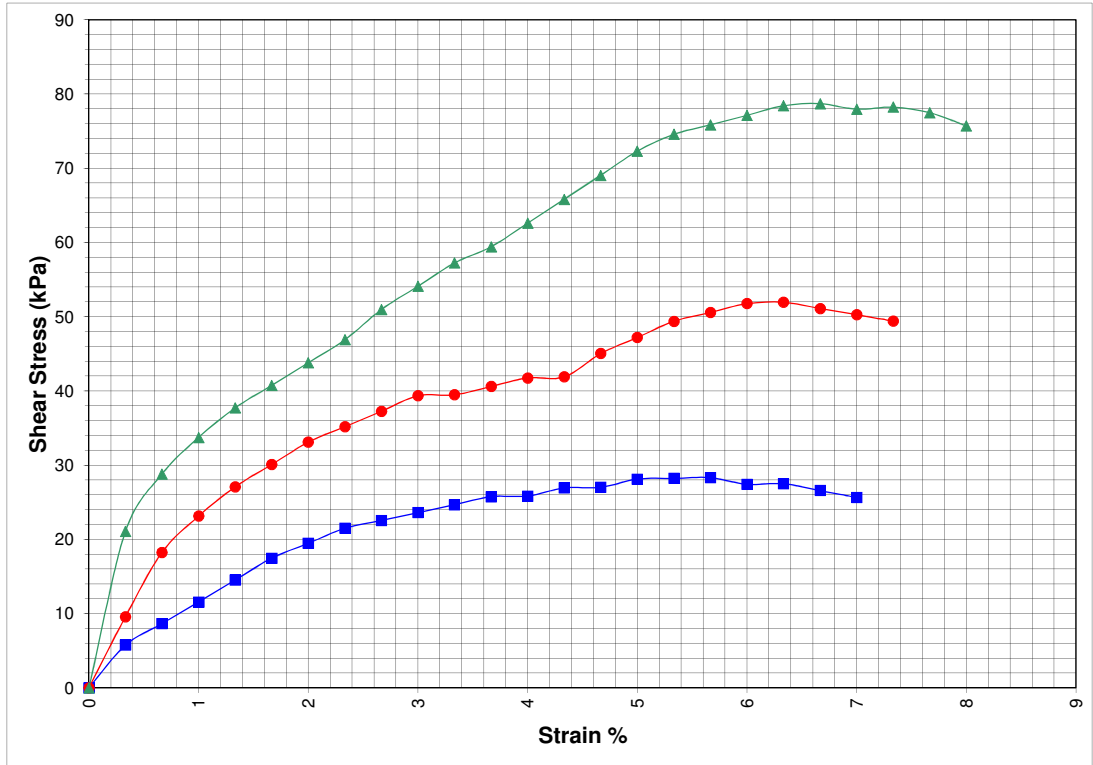


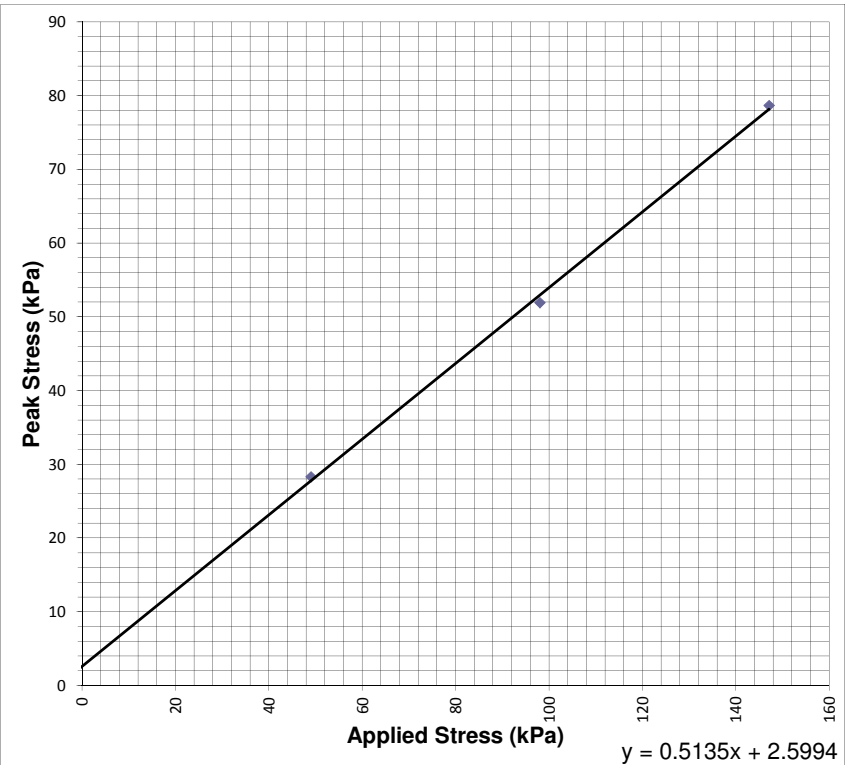
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	52
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.18 °
Apparent Cohesion	2.60 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

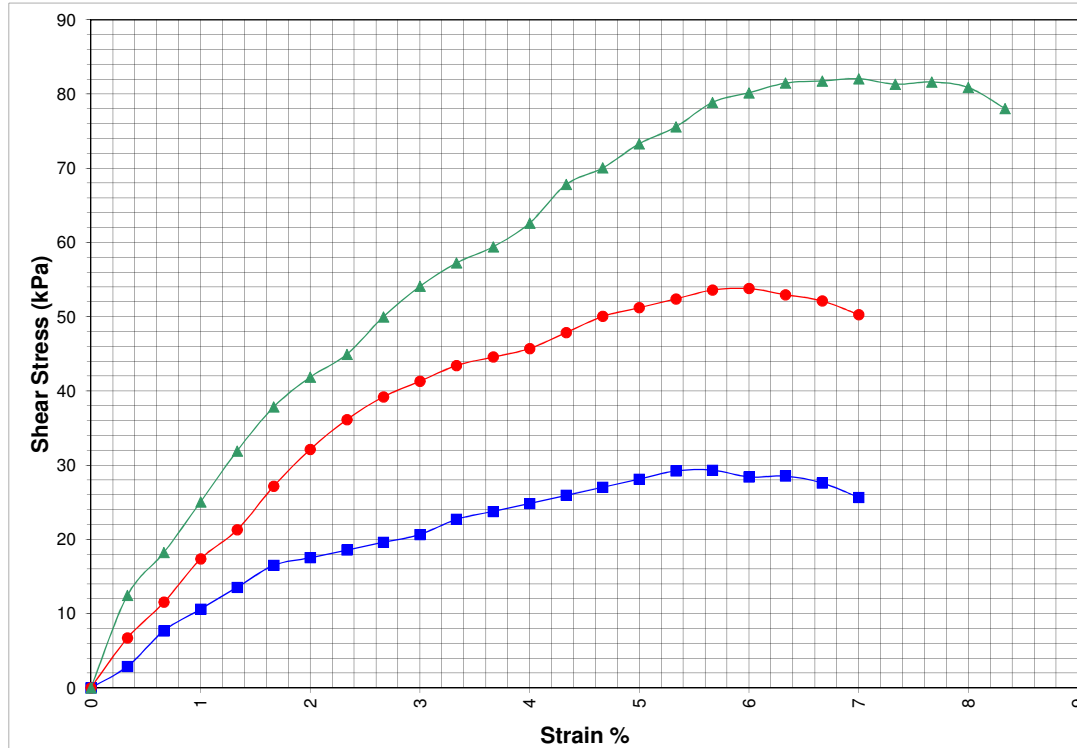
Borehole: LBH-05A

Sample Type: SPT-10

Depth: 15.00-15.45 m

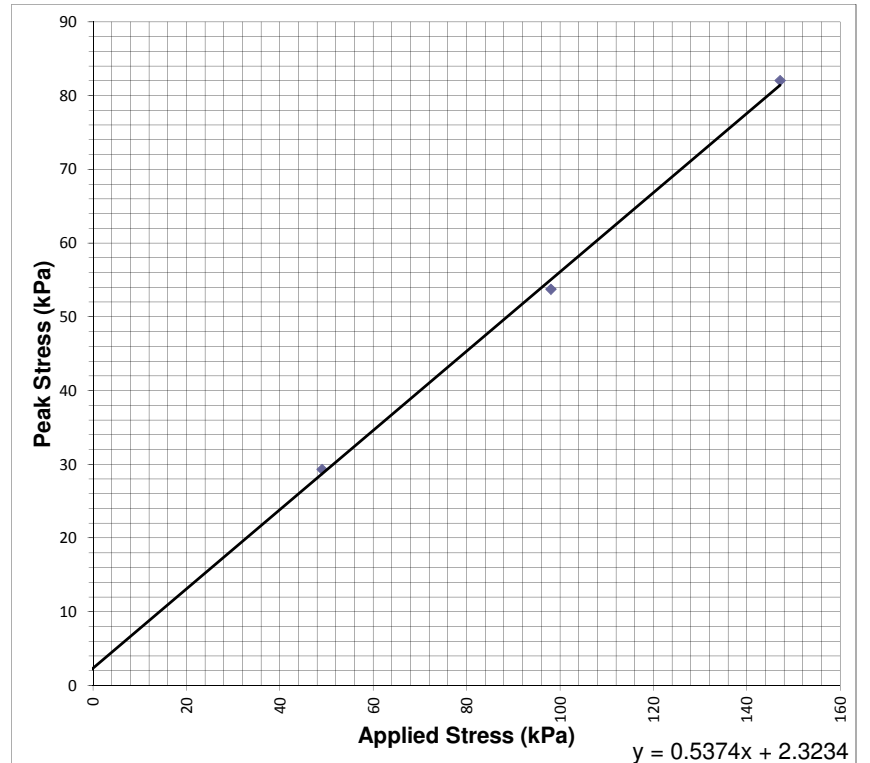
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	54
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.25 °
Apparent Cohesion	2.32 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

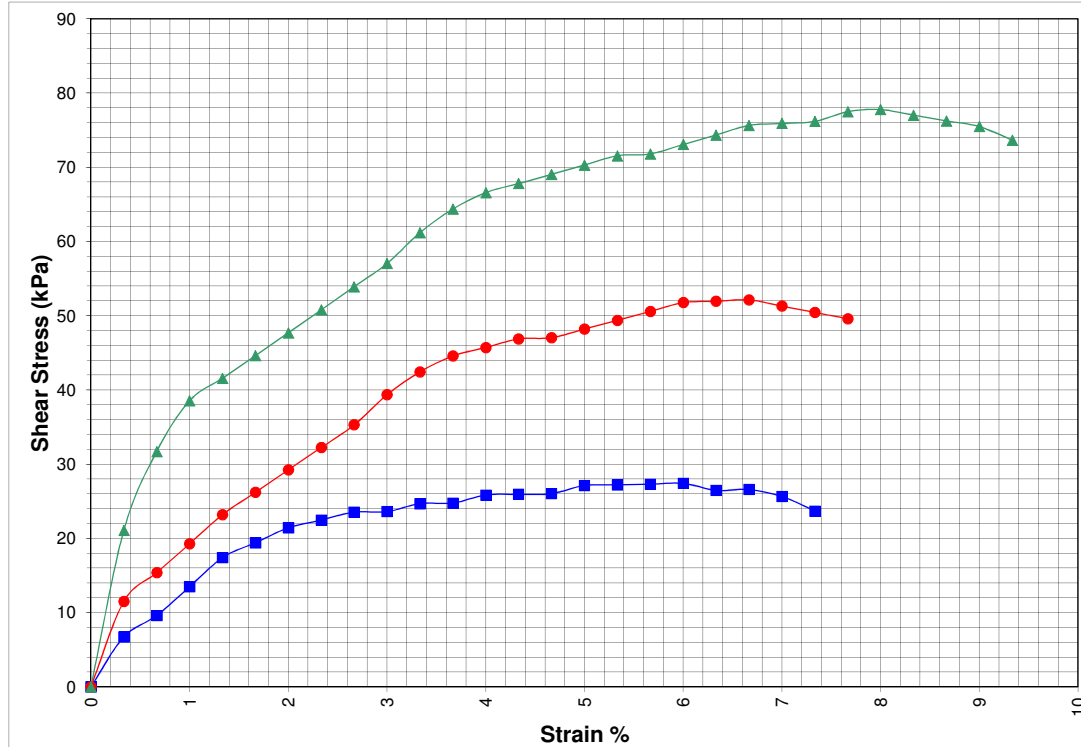
Borehole: LBH-05A

Sample Type: SPT-12

Depth: 18.00-18.45 m

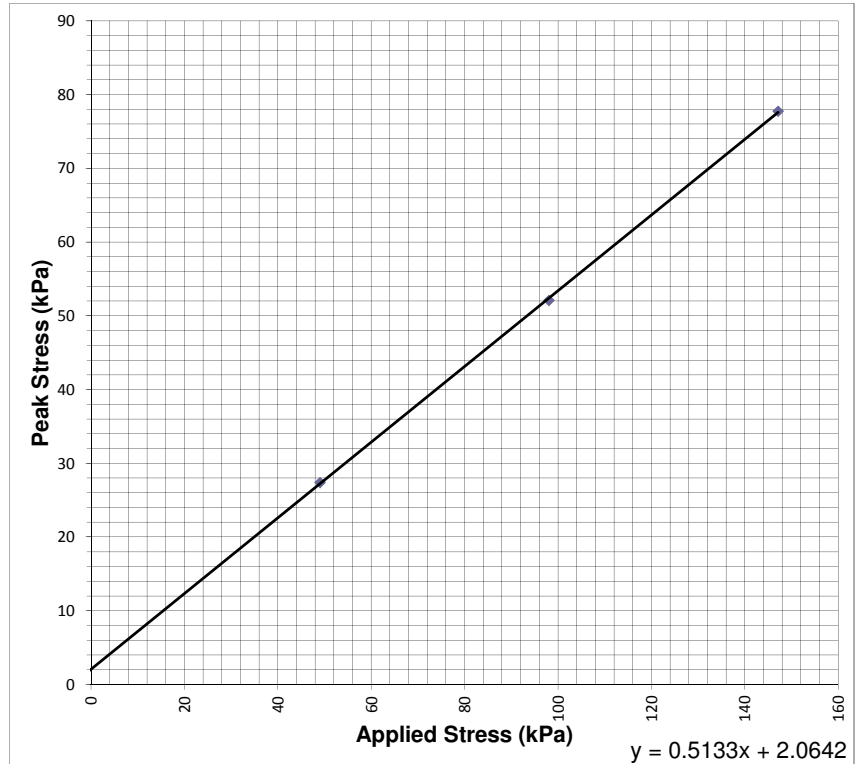
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	52
▲	Stage 3	147	78

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.17 °
Apparent Cohesion	2.12 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

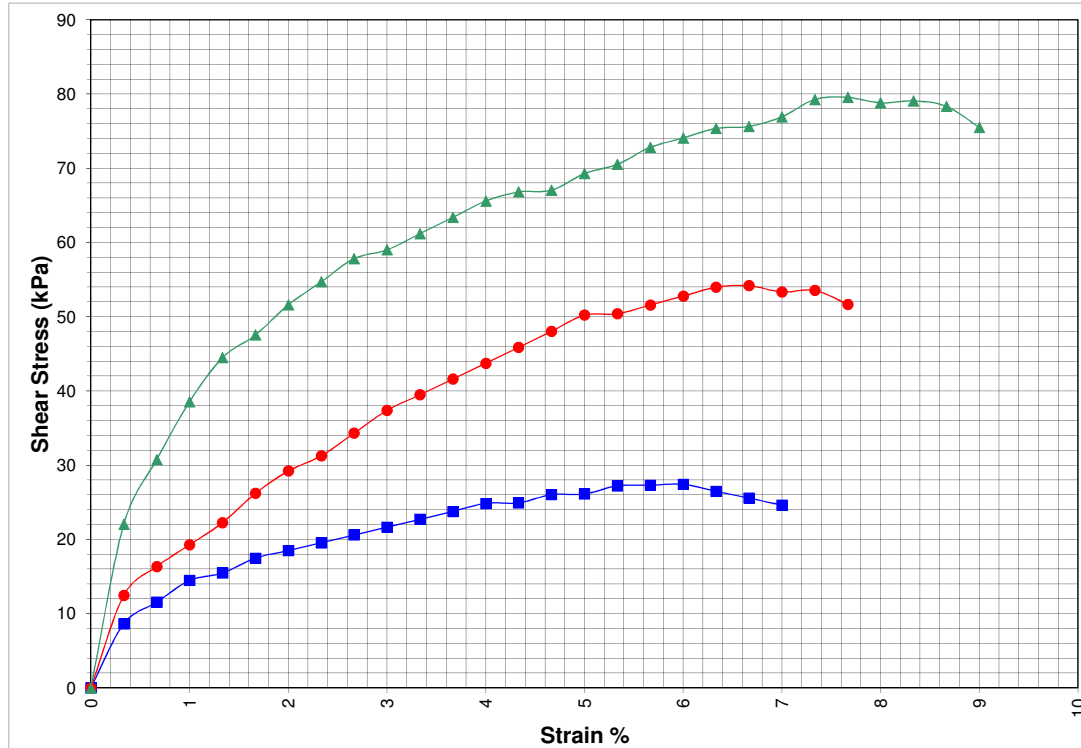
Borehole: LBH-05A

Sample Type: SPT-16

Depth: 24.00-24.45 m

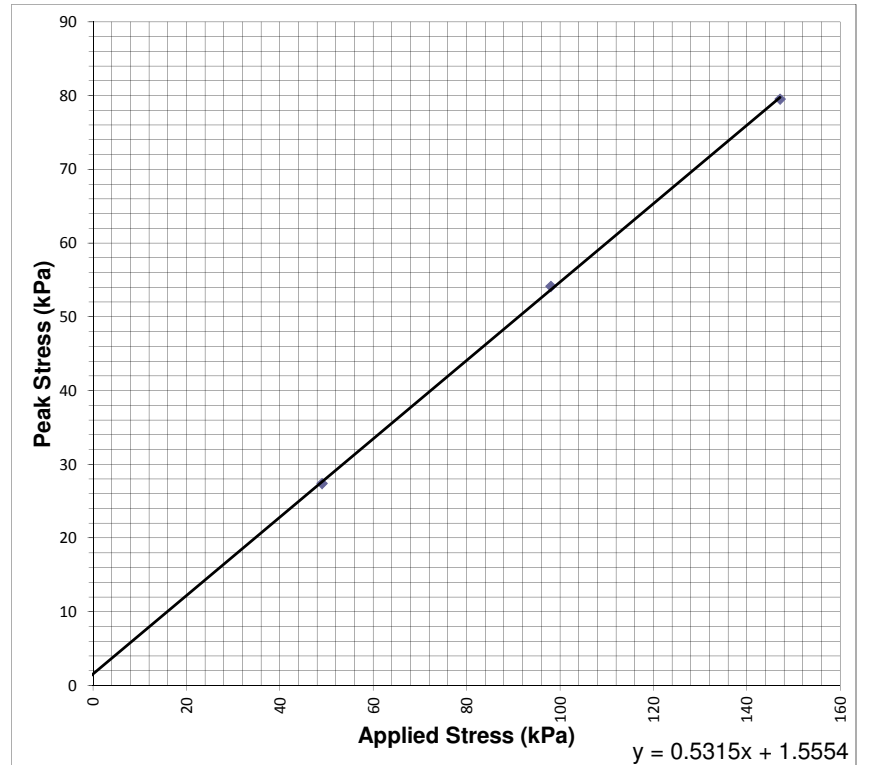
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	54
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.99 °
Apparent Cohesion	1.56 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

