Shrinkage of ground level to occur in the summer, while the swelling occurs in the winter season. Shrinkage and swelling behavior change can be seen in Figure 1

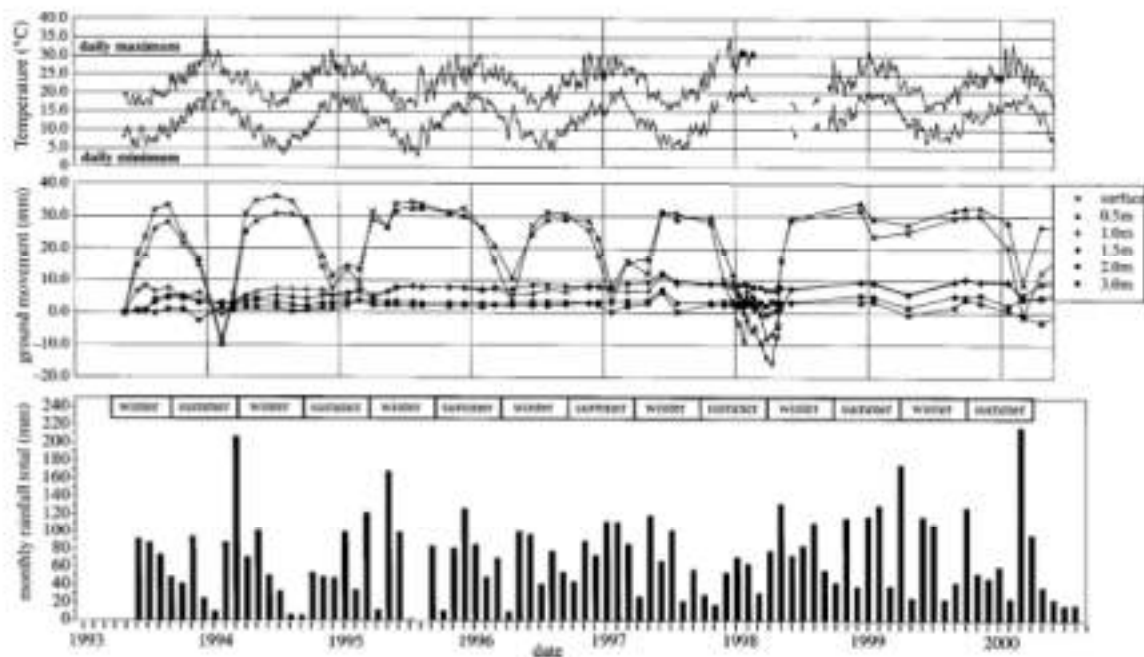


Fig. 4. Comparison of local daily temperature, rainfall, and ground movement at Maryland field site

Figure 1 Comparison of local temperature, rainfall, and ground movement at Maryland field site (Fityus S.G, 2004)

Robert W Day (1994) has conducted research on compacted clay to changes in shrinkage and swellingnya for 40 days with 10 cycles. In this study carried out with 3 variations of samples, no curing, curing 4 days and 21 days curing. Shrinkage of showed decreases with increasing number of cycles that occur. But the swelling will show increases with the number of cycles that occur. Relationship of 10 cycles of drying-wetting the clay compacted against shrinkage and swelling can be seen in Figure 2

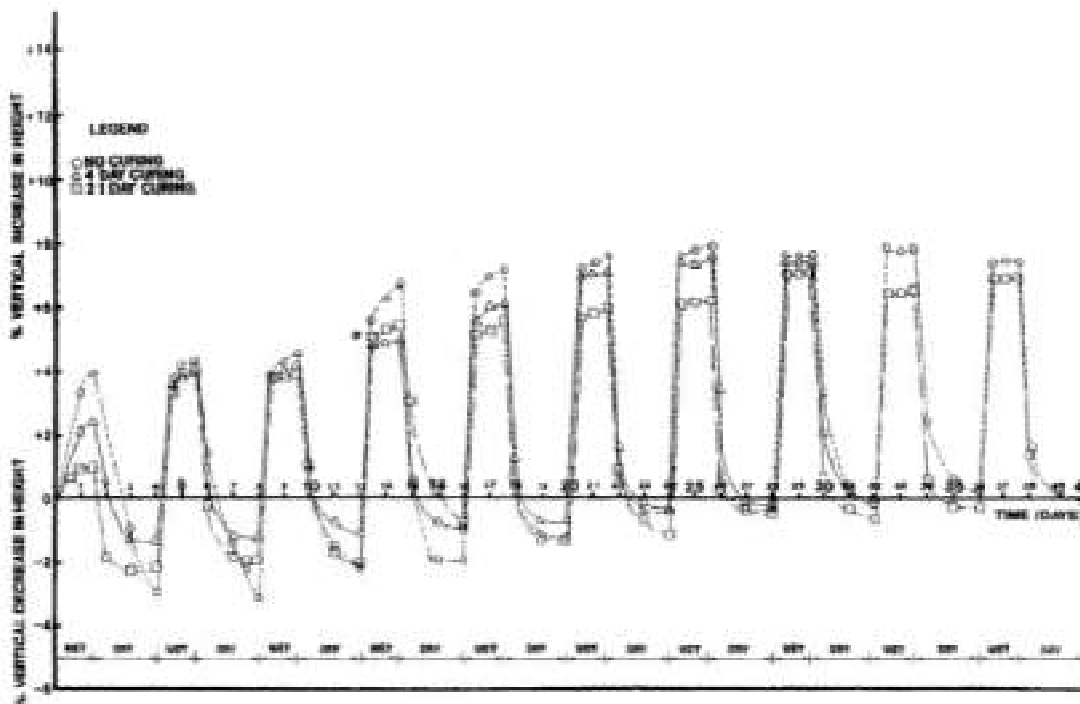


FIG. 1. Vertical Swell or Shrinkage versus Time

Figure 2 Vertical Swell and Shrinkage versus Time (day) (Robert W.D, 1994)

III. METHODES AND LABORATORY PROCEDURE

3.1 OEDOMETER CELL

Equipment used to measure changes in shrinkage and swelling on the soil sample is given variations in pressure of 10 , 20 and 30 kN/m² is Oedometer Cell. Oedometer cell loading completely on the system illustrated in Figure 3 below. In the laboratory used 9 oedometer with a complete load frame as in Figure 4. Weights are given specially made so that the resulting pressure on the oedometer cell for 10, 20 and 30 kN/m². Oedotemer cell we use in accordance with ASTM D24345-04.

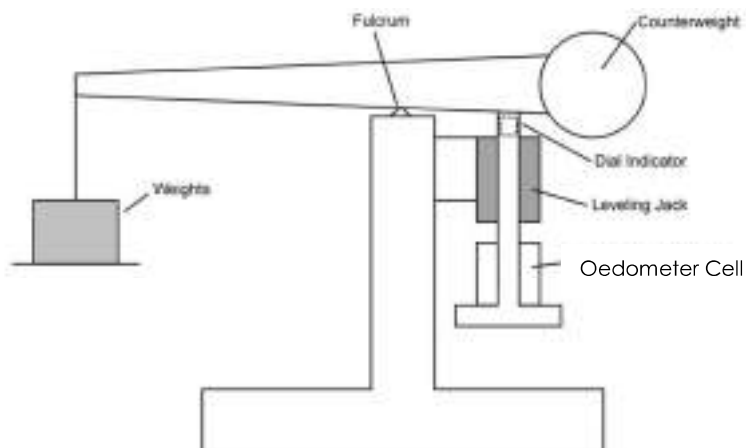


Figure 3. Incremental Loading frame schematic developed by Bishop



Figure 4 Oedometer Cell

3.2 LABORATORY TEST PROCEDURE



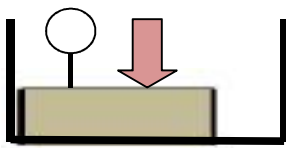
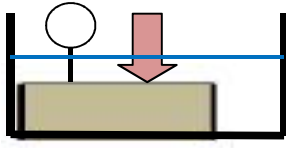
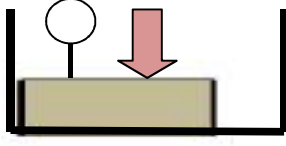
In this study, laboratory testing procedure is based on a case study on road works are planned to test car. Over burden pressure that work on unsoaked and soaked sample has been calculated based on embankment load of soil tested. Field Embankment load in the form of a layer of lime tone and structural pavement construction.

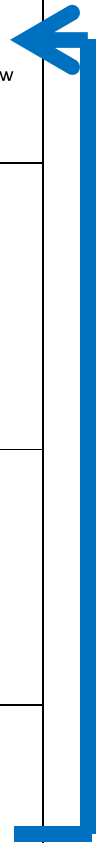
The procedure for testing the shrinkage-swelling test in accordance with the wishes of NIPPO-KADII JO and agreed to be a reference to testing in the laboratory. Schematic Procedure as described Table 1 below.

Index properties of soil sample was tested based on standards from American Standard for Testing Materials (ASTM). Types of index properties tests conducted on soil samples consisted of:

1. Soil moisture content (ASTM D 2216-80, 1989)
2. Bulk density (ASTM D 653-88, 1989)
3. Specific gravity (ASTM D 854-83, 1989)
4. Atterberg limits (ASTM D 4318-84, 1989)
5. Grained size distribution (ASTM D 422-72, 1989)
6. Soil classification (ASTM D 2487-85, 1989)

Tabel 1 Procedure testing for Shrinkage and Swelling Laboratory Testing (NIPPO-KADII - JO, 2016)

No	Illustration	Description	Data Collection
1		Preparation 9 samples	<ul style="list-style-type: none"> - Weight of ring - Weight of ring and soil sample - Weight of soil (Ws) - Natural water content (wn) - Weight of dry soil (Wd) - Before start the below test , it is necessary to check time and weight that original moisture content come to 25% keep inside of oven temperature at 40° C.(Graph of Time-moisture contents)
2		<ol style="list-style-type: none"> 1. Take all sample in out side room up to half day 2. Take all sample in dry oven with temperature of 40° C, and must be controlled every hours until the sample has to be 25% 	Find Weight of dry soil (Ws) at w=25%, $W_s = W_d (1+0.25)$ Ws = weight of soil at wn=25% Control Form of Weight of Soil (Ws) every hour up to $W_s=W_d(1+0.25)$ Check settlement level (how much mm down)
3		<ol style="list-style-type: none"> 1. Install dial indicator and various of pressure loading to measure vertical deformation of soil due to pressure of 10 kN/m², 20 kN/m² and 30 kN/m² in dry condition. 2. The measurement of deformation will be stopped until constant deformation (up to 2 ~ 3days) 	Form Data Collection : For dial reading and times
4		<ol style="list-style-type: none"> 1. All sample were saturated with fill full water in odometer cell. 2. Immediately recorded of dial indicator every times (hour) up to 3 days 3. The dial measurement will be stopped until has no deformation 	Form Data Collection : For dial reading and times
5		<ol style="list-style-type: none"> 1. Remove all water out of cell, and make it (cell) dry condition. 2. Release the pressure 3. Uninstall the sample and ring from odometer cell, and repeat the step no. 2 until 5 (3 cycles) 	



IV

Laboratory Results

4.1 Index Properties



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LABORATORY TESTING RESULTS

Project	SWELLING TEST	TES PIT	Location 1			
Location	SURYA CIPTA	Checked By	Singgih S.			
ITEM OF TEST	PARAMETER	Unit	Ring 7	Ring 8	Ring 9	Average
INDEX PROPERTIES						
	Water Content (Wn)	%	39.198	37.080	38.141	38.140
	Unit Weight of Soil (γ)	gr/cm ³	1.551	1.562	1.546	1.553
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1.114	1.139	1.119	1.124
	Specific Gravity	-	2.404	2.404	2.404	2.404
	Void Ratio (e)	-	1.158	1.110	1.148	1.138
	Porosity (n)	-	0.537	0.534	0.534	0.535
	Degree of Saturation (Sr)	%	81.408	80.326	79.866	80.533
	Liquid Limit (LL)	%	107.550			
	Plastic Limit (PL)	%	25.392			
	Plastisity Index (PI)	%	82.158			
GRAINED SIZE DISTRIBUTION						
	Gravel	%	0.00			
	Sand	%	22.07			
	Silt	%	64.93			
	Clay	%	13.00			
	Organic Matter	%	-			
SHEAR STRENGTH PARAMETER						
	Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-	
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Sensitivity (St)	-	-	-	-	
	Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-	
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-	
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-	
COMPRESSIBILITY						
	Praconsolidation Pressure (Pc)	Kg/cm ²	-	-	-	
	Compression Index (Cc)	-	-	-	-	
	Coef. Of Consolidation (Cv)	Cm ² /sec	- X10 ⁻³			
	Rebound Index (Cr)	-	-	-	-	



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LABORATORY TESTING RESULTS

Project	SWELLING TEST	TES PIT	Location 2			
Location	SURYA CIPTA	Checked By	Singgih S.			
ITEM OF TEST	PARAMETER	Unit	Ring 4	Ring 5	Ring 6	Average
INDEX PROPERTIES						
	Water Content (Wn)	%	44.342	45.773	45.075	45.063
	Unit Weight of Soil (γ)	gr/cm ³	1.494	1.477	1.422	1.464
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1.035	1.013	0.980	1.009
	Specific Gravity	-	2.378	2.378	2.378	2.378
	Void Ratio (e)	-	1.297	1.347	1.426	1.357
	Porosity (n)	-	0.565	0.574	0.588	0.575
	Degree of Saturation (Sr)	%	81.270	80.811	75.164	79.081
	Liquid Limit (LL)	%	81.610			
	Plastic Limit (PL)	%	24.194			
	Plastisity Index (PI)	%	57.416			
GRAINED SIZE DISTRIBUTION						
	Gravel	%	0.00			
	Sand	%	19.85			
	Silt	%	65.65			
	Clay	%	14.50			
	Organic Matter	%	-			
SHEAR STRENGTH PARAMETER						
	Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-	
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Sensitivity (St)	-	-	-	-	
	Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-	
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-	
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-	
COMPRESSIBILITY						
	Praconsolidation Pressure (Pc)	Kg/cm ²	-	-	-	
	Compression Index (Cc)	-	-	-	-	
	Coef. Of Consolidation (Cv)	Cm ² /sec	-	-	-	
	Rebound Index (Cr)	-	-	-	-	



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LABORATORY TESTING RESULTS

Project	SWELLING TEST	TES PIT	Location 3			
Location	SURYA CIPTA	Checked By	Singgih S.			
ITEM OF TEST	PARAMETER	Unit	Ring 1	Ring 2	Ring 3	Average
INDEX PROPERTIES						
	Water Content (Wn)	%	31.770	29.282	30.548	30.533
	Unit Weight of Soil (γ)	gr/cm ³	1.729	1.727	1.732	1.729
	Unit Weight of Dry Soil (γ_d)	gr/cm ³	1.312	1.336	1.327	1.325
	Specific Gravity	-	2.436	2.436	2.436	2.436
	Void Ratio (e)	-	0.856	0.823	0.836	0.838
	Porosity (n)	-	0.461	0.452	0.455	0.456
	Degree of Saturation (Sr)	%	90.376	86.632	89.021	88.676
	Liquid Limit (LL)	%	104.650			
	Plastic Limit (PL)	%	24.494			
	Plastisity Index (PI)	%	80.156			
GRAINED SIZE DISTRIBUTION						
	Gravel	%	0.00			
	Sand	%	22.07			
	Silt	%	65.93			
	Clay	%	13.00			
	Organic Matter	%	-			
SHEAR STRENGTH PARAMETER						
	Unconfined Compression Test					
	Ultimate Axial Strength (qu)	Kg/cm ²	-	-	-	
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Sensitivity (St)	-	-	-	-	
	Direct Shear Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial UU Test					
	Cohesion Undrained (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction (ϕ)	Degree	-	-	-	
	Triaxial CU Test					
	Cohesion Undrained Total (Cu)	Kg/cm ²	-	-	-	
	Angle of Internal Friction Total (ϕ)	Degree	-	-	-	
	Cohesion Undrained Eff. (Cu')	Kg/cm ²	-	-	-	
	Angle of Internal Friction Eff. (ϕ')	Degree	-	-	-	
COMPRESSIBILITY						
	Praconsolidation Pressure (Pc)	Kg/cm ²	-	-	-	
	Compression Index (Cc)	-	-	-	-	
	Coef. Of Consolidation (Cv)	Cm ² /sec	- X10 ⁻³			
	Rebound Index (Cr)	-	-	-	-	



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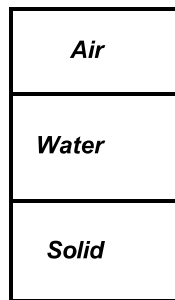
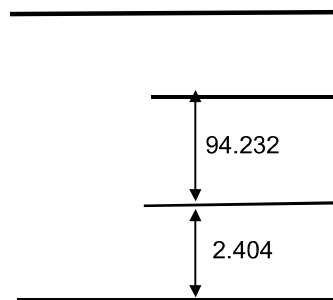
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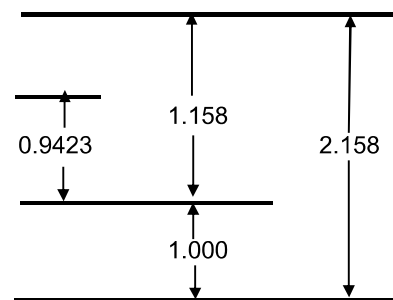
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 1 Ring No:7	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.551
Water Content of Sample (%)	39.198
Specific Gravity of Soil Sample	2.404
Unit Weight of Water (γ _w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1.651

Void Ratio (e)	1.158
Porosity (n)	0.537
Dry Unit Weight (γ _d)	1.114
Degree of Saturation (S _r)	81.408



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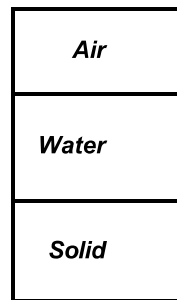
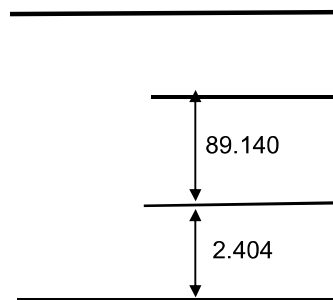
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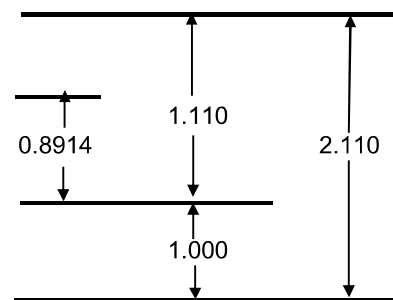
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT		TESTED BY
TEST PIT NO	Location 1 Ring No:8	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.562
Water Content of Sample (%)	37.080
Specific Gravity of Soil Sample	2.404
Unit Weight of Water (γ _w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1.665

Void Ratio (e)	1.110
Porosity (n)	0.526
Dry Unit Weight (γ _d)	1.139
Degree of Saturation (S _r)	80.326



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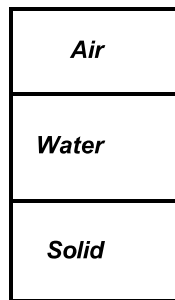
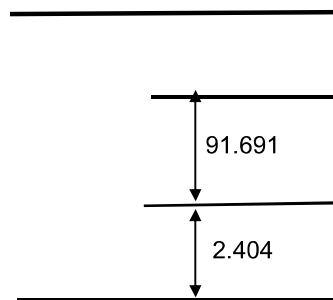
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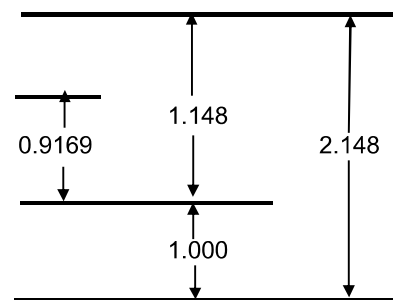
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT		TESTED BY
TEST PIT NO	Location 1 Ring No:9	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.546
Water Content of Sample (%)	38.141
Specific Gravity of Soil Sample	2.404
Unit Weight of Water (γ _w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1.654

Void Ratio (e)	1.148
Porosity (n)	0.534
Dry Unit Weight (γ _d)	1.119
Degree of Saturation (S _r)	79.866



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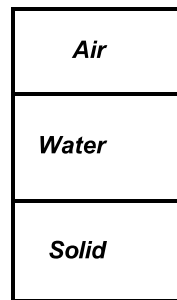
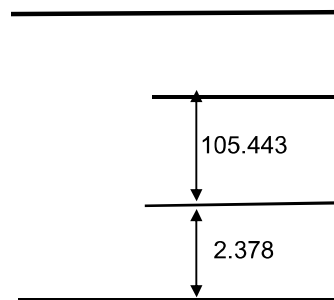
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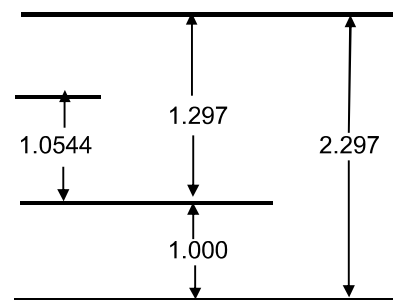
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 2 Ring No:4	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.494
Water Content of Sample (%)	44.342
Specific Gravity of Soil Sample	2.378
Unit Weight of Water (γ_w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ_{sat} , in grm/cm ³)	1.600

Void Ratio (e)	1.297
Porosity (n)	0.565
Dry Unit Weight (γ_d)	1.035
Degree of Saturation (Sr)	81.270



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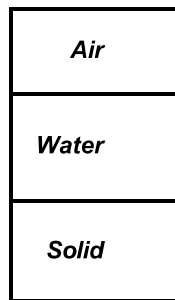
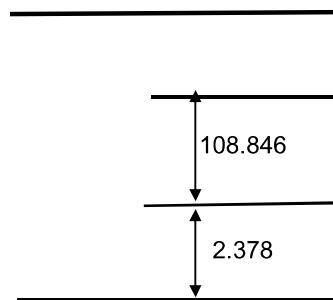
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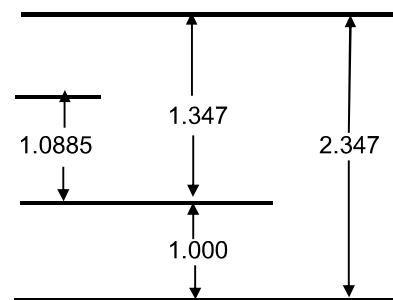
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 2 Ring No:5	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.477
Water Content of Sample (%)	45.773
Specific Gravity of Soil Sample	2.378
Unit Weight of Water (γ_w , in gr/cm ³)	1.000
Saturated Unit Weight of Soil (γ_{sat} , in gr/cm ³)	1.587

Void Ratio (e)	1.347
Porosity (n)	0.574
Dry Unit Weight (γ_d)	1.013
Degree of Saturation (Sr)	80.811



LABORATORIUM MEKANIKA TANAH

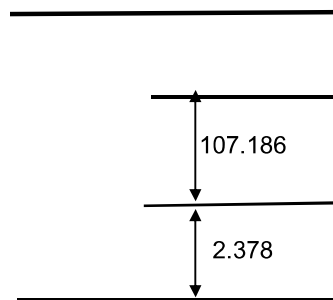
INSTITUT SAINS DAN TEKNOLOGI NASIONAL

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
 TELPON. 021 98189554 FAX . 021 78893379

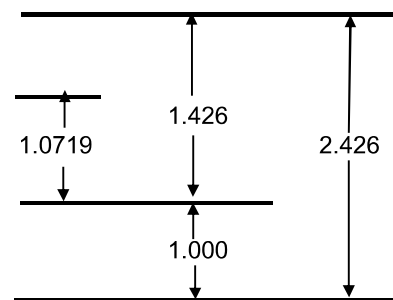
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 2 Ring No:6	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.422
Water Content of Sample (%)	45.075
Specific Gravity of Soil Sample	2.378
Unit Weight of Water (γ_w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ_{sat} , in grm/cm ³)	1.568

Void Ratio (e)	1.426
Porosity (n)	0.588
Dry Unit Weight (γ_d)	0.980
Degree of Saturation (Sr)	75.164



LABORATORIUM MEKANIKA TANAH

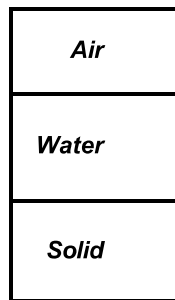
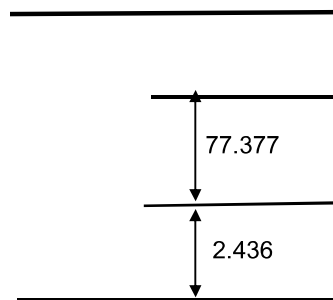
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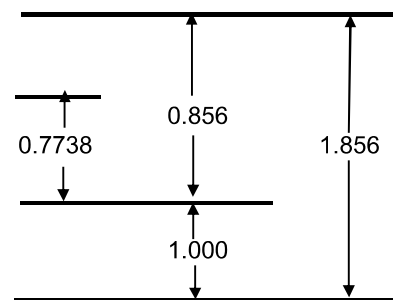
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil Unit Weight of Soil Specific Gravity of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 3 Ring No:1	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.729
Water Content of Sample (%)	31.770
Specific Gravity of Soil Sample	2.436
Unit Weight of Water (γ_w , in gr/cm ³)	1.000
Saturated Unit Weight of Soil (γ_{sat} , in gr/cm ³)	1.773

Void Ratio (e)	0.856
Porosity (n)	0.461
Dry Unit Weight (γ_d)	1.312
Degree of Saturation (Sr)	90.376



LABORATORIUM MEKANIKA TANAH

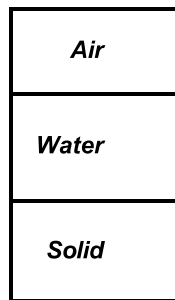
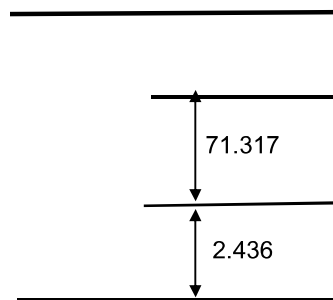
INSTITUT SAINS DAN TEKNOLOGI NASIONAL

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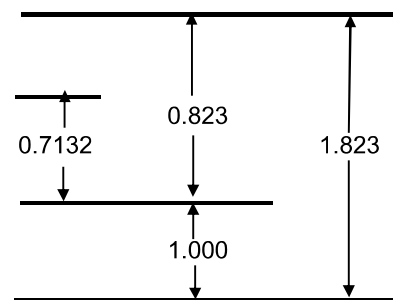
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT		TESTED BY
TEST PIT NO	Location 3 Ring No:2	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.727
Water Content of Sample (%)	29.282
Specific Gravity of Soil Sample	2.436
Unit Weight of Water (γ_w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ_{sat} , in grm/cm ³)	1.787

Void Ratio (e)	0.823
Porosity (n)	0.452
Dry Unit Weight (γ_d)	1.336
Degree of Saturation (Sr)	86.632



LABORATORIUM MEKANIKA TANAH

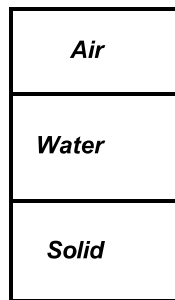
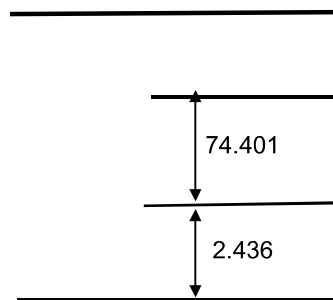
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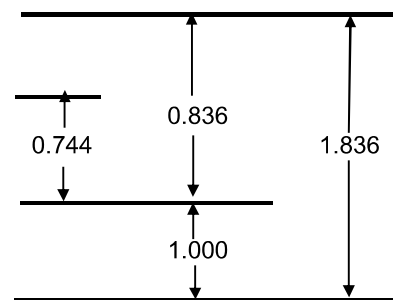
INDEX PROPERTIES TEST

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Water Content of Soil
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT		TESTED BY
TEST PIT NO	Location 3 Ring No:3	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

Weight



Volume



Unit Weight of Sample (in gr/cm ³)	1.732
Water Content of Sample (%)	30.548
Specific Gravity of Soil Sample	2.436
Unit Weight of Water (γ _w , in grm/cm ³)	1.000
Saturated Unit Weight of Soil (γ _{sat} , in grm/cm ³)	1.782

Void Ratio (e)	0.836
Porosity (n)	0.455
Dry Unit Weight (γ _d)	1.327
Degree of Saturation (S _r)	89.021



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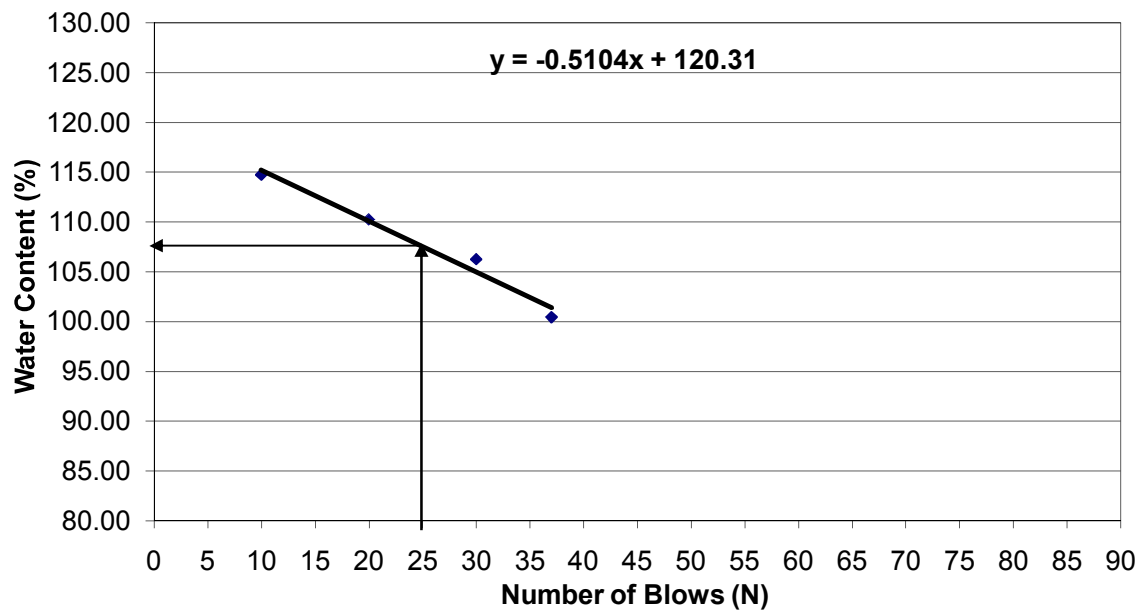
ATTERBERG LIMIT

