Pilot project Kaluga region

Report of Slake Durability Test
According to ASTM D 4644

Project name : Pilot project Kaluga region

Registration No. : 31110

Client :

Sample Drilling Date : 03/11/10

Date of the report preparation : 01/02/11

Drilled from Upper Stabilized (in accordance with TBE technology) Layer

Sample Dry Weight, g			**Slake Durability Index I_d, %**		
P0	P1	P2	After 1-st cycle	After 2-nd - final cycle	***Rock Resistance
351.4	320.5	300.8	91.2	85.6	Relatively High / Average

Before Test

After 1 cycle

After 2 cycle

Slake Durability Index (after 2-nd cycle) - $I_d(2)=(P_2/P_0)*100$:

***Gamble's Classification Scale of Rock Resistance Based on SDT results :

Class of rock resistance	Values of Id [%]	
	After 1-st cycle	After 2-nd cycle
Extremely high	> 99	> 98
High	98 - 99	95 - 98
Relatively high	95 - 98	85 - 95
Average	85 - 95	60 - 85
Low	60 - 85	20 - 60
Very low	< 60	< 20

Pilot project Kaluga region

Report Determining Dispersive Characteristics of Clayey Soils by the Crumb Test

According to ASTM D6572

Project name : Pilot project Kaluga region

Registration No. : 31110

Client :

Sample Drilling Date : 03/11/10

Date of the report preparation : 01/02/11

Drilled from Upper Stabilized (in accordance with TBE technology) Layer

Natural Moisture Content, % : 5.9

Water used for the test: Distilled

Description / Classification: Stabilazed soil material

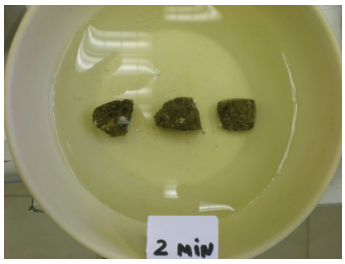
Specimen type: 1.Natural irregularly shaped crumb

Initial water temperature, °C : 22

Time, min	2	360
Water temperature, °C	22	22
Grade	1	1

before test

after 2 minutes



after 6 hours

after test

Dispersive Classification: Grade 1 - Nondispersive

Pilot project Kaluga region

Report of Point Load Test
According to ASTM D 5731

Project name : Pilot project Kaluga region

Registration No. : 31110

Client :

Sample Drilling Date : 03/11/10

Date of the report preparation : 01/02/11

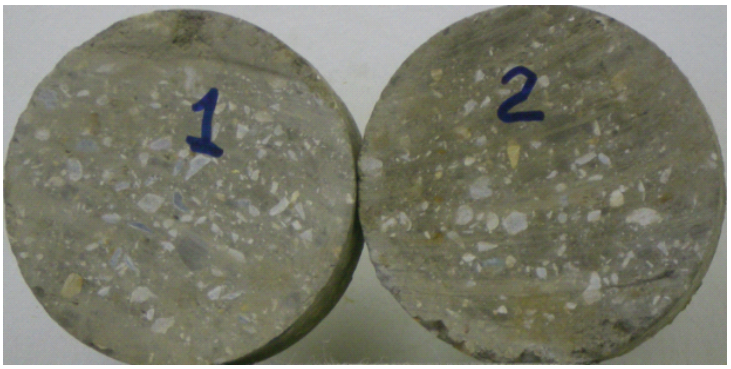
Drilled from Upper Stabilized (in accordance with TBE technology) Layer

Sample description : Undisturbed Core

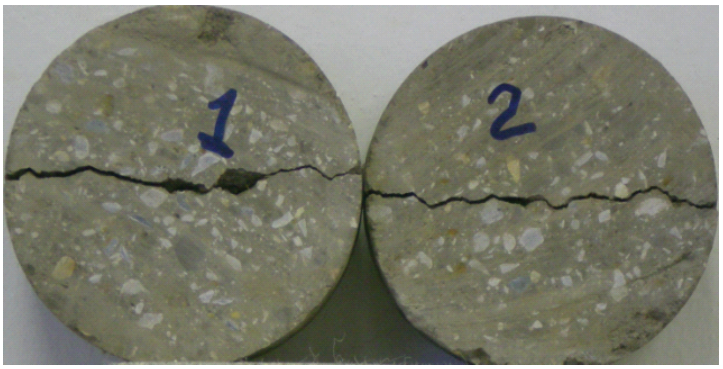
Average Bulk Density, kg/m^3: 1904
Average Water Content before Test, %: 5.9
Average Dry Density, kg/m^3: 1798
Number of Specimens Tested: 2