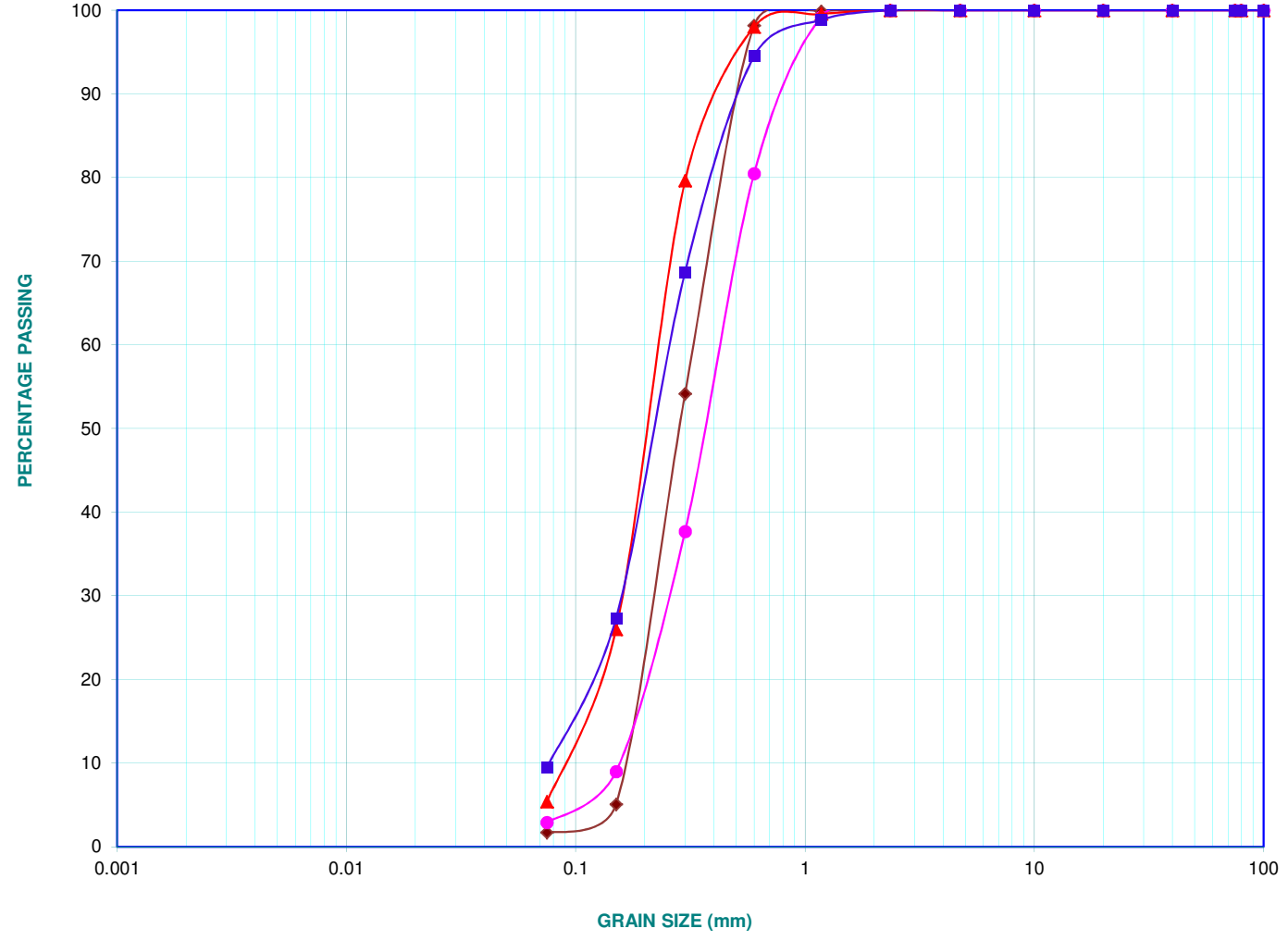
Borehole: LBH-05A

Sample Type: SPT-18

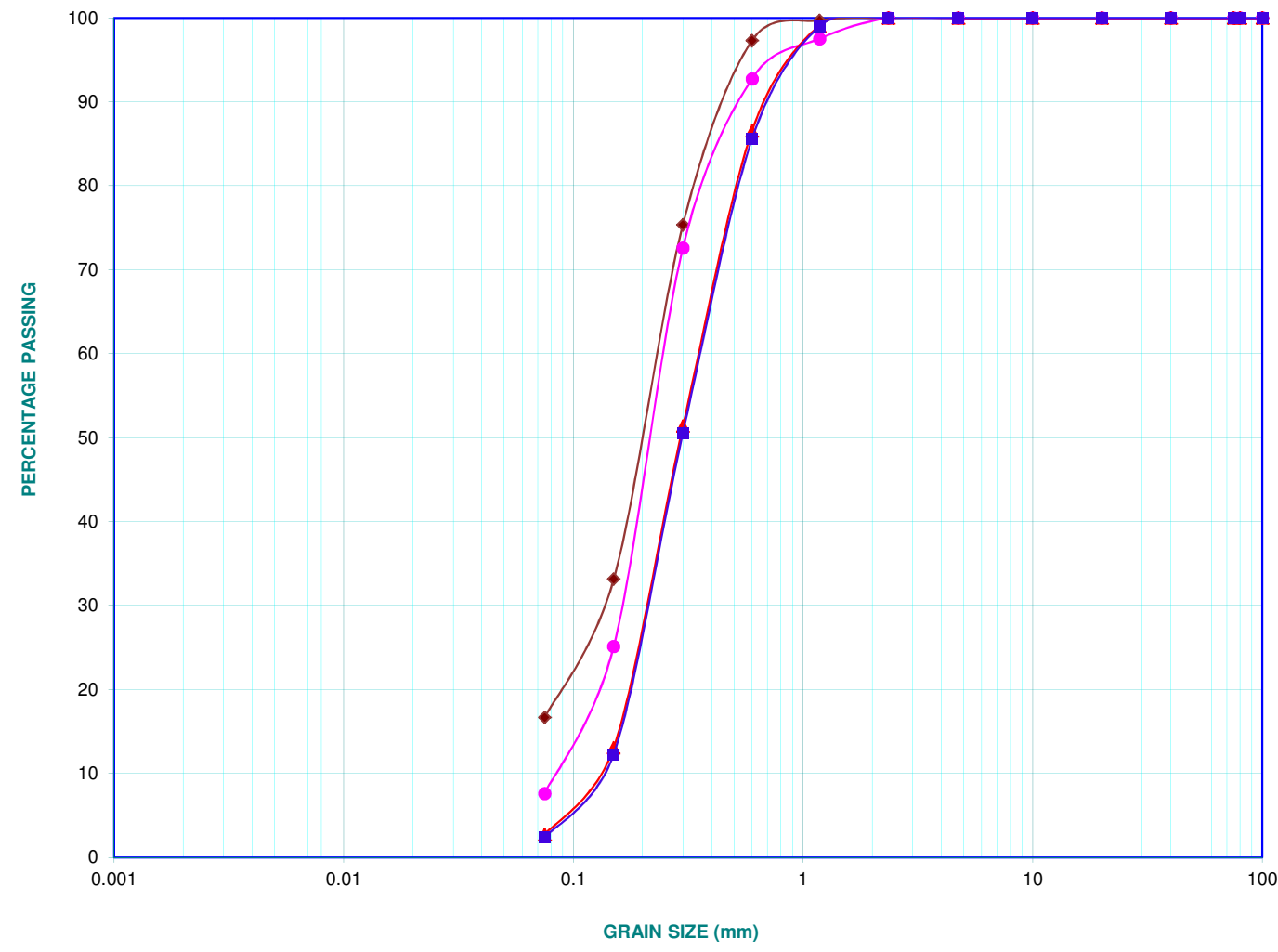
Depth: 27.00-27.45 m

SUMMARY OF TEST RESULTS																																			
SAMPLE DETAILS		Soil Classification	CLASSIFICATION & INDEX												SHEAR STRENGTH TEST										Free swell Index %	Consolidation Tests				Chemical tests					
Sample Type	Depth, m		Atterberg Limits			Physical Properties				Grain Size Distribution					Lateral & Vertical Loading Tests											Initial Void Ratio	Degree of Saturation %	Preconsolidation Pressure (kPa)	Compression Index	pH	Organic content (%)	Carbonate content (%)	Chloride content (ppm)	Sulphate content (ppm)	
			Liquid Limit LL %	Plastic Limit PL %	Plasticity Index PI %	Water Content %	Bulk Density (kN/m³)	Submerged Unit Weight (kN/m³)	Dry Density (kN/m³)	Specific Gravity	Gravel %	Sand %	Silt %	Clay %	Fines % (Silt +Clay)	Type of Test	Shear Strength Su (kpa)	Type of Failure	Cohesion C (kpa)	Internal friction angle φ °	Torvane (Kpa)	Pocket penetrometer (Kpa)	Miniature Vane												
SPT-1	0.00-0.30	SP				19.2	17.24	7.18	14.47	2.63	0	98	<-->	<-->	2																				
SPT-2	1.50-1.80					17.5	18.06	8.00	15.37							DST			0.43	27.8															
SPT-3	3.00-3.20					19.8	18.26	8.20	15.24	2.61																									
SPT-4	4.50-4.70	SP				16.4	16.48	6.42	14.16	2.62	0	97	<-->	<-->	3																				
SPT-5	6.00-6.15					15.9	15.85	5.79	13.68	2.59																									
SPT-6	7.50-7.68					15.4	17.38	7.32	15.06							DST			0.19	32.6															
SPT-7	9.00-9.10					17.6	16.52	6.46	14.04	2.60																									
SPT-8	10.50-10.64	SP-SM				20.8	15.94	5.88	13.19		0	95	<-->	<-->	5																				
SPT-9	12.00-12.30					21.3	17.31	7.25	14.27							DST			0.43	28.9															
SPT-10	13.50-13.75	SP-SM				18.6	17.20	7.14	14.50	2.63	0	91	<-->	<-->	9																				
SPT-11	15.00-15.22					19.8	17.88	7.82	14.93							DST			0.59	27.2															
SPT-12	16.50-16.70	SM / SC				19.8	18.28	8.22	15.26		0	83	<-->	<-->	17																				
SPT-13	18.00-18.15	SP-SM				18.7	18.18	8.12	15.31		0	92	<-->	<-->	8																				
SPT-14	19.50-19.60					19.3	17.86	7.80	14.97	2.59																									
SPT-15	21.00-21.15					19.1	17.59	7.53	14.77							DST			1.50	28.4															
SPT-16	22.50-22.75					18.1	17.51	7.45	14.82	2.61																									
SPT-17	24.00-24.10	SP				16.9	16.19	6.13	13.85		0	97	<-->	<-->	3																				
SPT-18	25.50-25.65					17.1	16.85	6.79	14.39							DST			0.19	29.1															
SPT-19	27.00-27.15	SP				18.4	16.94	6.88	14.31	2.59	0	98	<-->	<-->	2																				
SPT-20	28.50-28.65					17.8	17.57	7.51	14.91							DST			0.47	28.3															
SPT-21	30.00-30.12	SP				18.1	17.51	7.45	14.82	2.61	0	96	<-->	<-->	4																				
END OF BOREHOLE																																			
Notes :																																			
DS : Disturbed Sample						* : Insufficient sample						# : Decayed Wood						Failure Type						Project : Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharman, Dist Jagatsinghpur, Odisha.											
WAX/UDS :Undisturbed Sample						LL : Liquid Limit												A : Bulge						Project Code : CM 19 01 03											
TUU : Triaxial Test (Unconsolidated Undrained)						PL : Plastic Limit												B : Inclined Shear						Borehole No. : LBH-06A											
DST : Direct Shear Test						NP : Non Plastic												C : Multiple Shear																	
φ : ° (deg) Angle of internal friction						NS : Not Suitable												D : Vertical Shear																	

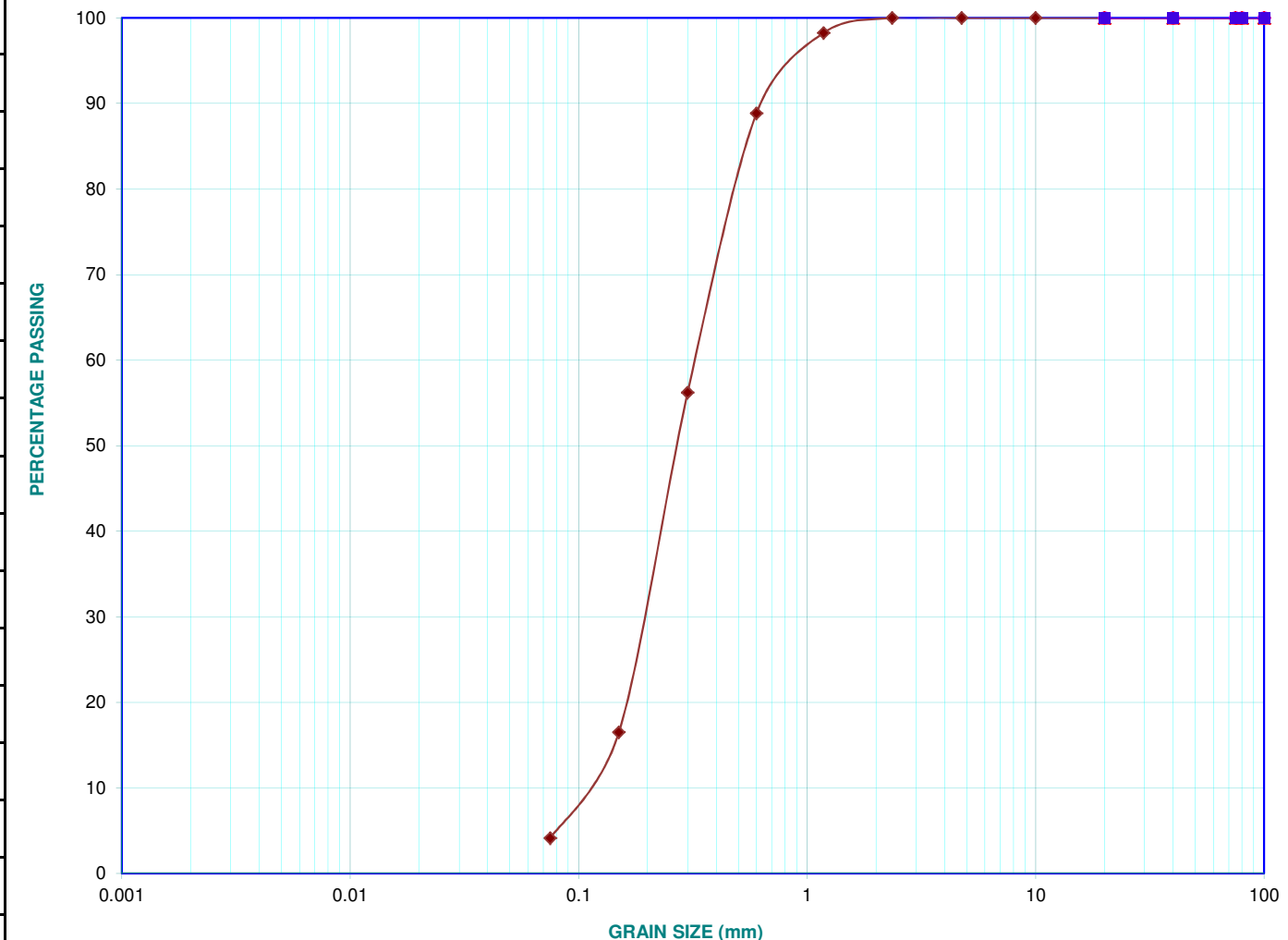
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : LBH-06A					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	LBH-06A	LBH-06A	LBH-06A	LBH-06A										
Depth (m)	0.00-0.30	4.50-4.70	10.50-10.64	13.50-13.75										
Sample Type	SPT-1	SPT-4	SPT-8	SPT-10										
Classification	SP	SP	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	98	97	95	91										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	2	3	5	9										
D60 mm	0.320	0.410	0.230	0.250										
D30 mm	0.210	0.260	0.170	0.160										
D10 mm	0.180	0.160	0.090	0.075										
Cu	1.78	2.56	2.56	3.33										
Cc	0.77	1.03	1.40	1.37										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