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 1	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	9.87	28.69	19.26	37	100.43	1	11.995	12.995	12.7925	25.39
2	9.87	28.35	18.83	30	106.25	LIQUID LIMIT , LL (%)			107.55	
3	7.98	29.89	18.4	20	110.27	PLASTIC LIMIT , PL (%)			25.39	
4	9.87	28.92	18.74	10	114.77	PLASTICITY INDEX , PI , (%)			82.16	





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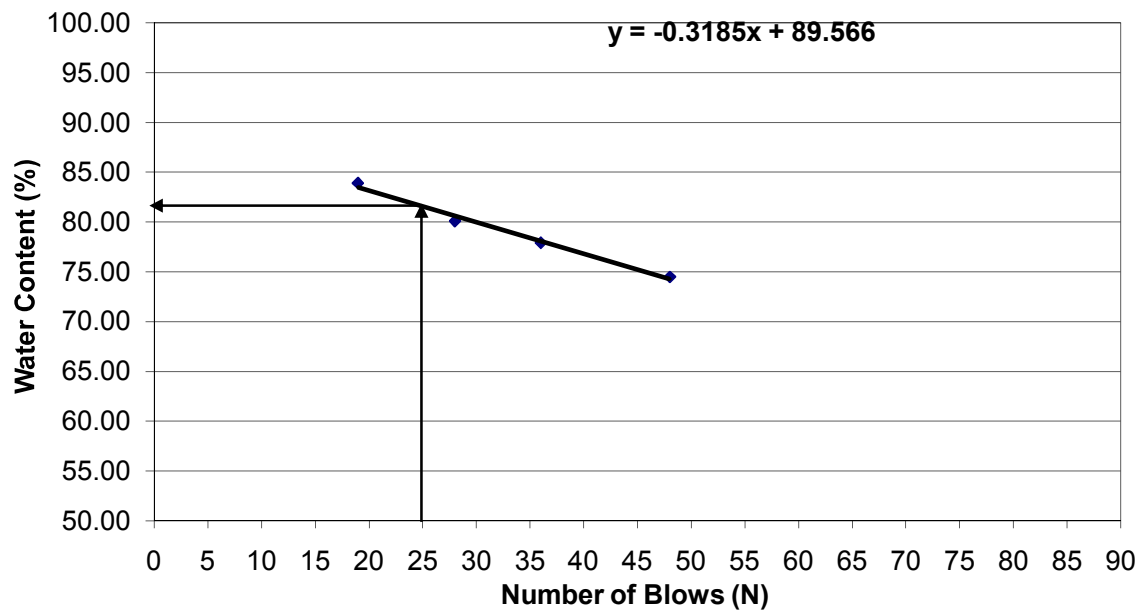
ATTERBERG LIMIT

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 2	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	9.78	31.02	21.95	48	74.53	1	12.33	13.2925	13.105	24.19
2	9.93	32.44	22.58	36	77.94	LIQUID LIMIT , LL (%)			81.61	
3	9.95	32.61	22.53	28	80.13	PLASTIC LIMIT , PL (%)			24.19	
4	9.75	32.65	22.2	19	83.94	PLASTICITY INDEX , PI , (%)			57.42	





LABORATORIUM MEKANIKA TANAH

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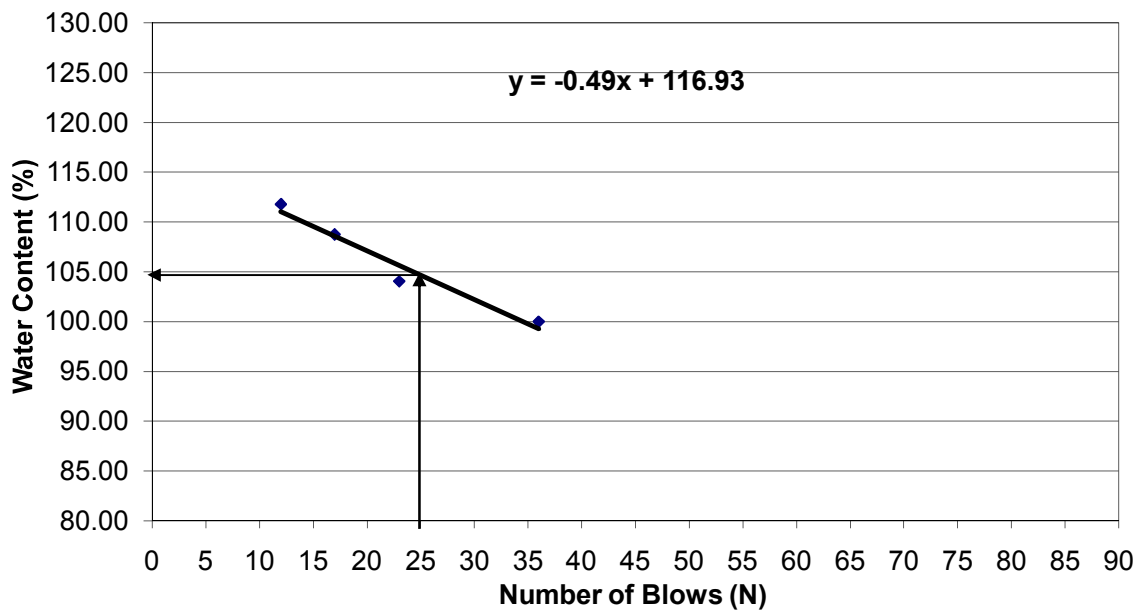
ATTERBERG LIMIT

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	Liquid Limit Plastic Limit Plasticity Index
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 3	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

LIQUID LIMIT

PLASTIC LIMIT

No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	No of BLOW	Water Content (%)	No Of Can	Weight of Can	Weight of Can & Wet Soil	Weight of Can & Dry Soil	Water Content (%)
1	8.13	29.41	18.77	36	100.00	1	11.87	13.255	12.9825	24.49
2	8.04	27.67	17.66	23	104.05	LIQUID LIMIT , LL (%)			104.65	
3	8.07	28.55	17.88	17	108.77	PLASTIC LIMIT , PL (%)			24.49	
4	9.81	31.35	19.98	12	111.80	PLASTICITY INDEX , PI , (%)			80.16	





LABORATORIUM MEKANIKA TANAH

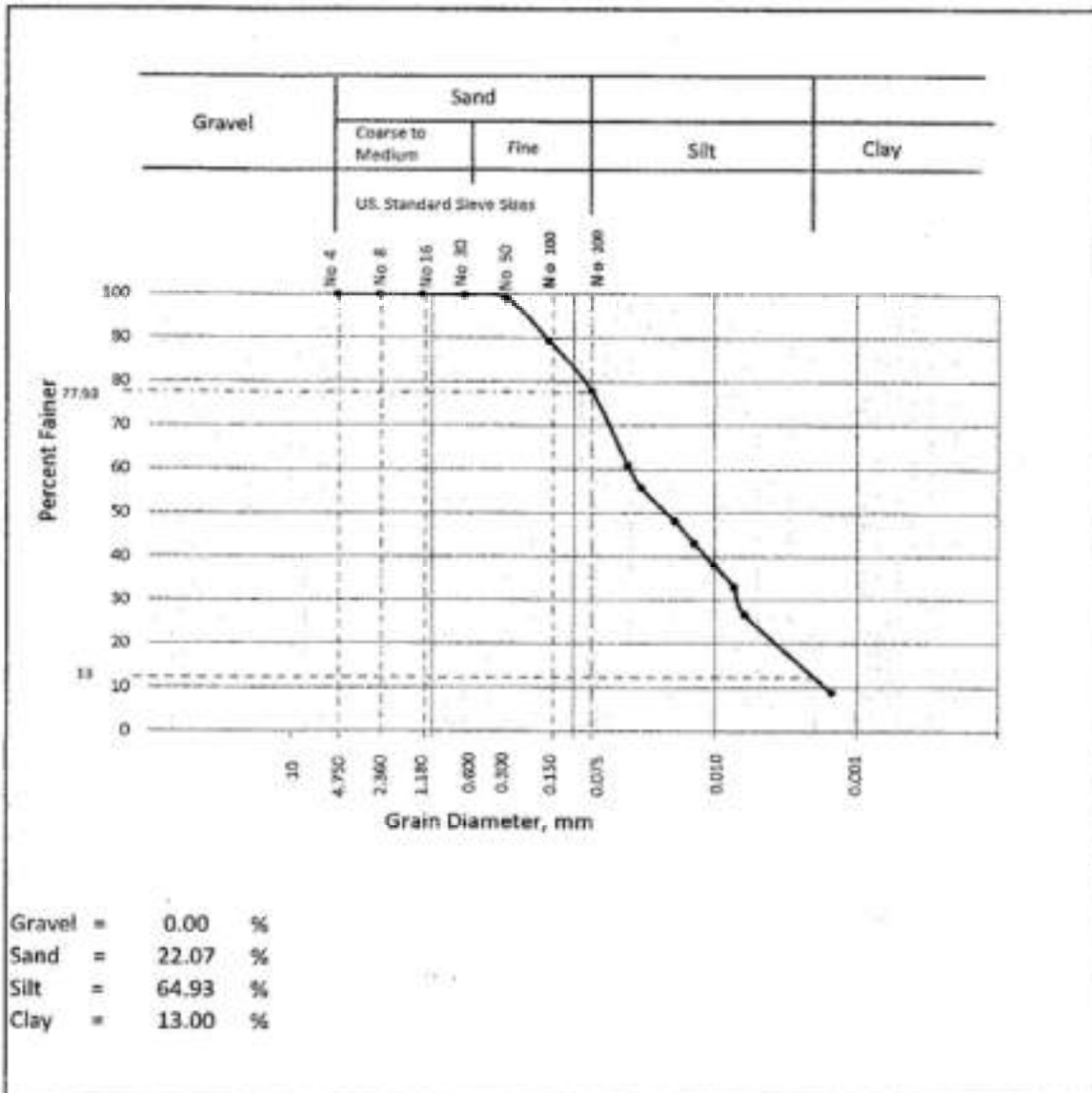
INSTITUT SAINS DAN TEKNOLOGI NASIONAL

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12840

TELPON. 021 98189554

GRAIN SIZE DISTRIBUTION

Project : Sircuit
 Location : Karawang
 Sample : Sample 3 / Lokasi 1
 Date Of Testing : Februari 2016





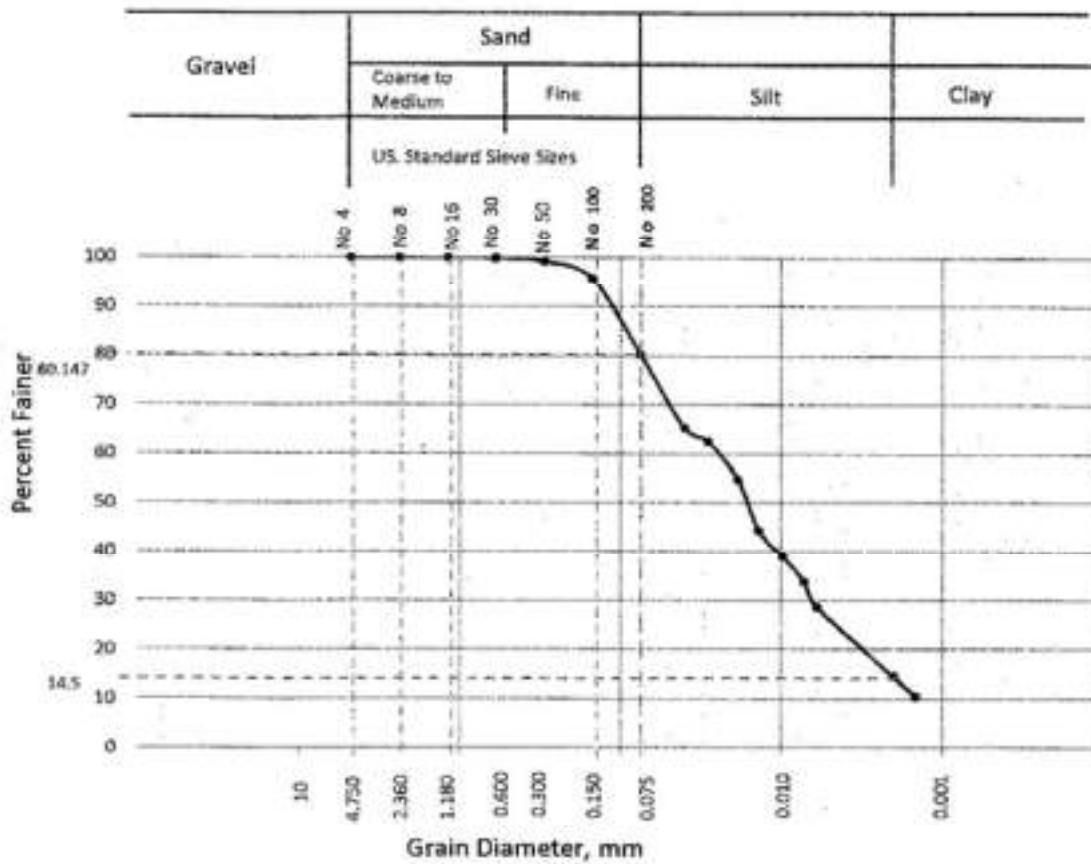
LABORATORIUM MEKANIKA TANAH

INSTITUT SAINS DAN TEKNOLOGI NASIONAL

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHLI 2 JAGAKARSA - JAKARTA 12540
 TELPON. 021 98189554

GRAIN SIZE DISTRIBUTION

Project : Circuit
 Location : Karawang
 Sample : Sample 2 / Lokasi 2
 Date Of Testing : Februari 2016



Gravel = 0.00 %
 Sand = 19.85 %
 Silt = 65.65 %
 Clay = 14.50 %



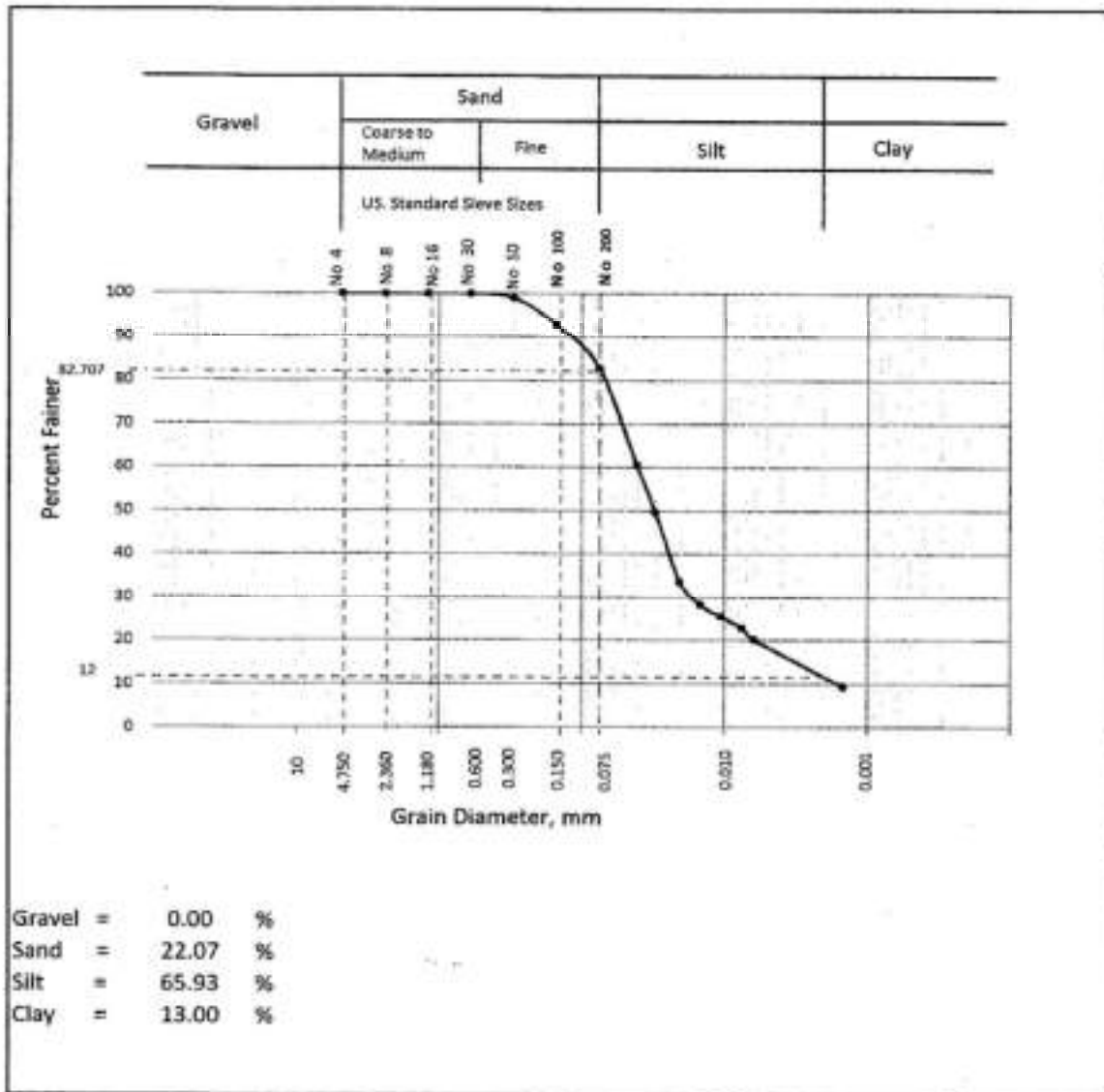
LABORATORIUM MEKANIKA TANAH

INSTITUT SAINS DAN TEKNOLOGI NASIONAL

KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA 12640
 TELPON. 021 98189554

GRAIN SIZE DISTRIBUTION

Project : Sircuit
 Location : Karawang
 Sample : Sample 1 / Lokasi 3
 Date Of Testing : Februari 2016



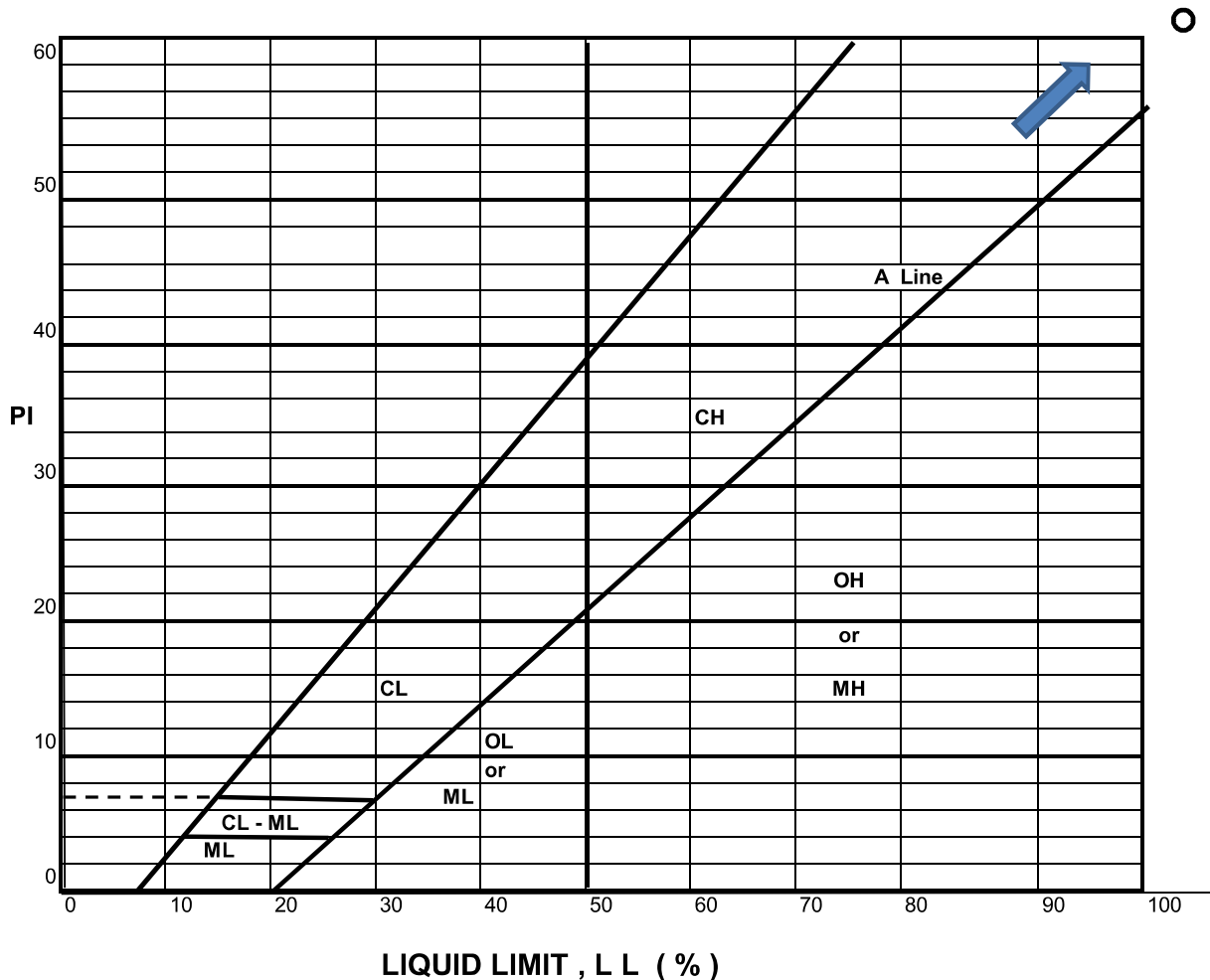


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KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA – JAKARTA 12640
TELPON. 021 98189554 FAX . 021 78893379

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT	Location 1	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

PLASTICITY CHART



SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

CH

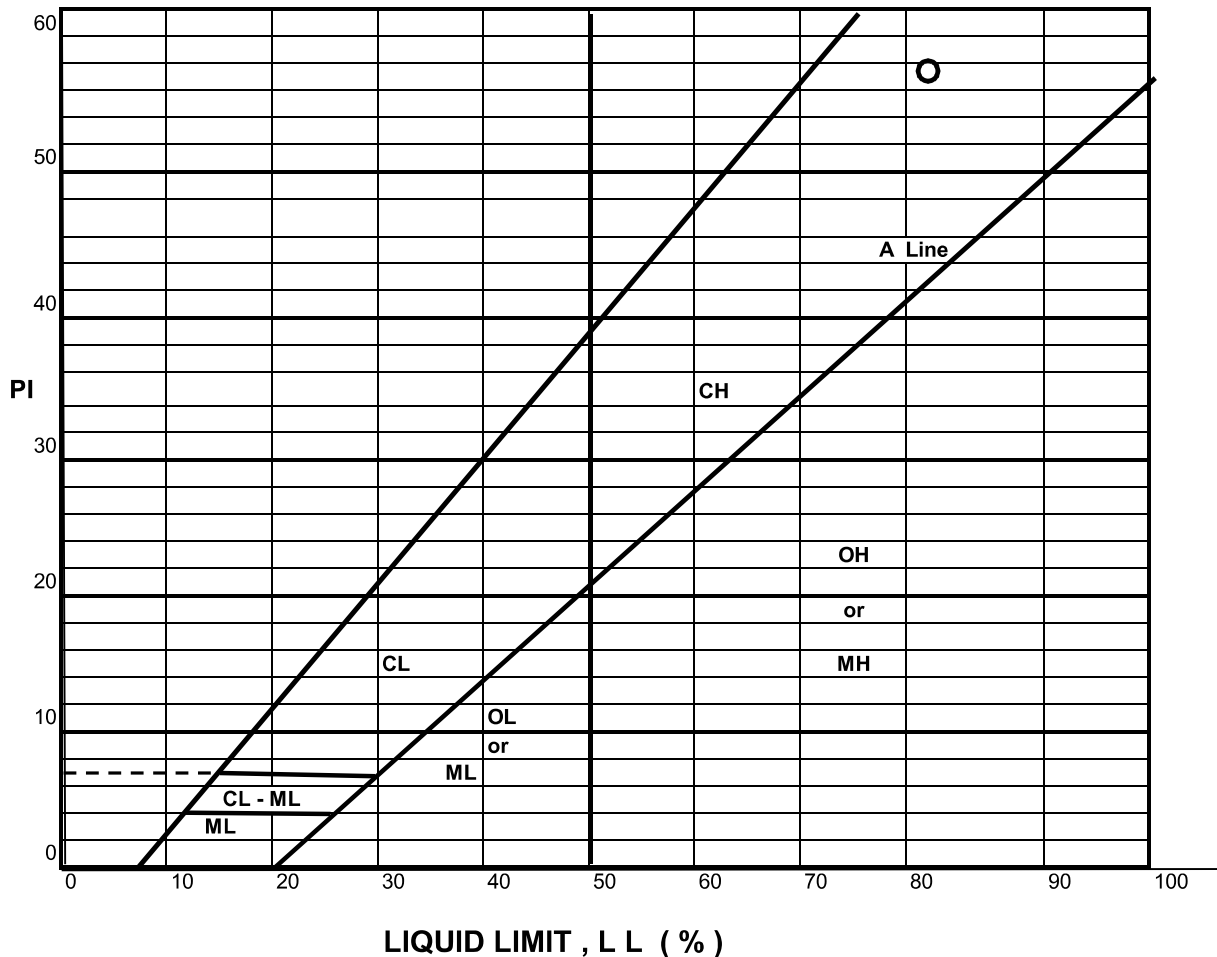


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KAMPUS ISTN BHUMI SRENGSENG INDAH JALAN MOCH KAHFI 2 JAGAKARSA - JAKARTA

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 2	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

PLASTICITY CHART



SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

CH

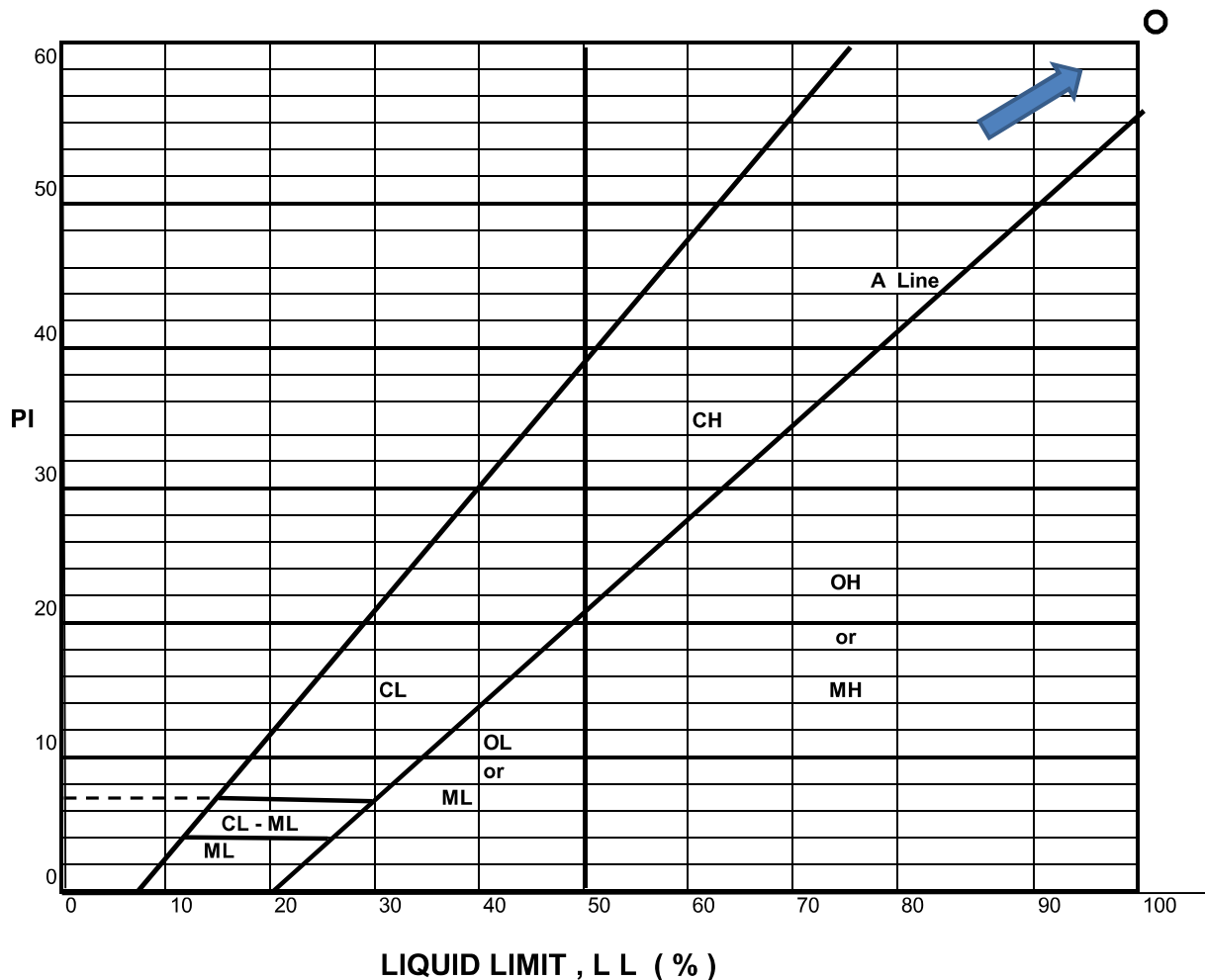


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TELPON. 021 98189554 FAX . 021 78893379

PROJECT	SWELLING TEST NIPPO-KADII JO Project	A.S.T.M STANDARD FOR	SOIL CLASSIFICATION by U.S.C.S
LOCATION	SURYA CIPTA KERAWANG JAWA BARAT	TESTED BY	Herman
TEST PIT NO	Location 3	CHECKED BY	Singgih S.
DEPTH	m	DATE OF TESTED	March 2016