Specimen registration No.	W, mm	D_e, mm	Failure Load (P), kN	I_s, MPa	$I_{s(50)}$, MPa	σ_{uc}, MPa
1	74.0	28.40	1.5	0.6	0.6	14
2	74.1	32.20	0.5	0.2	0.2	4
Average Value for Tested Specimens	74.1	30.30	1.0	0.3	0.4	9.1

before test



after test



D_e - Thickness of Specimen
W - Diameter of Specimen
P - Maximum Applied Load
I_s - Uncorrected Point Load Strength Index, $I_s = P/D_e^2$, where $D_e^2 = 4WD/\pi$
$I_{s(50)}$ - Corrected Point Load Strength Index, $I_{s(50)} = F*I_s$, where $F = (D_e/50)^{0.45}$
σ_{uc} - Estimated value of Uniaxial Compressive Strength, $\sigma_{uc} = 24.5*I_{s(50)}$

Pilot project Kaluga region

Report of
Elastic Moduli of Intact Core Specimens in Uniaxial Compression
According to ASTM D 3148

Project name : Pilot project Kaluga region

Registration No. : 31110

Client :

Sample Drilling Date : 03/11/10

Date of the report preparation : 01/02/11

Drilled from Upper Stabilized (in accordance with TBE technology) Layer

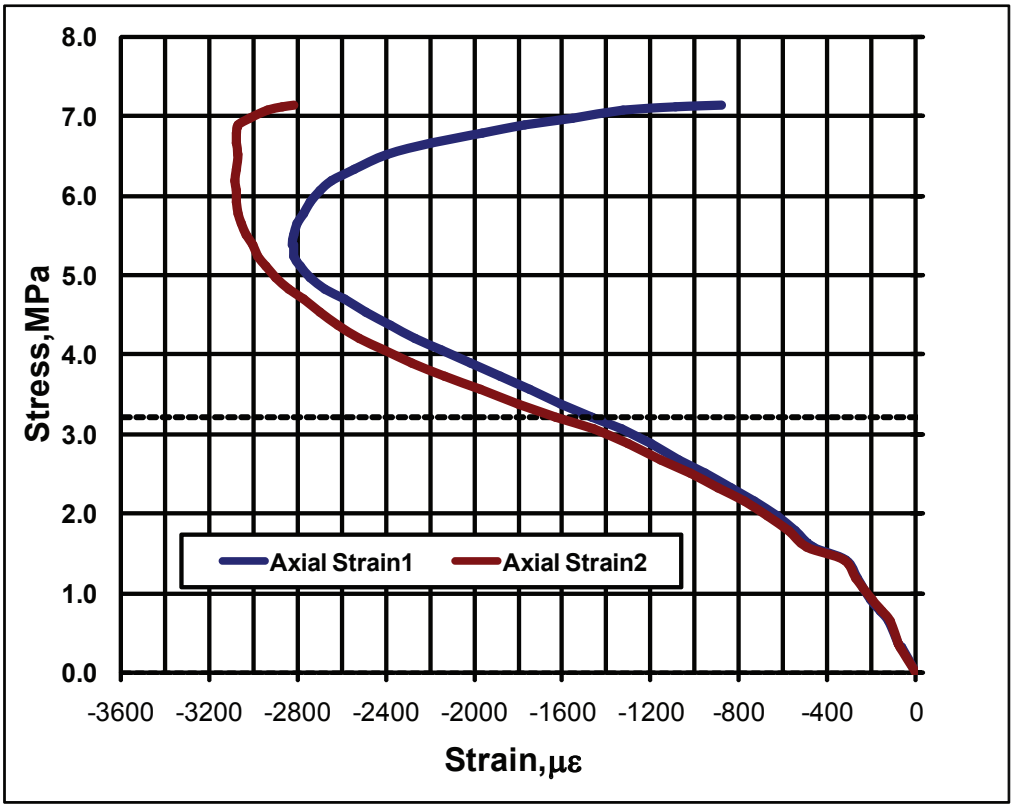
Sample description : Undisturbed Core

Dry Density, g/cm^3: 1.829

Average Height, mm: 65.2
Average Diameter, mm: 74.1

Loading Rate, MPa/s: 0.1
Maximum Axial Force, kN: 32.4

Max. Unconfined Compres.Stress, MPa: 7.5
Average (two strain gages)Young's modulus, E, GPa: 2.3