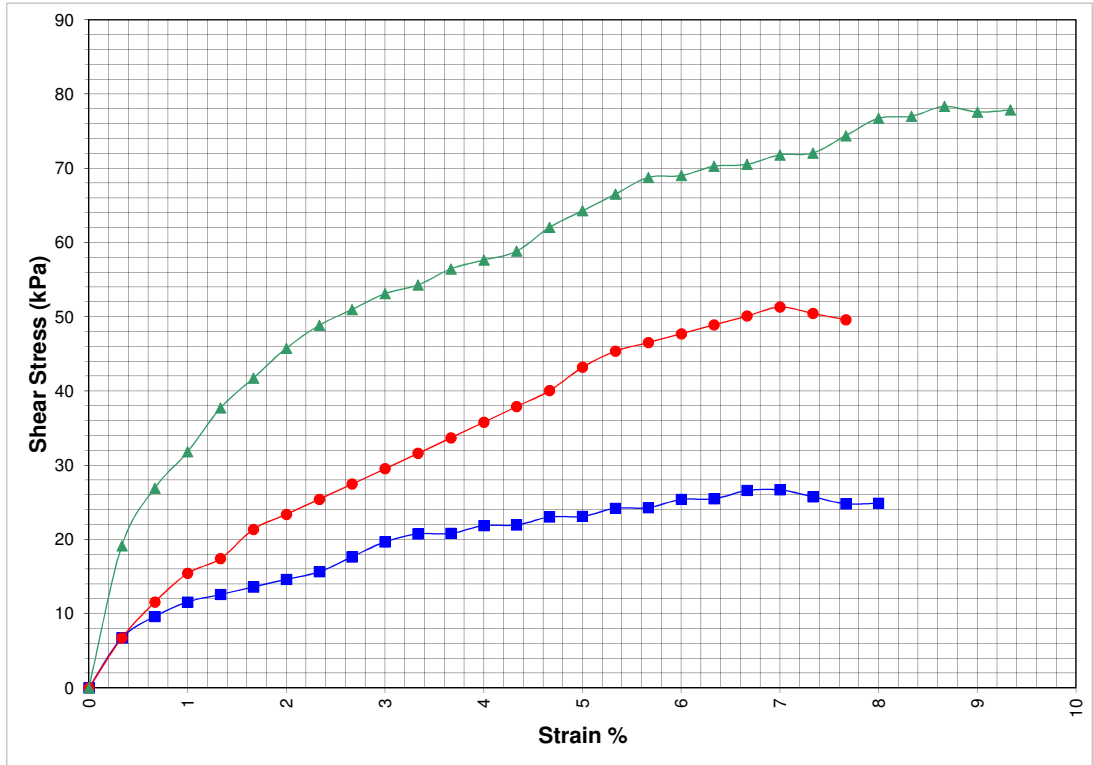
Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03		Borehole No. : LBH-06A					Date :		15-Jun-19				
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-06A	LBH-06A	LBH-06A	LBH-06A										
Depth (m)	16.50-16.70	18.00-18.15	24.00-24.10	27.00-27.15										
Sample Type	SPT-12	SPT-13	SPT-17	SPT-19										
Classification	SM/SC	SP-SM	SP	SP										
Gravel %	0	0	0	0										
Sand %	83	92	97	98										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	17	8	3	2										
D60 mm		0.250	0.360	0.360										
D30 mm		0.170	0.210	0.210										
D10 mm		0.085	0.150	0.150										
Cu		2.94	2.40	2.40										
Cc		1.36	0.82	0.82										
Liquid Limit %	---		---	---										
Plastic Limit %	---		---	---										
Plasticity Index	---	---	---	---										
								Checked By :						

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : LBH-06A					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	LBH-06A				PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	30.00-30.12													
Sample Type	SPT-21													
Classification	SP													
Gravel %	0													
Sand %	96													
Silt %	<---->													
Clay %	<---->													
Fines % (Silt+Clay)	4													
D60 mm	0.310													
D30 mm	0.200													
D10 mm	0.120													
Cu	2.58													
Cc	1.08													
Liquid Limit %	---													
Plastic Limit %	---													
Plasticity Index	---													
									Checked By :					

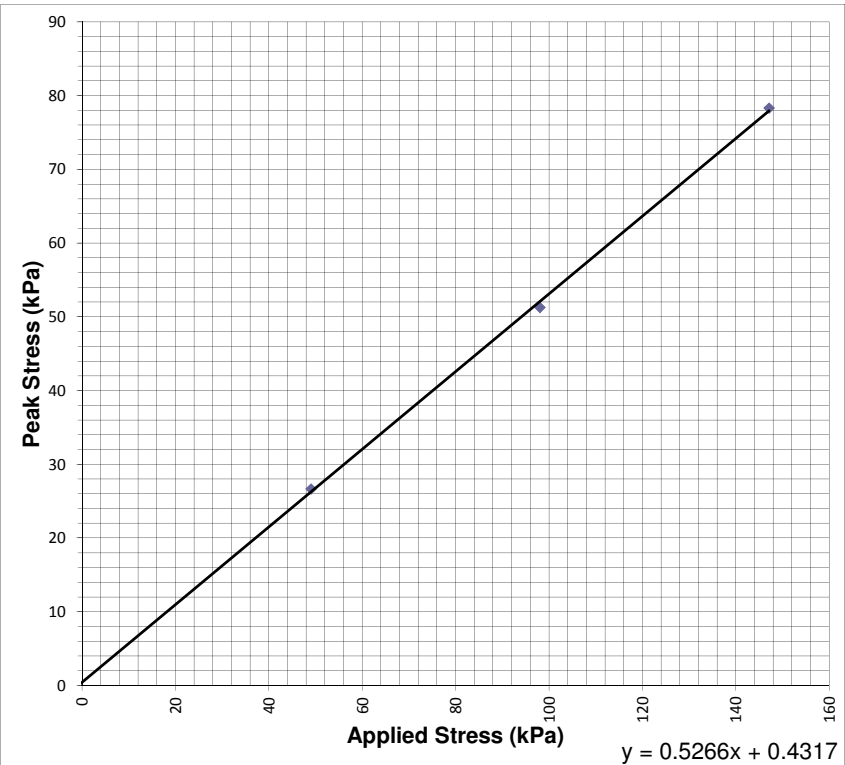
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	51
▲	Stage 3	147	78

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.77 °
Apparent Cohesion	0.43 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

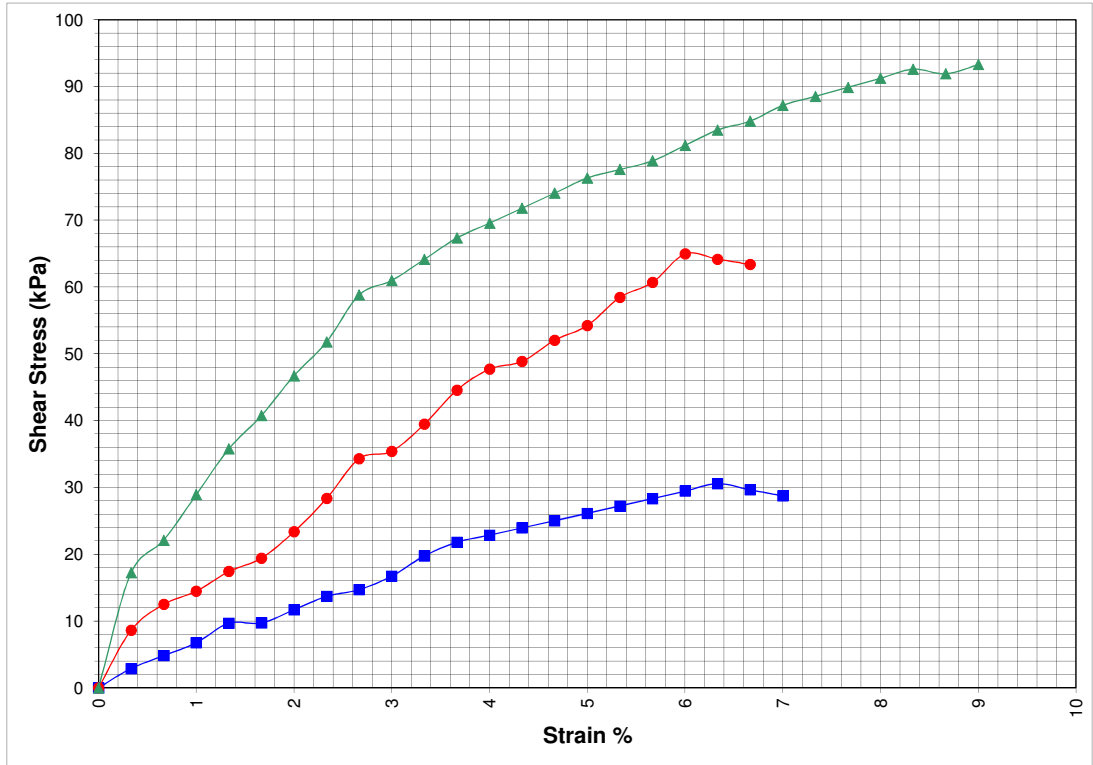
Borehole: LBH-06A

Sample Type: SPT-02

Depth: 1.50-1.80 m

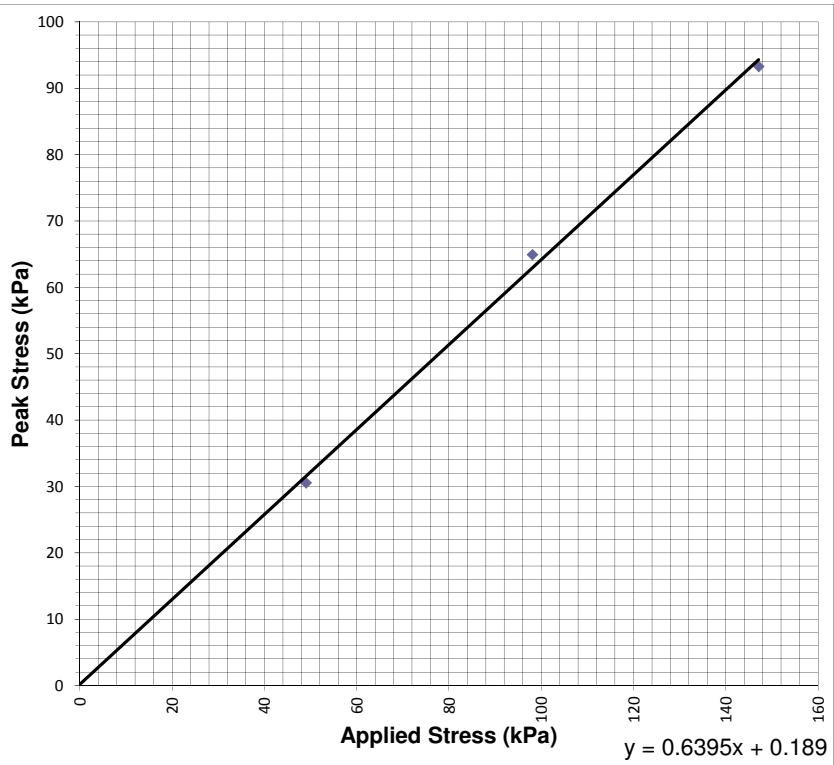
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	65
▲	Stage 3	147	93

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	32.60 °
Apparent Cohesion	0.19 kPa

Borehole: LBH-06A

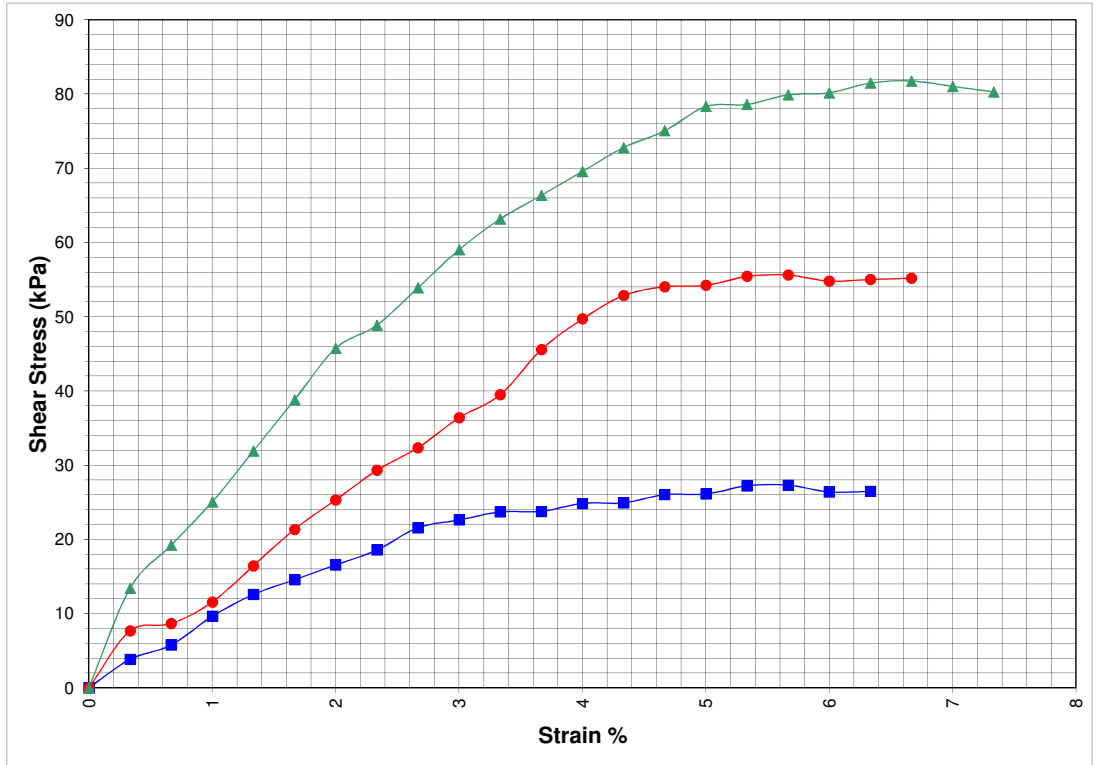
Sample Type: SPT-06

Depth: 7.50-7.68 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

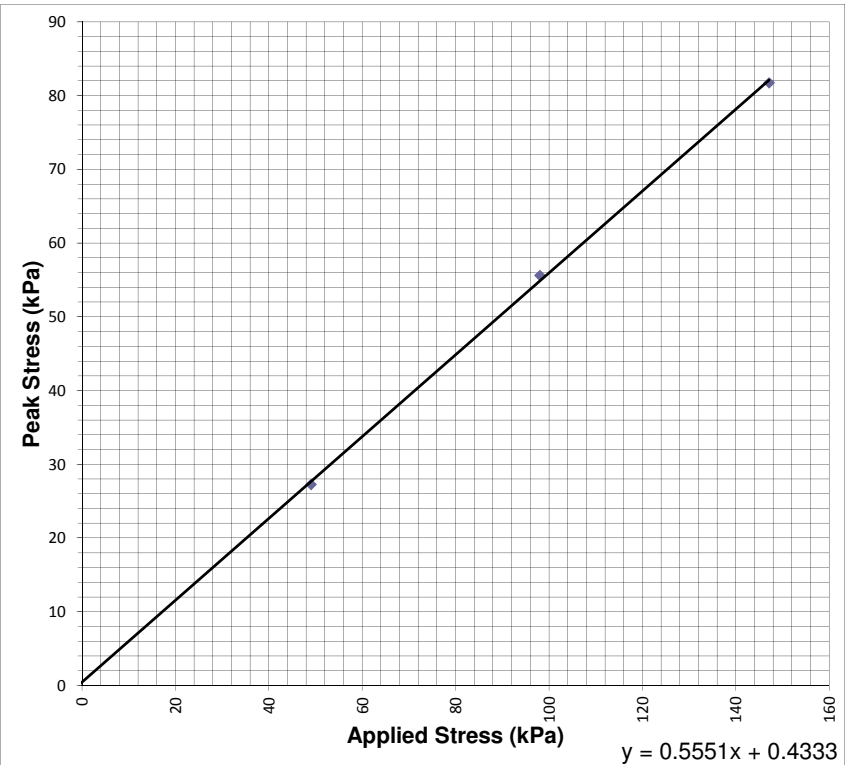
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	56
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.90 °
Apparent Cohesion	0.43 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