PLASTICITY CHART



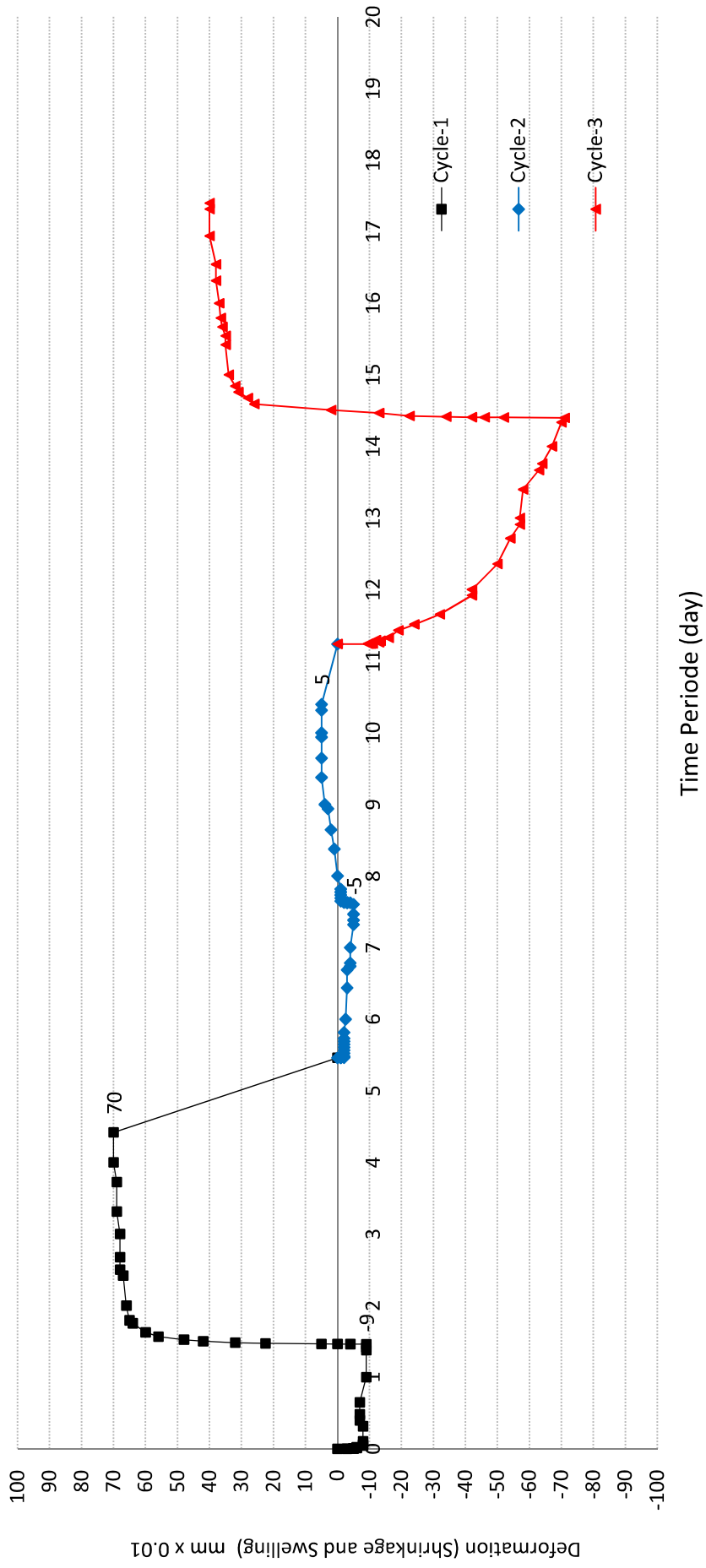
SOIL CLASSIFICATION USING UNIFIED SOIL CLASSIFICATION SYSTEM

CH

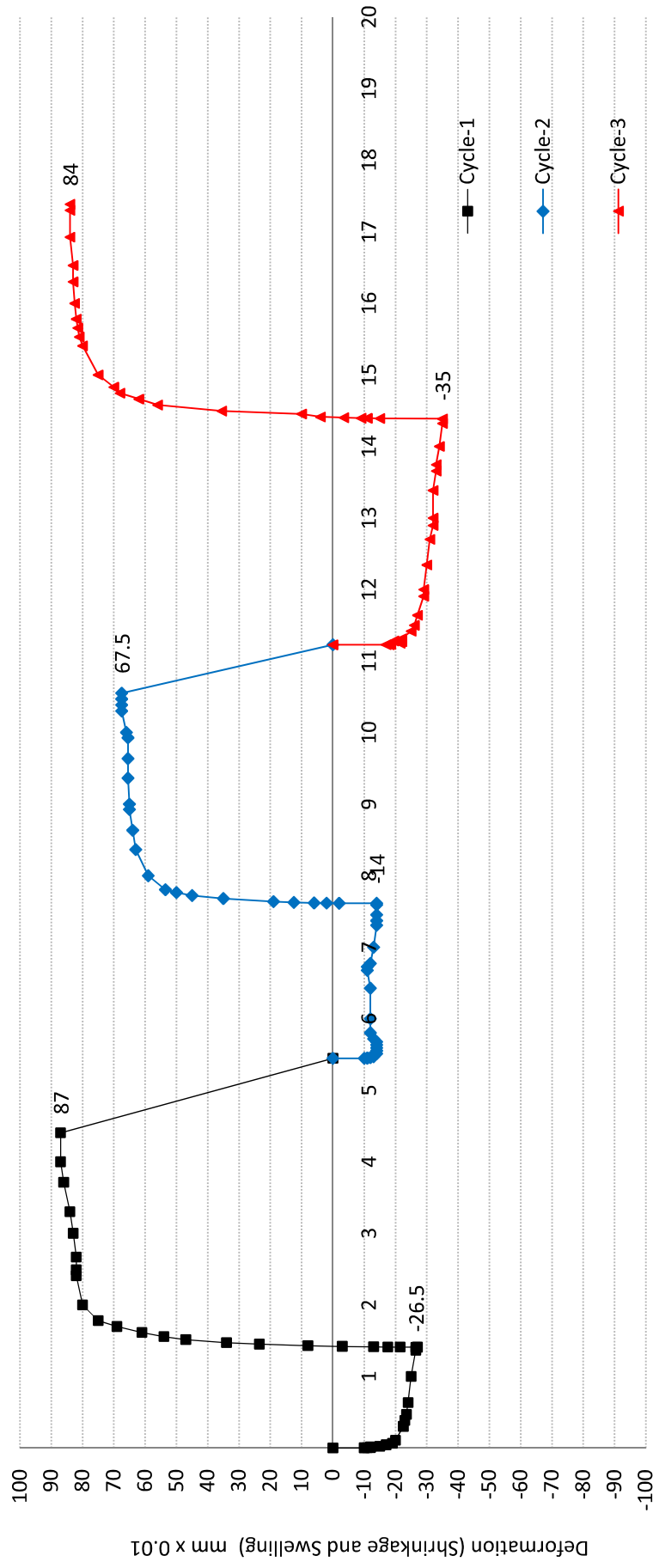
Laboratory Results

4.2 Shrinkage-Swelling Test

Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 3 sample No : 1, 10 kN/m²

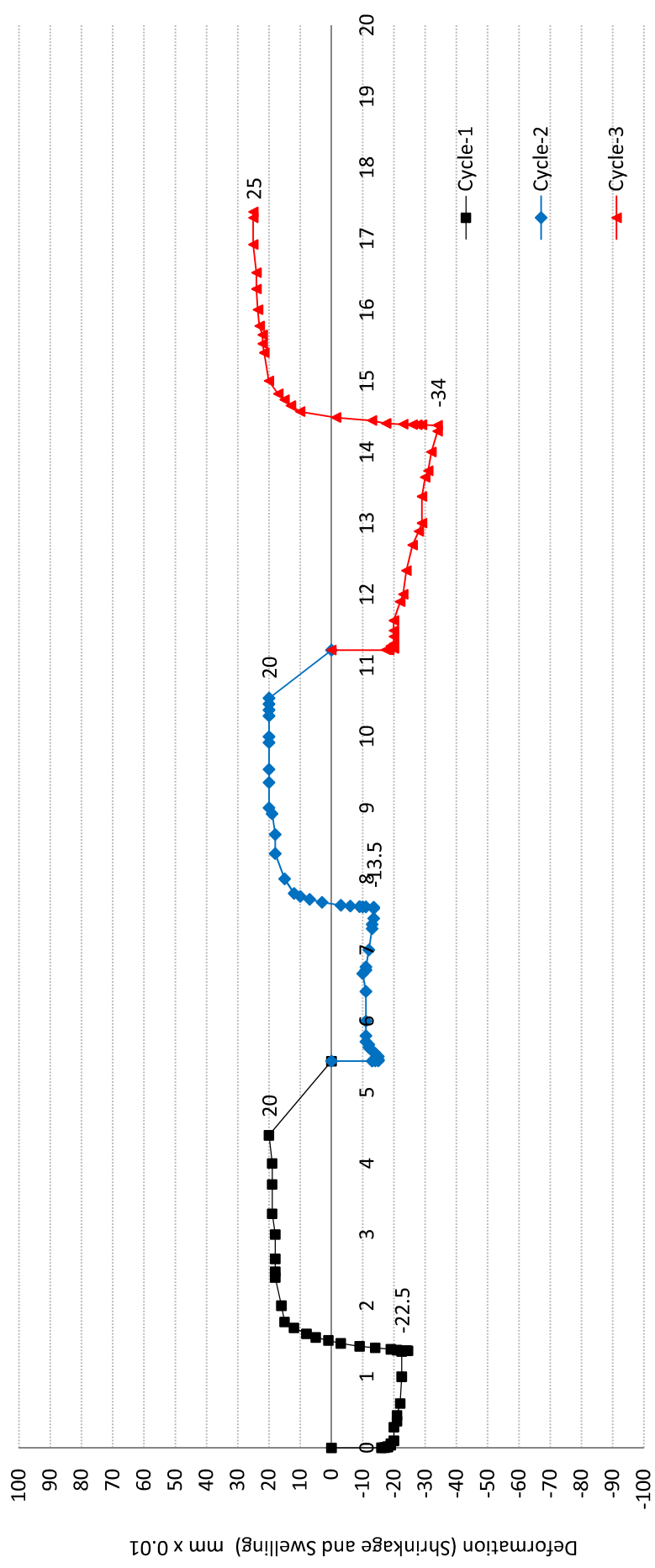


Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 3 sample No : 2, 20 kN/m²



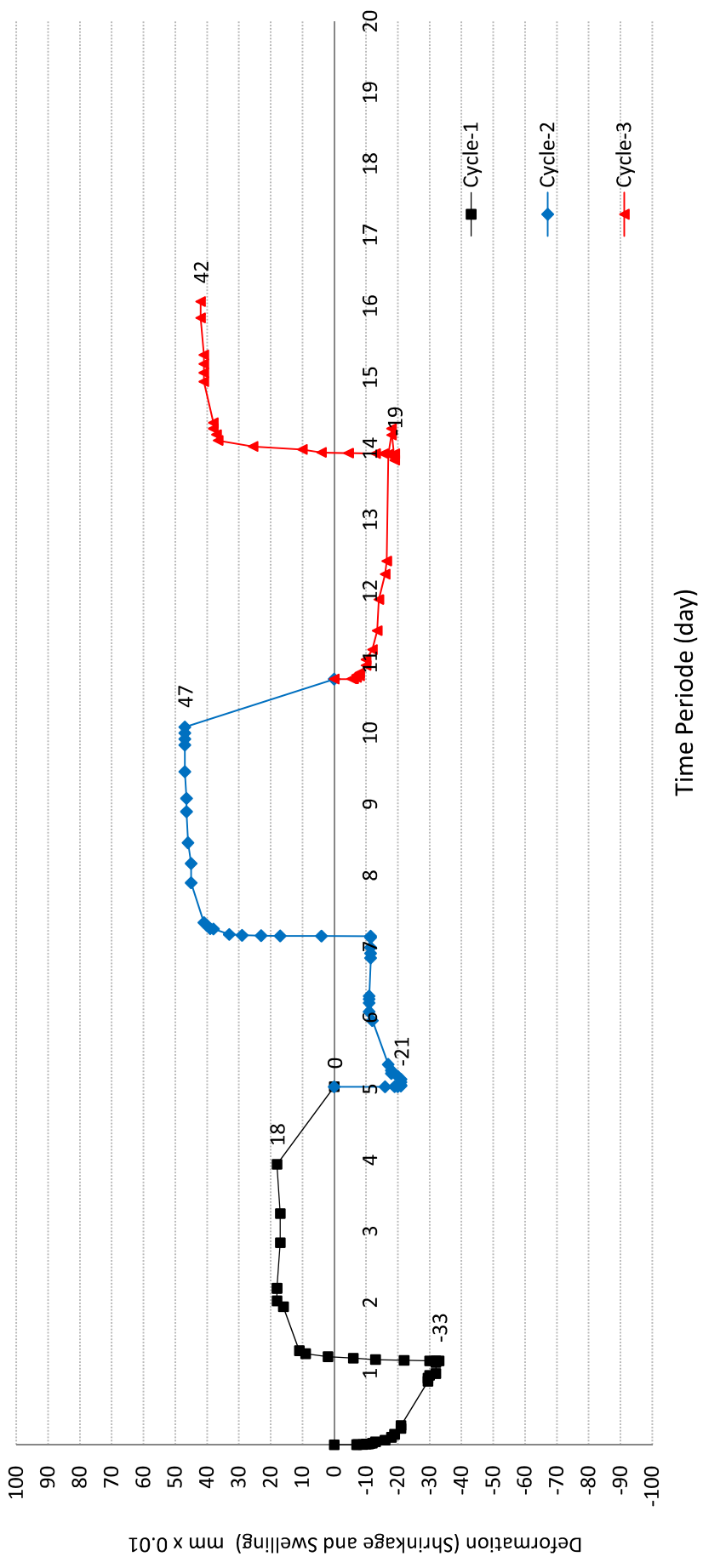
Time Period (day)

Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 3 sample No : 3, 30 kN/m²

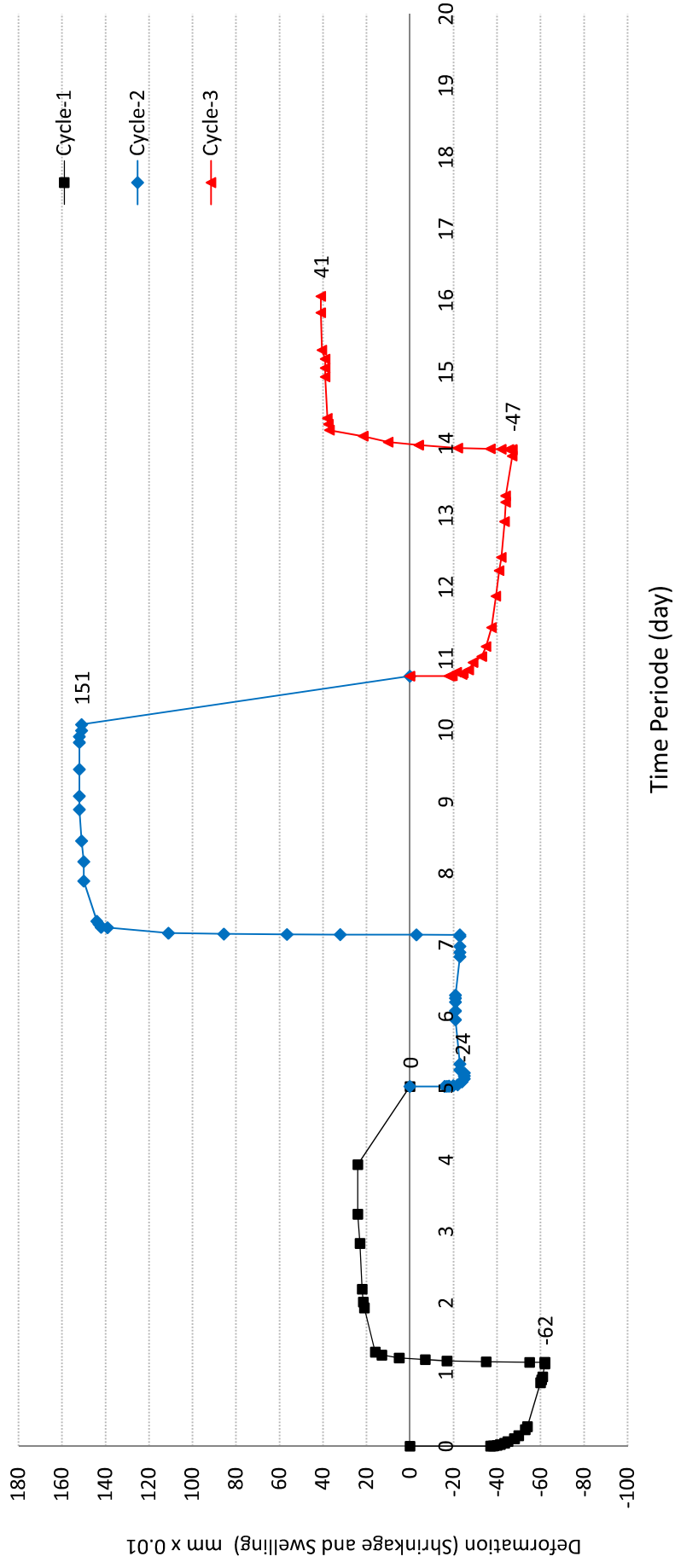


Time Period (day)

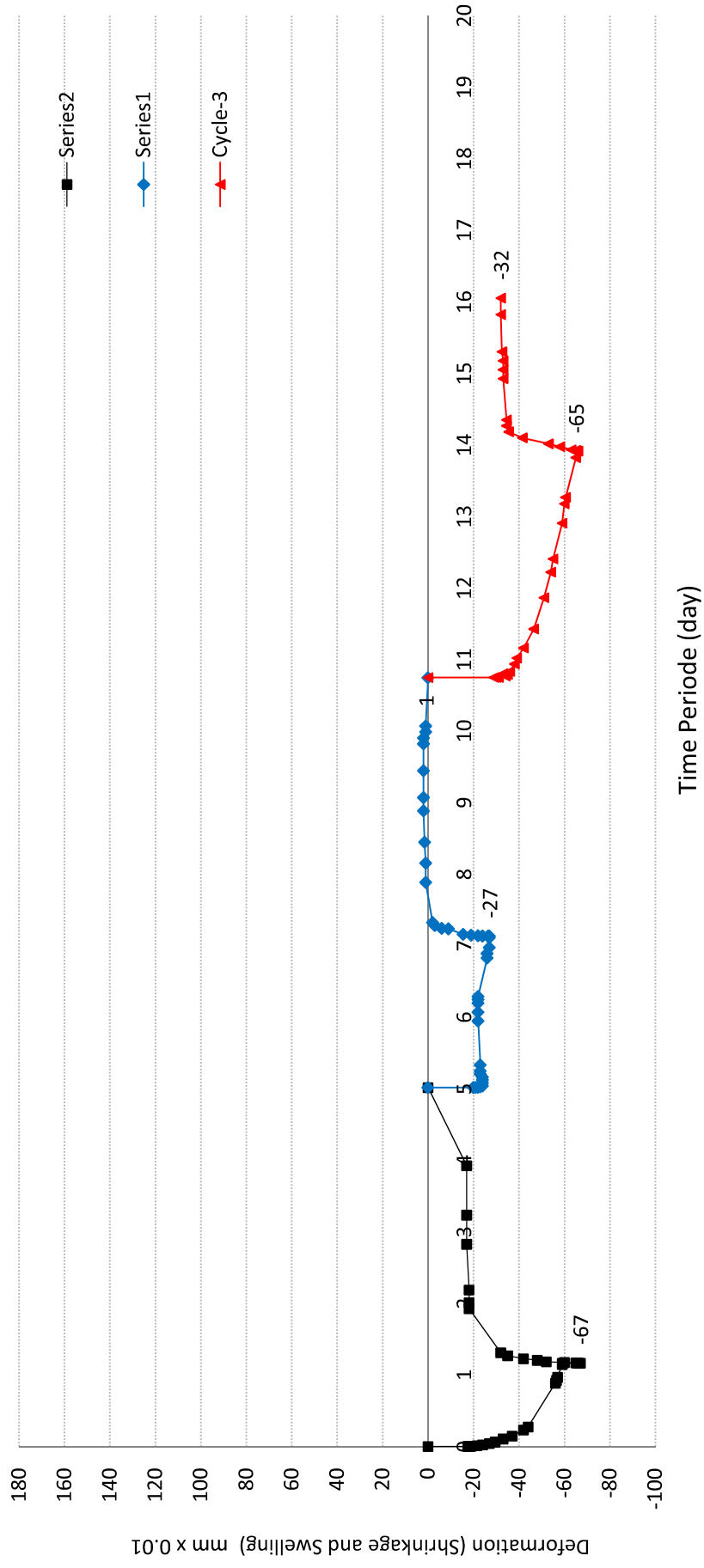
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 2 sample No : 4, 10 kN/m²



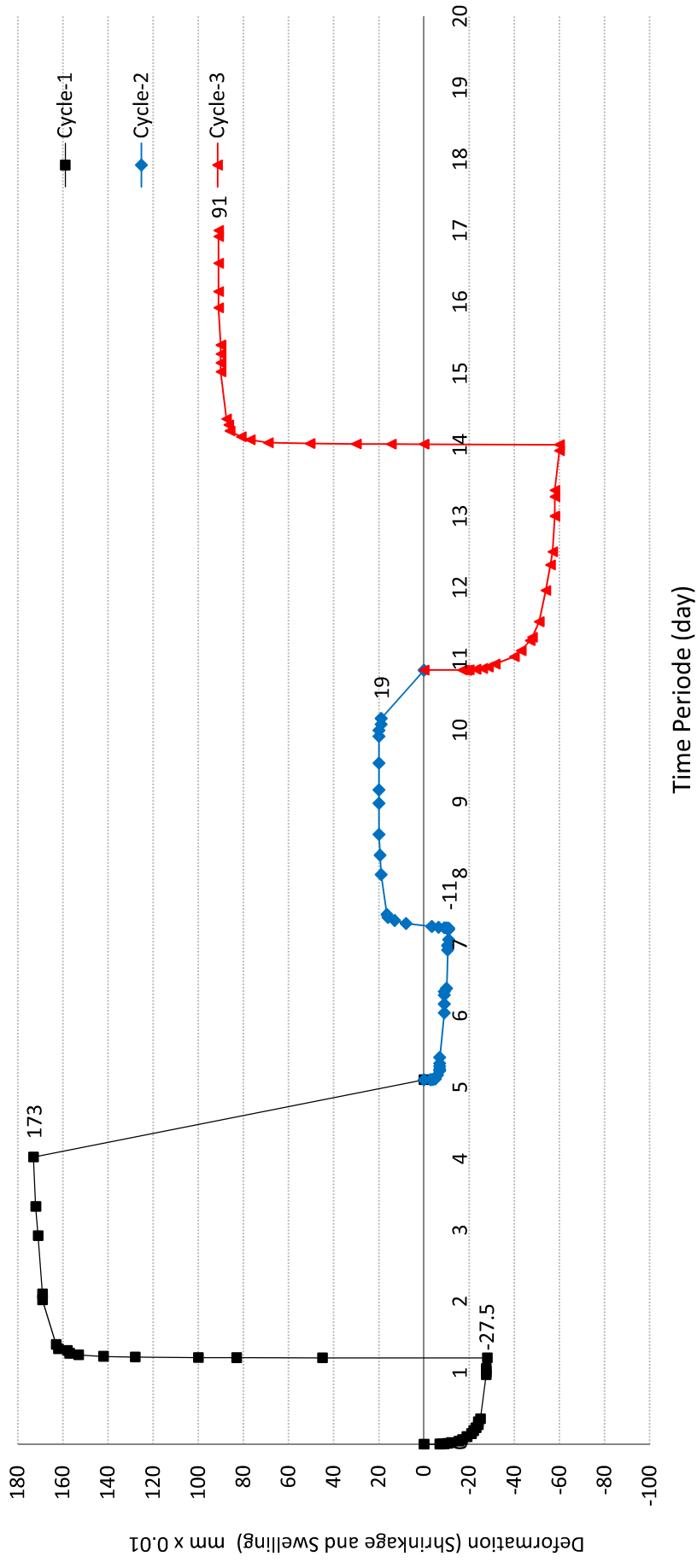
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 2 sample No : 5, 20 kN/m²



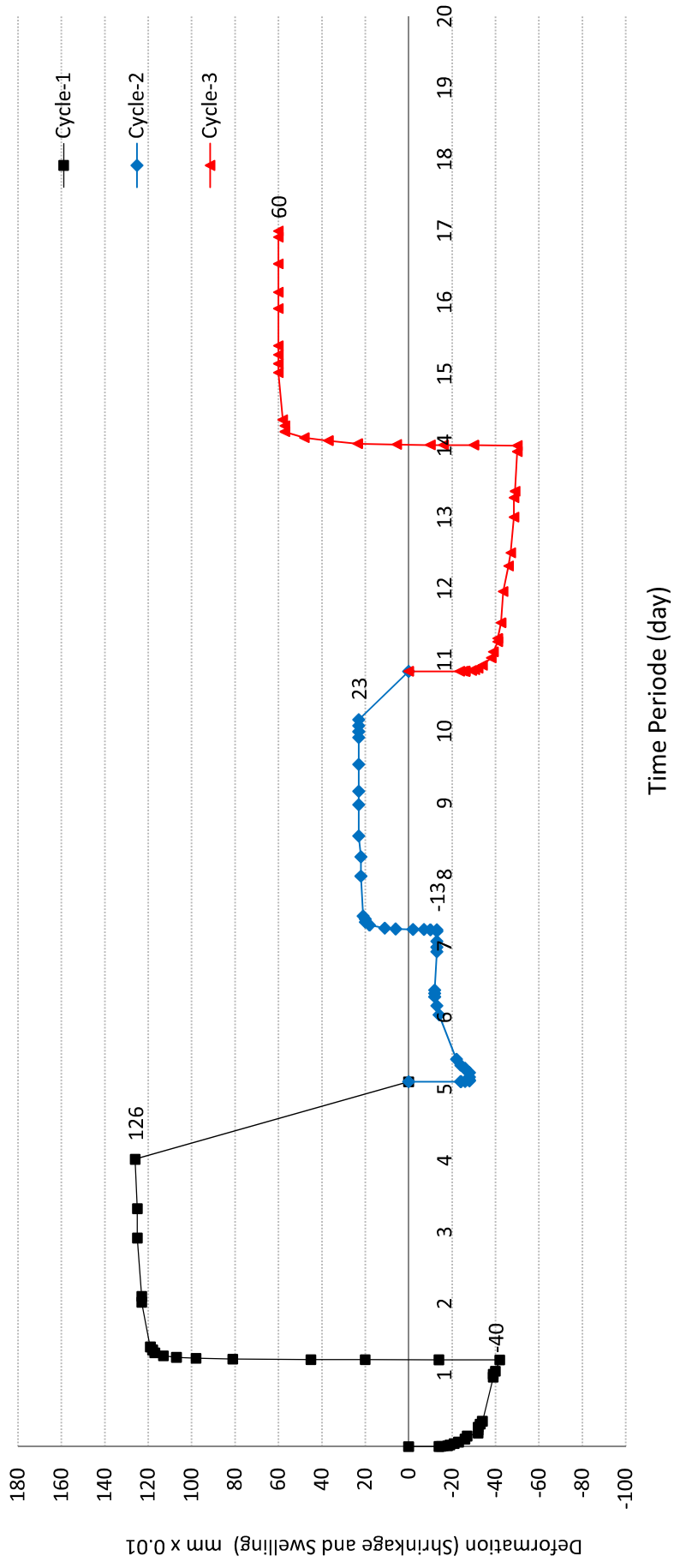
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 2 sample No : 6, 30 kN/m²



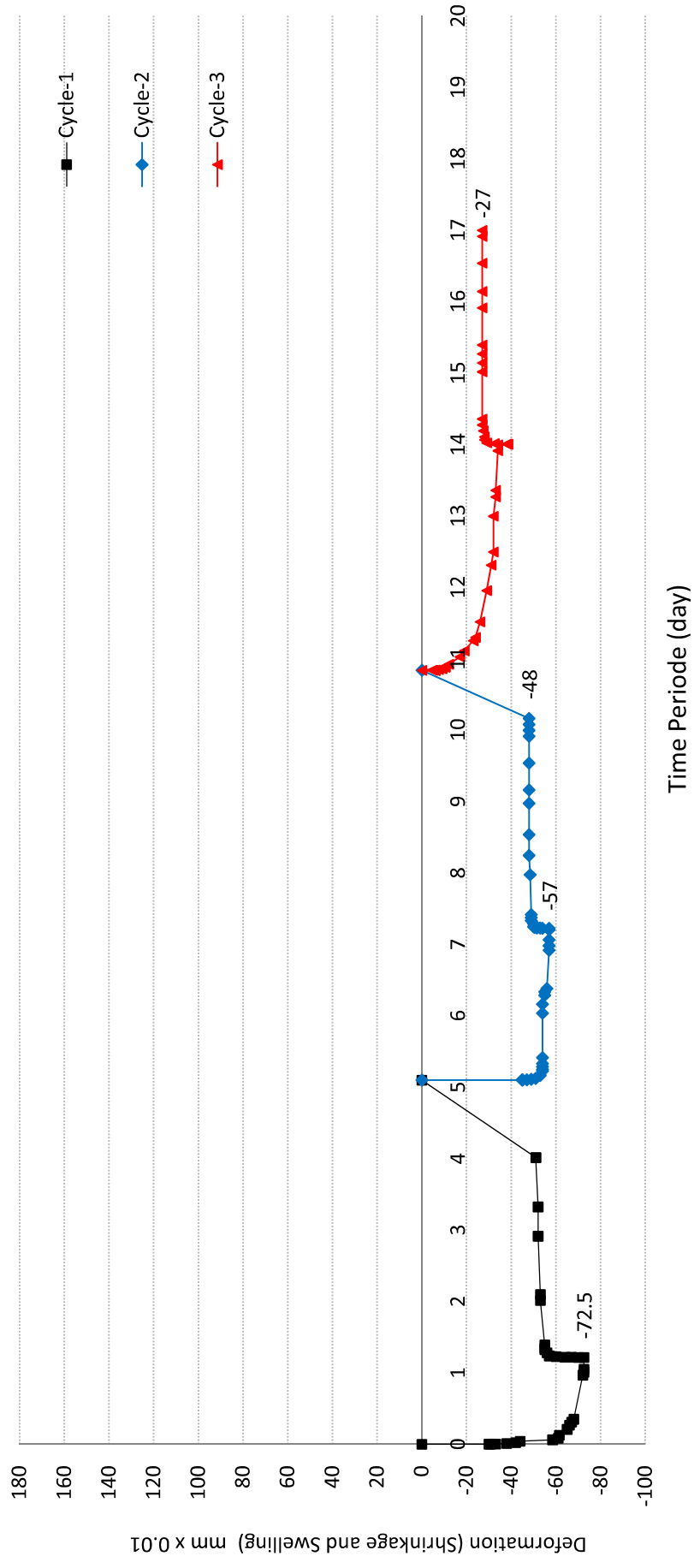
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 1 sample No : 7, 10 kN/m²