Pilot project Kaluga region

Report of
Freezing-Thawing Test Results in accordance with Method close to:
1. ASTM D 560 (freezing and thawing compacted soil-cement mixtures)
2. ASTM D 5312 (evaluation of durability of rock for erosion control under freezing and thawing conditions)

Project name : Pilot project Kaluga region

Registration No. : 31110

Client :

Sample Drilling Date : 03/11/10

Date of the report preparation : 01/02/11

Type of Samples: Prepared before test mix of natural soil passed sieve 4.75 mm (100 w.%)
+ portland cement (6% by soil weight)
+ TBE (6% by cement weight)
+ water (10% by soil+cement weight)
according to average dry density is taken as for specimens drilled: 1800 kg/m^3

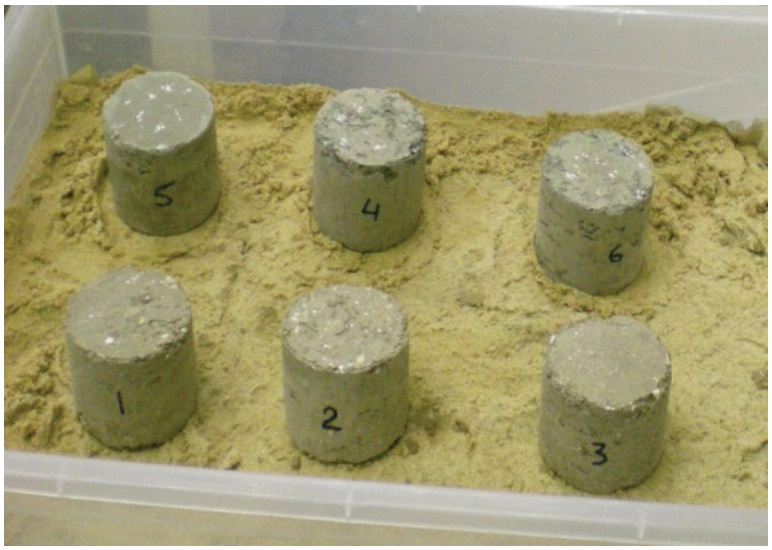
Stages:
1. Curing: 7 days in moist room at relative humidity of 100%
2. Saturation: Immersing to water - 3 days
3. Freezing/thawing cycle: Freezing at -18°C - 16 h; Thawing at 23°C - 8 h
4. Unconfined compressive strength test: after last freezing/thawing cycle of the specimen

Parameters of the Specimens before Saturation:

Specimen No.	Height, mm	Diameter, mm	Weight, g	Wet Density, g/cm^3	Dry Density, g/cm^3
5	49.1	51.2	203.76	2.016	1.832
6	51.1	51.5	214.80	2.018	1.834
1	48.7	51.5	204.75	2.018	1.835
2	49.1	51.4	204.43	2.007	1.824
3	51.0	51.2	208.76	1.988	1.807
4	50.9	51.6	214.06	2.011	1.828

Parameters and Test Results of the Specimens after Saturation and Freezing/Thawing Stages:

Specimen No.	Weight after Saturation, g	Weight after 5 cycles, g	Weight after 15 cycles, g	Water absorption (saturation stage), %	Oven-dry mass Loss as Result of Freezing/Thawing Test, %	UCS, MPa
5	211.48			3.8	-	3.98
6	224.70			4.6	-	3.61
1	212.98	213.95		4.0	2.2	3.45
2	211.93	212.99		3.7	1.9	3.63
3	220.96		222.18	5.8	2.9	3.08
4	225.93		227.37	5.5	2.7	3.24



Specimens in container before saturation stage

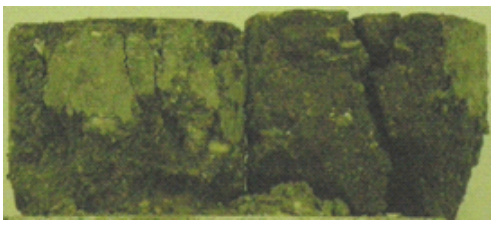
Spec-ns 5-6 after Saturation

Spec-ns 1-2 after 5 cycles

Spec-ns 3-4 after 15 cycles

After Compressive Strength:

Spec-ns 5-6



Spec-ns 1-2

Spec-ns 3-4