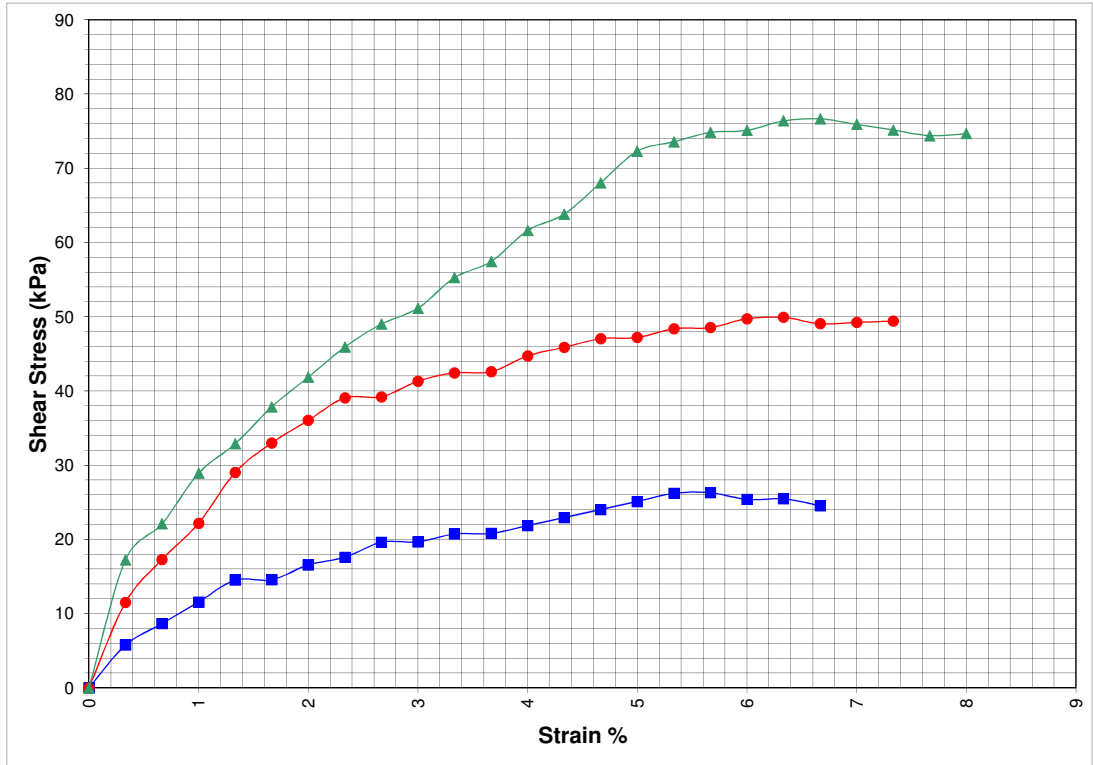
Borehole: LBH-06A

Sample Type: SPT-09

Depth: 12.00-12.30 m

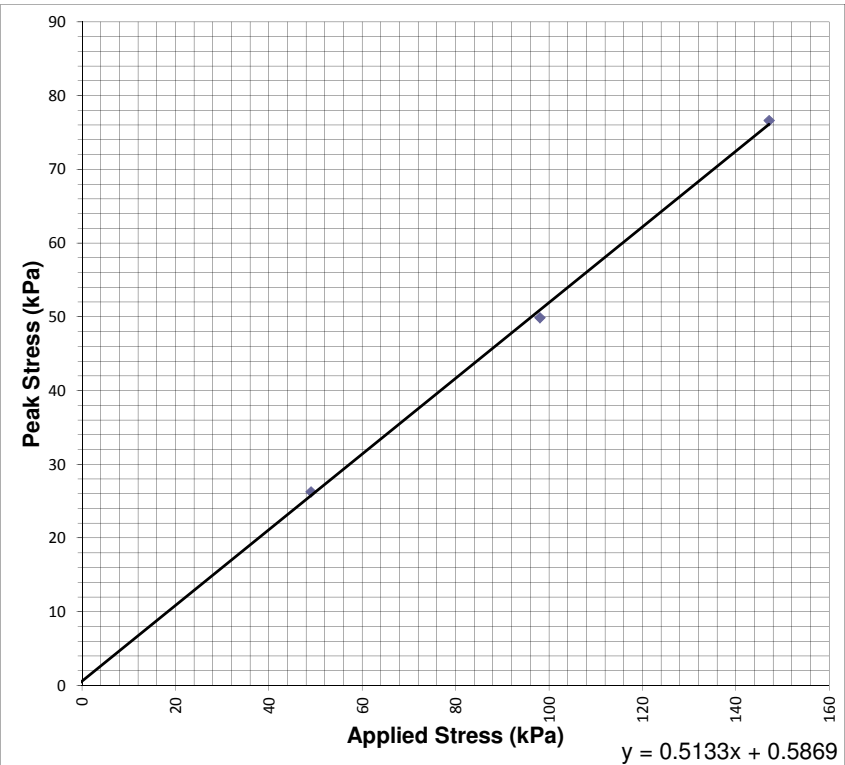
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	50
▲	Stage 3	147	77

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.17 °
Apparent Cohesion	0.59 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

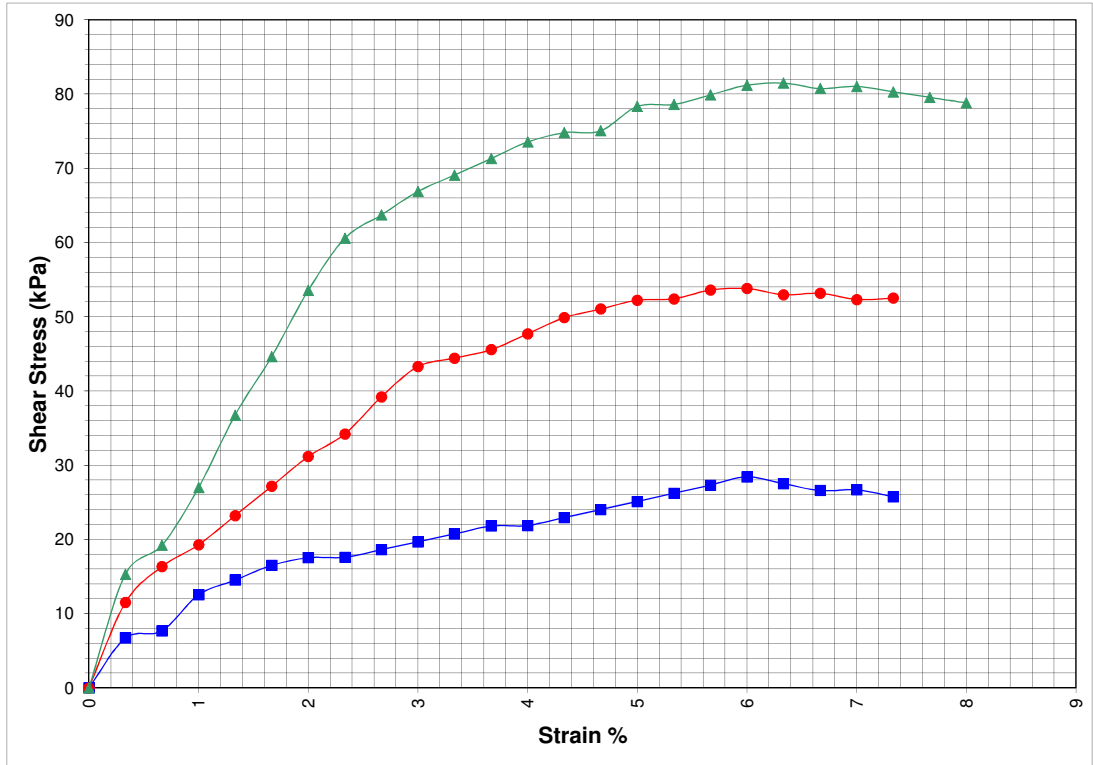
Borehole: LBH-06A

Sample Type: SPT-11

Depth: 15.00-15.22 m

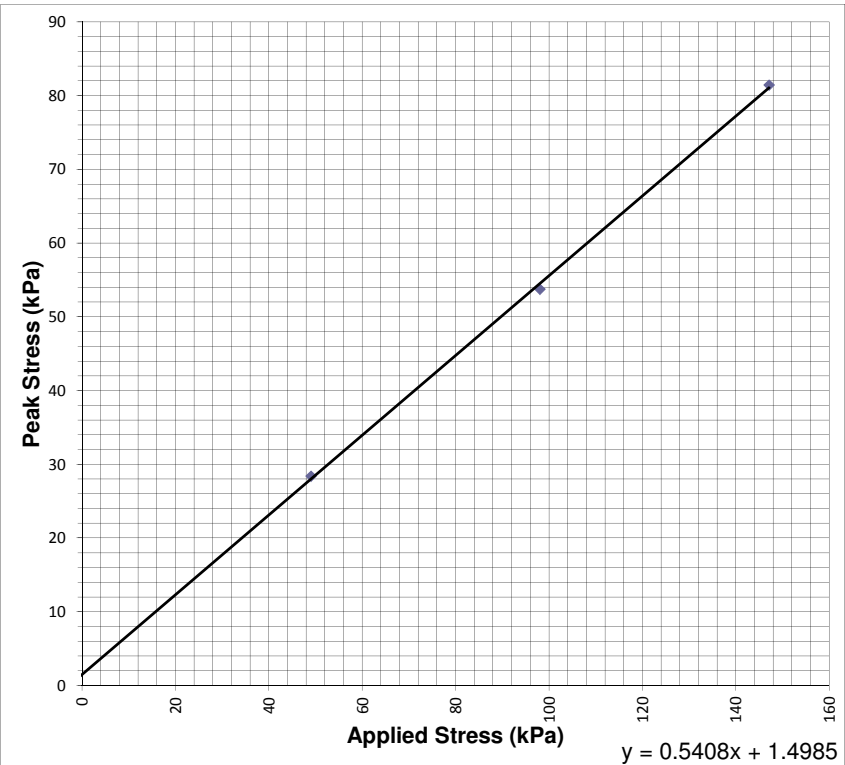
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	81

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.40 °
Apparent Cohesion	1.50 kPa

Borehole: LBH-06A

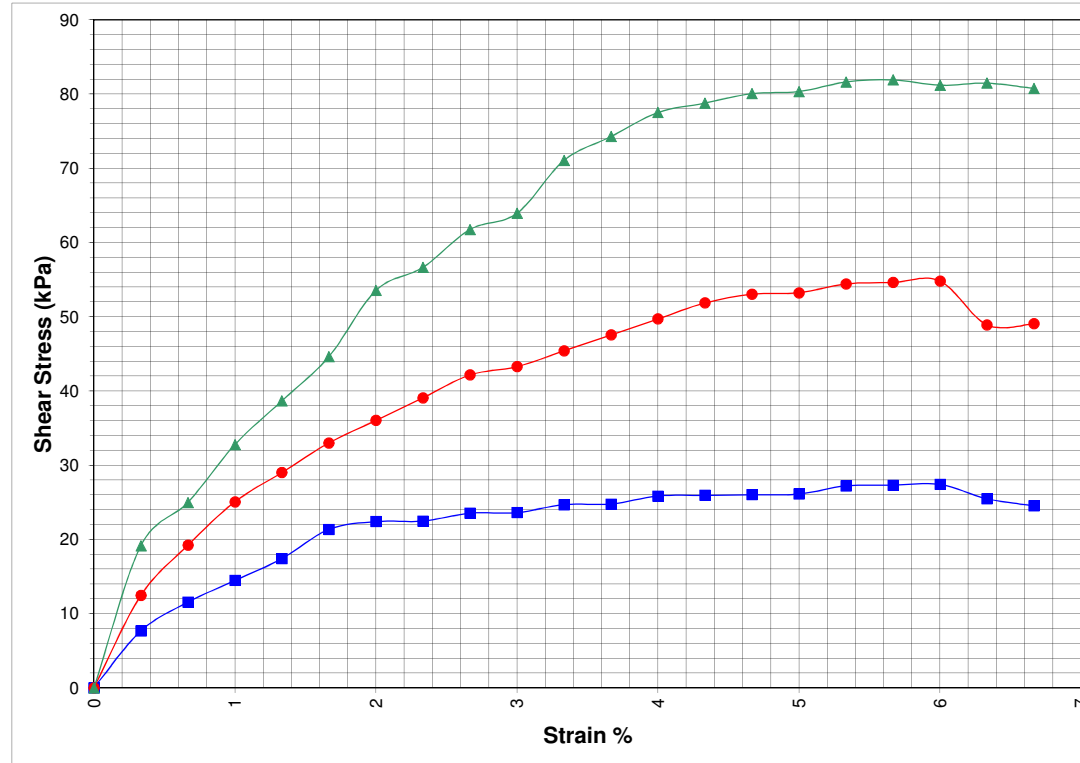
Sample Type: SPT-15

Depth: 21.00-21.15 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

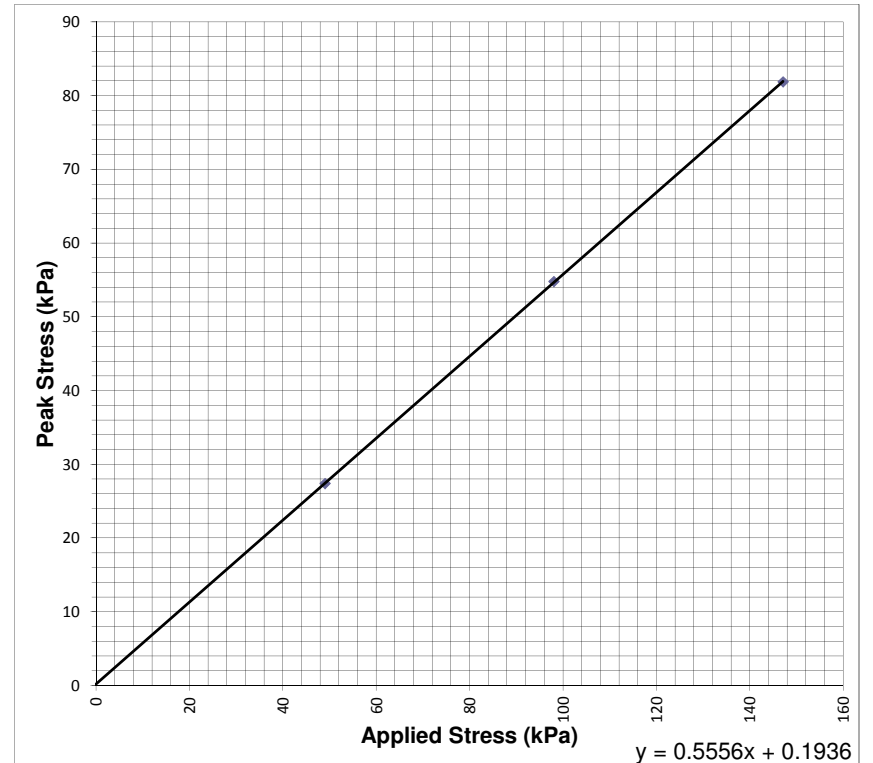
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	55
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	29.06 °
Apparent Cohesion	0.19 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

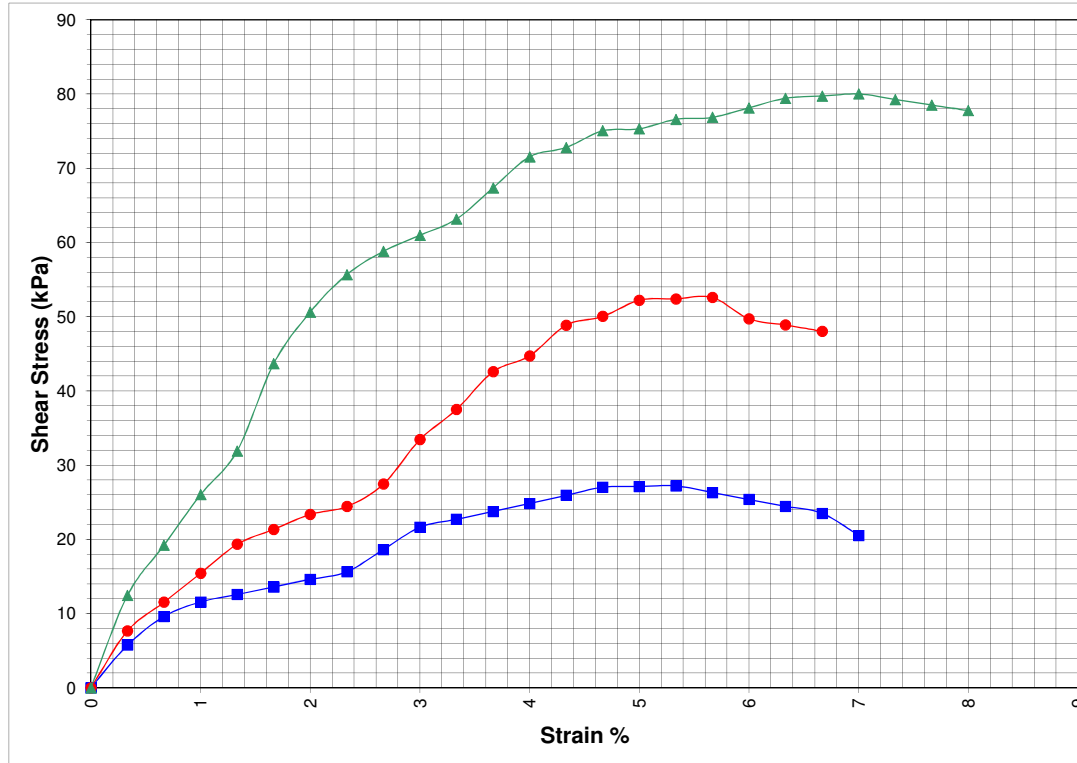
Borehole: LBH-06A

Sample Type: SPT-18

Depth: 25.50-25.65 m

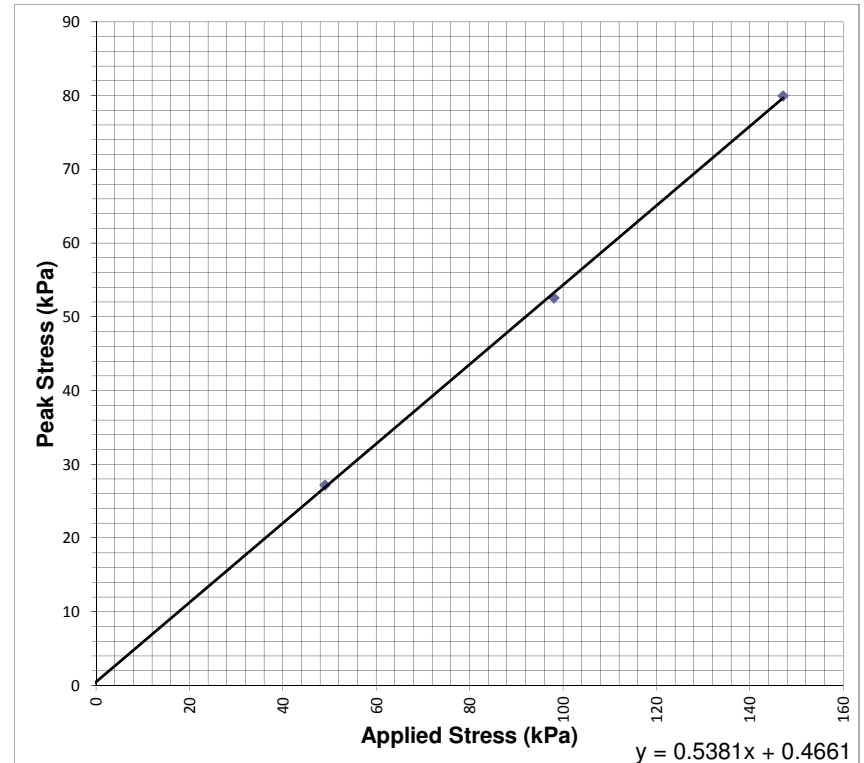
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	53
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.28 °
Apparent Cohesion	0.47 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