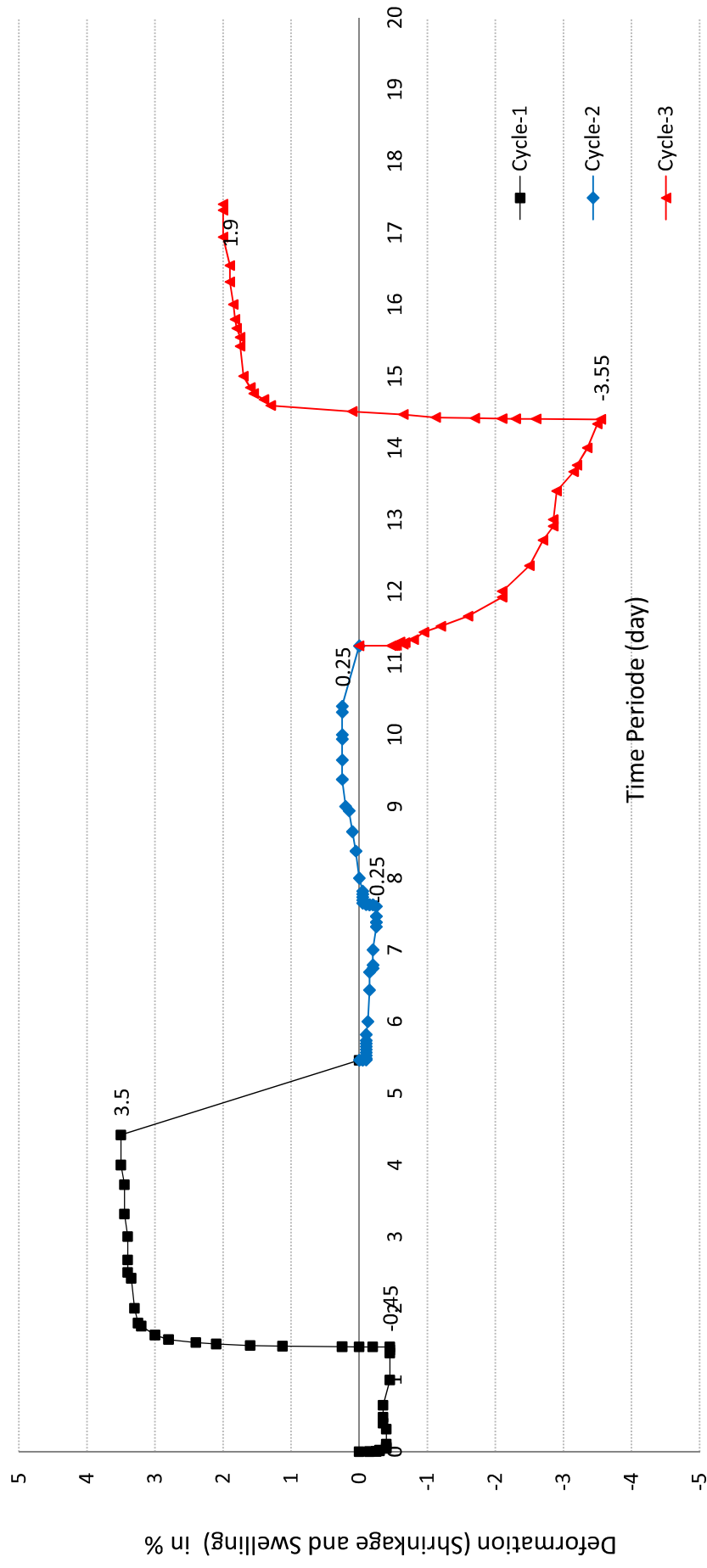
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 1 sample No : 8, 20 kN/m²



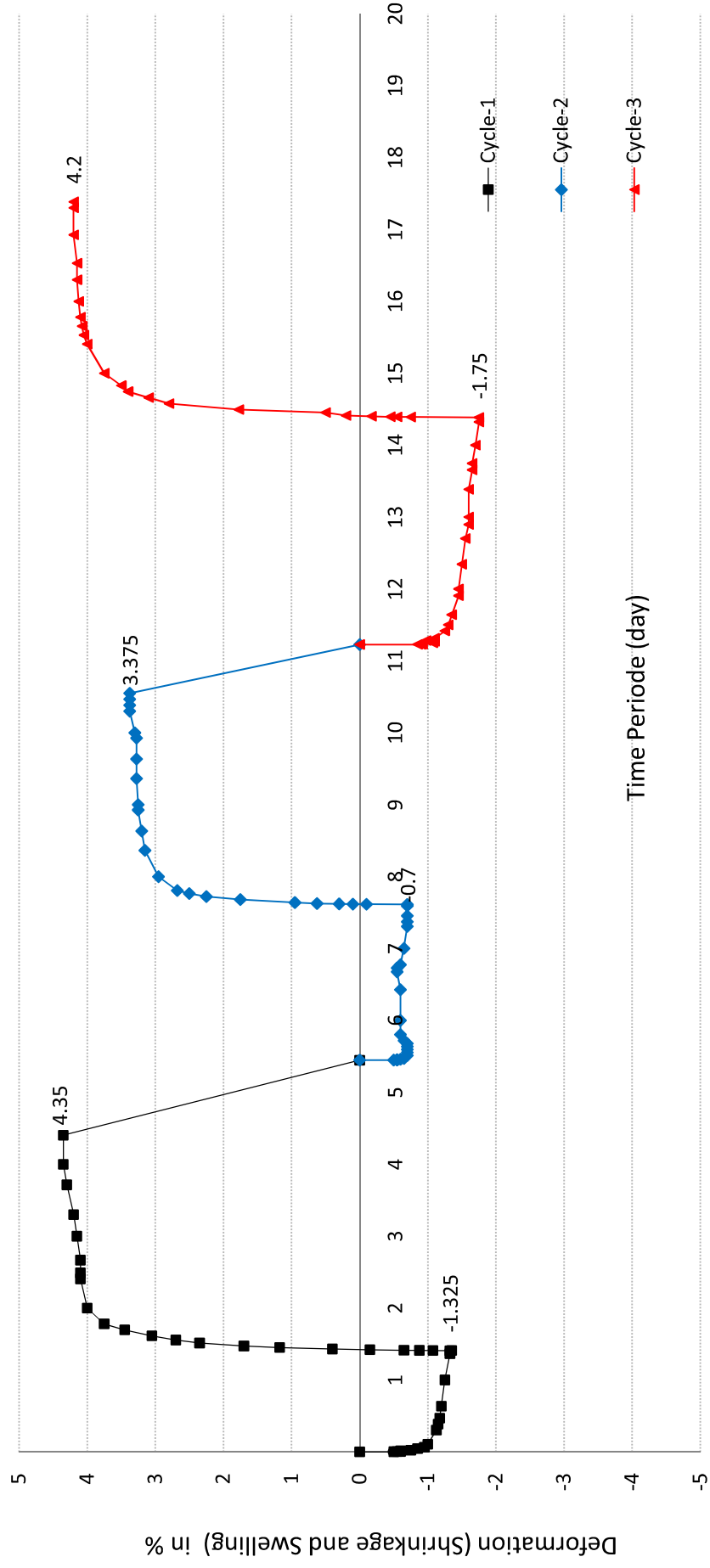
Shrinkage and Swelling Measurement Due To Drying and Wetting Process on Location 1 sample No : 9, 30 kN/m²



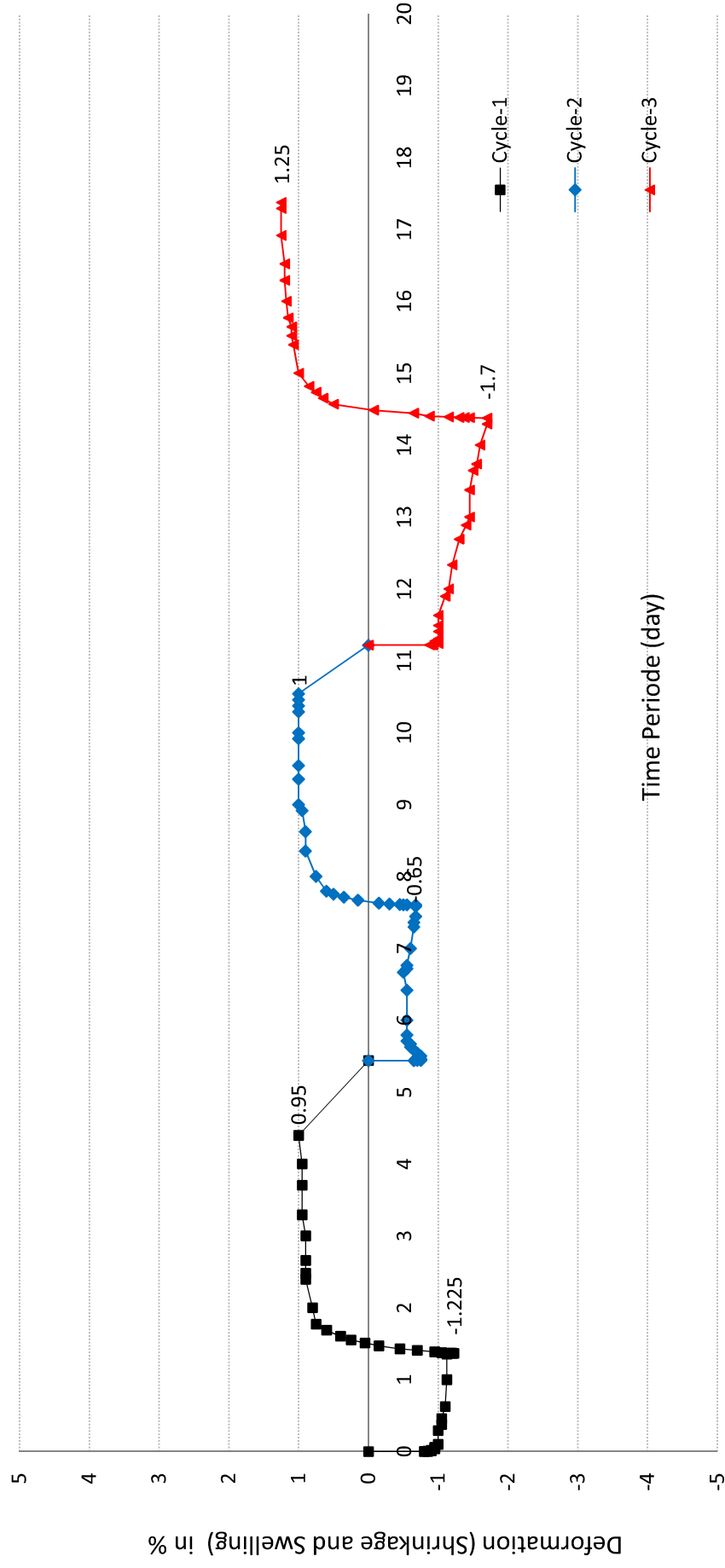
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 3 sample No : 1, 10 kN/m²



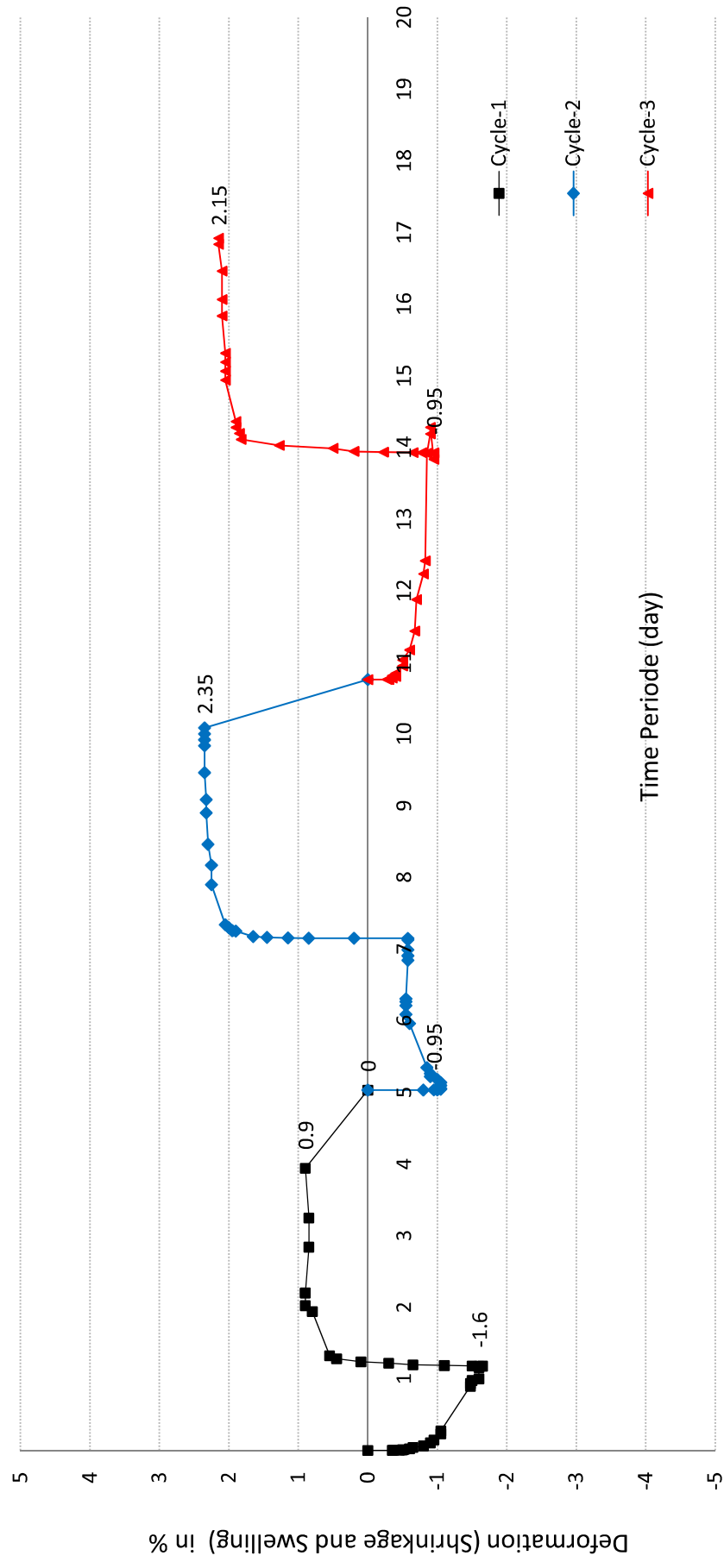
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 3 sample No : 2, 20 kN/m²



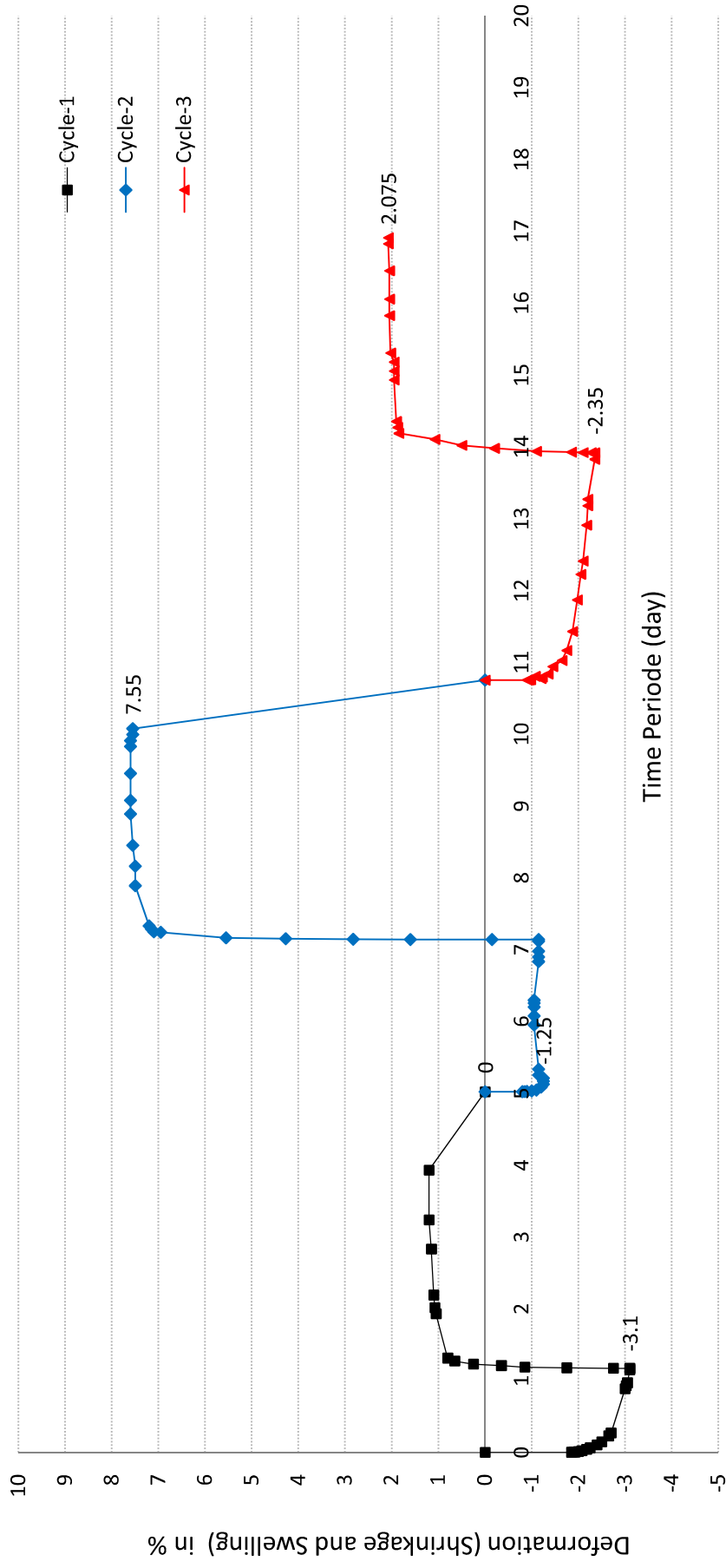
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 3 sample No : 3, 30 kN/m²



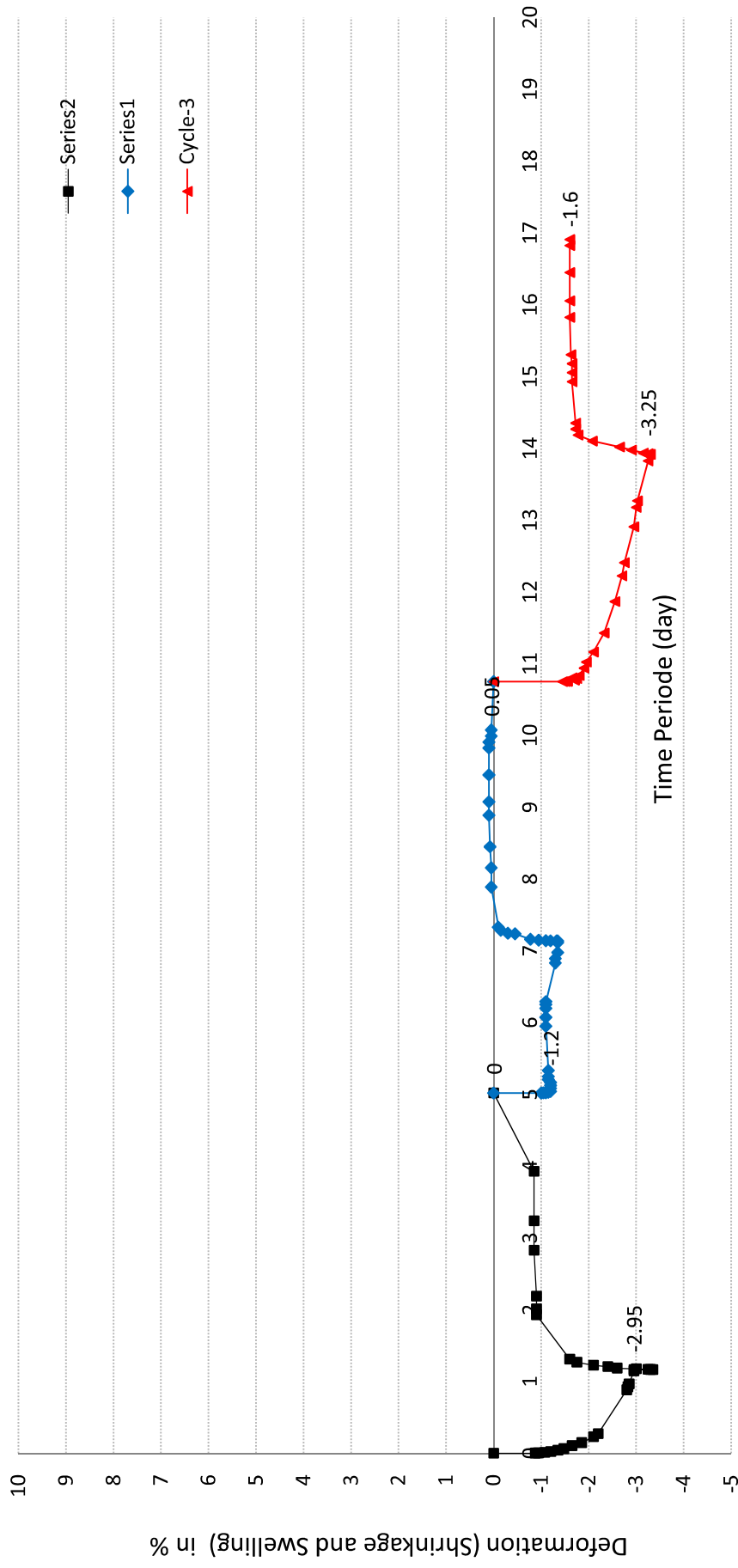
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 2 sample No : 4, 10 kN/m²



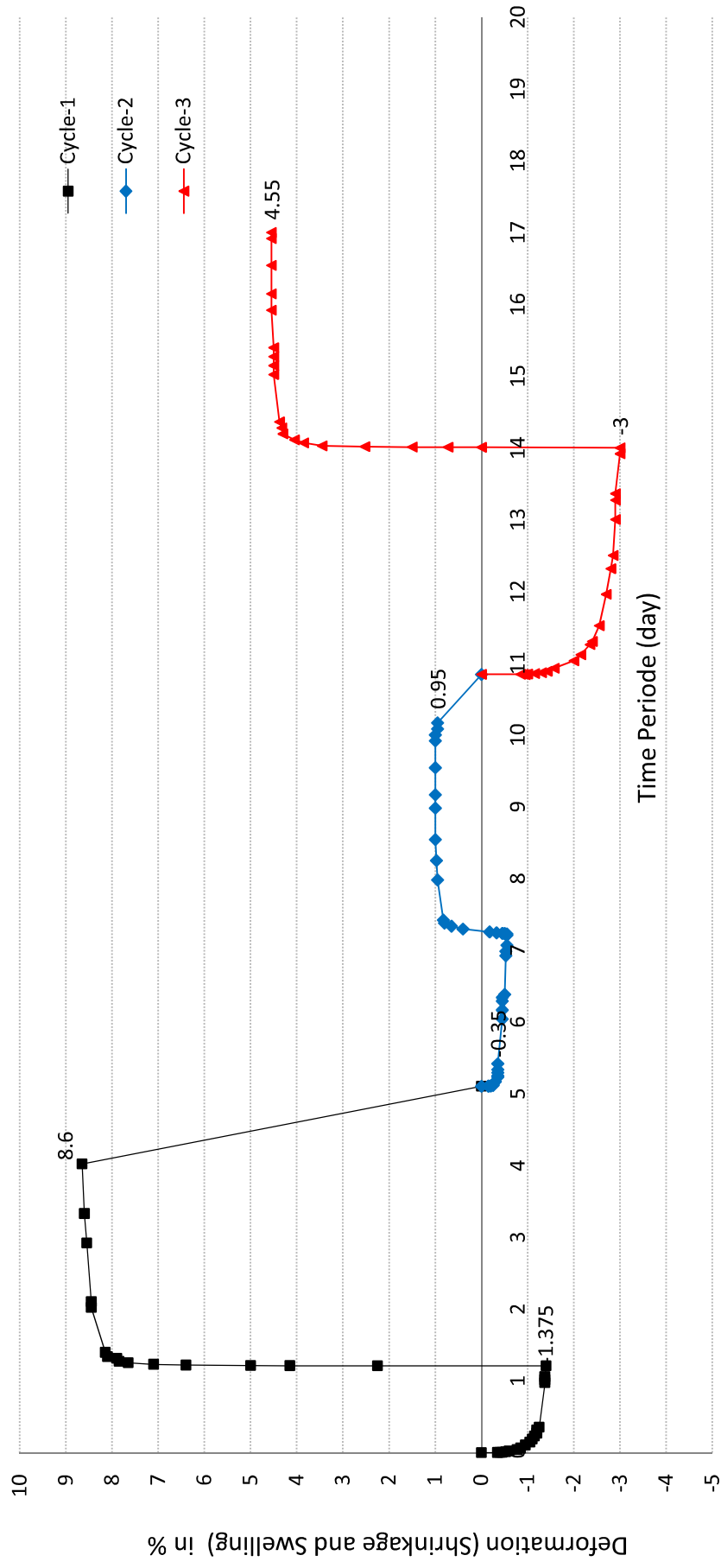
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 2 sample No : 5, 20 kN/m²



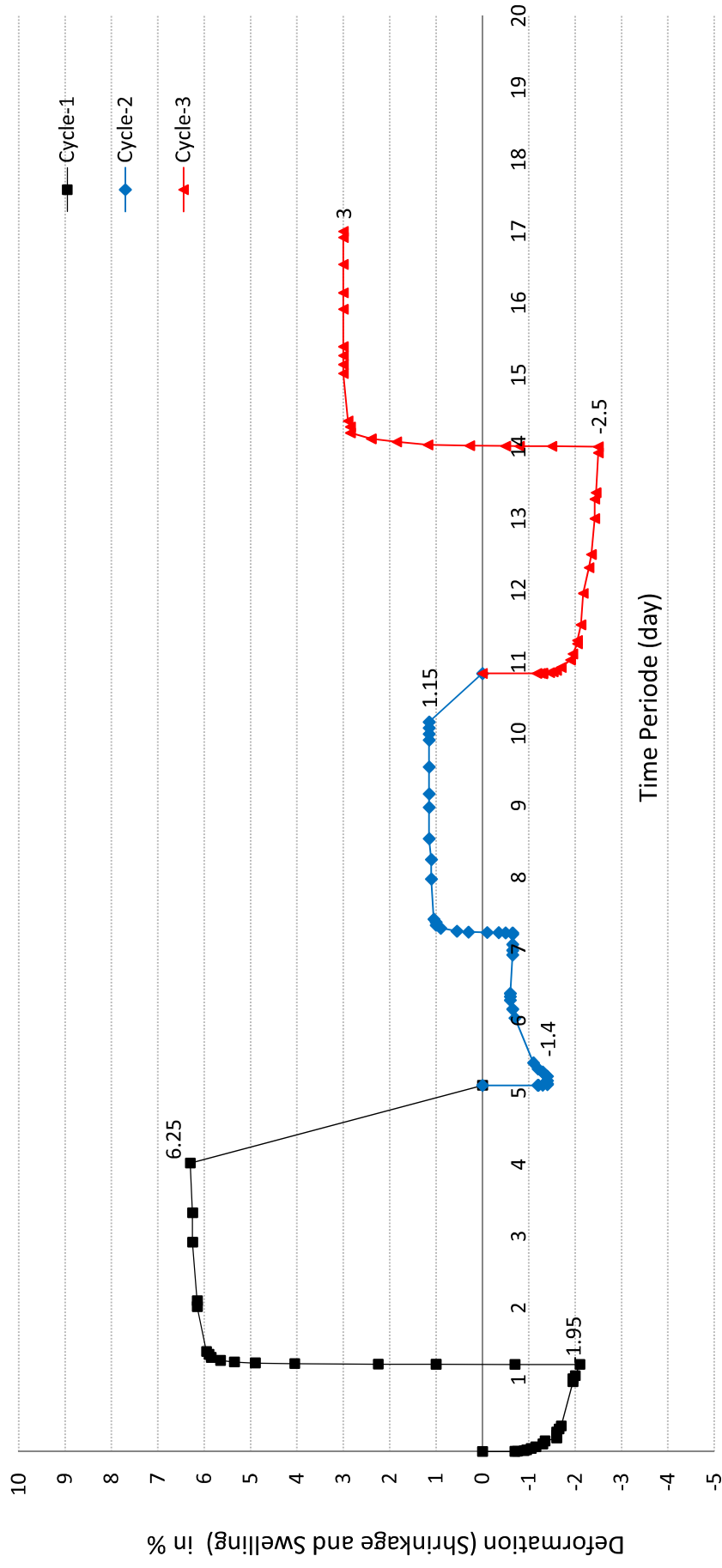
Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 2 sample No : 6, 30 kN/m²



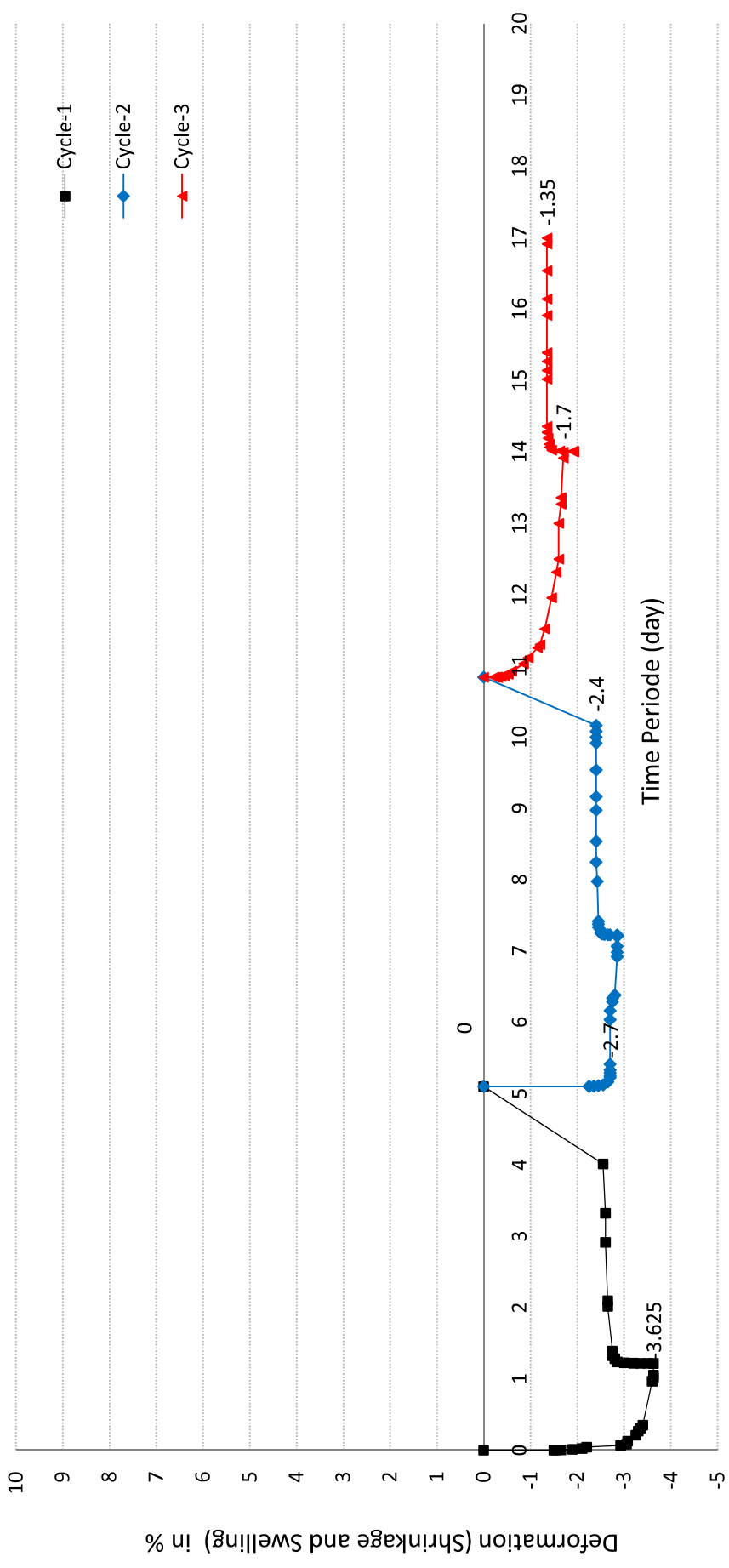
Shrinkage and Swelling Procentage Due To Drying and Wetting Process on Location 1 sample No : 7, 10 kN/m²



Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 1 sample No : 8, 20 kN/m²



Shrinkage and Swelling Percentage Due To Drying and Wetting Process on Location 1 sample No : 9, 30 kN/m²



ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 10 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	8	0	8.00	0.0000	300	0	0.00	Drying	1
	0	8	2	0.03	0.0014	293	-7	-0.35	Drying	1
		8	4	0.07	0.0028	292	-8	-0.40	Drying	1
		8	6	0.10	0.0042	291	-9	-0.45	Drying	1
		8	16	0.27	0.0111	289.5	-10.5	-0.53	Drying	1
		8	31	0.52	0.0215	288	-12	-0.60	Drying	1
		9	1	1.02	0.0424	284.5	-15.5	-0.78	Drying	1
		9	31	1.52	0.0632	283	-17	-0.85	Drying	1
		10	31	2.52	0.1049	281	-19	-0.95	Drying	1
		11	31	3.52	0.1465	279	-21	-1.05	Drying	1
		12	31	4.52	0.1882	278	-22	-1.10	Drying	1
		13	31	5.52	0.2299	277	-23	-1.15	Drying	1
		14	31	6.52	0.2715	276	-24	-1.20	Drying	1
		15	31	7.52	0.3132	276	-24	-1.20	Drying	1
		16	31	8.52	0.3549	275	-25	-1.25	Drying	1
27-Feb-16	1	7	22	23.37	0.9736	272.5	-27.5	-1.38	Drying	1
		8	22	24.37	1.0153	272.5	-27.5	-1.38	Drying	1
		9	22	25.37	1.0569	272.5	-27.5	-1.38	Drying	1
		13	0	29.00	1.2083	272	-28	-1.40	Wetting	1
		13	2	29.03	1.2097	345	45	2.25	Wetting	1
		13	4	29.07	1.2111	383	83	4.15	Wetting	1
		13	6	29.10	1.2125	400	100	5.00	Wetting	1
		13	16	29.27	1.2194	428	128	6.40	Wetting	1
		13	31	29.52	1.2299	442	142	7.10	Wetting	1
		14	1	30.02	1.2507	453	153	7.65	Wetting	1
		14	31	30.52	1.2715	457	157	7.85	Wetting	1
		15	31	31.52	1.3132	458	158	7.90	Wetting	1
		16	3	32.05	1.3354	462	162	8.10	Wetting	1
		17	31	33.52	1.3965	463	163	8.15	Wetting	1
28-Feb-16	2	8	31	48.52	2.0215	469	169	8.45	Wetting	1
		10	30	50.50	2.1042	469	169	8.45	Wetting	2
29-Feb-16	3	6	5	70.08	2.9201	471	171	8.55	Wetting	2
		15	55	79.92	3.3299	472	172	8.60	Wetting	2
1-Mar-16	4	8	30	96.50	4.0208	473	173	8.65	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 10 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	30	122.50	5.1042	300	0	0.00	Drying	2
		10	32	122.53	5.1056	297	-3	-0.15	Drying	2
		10	34	122.57	5.1069	297	-3	-0.15	Drying	2
		10	38	122.63	5.1097	296	-4	-0.20	Drying	2
		10	48	122.80	5.1167	295	-5	-0.25	Drying	2
		11	3	123.05	5.1271	295	-5	-0.25	Drying	2
		12	3	124.05	5.1688	294	-6	-0.30	Drying	2
		13	33	125.55	5.2313	293	-7	-0.35	Drying	2
		14	3	126.05	5.2521	293	-7	-0.35	Drying	2
		15	3	127.05	5.2938	293	-7	-0.35	Drying	2
		16	3	128.05	5.3354	293	-7	-0.35	Drying	2
		18	3	130.05	5.4188	293	-7	-0.35	Drying	2
3-Mar-16	6	9	0	145.00	6.0417	291	-9	-0.45	Drying	2
		12	0	148.00	6.1667	291	-9	-0.45	Drying	2
		15	0	151.00	6.2917	291	-9	-0.45	Drying	2
		16	10	152.17	6.3403	291	-9	-0.45	Drying	2
		17	15	153.25	6.3854	290	-10	-0.50	Drying	2
4-Mar-16	7	6	10	166.17	6.9236	289.5	-10.5	-0.53	Drying	2
		7	40	167.67	6.9861	289.5	-10.5	-0.53	Drying	2
		9	40	169.67	7.0694	289	-11	-0.55	Drying	2
		13	0	173.00	7.2083	289	-11	-0.55	Drying	2
		13	30	173.50	7.2292	289	-11	-0.55	Wetting	2
		13	32	173.53	7.2306	290	-10	-0.50	Wetting	2
		13	34	173.57	7.2319	290	-10	-0.50	Wetting	2
		13	38	173.63	7.2347	291	-9	-0.45	Wetting	2
		13	48	173.80	7.2417	293.5	-6.5	-0.33	Wetting	2
		14	5	174.08	7.2535	296.5	-3.5	-0.18	Wetting	2
		15	5	175.08	7.2951	308	8	0.40	Wetting	2
		16	5	176.08	7.3368	313	13	0.65	Wetting	2
		17	5	177.08	7.3785	316	16	0.80	Wetting	2
		18	5	178.08	7.4201	316.5	16.5	0.83	Wetting	2
5-Mar-16	8	7	30	191.50	7.9792	319	19	0.95	Wetting	2
		14	0	198.00	8.2500	319.5	19.5	0.98	Wetting	2
		21	0	205.00	8.5417	320	20	1.00	Wetting	2
6-Mar-16	9	7	30	215.50	8.9792	320	20	1.00	Wetting	2
		12	0	220.00	9.1667	320	20	1.00	Wetting	2
		21	0	229.00	9.5417	320	20	1.00	Wetting	2
7-Mar-16	10	6	0	238.00	9.9167	320	20	1.00	Wetting	3
		8	0	240.00	10.0000	320	20	1.00	Wetting	3
		10	0	242.00	10.0833	319	19	0.95	Wetting	3
		12	0	244.00	10.1667	319	19	0.95	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 10 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	11	4	13	260.22	10.8424	300	0	0.00	Drying	3
		4	15	260.25	10.8438	283	-17	-0.85	Drying	3
		4	17	260.28	10.8451	282	-18	-0.90	Drying	3
		4	9	260.15	10.8396	281	-19	-0.95	Drying	3
		4	21	260.35	10.8479	280	-20	-1.00	Drying	3
		4	31	260.52	10.8549	277	-23	-1.15	Drying	3
		4	46	260.77	10.8653	274	-26	-1.30	Drying	3
		5	16	261.27	10.8861	271.5	-28.5	-1.43	Drying	3
		6	16	262.27	10.9278	268.5	-31.5	-1.58	Drying	3
		8	45	264.75	11.0313	260	-40	-2.00	Drying	3
		10	46	266.77	11.1153	257	-43	-2.15	Drying	3
		14	10	270.17	11.2569	253	-47	-2.35	Drying	3
		15	15	271.25	11.3021	252	-48	-2.40	Drying	3
		20	30	276.50	11.5208	249	-51	-2.55	Drying	3
9-Mar-16	12	7	0	287.00	11.9583	246	-54	-2.70	Drying	3
		15	35	295.58	12.3160	244	-56	-2.80	Drying	3
		20	0	300.00	12.5000	243	-57	-2.85	Drying	3
10-Mar-16	13	8	0	312.00	13.0000	242	-58	-2.90	Drying	3
		14	30	318.50	13.2708	242	-58	-2.90	Drying	3
		16	40	320.67	13.3611	242	-58	-2.90	Drying	3
11-Mar-16	14	6	0	334.00	13.9167	240	-60	-3.00	Drying	3
		8	0	336.00	14.0000	240	-60	-3.00	Drying	3
		8	10	336.17	14.0069	300	0	0.00	Wetting	3
		8	12	336.20	14.0083	314.5	14.5	0.73	Wetting	3
		8	14	336.23	14.0097	330	30	1.50	Wetting	3
		8	24	336.40	14.0167	350.5	50.5	2.53	Wetting	3
		8	39	336.65	14.0271	369	69	3.45	Wetting	3
		9	39	337.65	14.0688	377	77	3.85	Wetting	3
		10	39	338.65	14.1104	381	81	4.05	Wetting	3
		12	39	340.65	14.1938	386	86	4.30	Wetting	3
		14	39	342.65	14.2771	386.5	86.5	4.33	Wetting	3
		16	39	344.65	14.3604	387.5	87.5	4.38	Wetting	3
12-Mar-16	15	8	30	360.50	15.0208	390	90	4.50	Wetting	3
		11	30	363.50	15.1458	390	90	4.50	Wetting	3
		14	30	366.50	15.2708	390	90	4.50	Wetting	3
		17	30	369.50	15.3958	390	90	4.50	Wetting	3
13-Mar-16	16	6	0	382.00	15.9167	391	91	4.55	Wetting	3
		11	30	387.50	16.1458	391	91	4.55	Wetting	3
		21	0	397.00	16.5417	391	91	4.55	Wetting	3
14-Mar-16	17	6	0	406.00	16.9167	391	91	4.55	Wetting	3
		8	0	408.00	17.0000	391	91	4.55	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 20 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	8	4	8.07	0.0000	300	0	0.00	Drying	1
	0	8	6	0.03	0.0014	286	-14	-0.70	Drying	1
		8	8	0.07	0.0028	285	-15	-0.75	Drying	1
		8	10	0.10	0.0042	285	-15	-0.75	Drying	1
		8	20	0.27	0.0111	282	-18	-0.90	Drying	1
		8	35	0.52	0.0215	281	-19	-0.95	Drying	1
		9	5	1.02	0.0424	279	-21	-1.05	Drying	1
		9	35	1.52	0.0632	277	-23	-1.15	Drying	1
		10	35	2.52	0.1049	274	-26	-1.30	Drying	1
		11	35	3.52	0.1465	273	-27	-1.35	Drying	1
		12	35	4.52	0.1882	268	-32	-1.60	Drying	1
		13	35	5.52	0.2299	268	-32	-1.60	Drying	1
		14	35	6.52	0.2715	268	-32	-1.60	Drying	1
		15	35	7.52	0.3132	267	-33	-1.65	Drying	1
		16	35	8.52	0.3549	266	-34	-1.70	Drying	1
27-Feb-16	1	7	23	23.32	0.9715	261	-39	-1.95	Drying	1
		8	23	24.32	1.0132	261	-39	-1.95	Drying	1
		9	23	25.32	1.0549	260	-40	-2.00	Drying	1
		13	10	29.10	1.2125	258	-42	-2.10	Wetting	1
		13	12	29.13	1.2139	286	-14	-0.70	Wetting	1
		13	14	29.17	1.2153	320	20	1.00	Wetting	1
		13	16	29.20	1.2167	345	45	2.25	Wetting	1
		13	26	29.37	1.2236	381	81	4.05	Wetting	1
		13	41	29.62	1.2340	398	98	4.90	Wetting	1
		14	1	29.95	1.2479	407	107	5.35	Wetting	1
		14	31	30.45	1.2688	413	113	5.65	Wetting	1
		15	31	31.45	1.3104	417	117	5.85	Wetting	1
		16	31	32.45	1.3521	418	118	5.90	Wetting	1
		17	31	33.45	1.3938	419	119	5.95	Wetting	1
28-Feb-16	2	8	31	48.45	2.0188	423	123	6.15	Wetting	1
		10	30	50.43	2.1014	423	123	6.15	Wetting	2
29-Feb-16	3	6	5	70.02	2.9174	425	125	6.25	Wetting	2
		15	55	79.85	3.3271	425	125	6.25	Wetting	2
1-Mar-16	4	8	30	96.43	4.0181	426	126	6.30	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 20 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	30	122.43	5.1014	300	0	0.00	Drying	2
		10	32	122.47	5.1028	276	-24	-1.20	Drying	2
		10	34	122.50	5.1042	276	-24	-1.20	Drying	2
		10	38	122.57	5.1069	274	-26	-1.30	Drying	2
		10	48	122.73	5.1139	272	-28	-1.40	Drying	2
		11	3	122.98	5.1243	272	-28	-1.40	Drying	2
		12	3	123.98	5.1660	272	-28	-1.40	Drying	2
		13	33	125.48	5.2285	272	-28	-1.40	Drying	2
		14	3	125.98	5.2493	273	-27	-1.35	Drying	2
		15	3	126.98	5.2910	274	-26	-1.30	Drying	2
		16	3	127.98	5.3326	276	-24	-1.20	Drying	2
		18	3	129.98	5.4160	278	-22	-1.10	Drying	2
3-Mar-16	6	9	0	144.93	6.0389	286	-14	-0.70	Drying	2
		12	0	147.93	6.1639	287	-13	-0.65	Drying	2
		15	0	150.93	6.2889	288	-12	-0.60	Drying	2
		16	10	152.10	6.3375	288	-12	-0.60	Drying	2
		17	15	153.18	6.3826	288	-12	-0.60	Drying	2
4-Mar-16	7	6	10	166.10	6.9208	287	-13	-0.65	Drying	2
		7	40	167.60	6.9833	287	-13	-0.65	Drying	2
		9	40	169.60	7.0667	287	-13	-0.65	Drying	2
		13	0	172.93	7.2056	287	-13	-0.65	Drying	2
		13	30	173.43	7.2264	287	-13	-0.65	Wetting	2
		13	32	173.47	7.2278	290	-10	-0.50	Wetting	2
		13	34	173.50	7.2292	293	-7	-0.35	Wetting	2
		13	38	173.57	7.2319	298	-2	-0.10	Wetting	2
		13	48	173.73	7.2389	306	6	0.30	Wetting	2
		14	5	174.02	7.2507	311	11	0.55	Wetting	2
		15	5	175.02	7.2924	318	18	0.90	Wetting	2
		16	5	176.02	7.3340	320	20	1.00	Wetting	2
		17	5	177.02	7.3757	320	20	1.00	Wetting	2
		18	5	178.02	7.4174	321	21	1.05	Wetting	2
5-Mar-16	8	7	30	191.43	7.9764	322	22	1.10	Wetting	2
		14	0	197.93	8.2472	322	22	1.10	Wetting	2
		21	0	204.93	8.5389	323	23	1.15	Wetting	2
6-Mar-16	9	7	30	215.43	8.9764	323	23	1.15	Wetting	2
		12	0	219.93	9.1639	323	23	1.15	Wetting	2
		21	0	228.93	9.5389	323	23	1.15	Wetting	2
7-Mar-16	10	6	0	237.93	9.9139	323	23	1.15	Wetting	3
		8	0	239.93	9.9972	323	23	1.15	Wetting	3
		10	0	241.93	10.0806	323	23	1.15	Wetting	3
		12	0	243.93	10.1639	323	23	1.15	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 20 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	11	4	13	260.15	10.8396	300	0	0.00	Drying	3
		4	15	260.18	10.8410	276.5	-23.5	-1.18	Drying	3
		4	17	260.22	10.8424	275	-25	-1.25	Drying	3
		4	9	260.08	10.8368	274	-26	-1.30	Drying	3
		4	21	260.28	10.8451	274	-26	-1.30	Drying	3
		4	31	260.45	10.8521	271	-29	-1.45	Drying	3
		4	46	260.70	10.8625	269.5	-30.5	-1.53	Drying	3
		5	16	261.20	10.8833	268	-32	-1.60	Drying	3
		6	16	262.20	10.9250	266	-34	-1.70	Drying	3
		8	45	264.68	11.0285	262	-38	-1.90	Drying	3
		10	46	266.70	11.1125	261	-39	-1.95	Drying	3
		14	10	270.10	11.2542	259	-41	-2.05	Drying	3
		15	15	271.18	11.2993	259	-41	-2.05	Drying	3
		20	30	276.43	11.5181	257.5	-42.5	-2.13	Drying	3
9-Mar-16	12	7	0	286.93	11.9556	256.5	-43.5	-2.18	Drying	3
		15	35	295.52	12.3132	254	-46	-2.30	Drying	3
		20	0	299.93	12.4972	253	-47	-2.35	Drying	3
10-Mar-16	13	8	0	311.93	12.9972	251.5	-48.5	-2.43	Drying	3
		14	30	318.43	13.2681	251.5	-48.5	-2.43	Drying	3
		16	40	320.60	13.3583	251	-49	-2.45	Drying	3
11-Mar-16	14	6	0	333.93	13.9139	250	-50	-2.50	Drying	3
		8	0	335.93	13.9972	250	-50	-2.50	Drying	3
		8	10	336.10	14.0042	270	-30	-1.50	Wetting	3
		8	12	336.13	14.0056	284	-16	-0.80	Wetting	3
		8	14	336.17	14.0069	290	-10	-0.50	Wetting	3
		8	24	336.33	14.0139	305.5	5.5	0.28	Wetting	3
		8	39	336.58	14.0243	323.5	23.5	1.18	Wetting	3
		9	39	337.58	14.0660	337	37	1.85	Wetting	3
		10	39	338.58	14.1076	348	48	2.40	Wetting	3
		12	39	340.58	14.1910	357	57	2.85	Wetting	3
		14	39	342.58	14.2743	357	57	2.85	Wetting	3
		16	39	344.58	14.3576	358	58	2.90	Wetting	3
12-Mar-16	15	8	30	360.43	15.0181	360	60	3.00	Wetting	3
		11	30	363.43	15.1431	360	60	3.00	Wetting	3
		14	30	366.43	15.2681	360	60	3.00	Wetting	3
		17	30	369.43	15.3931	360	60	3.00	Wetting	3
13-Mar-16	16	6	0	381.93	15.9139	360	60	3.00	Wetting	3
		11	30	387.43	16.1431	360	60	3.00	Wetting	3
		21	0	396.93	16.5389	360	60	3.00	Wetting	3
14-Mar-16	17	6	0	405.93	16.9139	360	60	3.00	Wetting	3
		8	0	407.93	16.9972	360	60	3.00	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 30 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	8	10	8.17	0.0000	300	0	0.00	Drying	1
	0	8	12	0.03	0.0014	270	-30	-1.50	Drying	1
		8	14	0.07	0.0028	269	-31	-1.55	Drying	1
		8	16	0.10	0.0042	267	-33	-1.65	Drying	1
		8	26	0.27	0.0111	262	-38	-1.90	Drying	1
		8	41	0.52	0.0215	258	-42	-2.10	Drying	1
		9	11	1.02	0.0424	256	-44	-2.20	Drying	1
		9	41	1.52	0.0632	241.5	-58.5	-2.93	Drying	1
		10	11	2.02	0.0840	239	-61	-3.05	Drying	1
		11	11	3.02	0.1257	238.5	-61.5	-3.08	Drying	1
		13	11	5.02	0.2090	235	-65	-3.25	Drying	1
		14	35	6.42	0.2674	234	-66	-3.30	Drying	1
		15	35	7.42	0.3090	233	-67	-3.35	Drying	1
		16	35	8.42	0.3507	232	-68	-3.40	Drying	1
27-Feb-16	1	7	24	23.23	0.9681	228	-72	-3.60	Drying	1
		8	24	24.23	1.0097	227.5	-72.5	-3.63	Drying	1
		9	24	25.23	1.0514	227.5	-72.5	-3.63	Drying	1
		13	20	29.17	1.2153	227.5	-72.5	-3.63	Wetting	1
		13	22	29.20	1.2167	230	-70	-3.50	Wetting	1
		13	24	29.23	1.2181	233	-67	-3.35	Wetting	1
		13	26	29.27	1.2194	236	-64	-3.20	Wetting	1
		13	36	29.43	1.2264	240	-60	-3.00	Wetting	1
		13	51	29.68	1.2368	243	-57	-2.85	Wetting	1
		14	56	30.77	1.2819	244	-56	-2.80	Wetting	1
		15	56	31.77	1.3236	245	-55	-2.75	Wetting	1
		16	31	32.35	1.3479	245	-55	-2.75	Wetting	1
		17	31	33.35	1.3896	245	-55	-2.75	Wetting	1
28-Feb-16	2	8	31	48.35	2.0146	247	-53	-2.65	Wetting	1
		10	30	50.33	2.0972	247	-53	-2.65	Wetting	2
29-Feb-16	3	6	5	69.92	2.9132	248	-52	-2.60	Wetting	2
		15	55	79.75	3.3229	248	-52	-2.60	Wetting	2
1-Mar-16	4	8	30	96.33	4.0139	249	-51	-2.55	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	30	122.33	5.0972	300	0	0.00	Drying	2
		10	32	122.37	5.0986	255	-45	-2.25	Drying	2
		10	34	122.40	5.1000	255	-45	-2.25	Drying	2
		10	38	122.47	5.1028	253	-47	-2.35	Drying	2
		10	48	122.63	5.1097	251	-49	-2.45	Drying	2
		11	3	122.88	5.1201	249	-51	-2.55	Drying	2
		12	3	123.88	5.1618	247	-53	-2.65	Drying	2
		13	33	125.38	5.2243	246	-54	-2.70	Drying	2
		14	3	125.88	5.2451	246	-54	-2.70	Drying	2
		15	3	126.88	5.2868	246	-54	-2.70	Drying	2
		16	3	127.88	5.3285	246	-54	-2.70	Drying	2
		18	3	129.88	5.4118	246	-54	-2.70	Drying	2
3-Mar-16	6	9	0	144.83	6.0347	246	-54	-2.70	Drying	2
		12	0	147.83	6.1597	246	-54	-2.70	Drying	2
		15	0	150.83	6.2847	245	-55	-2.75	Drying	2
		16	10	152.00	6.3333	245	-55	-2.75	Drying	2
		17	15	153.08	6.3785	244	-56	-2.80	Drying	2
4-Mar-16	7	6	10	166.00	6.9167	243	-57	-2.85	Drying	2
		7	40	167.50	6.9792	243	-57	-2.85	Drying	2
		9	40	169.50	7.0625	243	-57	-2.85	Drying	2
		13	0	172.83	7.2014	243	-57	-2.85	Drying	2
		13	30	173.33	7.2222	243	-57	-2.85	Wetting	2
		13	32	173.37	7.2236	246	-54	-2.70	Wetting	2
		13	34	173.40	7.2250	247	-53	-2.65	Wetting	2
		13	38	173.47	7.2278	248.5	-51.5	-2.58	Wetting	2
		13	48	173.63	7.2347	249.5	-50.5	-2.53	Wetting	2
		14	5	173.92	7.2465	250	-50	-2.50	Wetting	2
		15	5	174.92	7.2882	250	-50	-2.50	Wetting	2
		16	5	175.92	7.3299	251	-49	-2.45	Wetting	2
		17	5	176.92	7.3715	251	-49	-2.45	Wetting	2
		18	5	177.92	7.4132	251	-49	-2.45	Wetting	2
5-Mar-16	8	7	30	191.33	7.9722	251.5	-48.5	-2.43	Wetting	2
		14	0	197.83	8.2431	252	-48	-2.40	Wetting	2
		21	0	204.83	8.5347	252	-48	-2.40	Wetting	2
6-Mar-16	9	7	30	215.33	8.9722	252	-48	-2.40	Wetting	2
		12	0	219.83	9.1597	252	-48	-2.40	Wetting	2
		21	0	228.83	9.5347	252	-48	-2.40	Wetting	2
7-Mar-16	10	6	0	237.83	9.9097	252	-48	-2.40	Wetting	3
		8	0	239.83	9.9931	252	-48	-2.40	Wetting	3
		10	0	241.83	10.0764	252	-48	-2.40	Wetting	3
		12	0	243.83	10.1597	252	-48	-2.40	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 1 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	11	4	13	260.05	10.8354	300	0	0.00	Drying	3
		4	15	260.08	10.8368	295	-5	-0.25	Drying	3
		4	17	260.12	10.8382	295.5	-4.5	-0.23	Drying	3
		4	9	259.98	10.8326	294	-6	-0.30	Drying	3
		4	21	260.18	10.8410	294	-6	-0.30	Drying	3
		4	31	260.35	10.8479	292.5	-7.5	-0.38	Drying	3
		4	46	260.60	10.8583	291	-9	-0.45	Drying	3
		5	16	261.10	10.8792	289.5	-10.5	-0.53	Drying	3
		6	16	262.10	10.9208	288	-12	-0.60	Drying	3
		8	45	264.58	11.0243	283	-17	-0.85	Drying	3
		10	46	266.60	11.1083	281	-19	-0.95	Drying	3
		14	10	270.00	11.2500	277	-23	-1.15	Drying	3
		15	15	271.08	11.2951	276	-24	-1.20	Drying	3
		20	30	276.33	11.5139	274	-26	-1.30	Drying	3
9-Mar-16	12	7	0	286.83	11.9514	271	-29	-1.45	Drying	3
		15	35	295.42	12.3090	269	-31	-1.55	Drying	3
		20	0	299.83	12.4931	268	-32	-1.60	Drying	3
10-Mar-16	13	8	0	311.83	12.9931	268	-32	-1.60	Drying	3
		14	30	318.33	13.2639	267	-33	-1.65	Drying	3
		16	40	320.50	13.3542	267	-33	-1.65	Drying	3
11-Mar-16	14	6	0	333.83	13.9097	266	-34	-1.70	Drying	3
		8	0	335.83	13.9931	266	-34	-1.70	Drying	3
		8	10	336.00	14.0000	261.5	-38.5	-1.93	Wetting	3
		8	12	336.03	14.0014	261.5	-38.5	-1.93	Wetting	3
		8	14	336.07	14.0028	262	-38	-1.90	Wetting	3
		8	24	336.23	14.0097	267.5	-32.5	-1.63	Wetting	3
		8	39	336.48	14.0201	271	-29	-1.45	Wetting	3
		9	39	337.48	14.0618	272	-28	-1.40	Wetting	3
		10	39	338.48	14.1035	272	-28	-1.40	Wetting	3
		12	39	340.48	14.1868	272.5	-27.5	-1.38	Wetting	3
		14	39	342.48	14.2701	273	-27	-1.35	Wetting	3
		16	39	344.48	14.3535	273	-27	-1.35	Wetting	3
12-Mar-16	15	8	30	360.33	15.0139	273	-27	-1.35	Wetting	3
		11	30	363.33	15.1389	273	-27	-1.35	Wetting	3
		14	30	366.33	15.2639	273	-27	-1.35	Wetting	3
		17	30	369.33	15.3889	273	-27	-1.35	Wetting	3
13-Mar-16	16	6	0	381.83	15.9097	273	-27	-1.35	Wetting	3
		11	30	387.33	16.1389	273	-27	-1.35	Wetting	3
		21	0	396.83	16.5347	273	-27	-1.35	Wetting	3
14-Mar-16	17	6	0	405.83	16.9097	273	-27	-1.35	Wetting	3
		8	0	407.83	16.9931	273	-27	-1.35	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 10 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	10	0	10.00	0.0000	300	0	0.00	Drying	1
	0	10	2	0.03	0.0014	293	-7	-0.35	Drying	1
		10	4	0.07	0.0028	292.5	-7.5	-0.38	Drying	1
		10	6	0.10	0.0042	291	-9	-0.45	Drying	1
		10	16	0.27	0.0111	290	-10	-0.50	Drying	1
		10	31	0.52	0.0215	288	-12	-0.60	Drying	1
		11	1	1.02	0.0424	287	-13	-0.65	Drying	1
		11	31	1.52	0.0632	284	-16	-0.80	Drying	1
		12	31	2.52	0.1049	282	-18	-0.90	Drying	1
		13	31	3.52	0.1465	281	-19	-0.95	Drying	1
		15	31	5.52	0.2299	279	-21	-1.05	Drying	1
		16	31	6.52	0.2715	279	-21	-1.05	Drying	1
27-Feb-16	1	7	25	21.42	0.8924	270.5	-29.5	-1.48	Drying	1
		8	25	22.42	0.9340	270.5	-29.5	-1.48	Drying	1
		9	25	23.42	0.9757	270	-30	-1.50	Drying	1
		10	0	24.00	1.0000	268	-32	-1.60	Drying	1
		13	45	27.75	1.1563	268	-32	-1.60	Drying	1
		14	10	28.17	1.1736	268	-32	-1.60	Drying	1
		14	10	28.17	1.1736	268	-32	-1.60	Wetting	1
		14	12	28.20	1.1750	268	-32	-1.60	Wetting	1
		14	14	28.23	1.1764	267	-33	-1.65	Wetting	1
		14	16	28.27	1.1778	270	-30	-1.50	Wetting	1
		14	26	28.43	1.1847	278	-22	-1.10	Wetting	1
		14	41	28.68	1.1951	287	-13	-0.65	Wetting	1
		15	11	29.18	1.2160	294	-6	-0.30	Wetting	1
		15	41	29.68	1.2368	302	2	0.10	Wetting	1
		16	41	30.68	1.2785	309	9	0.45	Wetting	1
		17	41	31.68	1.3201	311	11	0.55	Wetting	1
28-Feb-16	2	8	31	46.52	1.9382	316	16	0.80	Wetting	1
		10	30	48.50	2.0208	318	18	0.90	Wetting	1
		14	43	52.72	2.1965	318	18	0.90	Wetting	1
		14	47	52.78	2.1993	318	18	0.90	Wetting	1
29-Feb-16	3	6	7	68.12	2.8382	317	17	0.85	Wetting	1
		15	53	77.88	3.2451	317	17	0.85	Wetting	1
1-Mar-16	4	8	30	94.50	3.9375	318	18	0.90	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 10 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	40	120.67	5.0278	300	0	0.00	Drying	2
		10	42	120.70	5.0292	284	-16	-0.80	Drying	2
		10	44	120.73	5.0306	281	-19	-0.95	Drying	2
		10	48	120.80	5.0333	280	-20	-1.00	Drying	2
		10	58	120.97	5.0403	279	-21	-1.05	Drying	2
		11	13	121.22	5.0507	279	-21	-1.05	Drying	2
		12	13	122.22	5.0924	279	-21	-1.05	Drying	2
		13	13	123.22	5.1340	279	-21	-1.05	Drying	2
		14	13	124.22	5.1757	280	-20	-1.00	Drying	2
		15	13	125.22	5.2174	282	-18	-0.90	Drying	2
		16	13	126.22	5.2590	282	-18	-0.90	Drying	2
		18	13	128.22	5.3424	283	-17	-0.85	Drying	2
3-Mar-16	6	9	0	143.00	5.9583	288	-12	-0.60	Drying	2
		12	0	146.00	6.0833	289	-11	-0.55	Drying	2
		15	0	149.00	6.2083	289	-11	-0.55	Drying	2
		16	15	150.25	6.2604	289	-11	-0.55	Drying	2
		17	15	151.25	6.3021	289	-11	-0.55	Drying	2
4-Mar-16	7	6	10	164.17	6.8403	288.5	-11.5	-0.58	Drying	2
		7	40	165.67	6.9028	288.5	-11.5	-0.58	Drying	2
		9	40	167.67	6.9861	288.5	-11.5	-0.58	Drying	2
		13	0	171.00	7.1250	288.5	-11.5	-0.58	Drying	2
		13	30	171.50	7.1458	288.5	-11.5	-0.58	Drying	2
		13	32	171.53	7.1472	304	4	0.20	Drying	2
		13	34	171.57	7.1486	317	17	0.85	Drying	2
		13	38	171.63	7.1514	323	23	1.15	Drying	2
		13	48	171.80	7.1583	329	29	1.45	Wetting	2
		14	5	172.08	7.1701	333	33	1.65	Wetting	2
		15	55	173.92	7.2465	338	38	1.90	Wetting	2
		16	5	174.08	7.2535	339	39	1.95	Wetting	2
		17	5	175.08	7.2951	340	40	2.00	Wetting	2
		18	5	176.08	7.3368	341	41	2.05	Wetting	2
5-Mar-16	8	7	30	189.50	7.8958	345	45	2.25	Wetting	2
		14	0	196.00	8.1667	345	45	2.25	Wetting	2
		21	0	203.00	8.4583	346	46	2.30	Wetting	2
6-Mar-16	9	7	30	213.50	8.8958	346.5	46.5	2.33	Wetting	2
		12	0	218.00	9.0833	346.5	46.5	2.33	Wetting	2
		21	0	227.00	9.4583	347	47	2.35	Wetting	2
7-Mar-16	10	6	0	236.00	9.8333	347	47	2.35	Wetting	2
		8	0	238.00	9.9167	347	47	2.35	Wetting	2
		10	0	240.00	10.0000	347	47	2.35	Wetting	2
		12	0	242.00	10.0833	347	47	2.35	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 10 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
8-Mar-16	11	4	13	258.22	10.7590	300	0	0.00	Drying	3
		4	15	258.25	10.7604	294.5	-5.5	-0.28	Drying	3
		4	17	258.28	10.7618	294	-6	-0.30	Drying	3
		4	19	258.32	10.7632	294	-6	-0.30	Drying	3
		4	21	258.35	10.7646	294	-6	-0.30	Drying	3
		5	31	259.52	10.8132	293	-7	-0.35	Drying	3
		4	46	258.77	10.7819	293	-7	-0.35	Drying	3
		5	16	259.27	10.8028	292	-8	-0.40	Drying	3
		6	16	260.27	10.8444	292	-8	-0.40	Drying	3
		8	46	262.77	10.9486	290	-10	-0.50	Drying	3
		10	46	264.77	11.0319	290	-10	-0.50	Drying	3
		14	8	268.13	11.1722	288	-12	-0.60	Drying	3
		20	30	274.50	11.4375	286.5	-13.5	-0.68	Drying	3
9-Mar-16	12	7	0	285.00	11.8750	286	-14	-0.70	Drying	3
		15	35	293.58	12.2326	284	-16	-0.80	Drying	3
		20	0	298.00	12.4167	283.5	-16.5	-0.83	Drying	3
10-Mar-16	13	8	0	334.00	13.9167	283	-17	-0.85	Drying	3
		14	30	340.50	14.1875	282	-18	-0.90	Drying	3
		16	40	342.67	14.2778	282	-18	-0.90	Drying	3
11-Mar-16	14	6	0	332.00	13.8333	281	-19	-0.95	Drying	3
		8	0	334.00	13.9167	281	-19	-0.95	Drying	3
		8	10	334.17	13.9236	281	-19	-0.95	Wetting	3
		8	12	334.20	13.9250	284.5	-15.5	-0.78	Wetting	3
		8	14	334.23	13.9264	287	-13	-0.65	Wetting	3
		8	24	334.40	13.9333	295.5	-4.5	-0.23	Wetting	3
		8	39	334.65	13.9438	304	4	0.20	Wetting	3
		9	39	335.65	13.9854	310	10	0.50	Wetting	3
		10	39	336.65	14.0271	325.5	25.5	1.28	Wetting	3
		12	39	338.65	14.1104	336.5	36.5	1.83	Wetting	3
		14	39	340.65	14.1938	337	37	1.85	Wetting	3
		16	39	342.65	14.2771	338	38	1.90	Wetting	3
		18	39	344.65	14.3604	338	38	1.90	Wetting	3
12-Mar-16	15	8	30	358.50	14.9375	341	41	2.05	Wetting	3
		11	30	361.50	15.0625	341	41	2.05	Wetting	3
		14	30	364.50	15.1875	341	41	2.05	Wetting	3
		17	30	367.50	15.3125	341	41	2.05	Wetting	3
13-Mar-16	16	6	0	380.00	15.8333	342	42	2.10	Wetting	3
		11	30	385.50	16.0625	342	42	2.10	Wetting	3
		21	0	395.00	16.4583	342	42	2.10	Wetting	3
14-Mar-16	17	6	0	404.00	16.8333	343	43	2.15	Wetting	3
		8	0	406.00	16.9167	343	43	2.15	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 20kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	10	10	10.17	0.0000	300	0	0.00	Drying	1
	0	10	12	0.03	0.0014	263	-37	-1.85	Drying	1
		10	14	0.07	0.0028	262	-38	-1.90	Drying	1
		10	16	0.10	0.0042	261.5	-38.5	-1.93	Drying	1
		10	26	0.27	0.0111	260	-40	-2.00	Drying	1
		10	41	0.52	0.0215	258.5	-41.5	-2.08	Drying	1
		11	11	1.02	0.0424	256.5	-43.5	-2.18	Drying	1
		11	41	1.52	0.0632	255	-45	-2.25	Drying	1
		12	41	2.52	0.1049	252	-48	-2.40	Drying	1
		13	41	3.52	0.1465	250	-50	-2.50	Drying	1
		15	41	5.52	0.2299	247	-53	-2.65	Drying	1
		16	41	6.52	0.2715	246	-54	-2.70	Drying	1
27-Feb-16	1	7	25	21.25	0.8854	240	-60	-3.00	Drying	1
		8	25	22.25	0.9271	239.5	-60.5	-3.03	Drying	1
		9	25	23.25	0.9688	239	-61	-3.05	Drying	1
		13	45	27.58	1.1493	238	-62	-3.10	Drying	1
		14	10	28.00	1.1667	238	-62	-3.10	Drying	1
		14	12	28.03	1.1681	238	-62	-3.10	Wetting	1
		14	14	28.07	1.1694	238	-62	-3.10	Wetting	1
		14	16	28.10	1.1708	245	-55	-2.75	Wetting	1
		14	26	28.27	1.1778	265	-35	-1.75	Wetting	1
		14	41	28.52	1.1882	283	-17	-0.85	Wetting	1
		15	11	29.02	1.2090	293	-7	-0.35	Wetting	1
		15	41	29.52	1.2299	305	5	0.25	Wetting	1
		16	41	30.52	1.2715	313	13	0.65	Wetting	1
		17	41	31.52	1.3132	316	16	0.80	Wetting	1
28-Feb-16	2	8	31	46.35	1.9313	321	21	1.05	Wetting	1
		10	30	48.33	2.0139	321.5	21.5	1.08	Wetting	1
		14	45	52.58	2.1910	322	22	1.10	Wetting	1
29-Feb-16	3	6	7	67.95	2.8313	323	23	1.15	Wetting	1
		15	53	77.72	3.2382	324	24	1.20	Wetting	1
1-Mar-16	4	8	30	94.33	3.9306	324	24	1.20	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 20kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	40	120.50	5.0208	300	0	0.00	Drying	2
		10	42	120.53	5.0222	284	-16	-0.80	Drying	2
		10	44	120.57	5.0236	283	-17	-0.85	Drying	2
		10	48	120.63	5.0264	282	-18	-0.90	Drying	2
		10	58	120.80	5.0333	280	-20	-1.00	Drying	2
		11	13	121.05	5.0438	278	-22	-1.10	Drying	2
		12	13	122.05	5.0854	276	-24	-1.20	Drying	2
		13	13	123.05	5.1271	275	-25	-1.25	Drying	2
		14	13	124.05	5.1688	275	-25	-1.25	Drying	2
		15	13	125.05	5.2104	275	-25	-1.25	Drying	2
		16	13	126.05	5.2521	277	-23	-1.15	Drying	2
		18	13	128.05	5.3354	277	-23	-1.15	Drying	2
3-Mar-16	6	9	0	142.83	5.9514	279	-21	-1.05	Drying	2
		12	0	145.83	6.0764	279	-21	-1.05	Drying	2
		15	0	148.83	6.2014	279	-21	-1.05	Drying	2
		16	15	150.08	6.2535	279	-21	-1.05	Drying	2
		17	15	151.08	6.2951	279	-21	-1.05	Drying	2
4-Mar-16	7	6	10	164.00	6.8333	277	-23	-1.15	Drying	2
		7	40	165.50	6.8958	277	-23	-1.15	Drying	2
		9	40	167.50	6.9792	277	-23	-1.15	Drying	2
		13	0	170.83	7.1181	277	-23	-1.15	Drying	2
		13	30	171.33	7.1389	277	-23	-1.15	Wetting	2
		13	32	171.37	7.1403	297	-3	-0.15	Wetting	2
		13	34	171.40	7.1417	332	32	1.60	Wetting	2
		13	38	171.47	7.1444	356.5	56.5	2.83	Wetting	2
		13	48	171.63	7.1514	385.5	85.5	4.28	Wetting	2
		14	5	171.92	7.1632	411	111	5.55	Wetting	2
		15	55	173.75	7.2396	439	139	6.95	Wetting	2
		16	5	173.92	7.2465	442	142	7.10	Wetting	2
		17	5	174.92	7.2882	443	143	7.15	Wetting	2
		18	5	175.92	7.3299	444	144	7.20	Wetting	2
5-Mar-16	8	7	30	189.33	7.8889	450	150	7.50	Wetting	2
		14	0	195.83	8.1597	450	150	7.50	Wetting	2
		21	0	202.83	8.4514	451	151	7.55	Wetting	2
6-Mar-16	9	7	30	213.33	8.8889	452	152	7.60	Wetting	2
		12	0	217.83	9.0764	452	152	7.60	Wetting	2
		21	0	226.83	9.4514	452	152	7.60	Wetting	2
7-Mar-16	10	6	0	235.83	9.8264	452	152	7.60	Wetting	2
		8	0	237.83	9.9097	452	152	7.60	Wetting	2
		10	0	239.83	9.9931	451	151	7.55	Wetting	2
		12	0	241.83	10.0764	451	151	7.55	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 20kN/m²