Borehole: LBH-06A

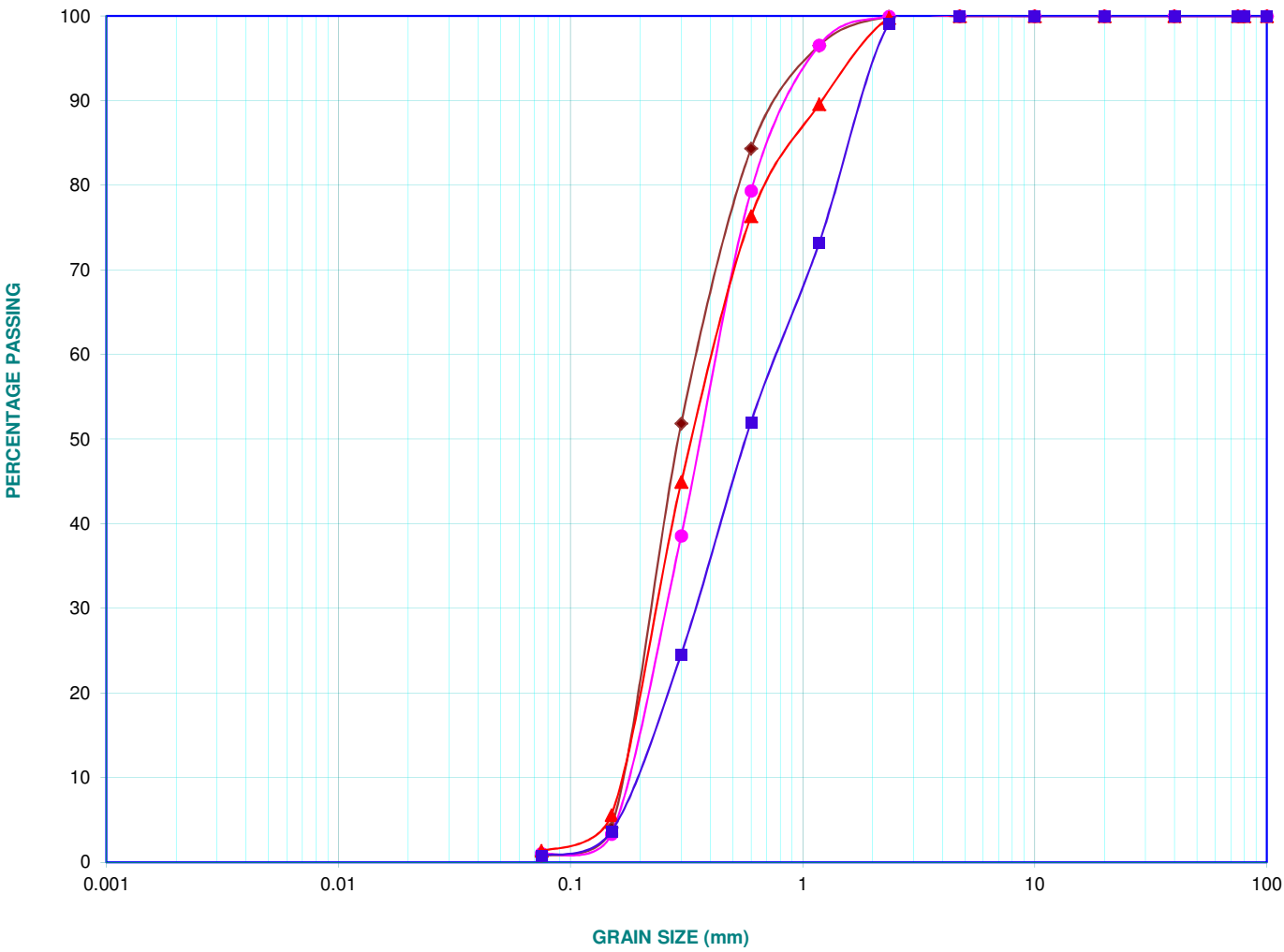
Sample Type: SPT-20

Depth: 28.50-28.65 m

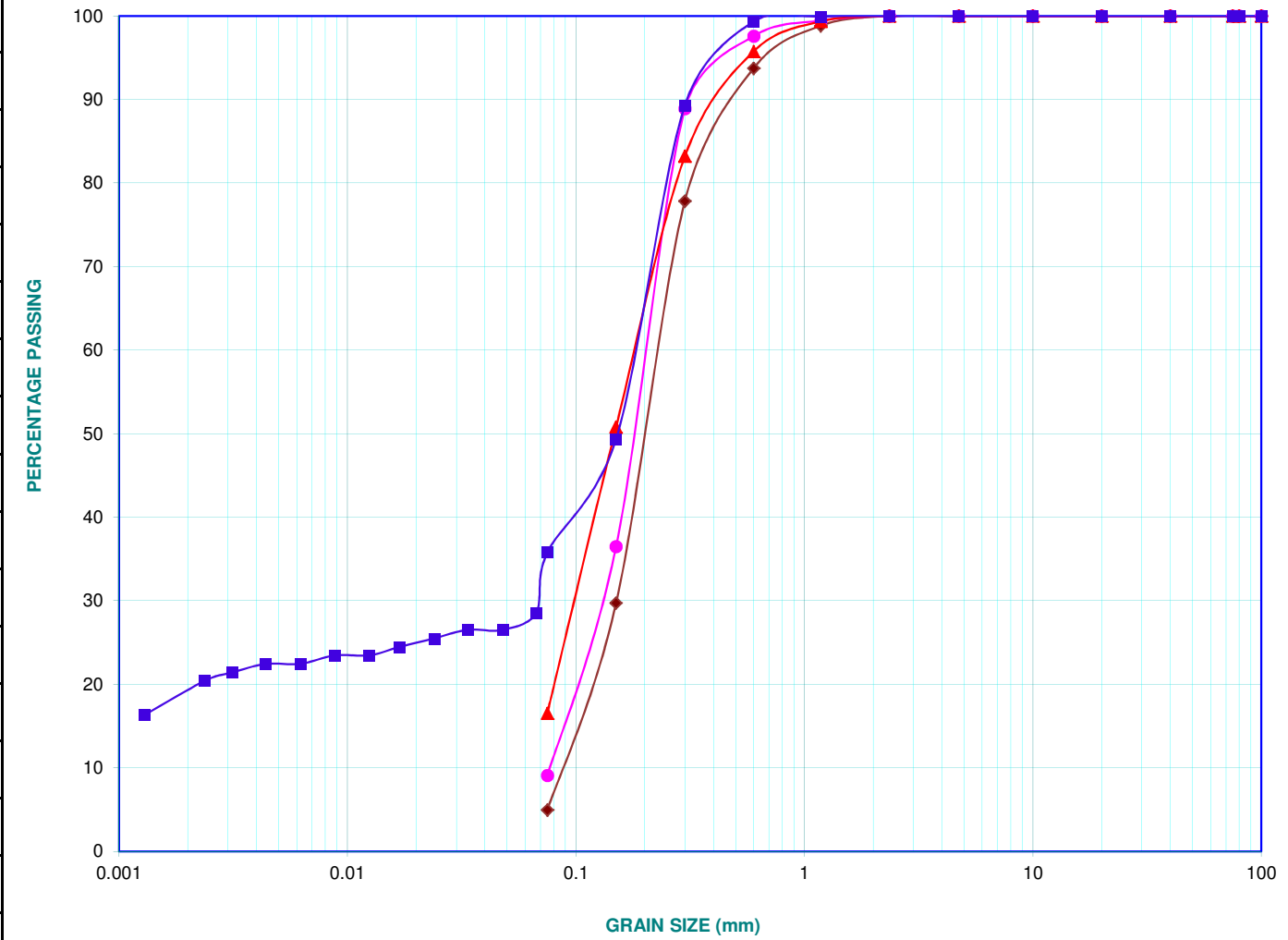
SUMMARY OF TEST RESULTS

SAMPLE DETAILS		Soil Classification	CLASSIFICATION & INDEX													SHEAR STRENGTH TEST								Free swell Index %	Consolidation Tests				Chemical tests					
Sample Type	Depth, m		Atterberg Limits			Physical Properties					Grain Size Distribution					Lateral & Vertical Loading Tests									Initial Void Ratio	Degree of Saturation %	Preconsolidation Pressure (kPa)	Compression Index	pH	Organic content (%)	Carbonate content (%)	Chloride content (ppm)	Sulphate content (ppm)	
			Liquid Limit LL %	Plastic Limit PL %	Plasticity Index PI %	Water Content %	Bulk Density (kN/m ³)	Submerged Unit Weight (kN/m ³)	Dry Density (kN/m ³)	Specific Gravity	Gravel %	Sand %	Silt %	Clay %	Fines % (Silt + Clay)	Type of Test	Shear Strength Su (kpa)	Type of Failure	Cohesion C (kpa)	Internal friction angle Φ °	Torvane (Kpa)	Pocket penetrometer (Kpa)	Miniature Vane											
DS	0.00-0.50					2.8	16.61	6.55	16.16	2.63						DST			1.77	24.5														
SPT-1	1.50-1.95	SP				19.1	17.97	7.91	15.09	2.62	0	99	<-->	<-->	1																			
SPT-2	3.00-3.45	SP				17.8	17.82	7.76	15.13	2.61	0	99	<-->	<-->	1																			
SPT-3	4.50-4.95					9.9	17.79	7.73	16.19	2.65						DST			1.53	27.4														
SPT-4	6.00-6.45					18.9	17.32	7.26	14.56	2.67						DST			2.34	27.4														
SPT-5	7.50-7.95	SP				19.2	17.70	7.64	14.85	2.64	0	99	<-->	<-->	1																			
SPT-6	9.00-9.45	SP				14.5	16.89	6.83	14.75	2.67	0	99	<-->	<-->	1																			
SPT-7	10.50-10.95					20.7	16.65	6.59	13.80	2.60						DST			0.96	27.0														
SPT-8	12.00-12.45	SP-SM				21.3	17.39	7.33	14.34	2.61	0	95	<-->	<-->	5	DST			0.93	28.4														
SPT-9	13.50-13.95	SP-SM				22.5	17.33	7.27	14.14	2.60	0	91	<-->	<-->	9	DST			0.78	28.9														
SPT-10	15.00-15.45					20.4	17.44	7.38	14.48	2.59	0	83	<-->	<-->	17																			
SPT-11	16.50-17.00					20.7	16.84	6.78	13.95	2.64						DST			1.82	27.5														
SPT-12	18.00-18.45	CL	29.4	16.4	13.0	18.9	20.91	10.85	17.59	2.61																								
UDS-1	19.50-20.00	SC	27.5	15.4	12.1	13.6	21.22	11.16	18.69	2.59	0	64	16	20	36	UU	114.2	A							30.0	0.36	97.0	186.3	0.003	6.90	2.30	1.00	700	8850
SPT-13	21.00-21.45	CL	28.4	15.8	12.6	18.4	20.95	10.89	17.69	2.60																								
SPT-14	22.50-22.95					22.8	17.45	7.39	14.21	2.65						DST			2.19	28.3														
SPT-15	24.00-24.45	SP-SM				23.5	17.52	7.46	14.18	2.61	0	95	<-->	<-->	5																			
SPT-16	25.50-25.95					16.8	17.57	7.51	15.04	2.62						DST			1.40	27.8														
SPT-17	27.00-27.45	SP				18.8	17.70	7.64	14.91	2.61	0	98	<-->	<-->	2																			
SPT-18	28.50-28.95					16.3	17.63	7.57	15.16	2.66						DST			2.38	27.7														
SPT-19	30.00-30.45	SP-SM				16.5	17.51	7.45	15.03	2.61	0	94	<-->	<-->	6																			
END OF BOREHOLE																																		
Notes :																																		
DS : Disturbed Sample * : Insufficient sample # : Decayed Wood Failure Type																																		
WAX/UDS :Undisturbed Sample LL : Liquid Limit A : Bulge Project :																																		
TUU : Triaxial Test (Unconsolidated Undrained) PL : Plastic Limit B : Inclined Shear :																																		
DST : Direct Shear Test NP : Non Plastic C : Multiple Shear :																																		
Φ : ° (deg) Angle of internal friction NS : Not Suitable D : Vertical Shear Project Code : CM 19 01 03																																		
Borehole No. : LBH-07-Opt.1																																		
Geotechnical Investigation For Capive Jetty at																																		
Jatadharmuhan, Near Paradip, Dist.																																		
Jagatsinghpur, Odisha																																		

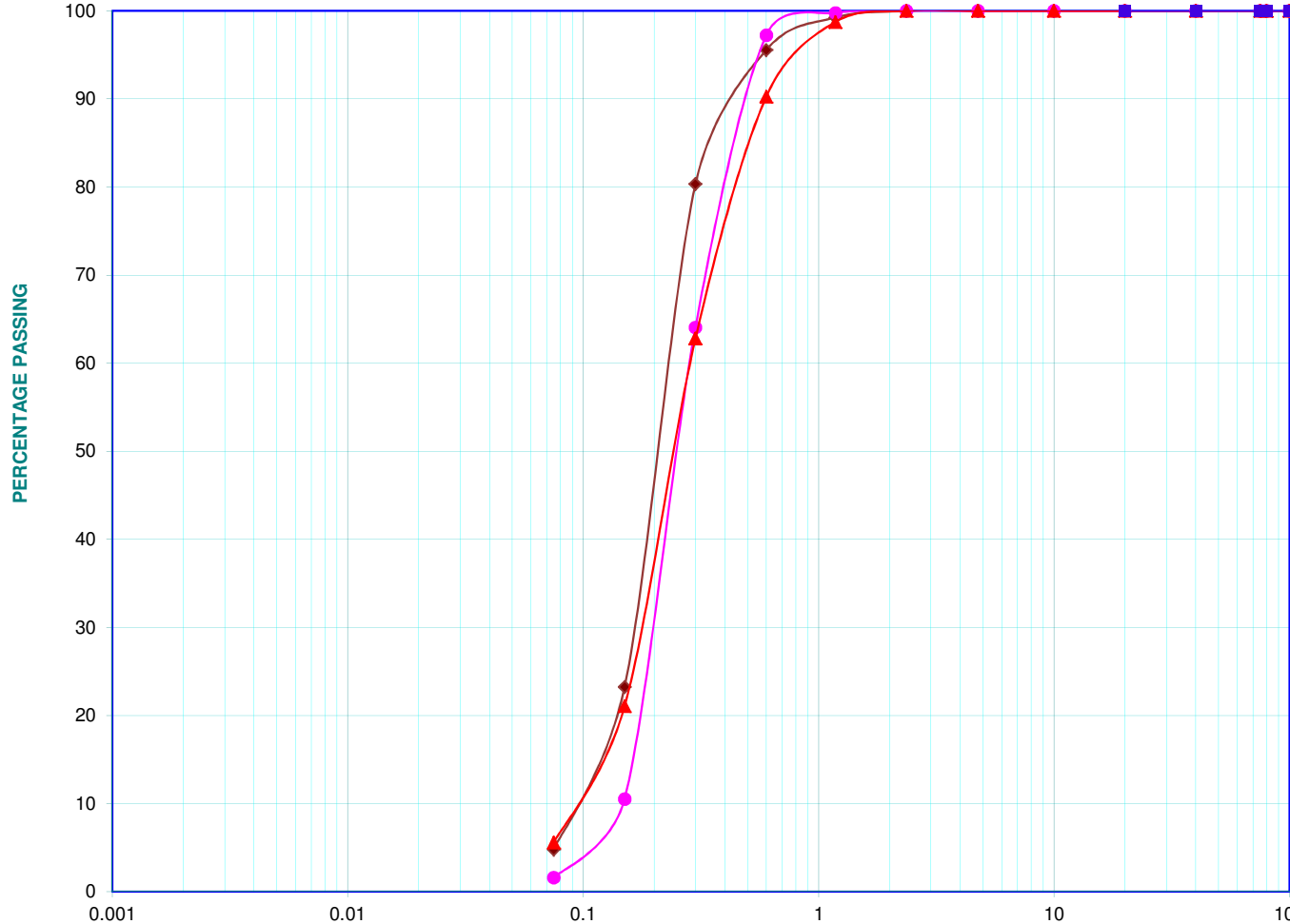
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-07-Opt.1					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-07-Opt.1	LBH-07-Opt.1	LBH-07-Opt.1	LBH-07-Opt.1										
Depth (m)	1.50-1.95	3.00-3.45	7.50-7.95	9.00-9.45										
Sample Type	SPT-1	SPT-2	SPT-5	SPT-6										
Classification	SP	SP	SP	SP										
Gravel %	0	0	0	0										
Sand %	99	99	99	99										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	1	1	1	1										
D60 mm	0.350	0.410	0.400	0.780										
D30 mm	0.220	0.260	0.230	0.340										
D10 mm	0.180	0.190	0.180	0.100										
Cu	1.94	2.16	2.22	7.80										
Cc	0.77	0.87	0.73	1.48										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

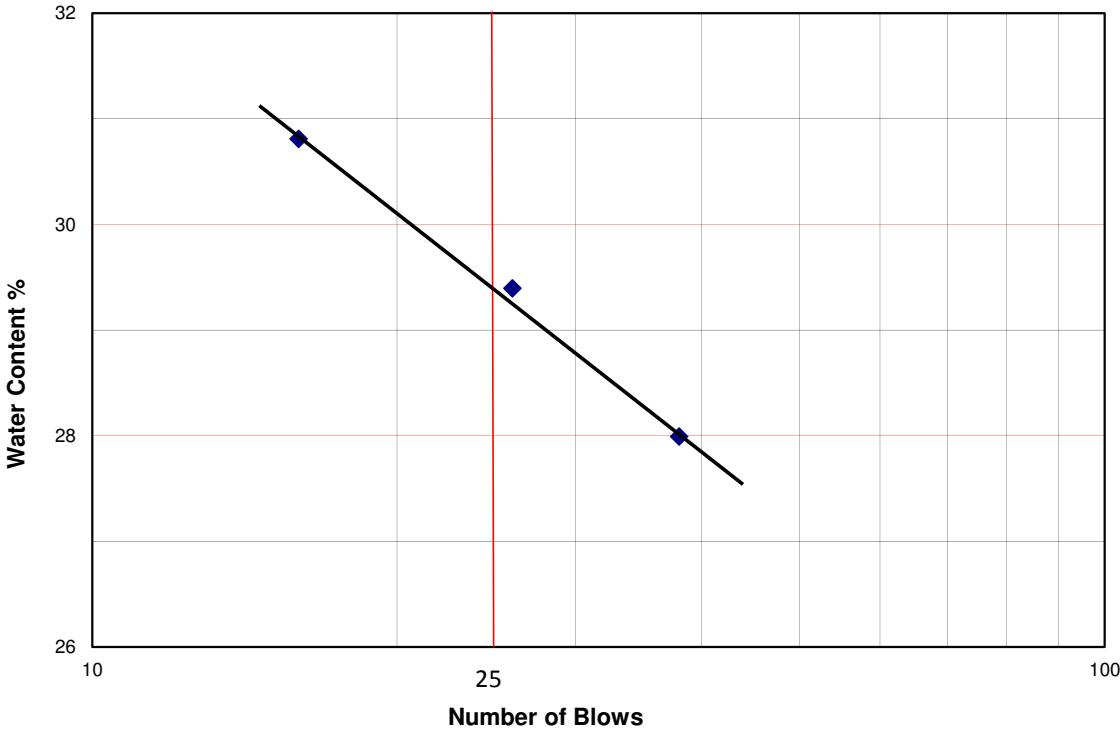
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03		Borehole No. : LBH-07-Opt.1					Date :			31-May-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-07-Opt.1	LBH-07-Opt.1	LBH-07-Opt.1	LBH-07-Opt.1										
Depth (m)	12.00-12.45	13.50-13.95	15.00-15.45	19.50-20.00										
Sample Type	SPT-8	SPT-9	SPT-10	UDS-1										
Classification	SP-SM	SP-SM		SC										
Gravel %	0	0	0	0										
Sand %	95	91	83	64										
Silt %	<---->	<---->	<---->	16										
Clay %	<---->	<---->	<---->	20										
Fines % (Silt+Clay)	5	9	17	36										
D60 mm	0.230	0.200												
D30 mm	0.150	0.140												
D10 mm	0.090	0.078												
Cu	2.56	2.56												
Cc	1.09	1.26												
Liquid Limit %	---	---	---	27.5										
Plastic Limit %	---	---	---	15.4										
Plasticity Index	---	---	---	12.1										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-07-Opt.1					Date :		31-May-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	LBH-07-Opt.1	LBH-07-Opt.1	LBH-07-Opt.1		 PERCENTAGE PASSING GRAIN SIZE (mm)									
Depth (m)	24.00-24.45	27.00-27.45	30.00-30.45											
Sample Type	SPT-15	SPT-17	SPT-19											
Classification	SP-SM	SP	SP-SM											
Gravel %	0	0	0											
Sand %	95	98	94											
Silt %	<---->	<---->	<---->											
Clay %	<---->	<---->	<---->											
Fines % (Silt+Clay)	5	2	6											
D60 mm	0.230	0.290	0.290											
D30 mm	0.180	0.200	0.190											
D10 mm	0.098	0.150	0.098											
Cu	2.35	1.93	2.96											
Cc	1.44	0.92	1.27											
Liquid Limit %	---	---	---											
Plastic Limit %	---	---	---											
Plasticity Index	---	---	---											
									Checked By :					

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	34.06	30.95	27.68		
Dry Weight + Can (g)	29.36	26.10	23.41		
Can Weight (g)	12.57	9.60	9.55		
Water Content, %	28.0	29.4	30.8		
Number of Blows	38	26	16		

Plastic Limit %

Wet Weight + Can (g)	20.25	19.78	19.25
Dry Weight + Can (g)	18.71	18.32	18.36
Can Weight (g)	9.36	9.37	12.93
Water Content, %	16.5	16.3	16.4

Liquid Limit % 29.4
Plastic Limit % 16.4
Plasticity Index % 13.0

Preparation of Sample :
Dry State

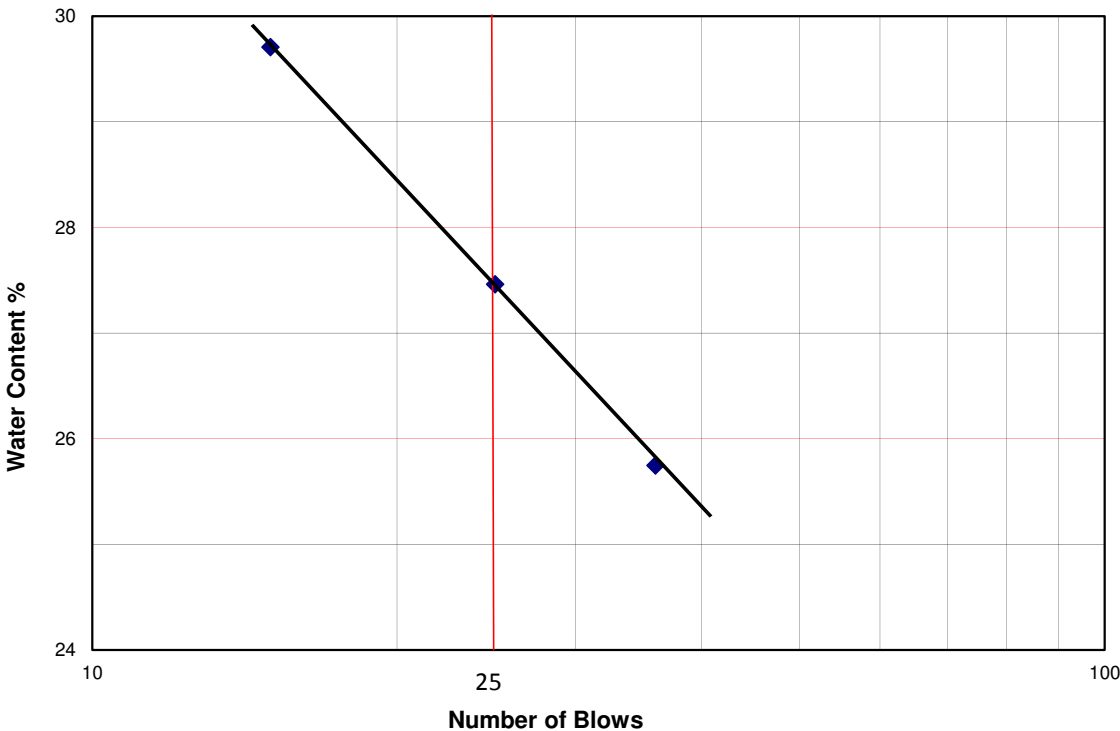
Sample Type: SPT-12

Borehole no.: LBH-07-Opt.1

Depth :18.00-18.45

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	35.45	34.22	31.79		
Dry Weight + Can (g)	30.89	29.87	27.45		
Can Weight (g)	13.18	14.03	12.84		
Water Content, %	25.7	27.5	29.7		
Number of Blows	36	25	15		

Plastic Limit %

Wet Weight + Can (g)	22.65	19.88	15.48
Dry Weight + Can (g)	21.31	18.28	14.49
Can Weight (g)	12.60	7.84	8.07
Water Content, %	15.4	15.3	15.4

Liquid Limit % 27.5
Plastic Limit % 15.4
Plasticity Index % 12.1

Preparation of Sample :
Dry State

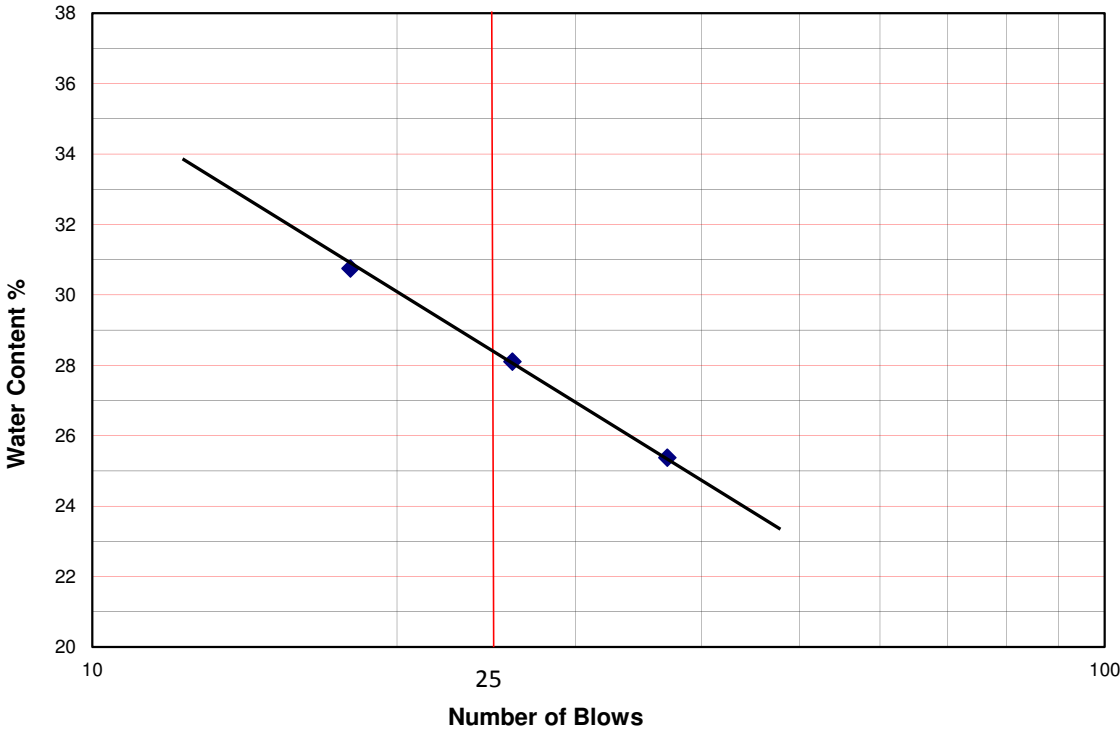
Sample Type: UDS-01

Borehole no.: LBH-07-Opt.1

Depth :19.50-20.00

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	27.34	27.11	29.49		
Dry Weight + Can (g)	23.33	23.10	25.69		
Can Weight (g)	7.53	8.83	13.33		
Water Content, %	25.4	28.1	30.7		
Number of Blows	37	26	18		

Plastic Limit %

Wet Weight + Can (g)	17.88	18.59	19.02
Dry Weight + Can (g)	16.60	17.80	18.06
Can Weight (g)	8.50	12.79	12.05
Water Content, %	15.8	15.8	16.0

Liquid Limit % 28.4
Plastic Limit % 15.8
Plasticity Index % 12.6

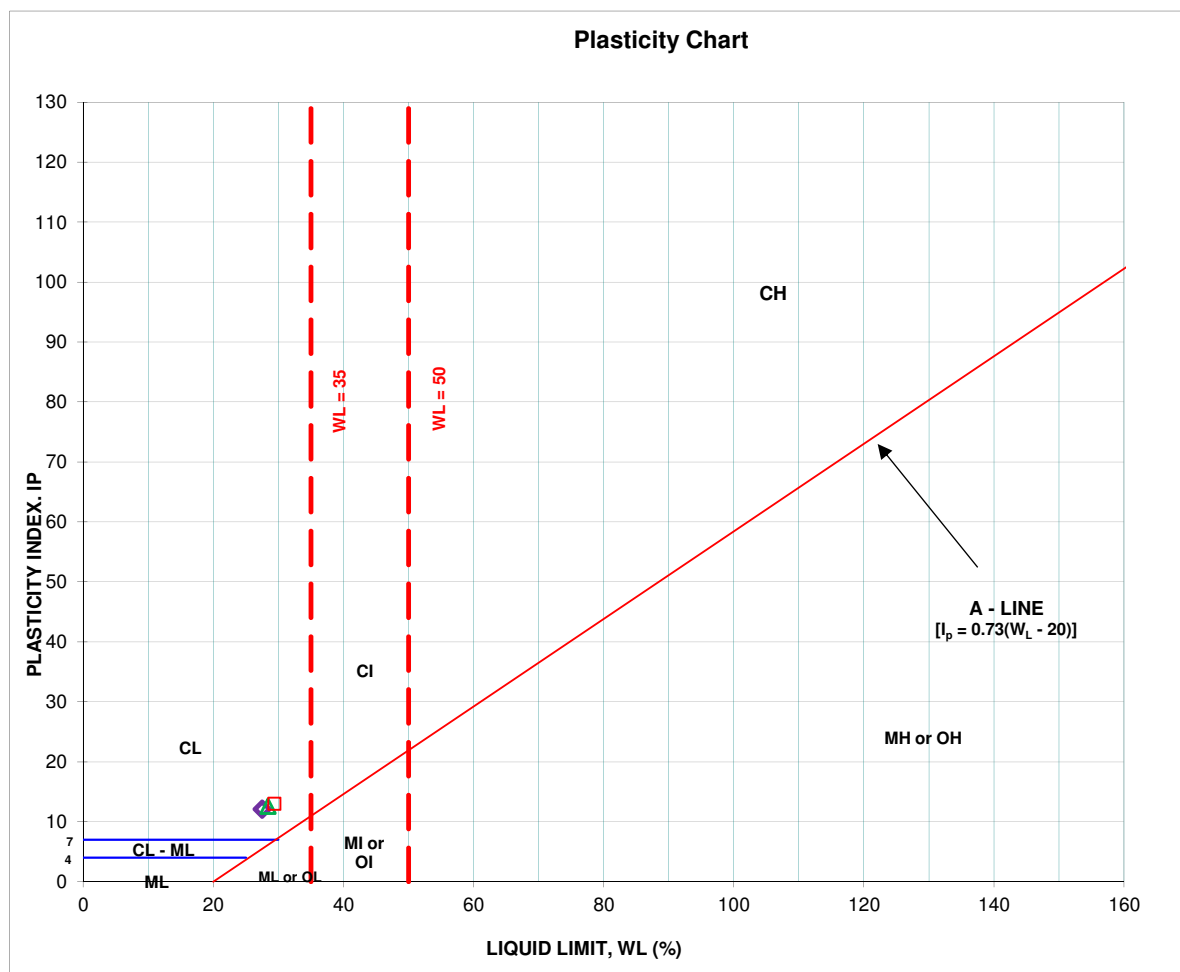
Preparation of Sample :
Dry State

Sample Type: SPT-13

Borehole no.: LBH-07-Opt.1

Depth :21.00-21.45

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.



	Sample Type	Depth (m)	W_L	W_p	I_p	Remarks
□	SPT-12	18.00-18.45	29.4	16.4	13.0	CL : Inorganic clays of low to medium plasticity.
◇	UDS-01	19.50-20.00	27.5	15.4	12.1	CL : Inorganic clays of low to medium plasticity.
△	SPT-13	21.00-21.45	28.4	15.8	12.6	CL : Inorganic clays of low to medium plasticity.
●						

ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	MH	Inorganic silts, or diatomaceous fine sands or silts, elastic silts
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	CH	Inorganic clays of high plasticity, fat clays
OL	Organic silts and organic silty clays of low plasticity	OH	Organic silts and organic clays of medium t high plasticity
CI	Clays with Intermediate plasticity	MI	Silt with intermediate plasticity

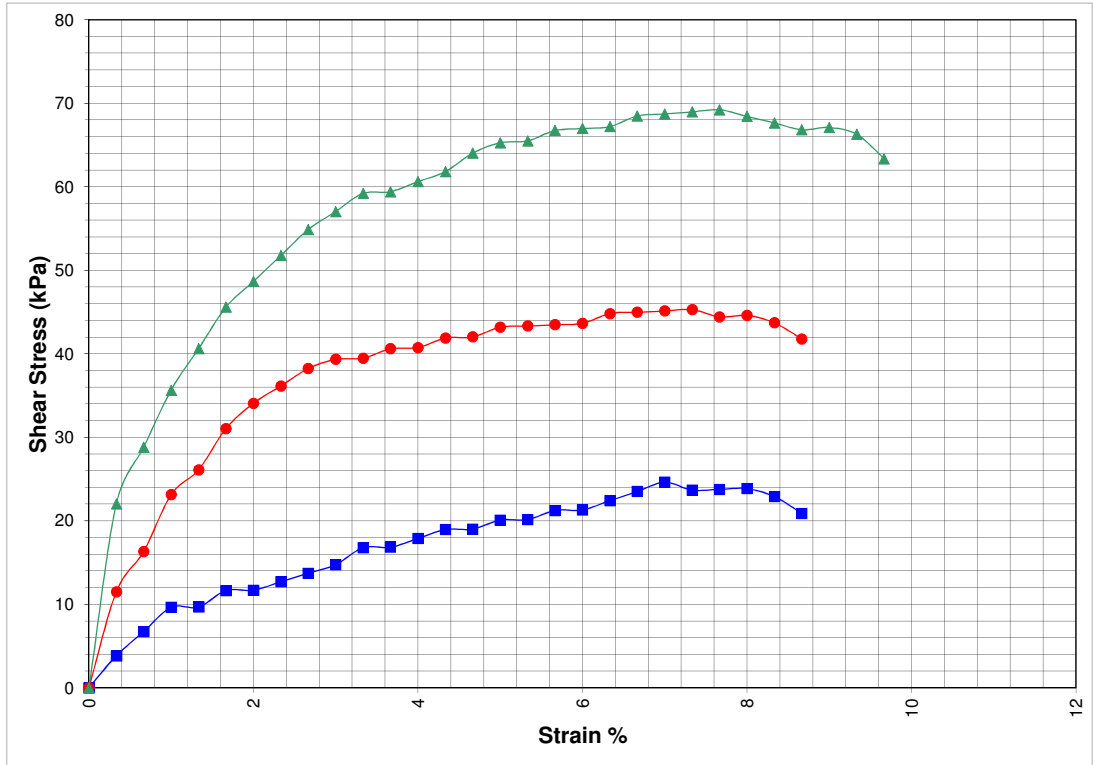
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : LBH-07-Opt.1