Date	Date of Started		Cum. Hours in Decimal	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
	Hours	Minutes			Reading	mm/100	in %			
8-Mar-16	11	4	13	258.05	10.7521	300	0	0.00	Drying	3
		4	15	258.08	10.7535	282	-18	-0.90	Drying	3
		4	17	258.12	10.7549	281.5	-18.5	-0.93	Drying	3
		4	19	258.15	10.7563	281	-19	-0.95	Drying	3
		4	21	258.18	10.7576	280.5	-19.5	-0.98	Drying	3
		5	31	259.35	10.8063	278.5	-21.5	-1.08	Drying	3
		4	46	258.60	10.7750	276	-24	-1.20	Drying	3
		5	16	259.10	10.7958	275.5	-24.5	-1.23	Drying	3
		6	16	260.10	10.8375	273	-27	-1.35	Drying	3
		8	46	262.60	10.9417	271	-29	-1.45	Drying	3
		10	46	264.60	11.0250	267	-33	-1.65	Drying	3
		14	8	267.97	11.1653	265	-35	-1.75	Drying	3
		20	30	274.33	11.4306	262.5	-37.5	-1.88	Drying	3
9-Mar-16	12	7	0	284.83	11.8681	260.5	-39.5	-1.98	Drying	3
		15	35	293.42	12.2257	259	-41	-2.05	Drying	3
		20	0	297.83	12.4097	258	-42	-2.10	Drying	3
10-Mar-16	13	8	0	309.83	12.9097	256.5	-43.5	-2.18	Drying	3
		14	30	316.33	13.1806	256	-44	-2.20	Drying	3
		16	40	318.50	13.2708	256	-44	-2.20	Drying	3
11-Mar-16	14	6	0	331.83	13.8264	253	-47	-2.35	Drying	3
		8	0	333.83	13.9097	253	-47	-2.35	Drying	3
		8	10	334.00	13.9167	253	-47	-2.35	Wetting	3
		8	12	334.03	13.9181	254.5	-45.5	-2.28	Wetting	3
		8	14	334.07	13.9194	258	-42	-2.10	Wetting	3
		8	24	334.23	13.9264	263	-37	-1.85	Wetting	3
		8	39	334.48	13.9368	278	-22	-1.10	Wetting	3
		9	39	335.48	13.9785	296	-4	-0.20	Wetting	3
		10	39	336.48	14.0201	310	10	0.50	Wetting	3
		12	39	338.48	14.1035	321.5	21.5	1.08	Wetting	3
		14	39	340.48	14.1868	337	37	1.85	Wetting	3
		16	39	342.48	14.2701	337.5	37.5	1.88	Wetting	3
		18	39	344.48	14.3535	338	38	1.90	Wetting	3
12-Mar-16	15	8	30	358.33	14.9306	339	39	1.95	Wetting	3
		11	30	361.33	15.0556	339	39	1.95	Wetting	3
		14	30	364.33	15.1806	339	39	1.95	Wetting	3
		17	30	367.33	15.3056	340.5	40.5	2.03	Wetting	3
13-Mar-16	16	6	0	379.83	15.8264	341	41	2.05	Wetting	3
		11	30	385.33	16.0556	341	41	2.05	Wetting	3
		21	0	394.83	16.4514	341	41	2.05	Wetting	3
14-Mar-16	17	6	0	403.83	16.8264	341.5	41.5	2.08	Wetting	3
		8	0	405.83	16.9097	341.5	41.5	2.08	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 30 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
26-Feb-16	Past of Day	10	15	10.25	0.0000	300	0	0.00	Drying	1
	0	10	17	0.03	0.0014	282.5	-17.5	-0.88	Drying	1
		10	19	0.07	0.0028	281.5	-18.5	-0.93	Drying	1
		10	21	0.10	0.0042	281	-19	-0.95	Drying	1
		10	31	0.27	0.0111	278.5	-21.5	-1.08	Drying	1
		10	46	0.52	0.0215	276	-24	-1.20	Drying	1
		11	16	1.02	0.0424	273	-27	-1.35	Drying	1
		11	46	1.52	0.0632	270.5	-29.5	-1.48	Drying	1
		12	46	2.52	0.1049	267	-33	-1.65	Drying	1
		13	46	3.52	0.1465	263	-37	-1.85	Drying	1
		15	46	5.52	0.2299	258	-42	-2.10	Drying	1
		16	46	6.52	0.2715	256	-44	-2.20	Drying	1
27-Feb-16	1	7	26	21.18	0.8826	244	-56	-2.80	Drying	1
		8	26	22.18	0.9243	243.5	-56.5	-2.83	Drying	1
		9	26	23.18	0.9660	243	-57	-2.85	Drying	1
		13	45	27.50	1.1458	241	-59	-2.95	Drying	1
		14	10	27.92	1.1632	241	-59	-2.95	Drying	1
		14	12	27.95	1.1646	233	-67	-3.35	Wetting	1
		14	14	27.98	1.1660	234	-66	-3.30	Wetting	1
		14	16	28.02	1.1674	235	-65	-3.25	Wetting	1
		14	26	28.18	1.1743	240	-60	-3.00	Wetting	1
		14	41	28.43	1.1847	248	-52	-2.60	Wetting	1
		15	11	28.93	1.2056	252	-48	-2.40	Wetting	1
		15	41	29.43	1.2264	258	-42	-2.10	Wetting	1
		16	41	30.43	1.2681	265	-35	-1.75	Wetting	1
		17	41	31.43	1.3097	268	-32	-1.60	Wetting	1
28-Feb-16	2	8	31	46.27	1.9278	282	-18	-0.90	Wetting	1
		10	30	48.25	2.0104	282	-18	-0.90	Wetting	1
		14	45	52.50	2.1875	282	-18	-0.90	Wetting	1
29-Feb-16	3	6	7	67.87	2.8278	283	-17	-0.85	Wetting	1
		15	55	77.67	3.2361	283	-17	-0.85	Wetting	1
1-Mar-16	4	8	30	94.25	3.9271	283	-17	-0.85	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	5	10	40	120.42	5.0174	300	0	0.00	Drying	2
		10	42	120.45	5.0188	280	-20	-1.00	Drying	2
		10	44	120.48	5.0201	279	-21	-1.05	Drying	2
		10	48	120.55	5.0229	278	-22	-1.10	Drying	2
		10	58	120.72	5.0299	277	-23	-1.15	Drying	2
		11	13	120.97	5.0403	276	-24	-1.20	Drying	2
		12	13	121.97	5.0819	276	-24	-1.20	Drying	2
		13	13	122.97	5.1236	276	-24	-1.20	Drying	2
		14	13	123.97	5.1653	276	-24	-1.20	Drying	2
		15	13	124.97	5.2069	277	-23	-1.15	Drying	2
		16	13	125.97	5.2486	277	-23	-1.15	Drying	2
		18	13	127.97	5.3319	277	-23	-1.15	Drying	2
3-Mar-16	6	9	0	142.75	5.9479	278	-22	-1.10	Drying	2
		12	0	145.75	6.0729	278	-22	-1.10	Drying	2
		15	0	148.75	6.1979	278	-22	-1.10	Drying	2
		16	15	150.00	6.2500	278	-22	-1.10	Drying	2
		17	15	151.00	6.2917	278	-22	-1.10	Drying	2
4-Mar-16	7	6	10	163.92	6.8299	274	-26	-1.30	Drying	2
		7	40	165.42	6.8924	274	-26	-1.30	Drying	2
		9	40	167.42	6.9757	273	-27	-1.35	Drying	2
		13	0	170.75	7.1146	273	-27	-1.35	Drying	2
		13	30	171.25	7.1354	273	-27	-1.35	Wetting	2
		13	32	171.28	7.1368	273.5	-26.5	-1.33	Wetting	2
		13	34	171.32	7.1382	276	-24	-1.20	Wetting	2
		13	38	171.38	7.1410	278	-22	-1.10	Wetting	2
		13	48	171.55	7.1479	281	-19	-0.95	Wetting	2
		14	5	171.83	7.1597	284.5	-15.5	-0.78	Wetting	2
		15	55	173.67	7.2361	291	-9	-0.45	Wetting	2
		16	5	173.83	7.2431	294	-6	-0.30	Wetting	2
		17	5	174.83	7.2847	297	-3	-0.15	Wetting	2
		18	5	175.83	7.3264	298	-2	-0.10	Wetting	2
5-Mar-16	8	7	30	189.25	7.8854	301	1	0.05	Wetting	2
		14	0	195.75	8.1563	301	1	0.05	Wetting	2
		21	0	202.75	8.4479	301.5	1.5	0.08	Wetting	2
6-Mar-16	9	7	30	213.25	8.8854	302	2	0.10	Wetting	2
		12	0	217.75	9.0729	302	2	0.10	Wetting	2
		21	0	226.75	9.4479	302	2	0.10	Wetting	2
7-Mar-16	10	6	0	235.75	9.8229	302	2	0.10	Wetting	2
		8	0	237.75	9.9063	302	2	0.10	Wetting	2
		10	0	239.75	9.9896	301	1	0.05	Wetting	2
		12	0	241.75	10.0729	301	1	0.05	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 2 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	11	4	13	257.97	10.7486	300	0	0.00	Drying	3
		4	15	258.00	10.7500	271	-29	-1.45	Drying	3
		4	17	258.03	10.7514	270	-30	-1.50	Drying	3
		4	19	258.07	10.7528	269	-31	-1.55	Drying	3
		4	21	258.10	10.7542	269	-31	-1.55	Drying	3
		5	31	259.27	10.8028	267	-33	-1.65	Drying	3
		4	46	258.52	10.7715	266	-34	-1.70	Drying	3
		5	16	259.02	10.7924	265	-35	-1.75	Drying	3
		6	16	260.02	10.8340	264	-36	-1.80	Drying	3
		8	46	262.52	10.9382	262	-38	-1.90	Drying	3
		10	46	264.52	11.0215	261	-39	-1.95	Drying	3
		14	8	267.88	11.1618	258	-42	-2.10	Drying	3
		20	30	274.25	11.4271	253.5	-46.5	-2.33	Drying	3
9-Mar-16	12	7	0	284.75	11.8646	249	-51	-2.55	Drying	3
		15	35	293.33	12.2222	246	-54	-2.70	Drying	3
		20	0	297.75	12.4063	245	-55	-2.75	Drying	3
10-Mar-16	13	8	0	309.75	12.9063	241	-59	-2.95	Drying	3
		14	30	316.25	13.1771	240	-60	-3.00	Drying	3
		16	40	318.42	13.2674	239.5	-60.5	-3.03	Drying	3
11-Mar-16	14	6	0	331.75	13.8229	235	-65	-3.25	Drying	3
		8	0	333.75	13.9063	235	-65	-3.25	Drying	3
		8	10	333.92	13.9132	235	-65	-3.25	Wetting	3
		8	12	333.95	13.9146	234	-66	-3.30	Wetting	3
		8	14	333.98	13.9160	234.5	-65.5	-3.28	Wetting	3
		8	24	334.15	13.9229	235	-65	-3.25	Wetting	3
		8	39	334.40	13.9333	237	-63	-3.15	Wetting	3
		9	39	335.40	13.9750	242	-58	-2.90	Wetting	3
		10	39	336.40	14.0167	247	-53	-2.65	Wetting	3
		12	39	338.40	14.1000	258.5	-41.5	-2.08	Wetting	3
		14	39	340.40	14.1833	264.5	-35.5	-1.78	Wetting	3
		16	39	342.40	14.2667	265.5	-34.5	-1.73	Wetting	3
		18	39	344.40	14.3500	265.5	-34.5	-1.73	Wetting	3
12-Mar-16	15	8	30	358.25	14.9271	267	-33	-1.65	Wetting	3
		11	30	361.25	15.0521	267	-33	-1.65	Wetting	3
		14	30	364.25	15.1771	267	-33	-1.65	Wetting	3
		17	30	367.25	15.3021	267.5	-32.5	-1.63	Wetting	3
13-Mar-16	16	6	0	379.75	15.8229	268	-32	-1.60	Wetting	3
		11	30	385.25	16.0521	268	-32	-1.60	Wetting	3
		21	0	394.75	16.4479	268	-32	-1.60	Wetting	3
14-Mar-16	17	6	0	403.75	16.8229	268	-32	-1.60	Wetting	3
		8	0	405.75	16.9063	268	-32	-1.60	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 10 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
25-Feb-16	Past of Day	22	27	22.45	0.0000	300	0	0.00	Drying	1
	0	22	29	0.03	0.0014	297	-3	-0.15	Drying	1
		22	31	0.07	0.0028	295	-5	-0.25	Drying	1
		22	35	0.13	0.0056	295	-5	-0.25	Drying	1
		22	45	0.30	0.0125	294	-6	-0.30	Drying	1
		23	0	0.55	0.0229	294	-6	-0.30	Drying	1
		23	30	1.05	0.0438	292	-8	-0.40	Drying	1
		24	0	1.55	0.0646	292	-8	-0.40	Drying	1
26-Feb-16	1	1	0	2.55	0.1063	292	-8	-0.40	Drying	1
		6	0	7.55	0.3146	292	-8	-0.40	Drying	1
		8	0	9.55	0.3979	293	-7	-0.35	Drying	1
		10	0	11.55	0.4813	293	-7	-0.35	Drying	1
		14	0	15.55	0.6479	293	-7	-0.35	Drying	1
		22	27	24.00	1.0000	291	-9	-0.45	Drying	1
27-Feb-16	2	7	30	33.05	1.3771	291	-9	-0.45	Drying	1
		8	30	34.05	1.4188	291	-9	-0.45	Drying	1
		9	30	35.05	1.4604	291	-9	-0.45	Drying	1
		9	32	35.08	1.4618	296	-4	-0.20	Wetting	1
		9	34	35.12	1.4632	300	0	0.00	Wetting	1
		9	36	35.15	1.4646	305	5	0.25	Wetting	1
		9	46	35.32	1.4715	322.5	22.5	1.13	Wetting	1
		10	1	35.57	1.4819	332	32	1.60	Wetting	1
		10	31	36.07	1.5028	342	42	2.10	Wetting	1
		11	1	36.57	1.5236	348	48	2.40	Wetting	1
		12	1	37.57	1.5653	356	56	2.80	Wetting	1
		13	30	39.05	1.6271	360	60	3.00	Wetting	1
		16	30	42.05	1.7521	364	64	3.20	Wetting	1
		17	30	43.05	1.7938	365	65	3.25	Wetting	1
		22	27	48.00	2.0000	366	66	3.30	Wetting	1
28-Feb-16	3	8	31	58.07	2.4194	367	67	3.35	Wetting	1
		10	30	60.05	2.5021	368	68	3.40	Wetting	1
		14	40	64.22	2.6757	368	68	3.40	Wetting	1
		22	27	72.00	3.0000	368	68	3.40	Wetting	1
29-Feb-16	4	6	0	79.55	3.3146	369	69	3.45	Wetting	1
		15	50	89.38	3.7243	369	69	3.45	Wetting	1
		22	27	96.00	4.0000	370	70	3.50	Wetting	1
1-Mar-16	5	8	30	106.05	4.4188	370	70	3.50	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 10 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	6	9	30	131.05	5.4604	300	0	0.00	Drying	2
		9	32	131.08	5.4618	299	-1	-0.05	Drying	2
		9	34	131.12	5.4632	299	-1	-0.05	Drying	2
		9	38	131.18	5.4660	298	-2	-0.10	Drying	2
		9	48	131.35	5.4729	298	-2	-0.10	Drying	2
		10	3	131.60	5.4833	298	-2	-0.10	Drying	2
		11	3	132.60	5.5250	298	-2	-0.10	Drying	2
		12	3	133.60	5.5667	298	-2	-0.10	Drying	2
		13	3	134.60	5.6083	298	-2	-0.10	Drying	2
		14	3	135.60	5.6500	298	-2	-0.10	Drying	2
		15	3	136.60	5.6917	298	-2	-0.10	Drying	2
		16	3	137.60	5.7333	298	-2	-0.10	Drying	2
		18	3	139.60	5.8167	298	-2	-0.10	Drying	2
		22	27	144.00	6.0000	297.5	-2.5	-0.13	Drying	2
3-Mar-16	7	9	0	154.55	6.4396	297	-3	-0.15	Drying	2
		15	0	160.55	6.6896	297	-3	-0.15	Drying	2
		16	15	161.80	6.7417	296	-4	-0.20	Drying	2
		17	20	162.88	6.7868	296	-4	-0.20	Drying	2
		22	27	168.00	7.0000	296	-4	-0.20	Drying	2
4-Mar-16	8	6	10	175.72	7.3215	295	-5	-0.25	Drying	2
		7	40	177.22	7.3840	295	-5	-0.25	Drying	2
		9	40	179.22	7.4674	295	-5	-0.25	Drying	2
		13	0	182.55	7.6063	295	-5	-0.25	Drying	2
		13	30	183.05	7.6271	296	-4	-0.20	Wetting	2
		13	32	183.08	7.6285	297	-3	-0.15	Wetting	2
		13	34	183.12	7.6299	297	-3	-0.15	Wetting	2
		13	38	183.18	7.6326	298	-2	-0.10	Wetting	2
		13	48	183.35	7.6396	298	-2	-0.10	Wetting	2
		14	5	183.63	7.6514	299	-1	-0.05	Wetting	2
		15	5	184.63	7.6931	299	-1	-0.05	Wetting	2
		16	5	185.63	7.7347	299	-1	-0.05	Wetting	2
		17	5	186.63	7.7764	299	-1	-0.05	Wetting	2
		18	5	187.63	7.8181	299	-1	-0.05	Wetting	2
		22	27	192.00	8.0000	300	0	0.00	Wetting	2
5-Mar-16	9	7	30	201.05	8.3771	301	1	0.05	Wetting	2
		14	0	207.55	8.6479	302	2	0.10	Wetting	2
		21	0	214.55	8.9396	303	3	0.15	Wetting	2
		22	27	216.00	9.0000	304	4	0.20	Wetting	2
6-Mar-16	10	7	30	225.05	9.3771	305	5	0.25	Wetting	2
		14	0	231.55	9.6479	305	5	0.25	Wetting	2
		21	0	238.55	9.9396	305	5	0.25	Wetting	2
		22	27	240.00	10.0000	305	5	0.25	Wetting	2
7-Mar-16	11	6	0	247.55	10.3146	305	5	0.25	Wetting	2
		8	0	249.55	10.3979	305	5	0.25	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 10 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	12	4	13	269.77	11.2403	300	0	0.00	Drying	3
		4	15	269.80	11.2417	290.5	-9.5	-0.48	Drying	3
		4	17	269.83	11.2431	290	-10	-0.50	Drying	3
		4	19	269.87	11.2444	289.5	-10.5	-0.53	Drying	3
		4	21	269.90	11.2458	289	-11	-0.55	Drying	3
		5	31	271.07	11.2944	288	-12	-0.60	Drying	3
		4	46	270.32	11.2632	287	-13	-0.65	Drying	3
		5	16	270.82	11.2840	286.5	-13.5	-0.68	Drying	3
		6	16	271.82	11.3257	284	-16	-0.80	Drying	3
		8	46	274.32	11.4299	281	-19	-0.95	Drying	3
		10	46	276.32	11.5132	276	-24	-1.20	Drying	3
		14	8	279.68	11.6535	268	-32	-1.60	Drying	3
		20	30	286.05	11.9188	258	-42	-2.10	Drying	3
		22	27	288.00	12.0000	258	-42	-2.10	Drying	3
9-Mar-16	13	7	0	296.55	12.3563	250	-50	-2.50	Drying	3
		15	35	305.13	12.7139	246	-54	-2.70	Drying	3
		20	15	309.80	12.9083	243	-57	-2.85	Drying	3
		22	27	312.00	13.0000	243	-57	-2.85	Drying	3
10-Mar-16	14	8	0	321.55	13.3979	242	-58	-2.90	Drying	3
		14	30	328.05	13.6688	237	-63	-3.15	Drying	3
		16	40	330.22	13.7590	236	-64	-3.20	Drying	3
		22	27	336.00	14.0000	233	-67	-3.35	Drying	3
11-Mar-16	15	6	30	344.05	14.3354	230	-70	-3.50	Drying	3
		8	0	345.55	14.3979	229	-71	-3.55	Drying	3
		8	10	345.72	14.4049	248	-52	-2.60	Wetting	3
		8	12	345.75	14.4063	254	-46	-2.30	Wetting	3
		8	14	345.78	14.4076	258	-42	-2.10	Wetting	3
		8	24	345.95	14.4146	266	-34	-1.70	Wetting	3
		8	39	346.20	14.4250	277.5	-22.5	-1.13	Wetting	3
		9	39	347.20	14.4667	287	-13	-0.65	Wetting	3
		10	39	348.20	14.5083	302	2	0.10	Wetting	3
		12	39	350.20	14.5917	326	26	1.30	Wetting	3
		14	39	352.20	14.6750	328	28	1.40	Wetting	3
		16	39	354.20	14.7583	331	31	1.55	Wetting	3
		18	39	356.20	14.8417	332	32	1.60	Wetting	3
		22	27	360.00	15.0000	334	34	1.70	Wetting	3
12-Mar-16	16	8	30	370.05	15.4188	335	35	1.75	Wetting	3
		11	30	373.05	15.5438	335	35	1.75	Wetting	3
		14	30	376.05	15.6688	336	36	1.80	Wetting	3
		17	30	379.05	15.7938	336.5	36.5	1.83	Wetting	3
		22	27	384.00	16.0000	337	37	1.85	Wetting	3
13-Mar-16	17	6	0	391.55	16.3146	338	38	1.90	Wetting	3
		11	30	397.05	16.5438	338	38	1.90	Wetting	3
		21	0	406.55	16.9396	340	40	2.00	Wetting	3
14-Mar-16	18	6	0	415.55	17.3146	340	40	2.00	Wetting	3
		8	0	417.55	17.3979	340	40	2.00	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 20 kN/m²