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

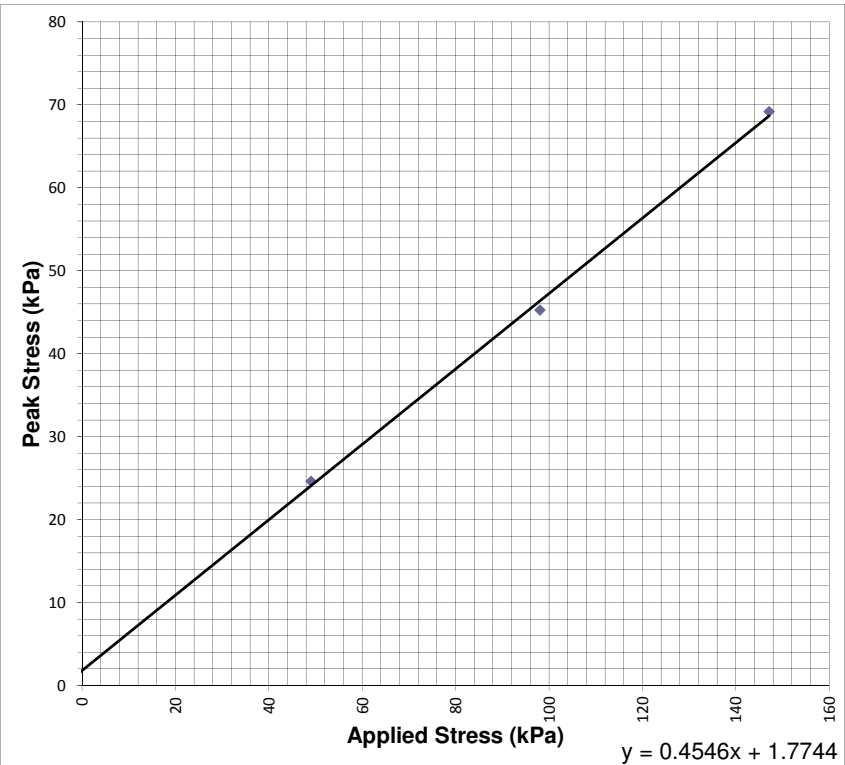
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	45
▲	Stage 3	147	69

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



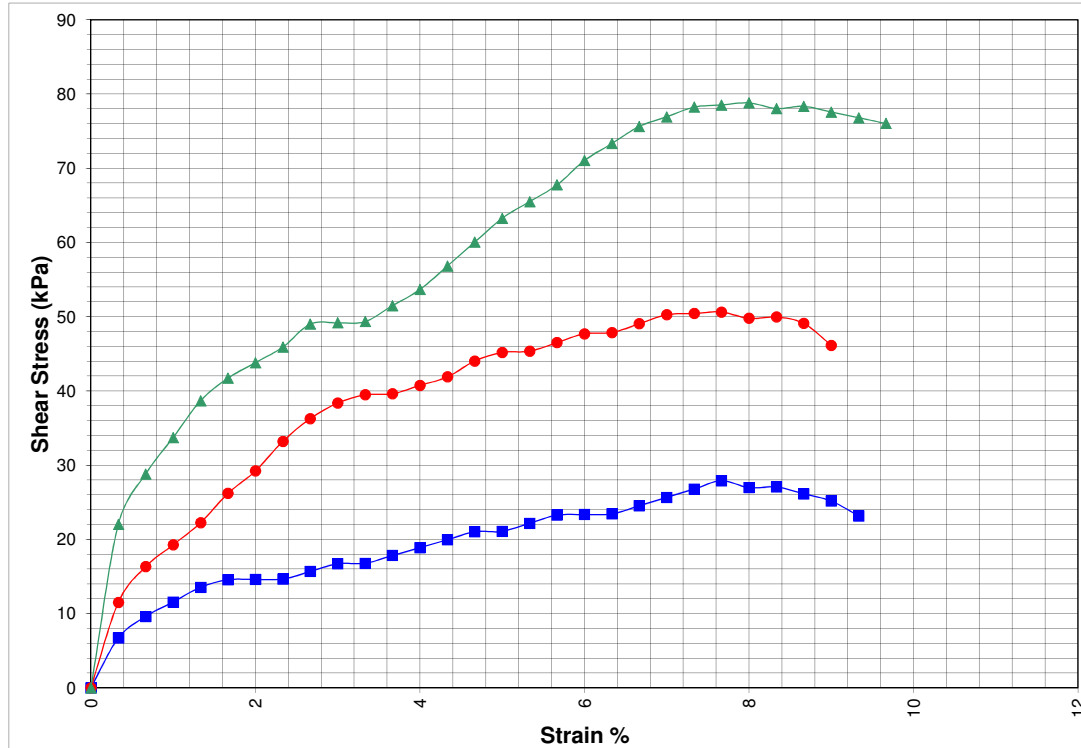
Angle of Friction	24.45 °
Apparent Cohesion	1.77 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

Borehole: LBH-07-Opt.1
Sample Type: DS-01
Depth: 0.00-0.50 m

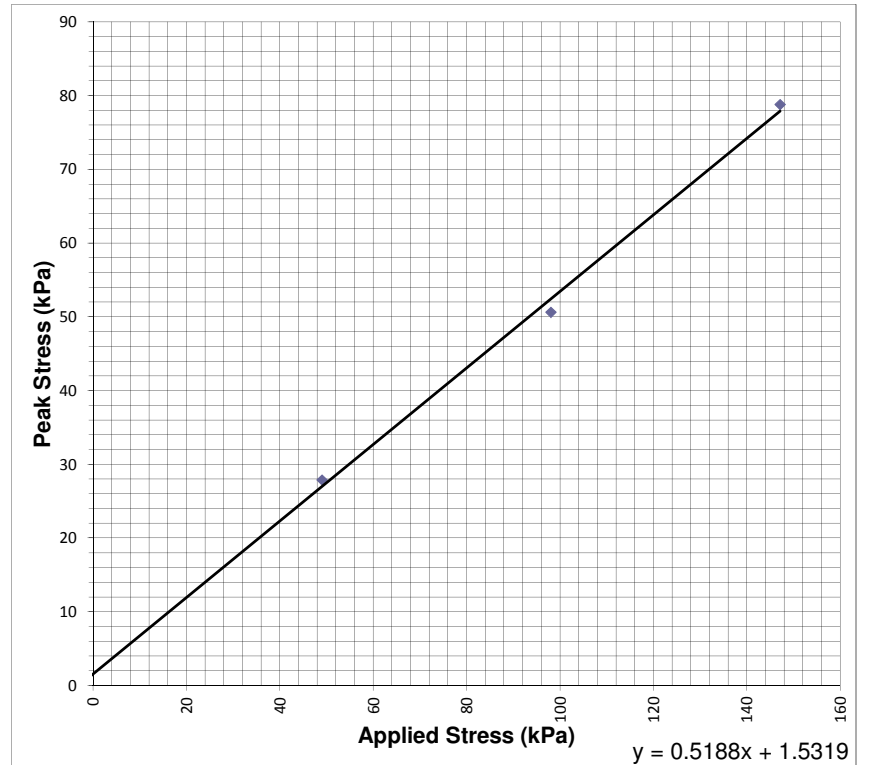
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	51
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.42 °
Apparent Cohesion	1.53 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

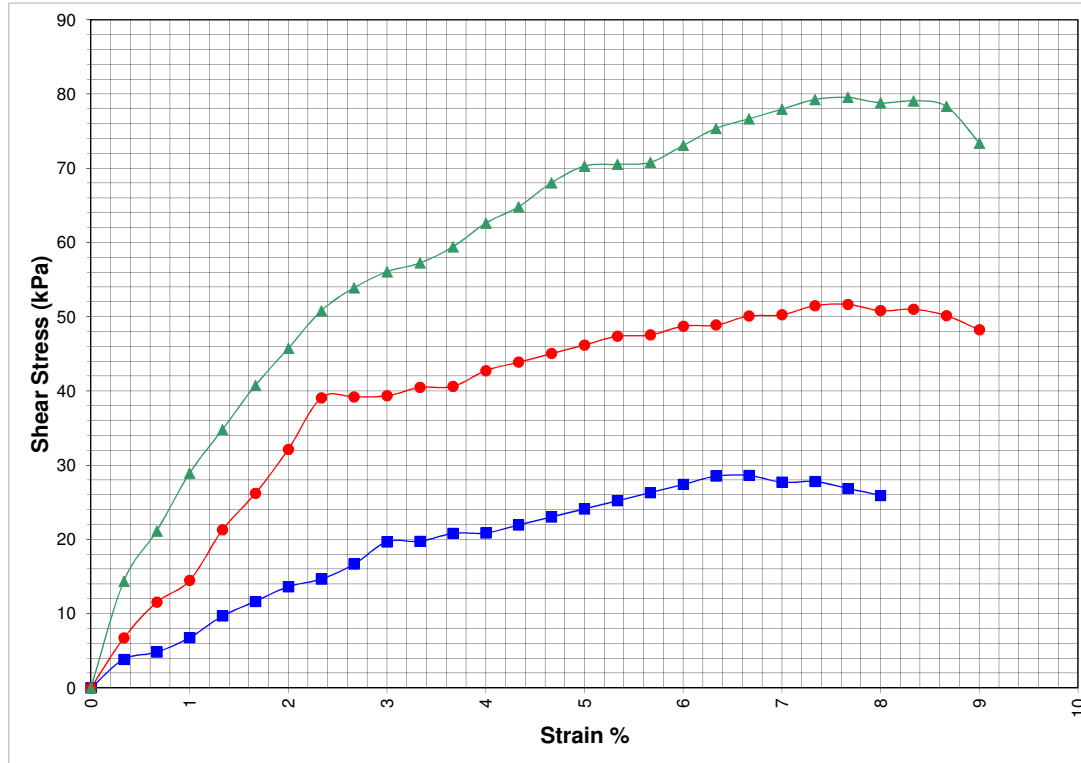
Borehole: LBH-07-Opt.1

Sample Type: SPT-03

Depth: 4.50-4.95 m

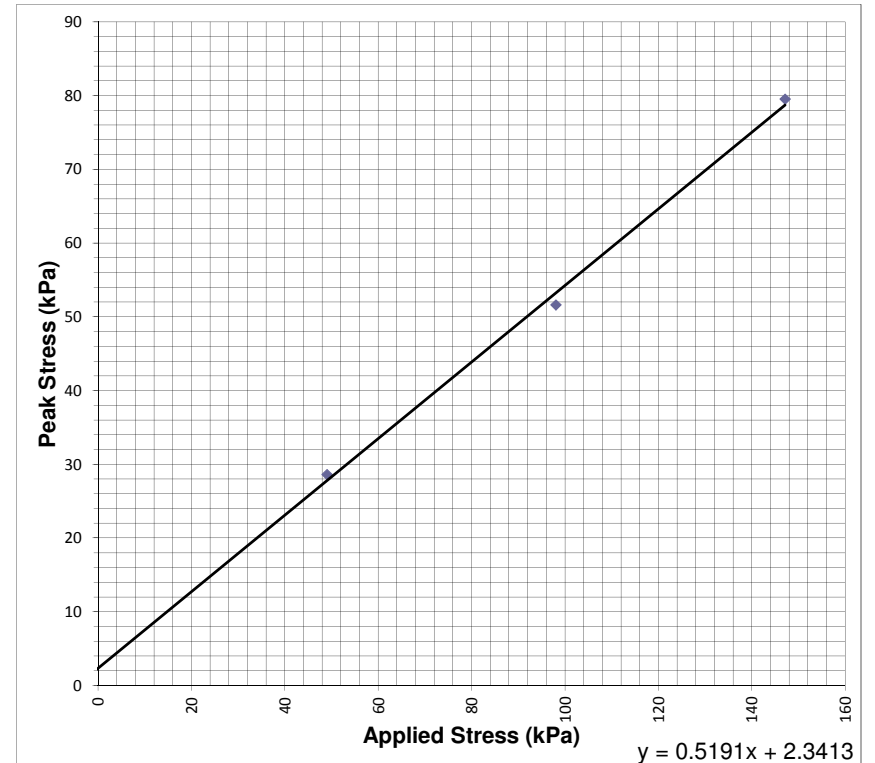
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	52
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.43 °
Apparent Cohesion	2.34 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

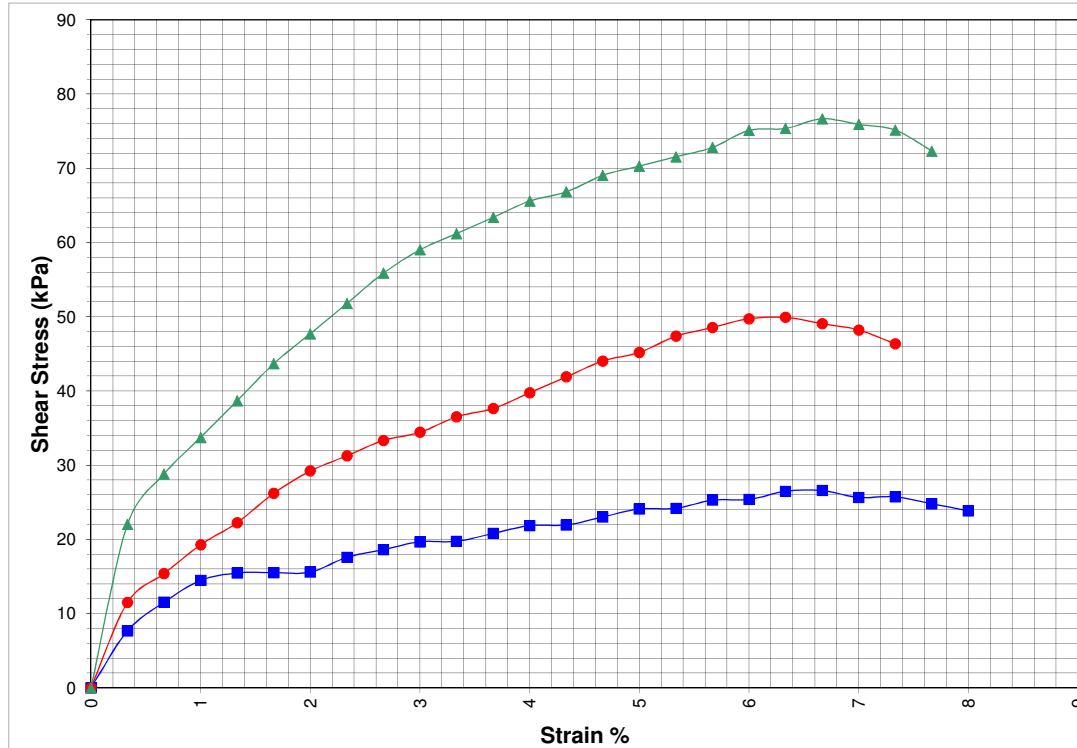
Borehole: LBH-07-Opt.1

Sample Type: SPT-04

Depth: 6.00-6.45 m

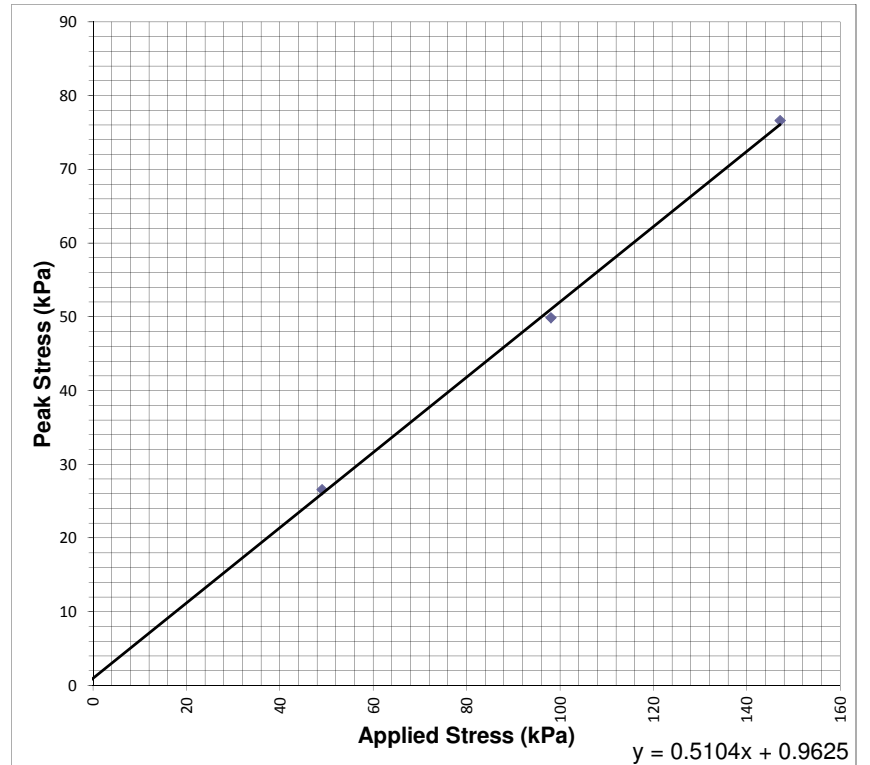
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	50
▲	Stage 3	147	77

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.04 °
Apparent Cohesion	0.96 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