	Date of Started			Cum. Hours in Decimal	Cum. Day	Dial Reading	Ver. Def mm/100	Ver.Def in %	Condition	CYCLES
	Date	Hours	Minutes							
25-Feb-16	Past of Day	22	46	22.77	0.0000	300	0	0.00	Drying	1
	0	22	48	0.03	0.0014	290	-10	-0.50	Drying	1
		22	50	0.07	0.0028	289	-11	-0.55	Drying	1
		22	54	0.13	0.0056	288	-12	-0.60	Drying	1
		23	4	0.30	0.0125	288	-12	-0.60	Drying	1
		23	19	0.55	0.0229	285	-15	-0.75	Drying	1
		23	49	1.05	0.0438	283	-17	-0.85	Drying	1
26-Feb-16	1	0	19	1.55	0.0646	281	-19	-0.95	Drying	1
		1	19	2.55	0.1063	280	-20	-1.00	Drying	1
		6	0	7.23	0.3014	277.5	-22.5	-1.13	Drying	1
		8	0	9.23	0.3847	277	-23	-1.15	Drying	1
		10	0	11.23	0.4681	276.5	-23.5	-1.18	Drying	1
		14	0	15.23	0.6347	276	-24	-1.20	Drying	1
		22	46	24.00	1.0000	275	-25	-1.25	Drying	1
27-Feb-16	2	7	30	32.73	1.3639	273.5	-26.5	-1.33	Drying	1
		8	30	33.73	1.4056	273.5	-26.5	-1.33	Drying	1
		8	35	33.82	1.4090	273	-27	-1.35	Wetting	1
		8	37	33.85	1.4104	278.5	-21.5	-1.08	Wetting	1
		8	39	33.88	1.4118	282.5	-17.5	-0.88	Wetting	1
		8	41	33.92	1.4132	287	-13	-0.65	Wetting	1
		8	51	34.08	1.4201	297	-3	-0.15	Wetting	1
		9	6	34.33	1.4306	308	8	0.40	Wetting	1
		9	36	34.83	1.4514	323.5	23.5	1.18	Wetting	1
		10	6	35.33	1.4722	334	34	1.70	Wetting	1
		11	6	36.33	1.5139	347	47	2.35	Wetting	1
		12	6	37.33	1.5556	354	54	2.70	Wetting	1
		13	30	38.73	1.6139	361	61	3.05	Wetting	1
		15	30	40.73	1.6972	369	69	3.45	Wetting	1
		17	30	42.73	1.7806	375	75	3.75	Wetting	1
		22	46	48.00	2.0000	380	80	4.00	Wetting	1
28-Feb-16	3	8	31	57.75	2.4063	382	82	4.10	Wetting	1
		10	30	59.73	2.4889	382	82	4.10	Wetting	1
		14	47	64.02	2.6674	382	82	4.10	Wetting	1
		22	46	72.00	3.0000	383	83	4.15	Wetting	1
29-Feb-16	4	6	0	79.23	3.3014	384	84	4.20	Wetting	1
		15	55	89.15	3.7146	386	86	4.30	Wetting	1
		22	46	96.00	4.0000	387	87	4.35	Wetting	1
1-Mar-16	5	8	30	105.73	4.4056	387	87	4.35	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 20 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	6	9	30	130.73	5.4472	300	0	0.00	Drying	2
		9	32	130.77	5.4486	290	-10	-0.50	Drying	2
		9	34	130.80	5.4500	289	-11	-0.55	Drying	2
		9	38	130.87	5.4528	289	-11	-0.55	Drying	2
		9	48	131.03	5.4597	288	-12	-0.60	Drying	2
		10	3	131.28	5.4701	287	-13	-0.65	Drying	2
		11	3	132.28	5.5118	286	-14	-0.70	Drying	2
		12	3	133.28	5.5535	286	-14	-0.70	Drying	2
		13	3	134.28	5.5951	286	-14	-0.70	Drying	2
		14	3	135.28	5.6368	286	-14	-0.70	Drying	2
		15	3	136.28	5.6785	286	-14	-0.70	Drying	2
		16	3	137.28	5.7201	287	-13	-0.65	Drying	2
		18	3	139.28	5.8035	288	-12	-0.60	Drying	2
		22	46	144.00	6.0000	288	-12	-0.60	Drying	2
3-Mar-16	7	9	0	154.23	6.4264	288	-12	-0.60	Drying	2
		15	0	160.23	6.6764	289	-11	-0.55	Drying	2
		16	15	161.48	6.7285	289	-11	-0.55	Drying	2
		17	20	162.57	6.7736	288	-12	-0.60	Drying	2
		22	46	168.00	7.0000	287	-13	-0.65	Drying	2
4-Mar-16	8	6	10	175.40	7.3083	286	-14	-0.70	Drying	2
		7	40	176.90	7.3708	286	-14	-0.70	Drying	2
		9	40	178.90	7.4542	286	-14	-0.70	Drying	2
		13	0	182.23	7.5931	286	-14	-0.70	Drying	2
		13	30	182.73	7.6139	286	-14	-0.70	Wetting	2
		13	32	182.77	7.6153	298	-2	-0.10	Wetting	2
		13	34	182.80	7.6167	302	2	0.10	Wetting	2
		13	38	182.87	7.6194	306	6	0.30	Wetting	2
		13	48	183.03	7.6264	312.5	12.5	0.63	Wetting	2
		14	5	183.32	7.6382	319	19	0.95	Wetting	2
		15	5	184.32	7.6799	335	35	1.75	Wetting	2
		16	5	185.32	7.7215	345	45	2.25	Wetting	2
		17	5	186.32	7.7632	350	50	2.50	Wetting	2
		18	5	187.32	7.8049	353.5	53.5	2.68	Wetting	2
		22	46	192.00	8.0000	359	59	2.95	Wetting	2
5-Mar-16	9	7	30	200.73	8.3639	363	63	3.15	Wetting	2
		14	0	207.23	8.6347	364	64	3.20	Wetting	2
		21	0	214.23	8.9264	365	65	3.25	Wetting	2
		22	46	216.00	9.0000	365	65	3.25	Wetting	2
6-Mar-16	10	7	30	224.73	9.3639	365.5	65.5	3.28	Wetting	2
		14	0	231.23	9.6347	365.5	65.5	3.28	Wetting	2
		21	0	238.23	9.9264	365.5	65.5	3.28	Wetting	2
		22	46	240.00	10.0000	366	66	3.30	Wetting	2
7-Mar-16	11	6	0	247.23	10.3014	367.5	67.5	3.38	Wetting	2
		8	0	249.23	10.3847	367.5	67.5	3.38	Wetting	2
		10	0	251.23	10.4681	367.5	67.5	3.38	Wetting	2
		12	0	253.23	10.5514	367.5	67.5	3.38	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 20 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	12	4	13	269.45	11.2271	300	0	0.00	Drying	3
		4	15	269.48	11.2285	283	-17	-0.85	Drying	3
		4	17	269.52	11.2299	282	-18	-0.90	Drying	3
		4	19	269.55	11.2313	282	-18	-0.90	Drying	3
		4	21	269.58	11.2326	281.5	-18.5	-0.93	Drying	3
		5	31	270.75	11.2813	280.5	-19.5	-0.98	Drying	3
		4	46	270.00	11.2500	278.5	-21.5	-1.08	Drying	3
		5	16	270.50	11.2708	278	-22	-1.10	Drying	3
		6	16	271.50	11.3125	278	-22	-1.10	Drying	3
		8	46	274.00	11.4167	275	-25	-1.25	Drying	3
		10	46	276.00	11.5000	274	-26	-1.30	Drying	3
		14	8	279.37	11.6403	273	-27	-1.35	Drying	3
		20	30	285.73	11.9056	271	-29	-1.45	Drying	3
		22	46	288.00	12.0000	271	-29	-1.45	Drying	3
9-Mar-16	13	7	0	296.23	12.3431	270	-30	-1.50	Drying	3
		15	35	304.82	12.7007	269	-31	-1.55	Drying	3
		20	15	309.48	12.8951	268	-32	-1.60	Drying	3
		22	46	312.00	13.0000	268	-32	-1.60	Drying	3
10-Mar-16	14	8	0	321.23	13.3847	268	-32	-1.60	Drying	3
		14	30	327.73	13.6556	267	-33	-1.65	Drying	3
		16	40	329.90	13.7458	267	-33	-1.65	Drying	3
		22	46	336.00	14.0000	266	-34	-1.70	Drying	3
11-Mar-16	15	6	30	343.73	14.3222	265	-35	-1.75	Drying	3
		8	0	345.23	14.3847	265	-35	-1.75	Drying	3
		8	10	345.40	14.3917	285	-15	-0.75	Wetting	3
		8	12	345.43	14.3931	289	-11	-0.55	Wetting	3
		8	14	345.47	14.3944	291	-9	-0.45	Wetting	3
		8	24	345.63	14.4014	296.5	-3.5	-0.18	Wetting	3
		8	39	345.88	14.4118	304	4	0.20	Wetting	3
		9	39	346.88	14.4535	310	10	0.50	Wetting	3
		10	39	347.88	14.4951	335.5	35.5	1.78	Wetting	3
		12	39	349.88	14.5785	356	56	2.80	Wetting	3
		14	39	351.88	14.6618	362	62	3.10	Wetting	3
		16	39	353.88	14.7451	368	68	3.40	Wetting	3
		18	39	355.88	14.8285	370	70	3.50	Wetting	3
		22	46	360.00	15.0000	375	75	3.75	Wetting	3
12-Mar-16	16	8	30	369.73	15.4056	380	80	4.00	Wetting	3
		11	30	372.73	15.5306	381	81	4.05	Wetting	3
		14	30	375.73	15.6556	381.5	81.5	4.08	Wetting	3
		17	30	378.73	15.7806	382	82	4.10	Wetting	3
		22	46	384.00	16.0000	382.5	82.5	4.13	Wetting	3
13-Mar-16	17	6	0	391.23	16.3014	383	83	4.15	Wetting	3
		11	30	396.73	16.5306	383	83	4.15	Wetting	3
		21	0	406.23	16.9264	384	84	4.20	Wetting	3
14-Mar-16	18	6	0	415.23	17.3014	384	84	4.20	Wetting	3
		8	0	417.23	17.3847	384	84	4.20	Wetting	3

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 30 kN/m²

Date of Started		Cum. Hours	Cum. Day	Dial	Ver. Def	Ver.Def	Condition	CYCLES		
Date	Hours	Minutes	in Decimal	Reading	mm/100	in %				
25-Feb-16	Past of Day	23	0	23.00	0.0000	300	0	0.00	Drying	1
	0	23	2	0.03	0.0014	284	-16	-0.80	Drying	1
		23	4	0.07	0.0028	283	-17	-0.85	Drying	1
		23	8	0.13	0.0056	283	-17	-0.85	Drying	1
		23	18	0.30	0.0125	282	-18	-0.90	Drying	1
		23	23	0.38	0.0160	282	-18	-0.90	Drying	1
		23	53	0.88	0.0368	281	-19	-0.95	Drying	1
26-Feb-16	1	0	23	1.38	0.0576	281	-19	-0.95	Drying	1
		1	23	2.38	0.0993	280	-20	-1.00	Drying	1
		6	0	7.00	0.2917	280	-20	-1.00	Drying	1
		8	0	9.00	0.3750	279	-21	-1.05	Drying	1
		10	0	11.00	0.4583	279	-21	-1.05	Drying	1
		14	0	15.00	0.6250	278	-22	-1.10	Drying	1
		23	0	24.00	1.0000	277.5	-22.5	-1.13	Drying	1
27-Feb-16	2	7	31	32.52	1.3549	277.5	-22.5	-1.13	Drying	1
		7	45	32.75	1.3646	275.5	-24.5	-1.23	Wetting	1
		7	47	32.78	1.3660	275.5	-24.5	-1.23	Wetting	1
		7	49	32.82	1.3674	276	-24	-1.20	Wetting	1
		7	51	32.85	1.3688	276.5	-23.5	-1.18	Wetting	1
		8	1	33.02	1.3757	279	-21	-1.05	Wetting	1
		8	16	33.27	1.3861	281	-19	-0.95	Wetting	1
		8	46	33.77	1.4069	286	-14	-0.70	Wetting	1
		9	16	34.27	1.4278	291	-9	-0.45	Wetting	1
		10	16	35.27	1.4694	297	-3	-0.15	Wetting	1
		11	16	36.27	1.5111	301	1	0.05	Wetting	1
		12	16	37.27	1.5528	305	5	0.25	Wetting	1
		13	30	38.50	1.6042	308	8	0.40	Wetting	1
		15	30	40.50	1.6875	312	12	0.60	Wetting	1
		17	30	42.50	1.7708	315	15	0.75	Wetting	1
		23	0	48.00	2.0000	316	16	0.80	Wetting	1
28-Feb-16	3	8	31	57.52	2.3965	318	18	0.90	Wetting	1
		10	30	59.50	2.4792	318	18	0.90	Wetting	1
		14	47	63.78	2.6576	318	18	0.90	Wetting	1
		23	0	72.00	3.0000	318	18	0.90	Wetting	1
29-Feb-16	4	6	0	79.00	3.2917	319	19	0.95	Wetting	1
		15	55	88.92	3.7049	319	19	0.95	Wetting	1
		23	0	96.00	4.0000	319	19	0.95	Wetting	1
1-Mar-16	5	8	30	105.50	4.3958	320	20	1.00	Wetting	1

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

LOCATION 3 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
2-Mar-16	6	9	30	130.50	5.4375	300	0	0.00	Drying	2
		9	32	130.53	5.4389	287	-13	-0.65	Drying	2
		9	34	130.57	5.4403	286	-14	-0.70	Drying	2
		9	38	130.63	5.4431	285	-15	-0.75	Drying	2
		9	48	130.80	5.4500	285	-15	-0.75	Drying	2
		10	3	131.05	5.4604	285	-15	-0.75	Drying	2
		11	3	132.05	5.5021	285	-15	-0.75	Drying	2
		12	3	133.05	5.5438	286	-14	-0.70	Drying	2
		13	3	134.05	5.5854	287	-13	-0.65	Drying	2
		14	3	135.05	5.6271	288	-12	-0.60	Drying	2
		15	3	136.05	5.6688	288	-12	-0.60	Drying	2
		16	3	137.05	5.7104	289	-11	-0.55	Drying	2
		18	3	139.05	5.7938	289	-11	-0.55	Drying	2
		23	0	144.00	6.0000	289	-11	-0.55	Drying	2
3-Mar-16	7	9	0	154.00	6.4167	289	-11	-0.55	Drying	2
		15	0	160.00	6.6667	290	-10	-0.50	Drying	2
		16	15	161.25	6.7188	289	-11	-0.55	Drying	2
		17	20	162.33	6.7639	289	-11	-0.55	Drying	2
		23	0	168.00	7.0000	288	-12	-0.60	Drying	2
4-Mar-16	8	6	10	175.17	7.2986	287	-13	-0.65	Drying	2
		7	40	176.67	7.3611	287	-13	-0.65	Drying	2
		9	40	178.67	7.4444	286.5	-13.5	-0.68	Drying	2
		13	0	182.00	7.5833	286.5	-13.5	-0.68	Drying	2
		13	30	182.50	7.6042	286.5	-13.5	-0.68	Wetting	2
		13	32	182.53	7.6056	289	-11	-0.55	Wetting	2
		13	34	182.57	7.6069	290	-10	-0.50	Wetting	2
		13	38	182.63	7.6097	291	-9	-0.45	Wetting	2
		13	48	182.80	7.6167	294	-6	-0.30	Wetting	2
		14	5	183.08	7.6285	297	-3	-0.15	Wetting	2
		15	5	184.08	7.6701	303	3	0.15	Wetting	2
		16	5	185.08	7.7118	307	7	0.35	Wetting	2
		17	5	186.08	7.7535	310	10	0.50	Wetting	2
		18	5	187.08	7.7951	312	12	0.60	Wetting	2
		23	0	192.00	8.0000	315	15	0.75	Wetting	2
5-Mar-16	9	7	30	200.50	8.3542	318	18	0.90	Wetting	2
		14	0	207.00	8.6250	318	18	0.90	Wetting	2
		21	0	214.00	8.9167	319	19	0.95	Wetting	2
		23	0	216.00	9.0000	320	20	1.00	Wetting	2
6-Mar-16	10	7	30	224.50	9.3542	320	20	1.00	Wetting	2
		12	0	229.00	9.5417	320	20	1.00	Wetting	2
		21	0	238.00	9.9167	320	20	1.00	Wetting	2
		23	0	240.00	10.0000	320	20	1.00	Wetting	2
7-Mar-16	11	6	0	247.00	10.2917	320	20	1.00	Wetting	2
		8	0	249.00	10.3750	320	20	1.00	Wetting	2
		10	0	251.00	10.4583	320	20	1.00	Wetting	2
		12	0	253.00	10.5417	320	20	1.00	Wetting	2

ROW DATA SWELLING AND SHRINKAGE MEASUREMENT

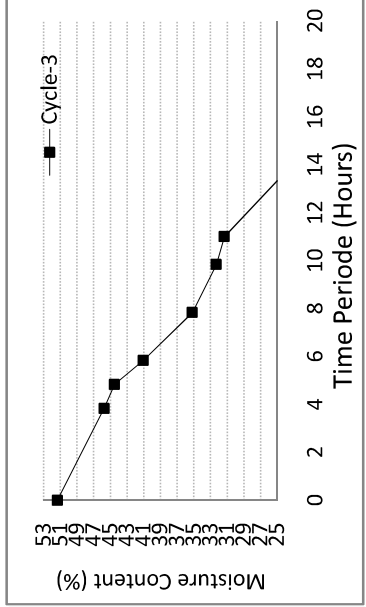
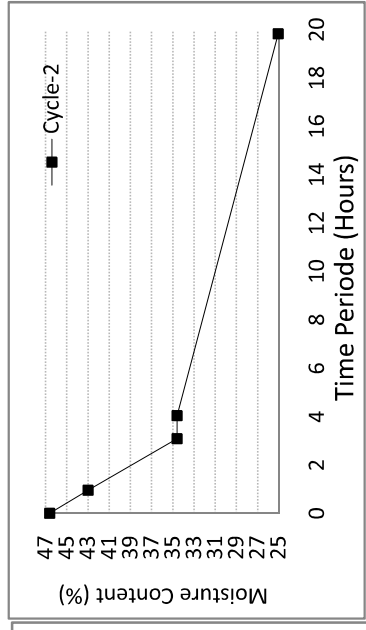
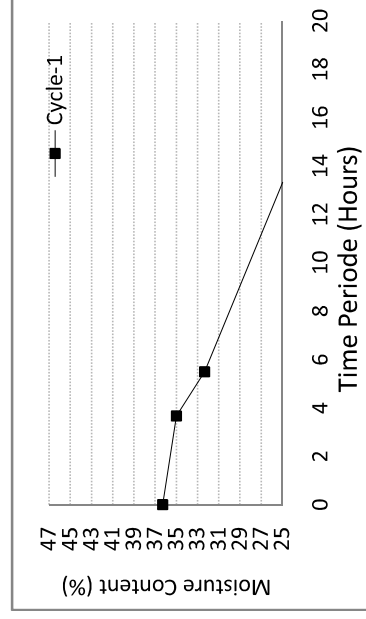
LOCATION 3 PRESSURE 30 kN/m²

Date of Started			Cum. Hours	Cum. Day	Dial	Ver. Def	Ver. Def	Condition	CYCLES	
Date	Hours	Minutes	in Decimal		Reading	mm/100	in %			
8-Mar-16	12	4	13	269.22	11.2174	300	0	0.00	Drying	3
		4	15	269.25	11.2188	282.5	-17.5	-0.88	Drying	3
		4	17	269.28	11.2201	282	-18	-0.90	Drying	3
		4	19	269.32	11.2215	281.5	-18.5	-0.93	Drying	3
		4	21	269.35	11.2229	281.5	-18.5	-0.93	Drying	3
		5	31	270.52	11.2715	281	-19	-0.95	Drying	3
		4	46	269.77	11.2403	280	-20	-1.00	Drying	3
		5	16	270.27	11.2611	280	-20	-1.00	Drying	3
		6	16	271.27	11.3028	280	-20	-1.00	Drying	3
		8	46	273.77	11.4069	280	-20	-1.00	Drying	3
		10	46	275.77	11.4903	280	-20	-1.00	Drying	3
		14	8	279.13	11.6306	280	-20	-1.00	Drying	3
		20	30	285.50	11.8958	278	-22	-1.10	Drying	3
		23	0	288.00	12.0000	277	-23	-1.15	Drying	3
9-Mar-16	13	7	0	296.00	12.3333	276	-24	-1.20	Drying	3
		15	35	304.58	12.6910	274	-26	-1.30	Drying	3
		20	15	309.25	12.8854	272	-28	-1.40	Drying	3
		23	0	312.00	13.0000	271	-29	-1.45	Drying	3
10-Mar-16	14	8	0	321.00	13.3750	271	-29	-1.45	Drying	3
		14	30	327.50	13.6458	270	-30	-1.50	Drying	3
		16	40	329.67	13.7361	269	-31	-1.55	Drying	3
		23	0	336.00	14.0000	268	-32	-1.60	Drying	3
11-Mar-16	15	6	0	343.00	14.2917	266	-34	-1.70	Drying	3
		8	0	345.00	14.3750	266	-34	-1.70	Drying	3
		8	10	345.17	14.3819	271	-29	-1.45	Wetting	3
		8	12	345.20	14.3833	272.5	-27.5	-1.38	Wetting	3
		8	14	345.23	14.3847	274	-26	-1.30	Wetting	3
		8	24	345.40	14.3917	277	-23	-1.15	Wetting	3
		8	39	345.65	14.4021	282.5	-17.5	-0.88	Wetting	3
		9	39	346.65	14.4438	287	-13	-0.65	Wetting	3
		10	39	347.65	14.4854	298.5	-1.5	-0.08	Wetting	3
		12	39	349.65	14.5688	310	10	0.50	Wetting	3
		14	39	351.65	14.6521	313	13	0.65	Wetting	3
		16	39	353.65	14.7354	315	15	0.75	Wetting	3
		18	39	355.65	14.8188	317	17	0.85	Wetting	3
		23	0	360.00	15.0000	320	20	1.00	Wetting	3
12-Mar-16	16	8	30	369.50	15.3958	321.5	21.5	1.08	Wetting	3
		11	30	372.50	15.5208	322	22	1.10	Wetting	3
		14	30	375.50	15.6458	322	22	1.10	Wetting	3
		17	30	378.50	15.7708	323	23	1.15	Wetting	3
		23	0	384.00	16.0000	323.5	23.5	1.18	Wetting	3
13-Mar-16	17	6	0	391.00	16.2917	324	24	1.20	Wetting	3
		11	30	396.50	16.5208	324	24	1.20	Wetting	3
		21	0	406.00	16.9167	325	25	1.25	Wetting	3
14-Mar-16	18	6	0	415.00	17.2917	325	25	1.25	Wetting	3
		8	0	417.00	17.3750	325	25	1.25	Wetting	3

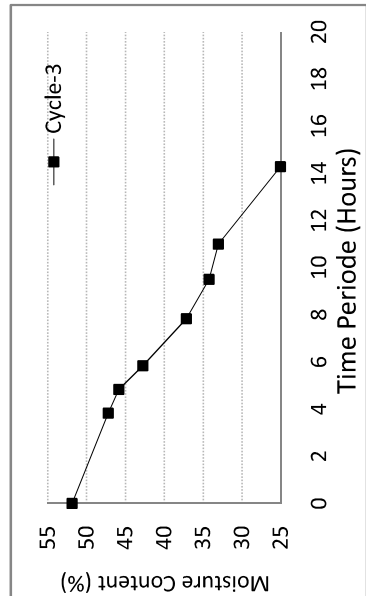
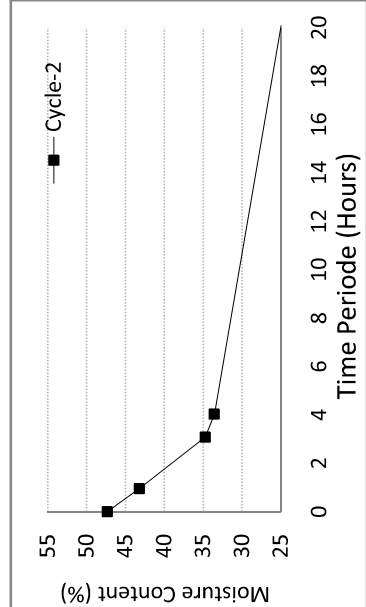
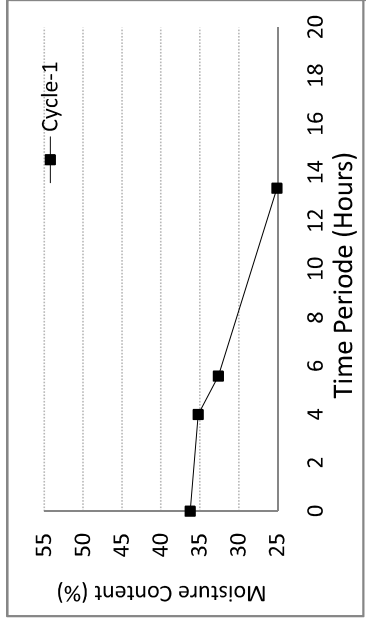
Laboratory Results

4.3 Decreasing of Sample Moisture Content

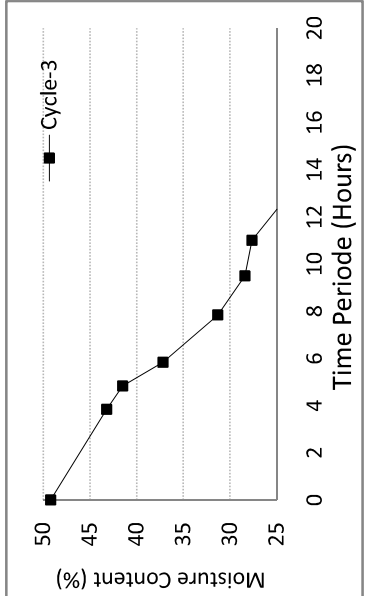
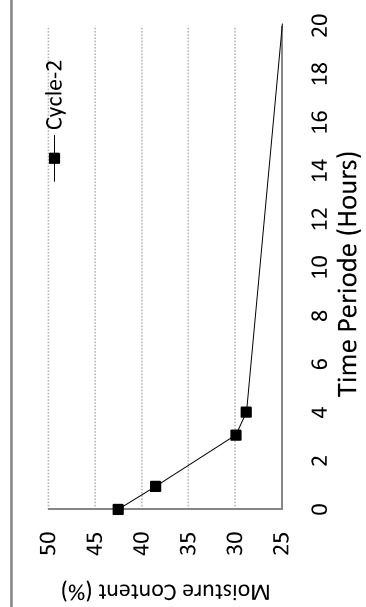
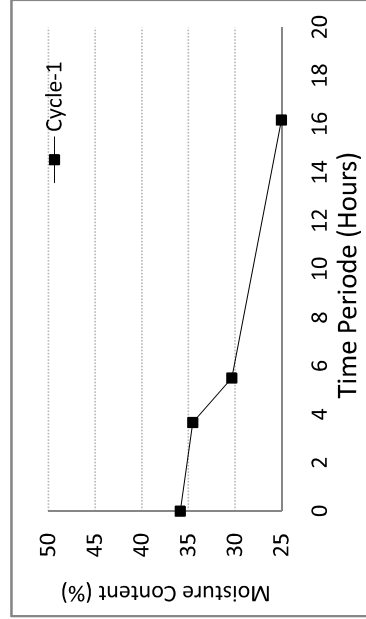
Location		1		Wi		38.14		%		Location		1		Wi		38.14		%	
CICLE-1		RING-7		RING-7		Pressure		10 kN/m ²		CICLE-3		RING-7		Pressure		10 kN/m ²		%	
Weight of Ring		67.3		67.3		67.3		67.3		Weight of Ring		67.3		67.3		67.3		67.3	
Weight of Ring+ wet soil		134.56		134.56		134.56		134.56		Weight of Ring+ wet soil		134.56		134.56		134.56		134.56	
Weight of wet soil		67.26		67.26		67.26		67.26		Weight of wet soil		67.26		67.26		67.26		67.26	
Weight Dry Soil		48.68974		48.68974		48.68974		48.68974		Weight Dry Soil		48.68974		48.68974		48.68974		48.68974	
Moisture Content Target		25		25		25		25		Moisture Content Target		25		25		25		25	
Weight of wet soil		60.86217		60.86217		60.86217		60.86217		Weight of wet soil		60.86217		60.86217		60.86217		60.86217	
Target of Total Weight Due To Moisture Content 25 %		128.16		128.16		128.16		128.16		Target of Total Weight Due To Moisture Content 25 %		128.16		128.16		128.16		128.16	
Time		Time		Time		Total Weight		Moisture Content		Time		Time		Total Weight		Moisture Content			
Hours		Minutes		Hours (per 100)		gram		%		Hours		Minutes		gram		%			
16	55	0.000	133.66	36.29	0.000	138.69	46.62	13	0	0.000	141	51.37							
20	35	3.667	133.02	34.98	0.950	136.92	42.99	16	50	3.833	138.27	45.76							
22	25	5.500	131.73	32.33	3.083	132.84	34.61	17	50	4.833	137.66	44.51							
6	15	13.333	128.14	24.95	4.033	132.84	34.61	18	50	5.833	135.98	41.06							
					19.833	128.19	25.06	20	50	7.833	133.12	35.18							
								22	50	9.833	131.72	32.31							
								0	0	11.000	131.25	31.34							
								2	20	13.333	128.16	25.00							



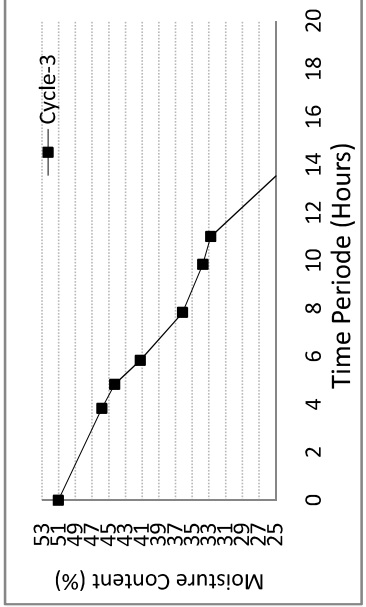
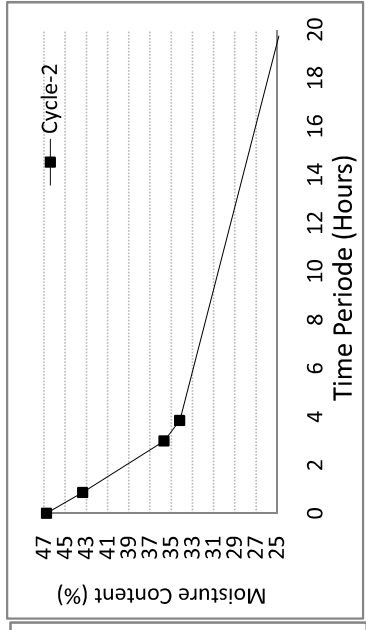
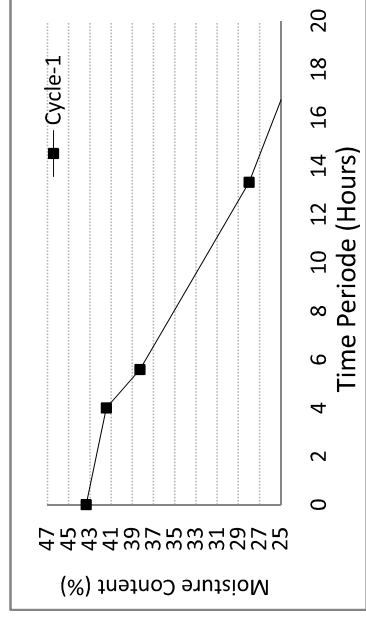
Location		1		Wi		38.14		%		Location		1		Wi		38.14		%	
CICLE-1		RING-8		RING-8		Pressure		20 kN/m ²		CICLE-2		RING-8		RING-8		Pressure		20 kN/m ²	
Weight of Ring		66.5		66.5		66.5		66.5		Weight of Ring		66.5		66.5		66.5		66.5	
Weight of Ring+ wet soil		134.24		134.24		134.24		134.24		Weight of Ring+ wet soil		134.24		134.24		134.24		134.24	
Weight of wet soil		67.74		67.74		67.74		67.74		Weight of wet soil		67.74		67.74		67.74		67.74	
Weight Dry Soil		49.03721		49.03721		49.03721		49.03721		Weight Dry Soil		49.03721		49.03721		49.03721		49.03721	
Moisture Content Target		25		25		25		25		Moisture Content Target		25		25		25		25	
Weight of wet soil		61.29651		61.29651		61.29651		61.29651		Weight of wet soil		61.29651		61.29651		61.29651		61.29651	
Target of Total Weight Due To Moisture Content 25 %		127.80		127.80		127.80		127.80		Target of Total Weight Due To Moisture Content 25 %		127.80		127.80		127.80		127.80	
Time		Time		Time		Total Weight		Moisture Content		Time		Time		Total Weight		Moisture Content			
Hours	Minutes	Hours	(per 100)	Hours	Minutes	Hours	gram	%	Hours	Minutes	Hours	(per 100)	Hours	Minutes	gram	%			
15	55	0.000	36.22	12	40	0.000	138.75	47.34	13	0	0.000	140.98	51.88						
20	55	4.000	35.18	13	37	0.950	136.73	43.22	16	50	3.833	138.69	47.21						
22	30	5.583	32.59	15	45	3.083	132.57	34.73	17	50	4.833	138.04	45.89						
6	16	13.350	25.07	16	42	4.033	132	33.57	18	50	5.833	136.51	42.77						
				8	45	20.083	127.8	25.01	20	50	7.833	133.76	37.16						
									22	30	9.500	132.34	34.27						
									0	0	11.000	131.74	33.04						
									3	17	14.283	127.83	25.07						



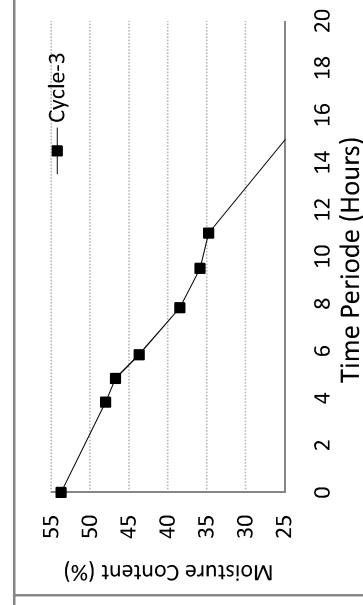
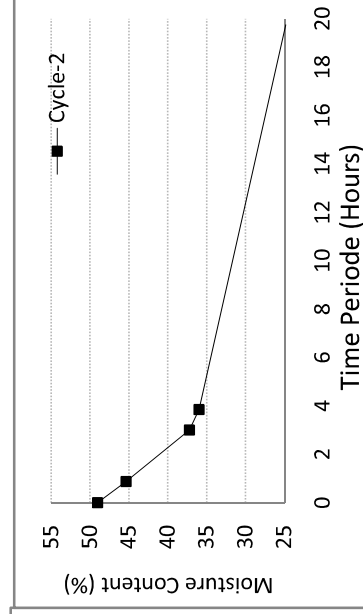
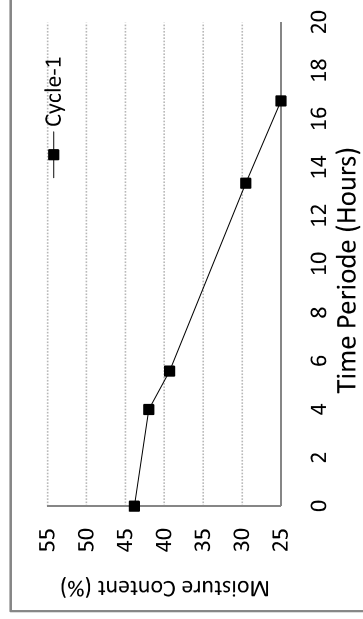
Location		1		Wi		38.14		%		30 kN/m ²		Location		1		Wi		38.14		%		30 kN/m ²	
		CICLE-1		RING-9		Pressure		66.6		66.6		CICLE-3		RING-9		Pressure		66.6		66.6		66.6	
Weight of Ring								66.6		66.6		Weight of Ring						66.6		66.6		66.6	
Weight of Ring+ wet soil						133.65		133.65		133.65		Weight of Ring+ wet soil						133.65		133.65		133.65	
Weight of wet soil						67.05		67.05		67.05		Weight of wet soil						67.05		67.05		67.05	
Weight Dry Soil						48.53772		48.53772		48.53772		Weight Dry Soil						48.53772		48.53772		48.53772	
Moisture Content Target						25		25		25		Moisture Content Target						25		25		25	
Weight of wet soil						60.67214		60.67214		60.67214		Weight of wet soil						60.67214		60.67214		60.67214	
Target of Total Weight Due To Moisture Content 25 %						127.27		127.27		127.27		Target of Total Weight Due To Moisture Content 25 %						127.27		127.27		127.27	
Time		Time		Time		Total Weight		Moisture Content		Time		Time		Time		Total Weight		Moisture Content		Time		Moisture Content	
Hours		Minutes		(per 100)		gram		%		Hours		Minutes		(per 100)		gram		%		Hours		%	
16	55	0.000	132.54	35.85	0.000	135.77	42.51	13	0	0.000	139.02	49.20											
20	35	3.667	131.9	34.53	0.950	133.82	38.49	16	50	3.833	136.11	43.21											
22	25	5.500	129.86	30.33	3.083	129.65	29.90	17	50	4.833	135.27	41.48											
9	5	16.167	127.29	25.04	4.033	129.11	28.79	18	50	5.833	133.18	37.17											
					20.083	127.24	24.93	20	50	7.833	130.33	31.30											
								22	30	9.500	128.92	28.40											
								0	0	11.000	128.55	27.63											
								1	19	12.317	127.26	24.97											



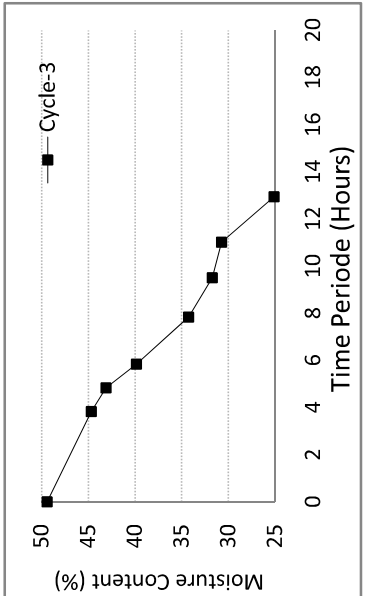
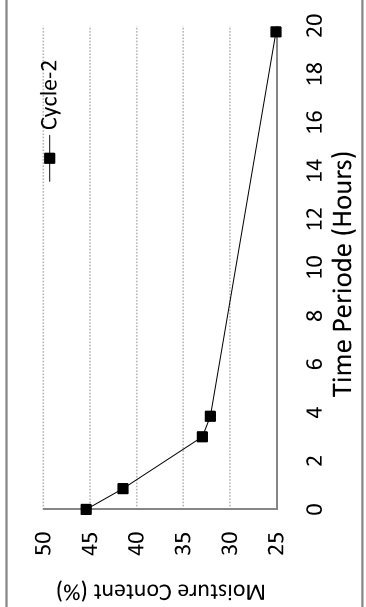
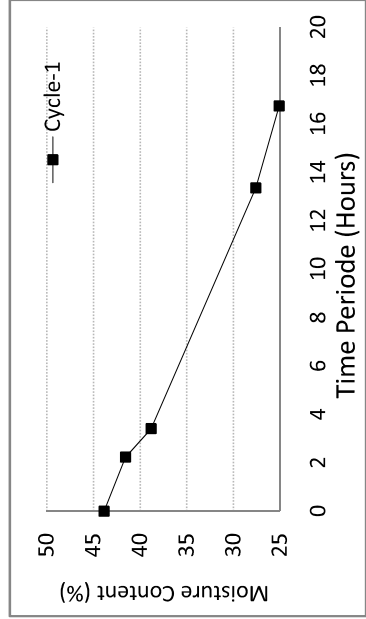
Location		2		Wi		46.06		%		Location		2		Wi		46.06		%	
CICLE-1		RING-4		RING-4		Pressure		10 kN/m ²		CICLE-2		RING-4		RING-4		Pressure		10 kN/m ²	
Weight of Ring		67.4		67.4		67.4		67.4		Weight of Ring		67.4		67.4		67.4		67.4	
Weight of Ring+ wet soil		135.95		135.95		135.95		135.95		Weight of Ring+ wet soil		135.95		135.95		135.95		135.95	
Weight of wet soil		68.55		68.55		68.55		68.55		Weight of wet soil		68.55		68.55		68.55		68.55	
Weight Dry Soil		46.93277		46.93277		46.93277		46.93277		Weight Dry Soil		46.93277		46.93277		46.93277		46.93277	
Moisture Content Target		25		25		25		25		Moisture Content Target		25		25		25		25	
Weight of wet soil		58.66596		58.66596		58.66596		58.66596		Weight of wet soil		58.66596		58.66596		58.66596		58.66596	
Target of Total Weight Due To Moisture Content 25 %		126.07		126.07		126.07		126.07		Target of Total Weight Due To Moisture Content 25 %		126.07		126.07		126.07		126.07	
Time		Time		Time		Total Weight		Moisture Content		Time		Time		Total Weight		Moisture Content			
Hours		Minutes		Hours (per 100)		gram		%		Hours		Minutes		gram		%			
16	55	0.000	134.68	43.35	0.000	136.28	46.76	13	0	0.000	138.28	51.02							
20	55	4.000	133.79	41.46	0.867	134.68	43.35	16	50	3.833	135.83	45.80							
22	30	5.583	132.3	38.28	3.000	131.07	35.66	17	50	4.833	135.12	44.29							
6	15	13.333	127.46	27.97	3.850	130.38	34.19	18	50	5.833	133.67	41.20							
9	40	16.750	126.05	24.97	19.750	126	24.86	20	50	7.833	131.3	36.15							
								22	50	9.833	130.16	33.72							
								0	0	11.000	129.72	32.79							
								2	32	13.533	126.04	24.94							



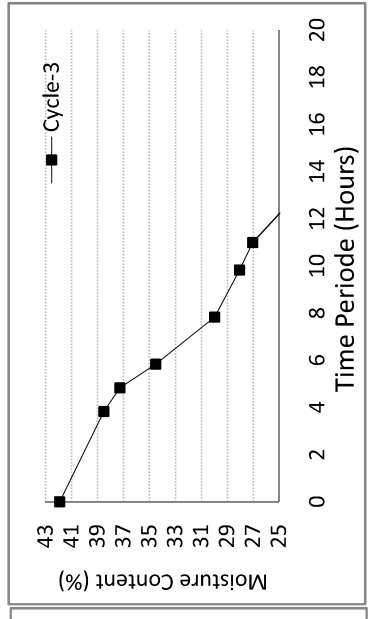
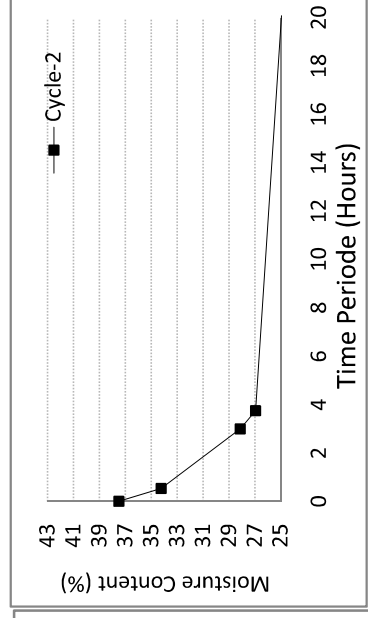
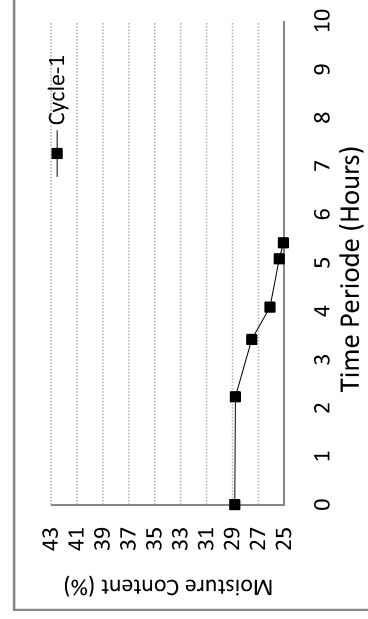
Location		2		Wi		46.06		%		Location		2		Wi		46.06		%	
CICLE-1		RING-5		RING-5		Pressure		20 kN/m ²		CICLE-2		RING-5		RING-5		Pressure		20 kN/m ²	
Weight of Ring						59.1		grm		Weight of Ring						59.1		grm	
Weight of Ring+ wet soil						126.86		grm		Weight of Ring+ wet soil						126.86		grm	
Weight of wet soil						67.76		grm		Weight of wet soil						67.76		grm	
Weight Dry Soil						46.39189		grm		Weight Dry Soil						46.39189		grm	
Moisture Content Target						25		%		Moisture Content Target						25		%	
Weight of wet soil						57.98987		grm		Weight of wet soil						57.98987		grm	
Target of Total Weight Due To Moisture Content 25 %						117.09		grm		Target of Total Weight Due To Moisture Content 25 %						117.09		grm	
Time		Time		Time		Total Weight		Moisture Content		Time		Time		Total Weight		Moisture Content			
Hours	Minutes	Hours	Minutes	Hours	Minutes	gram	gram	%	%	Hours	Minutes	Hours	Minutes	gram	gram	%	%		
16	55	0.000		12	40	125.83	128.24	43.84	49.03	13	0	130.41	0.000	130.41	53.71	53.71			
20	55	4.000		13	37	124.97	126.53	41.99	45.35	16	50	127.76	3.833	127.76	48.00	48.00			
22	30	5.583		15	45	123.74	122.76	39.33	37.22	17	50	127.16	4.833	127.16	46.71	46.71			
6	16	13.350		16	36	119.18	122.18	29.51	35.97	18	50	125.76	5.833	125.76	43.69	43.69			
9	40	16.750		8	30	117.09	117	25.00	24.81	20	50	123.33	7.833	123.33	38.45	38.45			
										22	30	122.12	9.500	122.12	35.84	35.84			
										0	0	121.61	11.000	121.61	34.74	34.74			
										3	58	117.04	14.967	117.04	24.89	24.89			



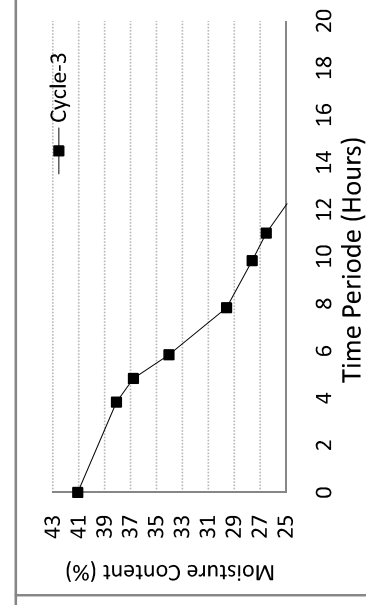
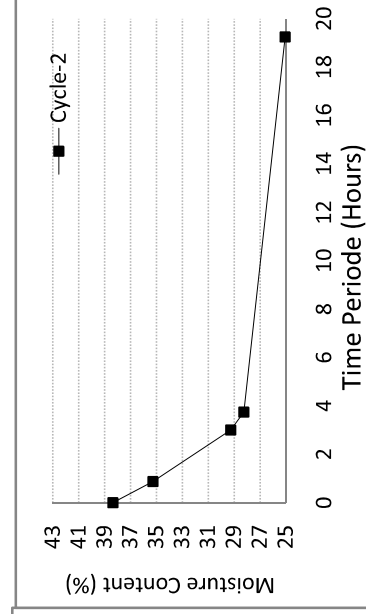
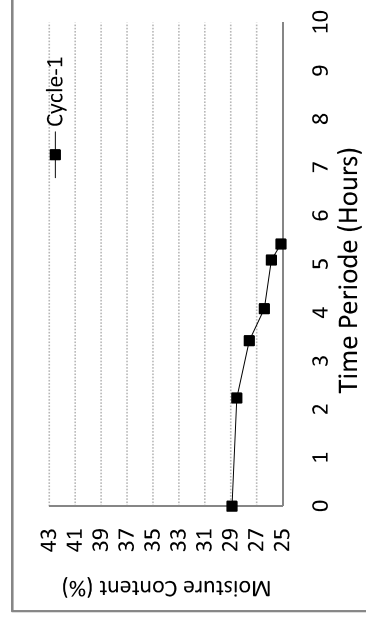
Location		2		Wi		46.06		%		30 kN/m ²		46.06		%	
CICLE-1		RING-6		RING-3		Pressure		30 kN/m ²		Pressure		RING-3		30 kN/m ²	
Weight of Ring		Weight of Ring		Weight of Ring		47.7		gram		47.7		Weight of Ring		gram	
Weight of Ring+ wet soil		Weight of Ring+ wet soil		Weight of Ring+ wet soil		112.9		gram		112.9		Weight of Ring+ wet soil		gram	
Weight of wet soil		Weight of wet soil		Weight of wet soil		65.2		gram		65.2		Weight of wet soil		gram	
Weight Dry Soil		Weight Dry Soil		Weight Dry Soil		44.63919		gram		44.63919		Weight Dry Soil		gram	
Moisture Content Target		Moisture Content Target		Moisture Content Target		25		%		25		Moisture Content Target		%	
Weight of wet soil		Weight of wet soil		Weight of wet soil		55.79899		gram		55.79899		Weight of wet soil		gram	
Target of Total Weight Due To Moisture Content 25 %		Target of Total Weight Due To Moisture Content 25 %		Target of Total Weight Due To Moisture Content 25 %		103.50		gram		103.50		Target of Total Weight Due To Moisture Content 25 %		gram	
Time		Time		Time		Total Weight		Moisture Content		Time		Total Weight		Moisture Content	
Hours	Minutes	Hours	Minutes	Hours	Minutes	gram	gram	%	%	Hours	Minutes	gram	gram	%	%
16	55	0.000		12	40	111.91	112.61	43.84	45.41	13	0	114.39	114.39	49.40	49.40
19	9	2.233		13	37	110.88	110.84	41.53	41.45	16	50	112.28	112.28	44.67	44.67
20	20	3.417		15	45	109.66	107.04	38.80	32.93	17	50	111.57	111.57	43.08	43.08
6	17	13.367		16	36	104.66	106.66	27.60	32.08	18	50	110.12	110.12	39.83	39.83
9	40	16.750		8	30	103.54	103.52	25.09	25.05	20	50	107.63	107.63	34.25	34.25
										22	30	106.5	106.5	31.72	31.72
										0	0	106.06	106.06	30.74	30.74
										1	56	103.55	103.55	25.11	25.11



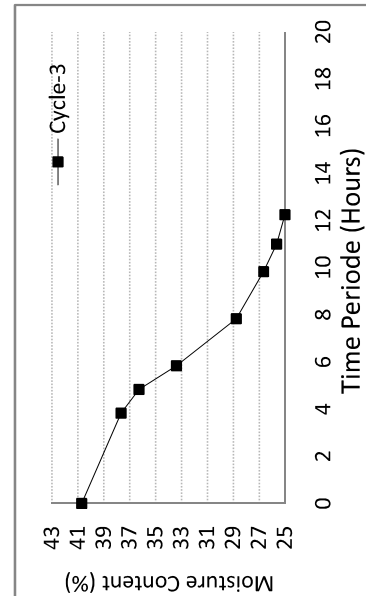
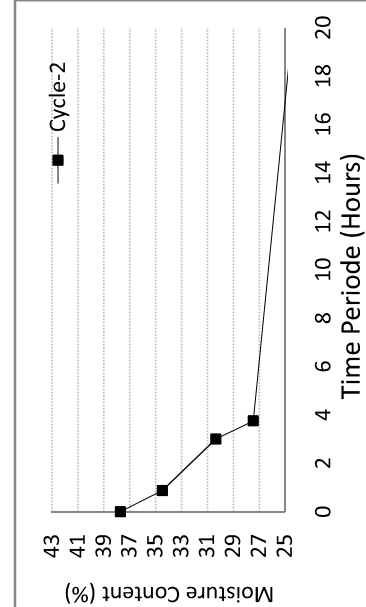
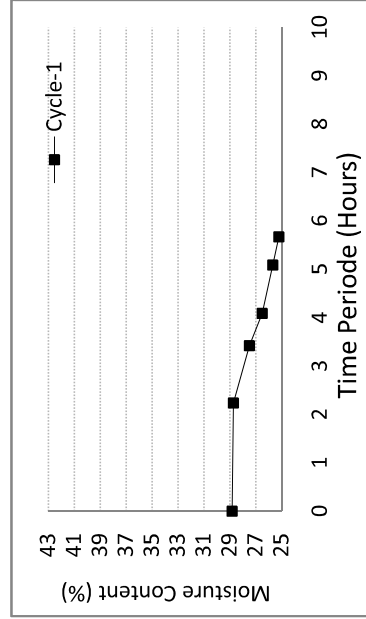
Location		3	Wi	30.53		%		Location		3	Wi	30.53		%	
		CICLE-1	RING-1	Pressure	10 kN/m ²	Pressure	10 kN/m ²			CICLE-2	RING-1	Pressure	10 kN/m ²	Pressure	10 kN/m ²
Weight of Ring				66.1	grm	66.1	grm	Weight of Ring				66.1	grm	66.1	grm
Weight of Ring+ wet soil				136.95	grm	136.95	grm	Weight of Ring+ wet soil				136.95	grm	136.95	grm
Weight of wet soil				70.85	grm	70.85	grm	Weight of wet soil				70.85	grm	70.85	grm
Weight Dry Soil				54.27871	grm	54.27871	grm	Weight Dry Soil				54.27871	grm	54.27871	grm
Moisture Content Target				25	%	25	%	Moisture Content Target				25	%	25	%
Weight of wet soil				67.84839	grm	67.84839	grm	Weight of wet soil				67.84839	grm	67.84839	grm
Target of Total Weight Due To Moisture Content 2.5 %				133.95	grm	133.95	grm	Target of Total Weight Due To Moisture Content 2.5 %				133.95	grm	133.95	grm
Time		Time		Total Weight		Moisture Content		Time		Time		Total Weight		Moisture Content	
Hours	Minutes	Hours	(per 100)	grm	%	grm	%	Hours	Minutes	Hours	(per 100)	grm	%	grm	%
16	55	0.000		136.02	28.82	140.73	37.49	12	45	0.000		140.73	37.49	143.13	41.92
19	9	2.233		135.99	28.76	138.96	34.23	13	17	0.533		138.96	34.23	141.28	38.51
20	20	3.417		135.31	27.51	135.64	28.12	15	45	3.000		135.64	28.12	140.61	37.27
21	0	4.083		134.55	26.11	135	26.94	16	30	3.750		135	26.94	139.11	34.51
22	0	5.083		134.16	25.39	133.92	24.95	8	50	20.083		133.92	24.95	136.65	29.98
22	20	5.417		133.99	25.08									135.61	28.06
														135.06	27.05
														133.92	24.95



Location		3		Wi		30.53		%		Location		3		Wi		30.53		%	
		CICLE-1		RING-2		Pressure		20 kN/m ²				CICLE-2		RING-2		Pressure		20 kN/m ²	
Weight of Ring		55		0.000		138.22		28.89		Weight of Ring		0		0.000		145.36		41.06	
Weight of Ring+ wet soil		9		2.233		138		28.52		Weight of Ring+ wet soil		50		3.833		143.61		38.08	
Weight of wet soil		20		3.417		137.43		27.55		Weight of wet soil		50		4.833		142.84		36.77	
Weight Dry Soil		0		4.083		136.76		26.41		Weight Dry Soil		50		5.833		141.23		34.02	
		0		5.083		136.43		25.84				50		7.833		138.62		29.58	
		20		5.417		136		25.11				50		9.833		137.47		27.62	
Moisture Content Target										Moisture Content Target						25			
Weight of wet soil						73.33563		grm		Weight of wet soil						73.33563		grm	
Target of Total Weight Due To Moisture Content 25 %						135.94		grm		Target of Total Weight Due To Moisture Content 25 %						135.94		grm	
Time		Minutes		Hours (per 100)		Total Weight		Moisture Content %		Time		Minutes		Hours (per 100)		Total Weight		Moisture Content %	
Hours						grm				Hours						grm			
16		55		0.000		138.22		28.89		13		0		0.000		145.36		41.06	
19		9		2.233		138		28.52		16		50		3.833		143.61		38.08	
20		20		3.417		137.43		27.55		17		50		4.833		142.84		36.77	
21		0		4.083		136.76		26.41		18		50		5.833		141.23		34.02	
22		0		5.083		136.43		25.84		20		50		7.833		138.62		29.58	
22		20		5.417		136		25.11		22		50		9.833		137.47		27.62	
										0		0		11.000		136.83		26.52	
										1		15		12.250		135.89		24.92	



Location		3		Wi		30.53		%	
CICLE-1		RING-3		RING-3		Pressure		30 kN/m ²	
Weight of Ring				Weight of Ring		68.5		gram	
Weight of Ring+ wet soil				Weight of Ring+ wet soil		142.37		gram	
Weight of wet soil				Weight of wet soil		73.87		gram	
Weight Dry Soil				Weight Dry Soil		56.59235		gram	
Moisture Content Target				Moisture Content Target		25		%	
Weight of wet soil				Weight of wet soil		70.74044		gram	
Target of Total Weight Due To Moisture Content 25 %				Target of Total Weight Due To Moisture Content 25 %		139.24		gram	
Time		Time		Time		Total Weight		Moisture Content	
Hours	Minutes	Hours	Minutes	Hours	Minutes	gram	gram	%	%
16	55	0.000		12	45	141.41	146.43	28.83	37.70
19	9	2.233		13	37	141.36	144.6	28.75	34.47
20	20	3.417		15	45	140.65	142.27	27.49	30.35
21	0	4.083		16	30	140.09	140.63	26.50	27.46
22	0	5.083		8	0	139.64	139	25.71	24.58
22	35	5.667				139.37		25.23	
Time		Time		Time		Total Weight		Moisture Content	
Hours	Minutes	Hours	Minutes	Hours	Minutes	gram	gram	%	%
13	0	0.000		13	0	148.13	148.13	40.71	40.71
16	50	3.833		16	50	146.41	146.41	37.67	37.67
17	50	4.833		17	50	145.62	145.62	36.27	36.27
18	50	5.833		18	50	143.99	143.99	33.39	33.39
20	50	7.833		20	50	141.37	141.37	28.76	28.76
22	50	9.833		22	50	140.18	140.18	26.66	26.66
0	0	11.000		0	0	139.61	139.61	25.65	25.65
1	15	12.250		1	15	139.25	139.25	25.02	25.02



Photograph

FIELD SOIL SAMPLING



Test Pit Location-1



Test Pit Location-2



Test Pit Location-3



Taking UDS on TP-3



Taking UDS on TP-3



UDS Sample in Ring No.1



Saving with plastic cover



Weighing sample in site

FIELD SOIL SAMPLING



Test Pit No.2



Sampling from TP No.2



Weighing soil sample in site



Taking Sample in TP No. 1



Taking Sample in TP No. 1

LABORATORY ACTIVITIES



Setting temperatur to be 40° C



Oven Drying for 9 soil saamples



Waiting for weighing



Preperation in Oedometer Cell



Deformation measurement due to unsoaked and soaked condition

LABORATORY ACTIVITIES



Dewatering after finished Cycle 1



6 hours natural drying before in to Oven



9 set Oedometer cell apparatuses



Natural drying after cycle 2



Natural drying after cycle 2 for all samples

Reference :

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- ASTM D 653-88 (1989). Standard Terminology Relating to Soil, Rock, and Contained Fluids. In *Annual Book of ASTM Standard*.
- ASTM D 854-83 (1989). Test Method for Specific Gravity of Soils. In *Annual Book of ASTM Standard*.
- ASTM D 2216-80 (1989). Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures. In *Annual Book of ASTM Standard*.
- ASTM D 2487-85 (1989). Test Method for Classification of Soil for Engineering Purpose. In *Annual Book of ASTM Standard*.
- ASTM D 4318-84 (1989). Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. In *Annual Book of ASTM Standard*.
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- Robert W.D (1994). SWELL-SHRINK BEHAVIOUR OF COMPACTED CLAY *Journal of Geotechnical Engineering, Vol. 120, No. 3, March, 1994*.