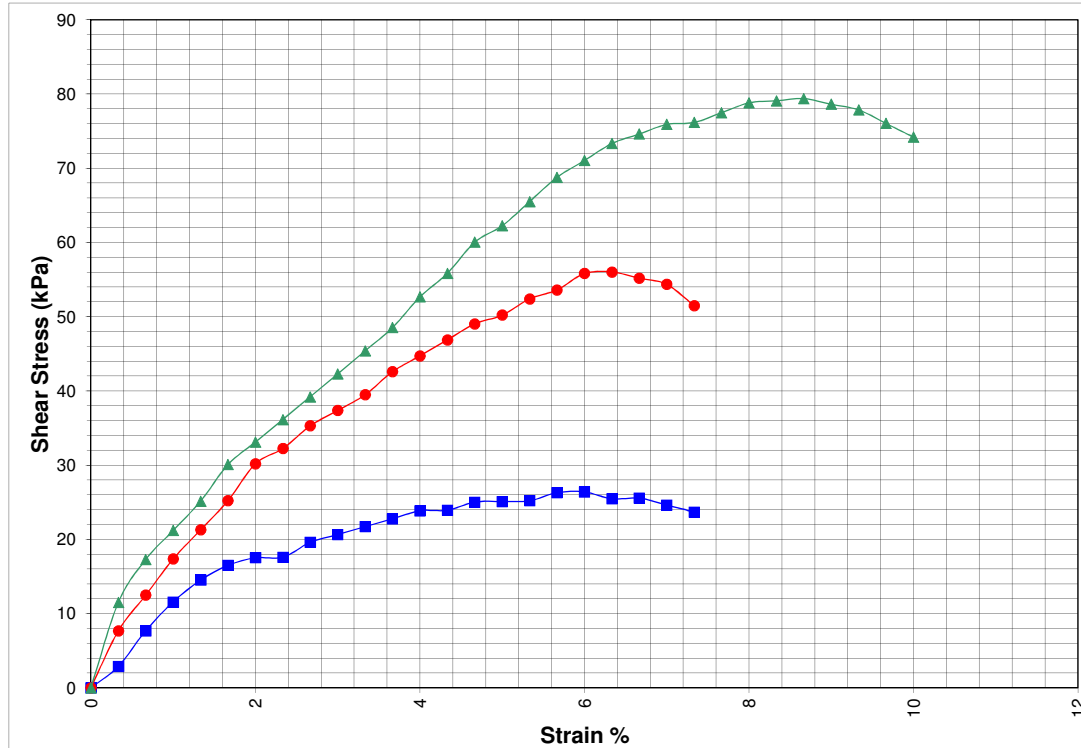
Borehole: LBH-07-Opt.1

Sample Type: SPT-07

Depth: 10.50-10.95 m

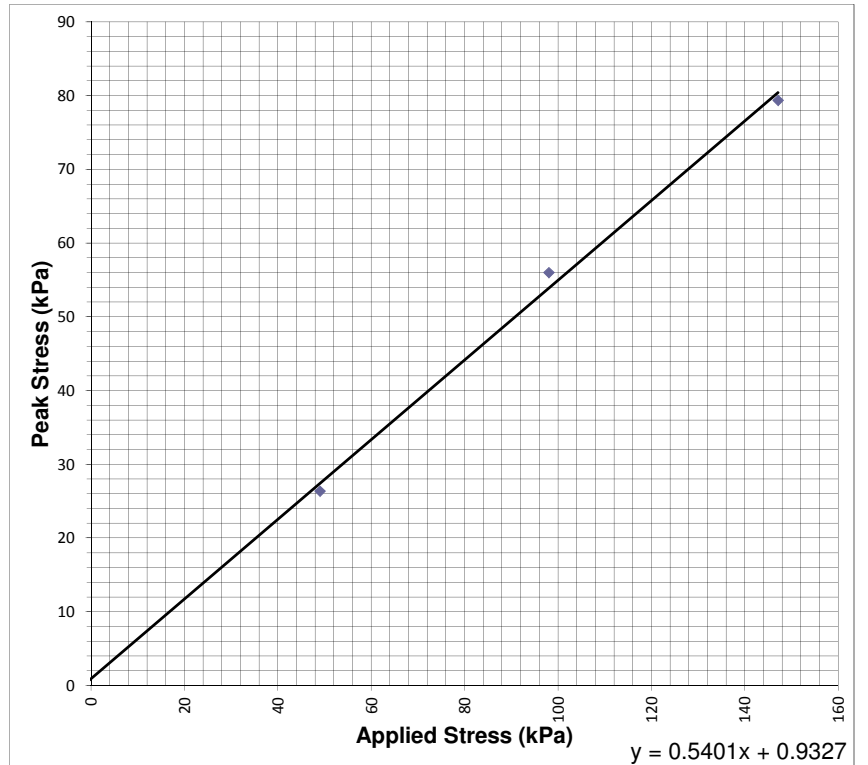
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	56
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.37 °
Apparent Cohesion	0.93 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

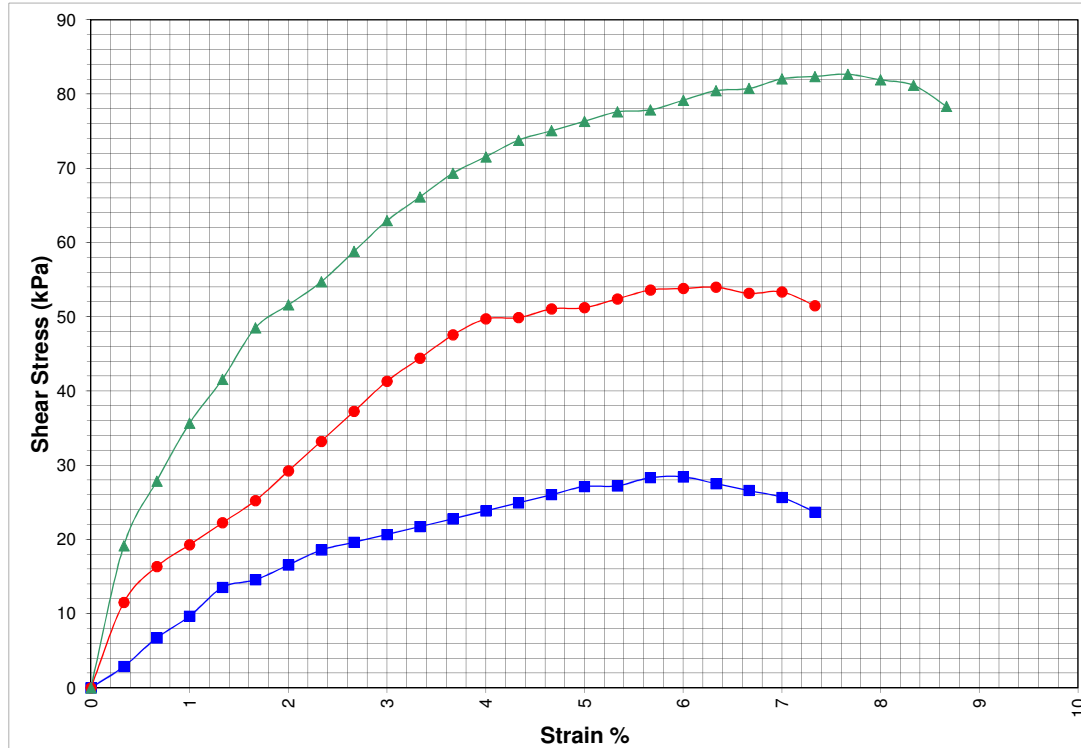
Borehole: LBH-07-Opt.1

Sample Type: SPT-08

Depth: 12.00-12.45 m

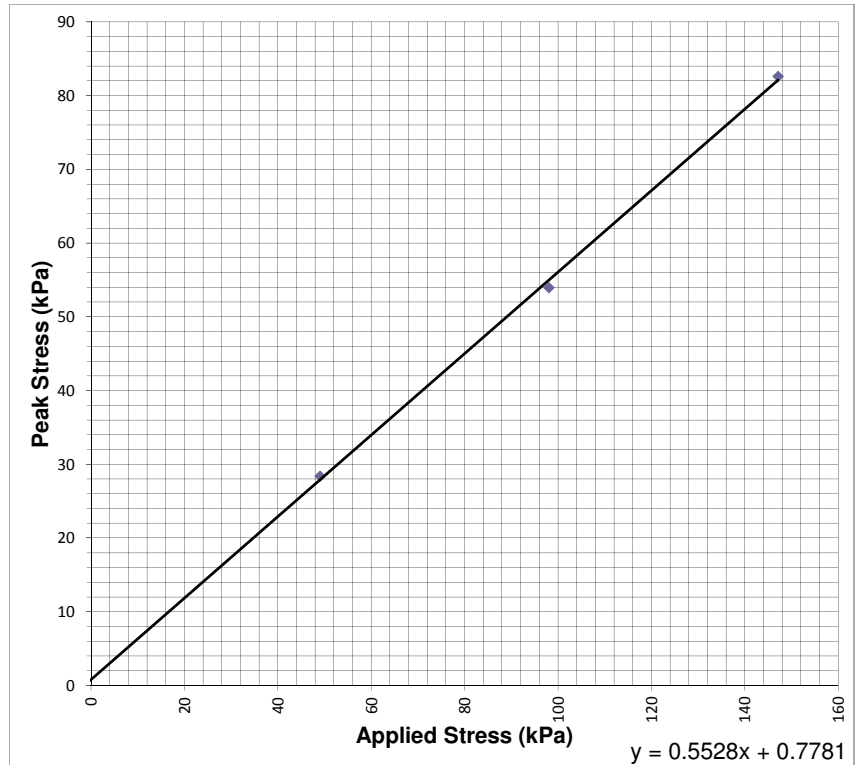
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	83

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.93 °
Apparent Cohesion	0.78 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

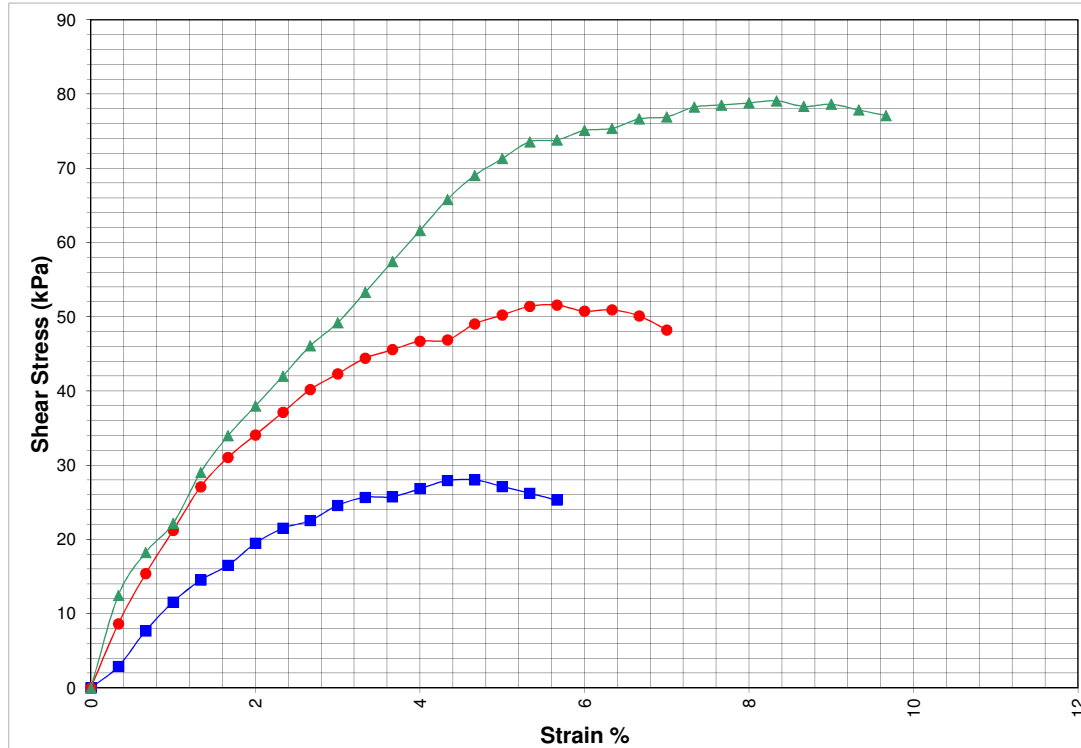
Borehole: LBH-07-Opt.1

Sample Type: SPT-09

Depth: 13.50-13.95 m

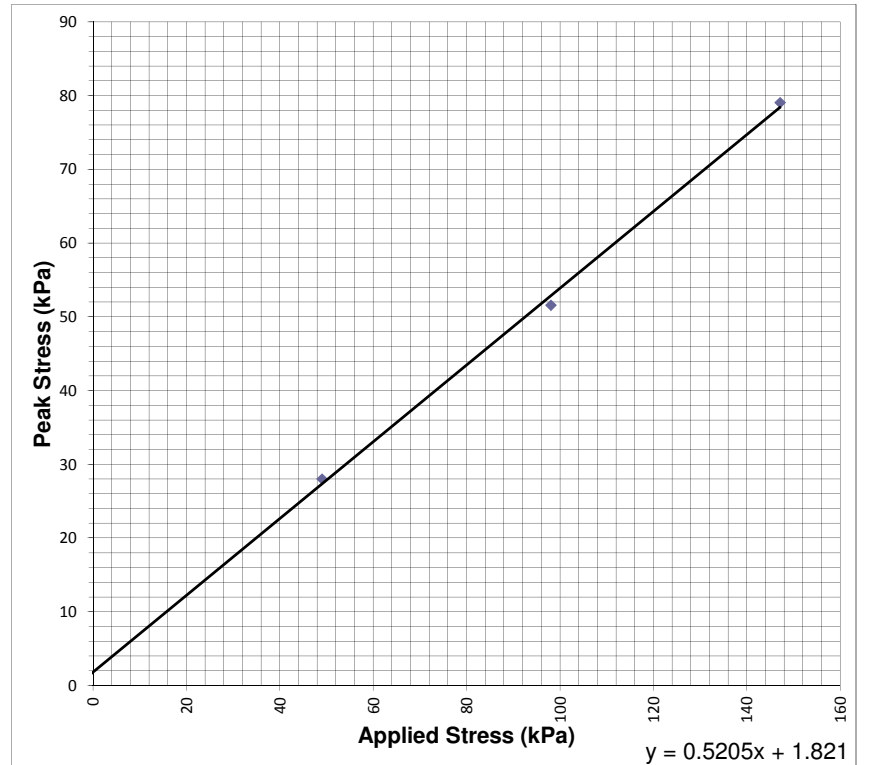
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	52
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.50 °
Apparent Cohesion	1.82 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

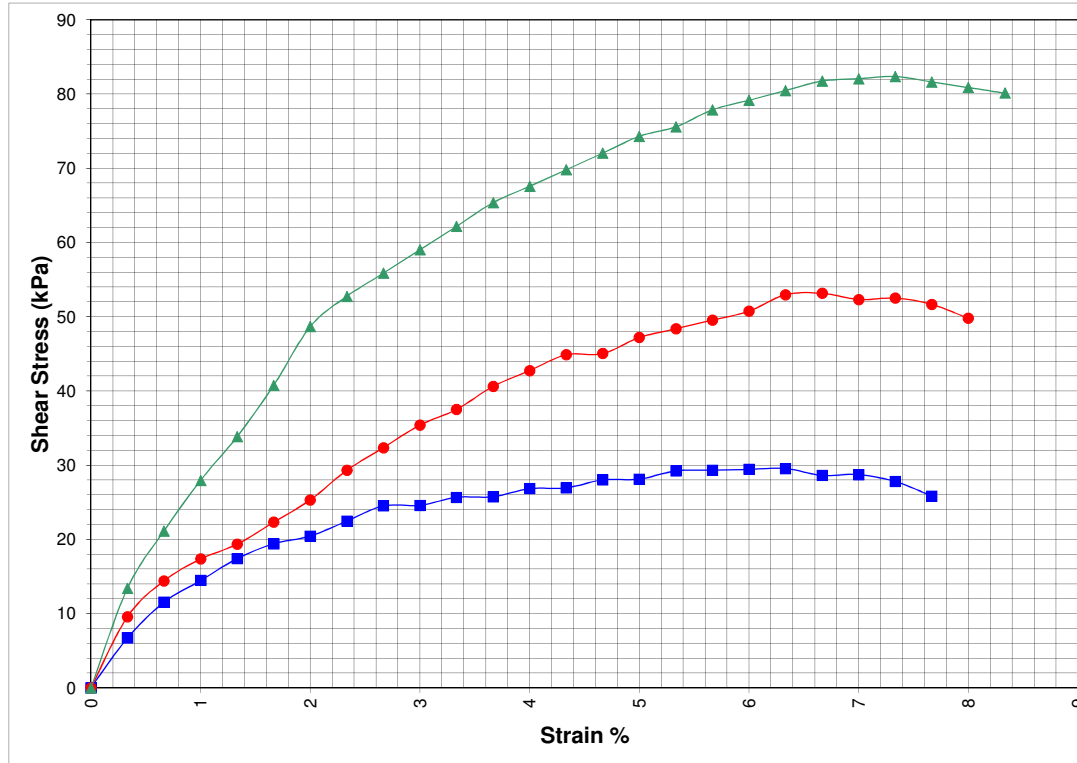
Borehole: LBH-07-Opt.1

Sample Type: SPT-11

Depth: 16.50-17.00 m

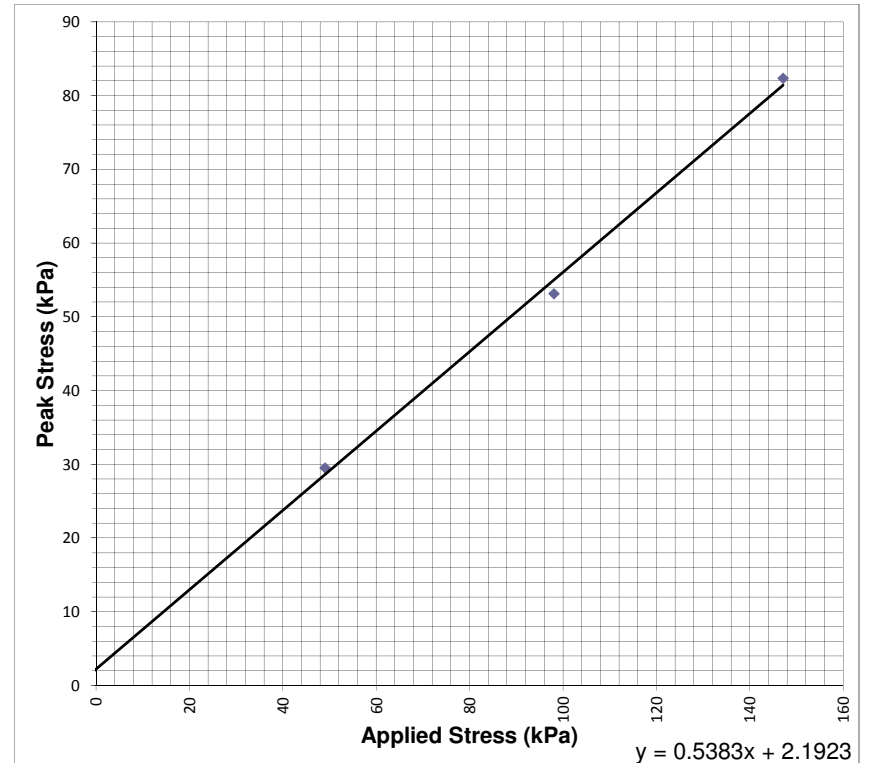
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	53
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.29 °
Apparent Cohesion	2.19 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

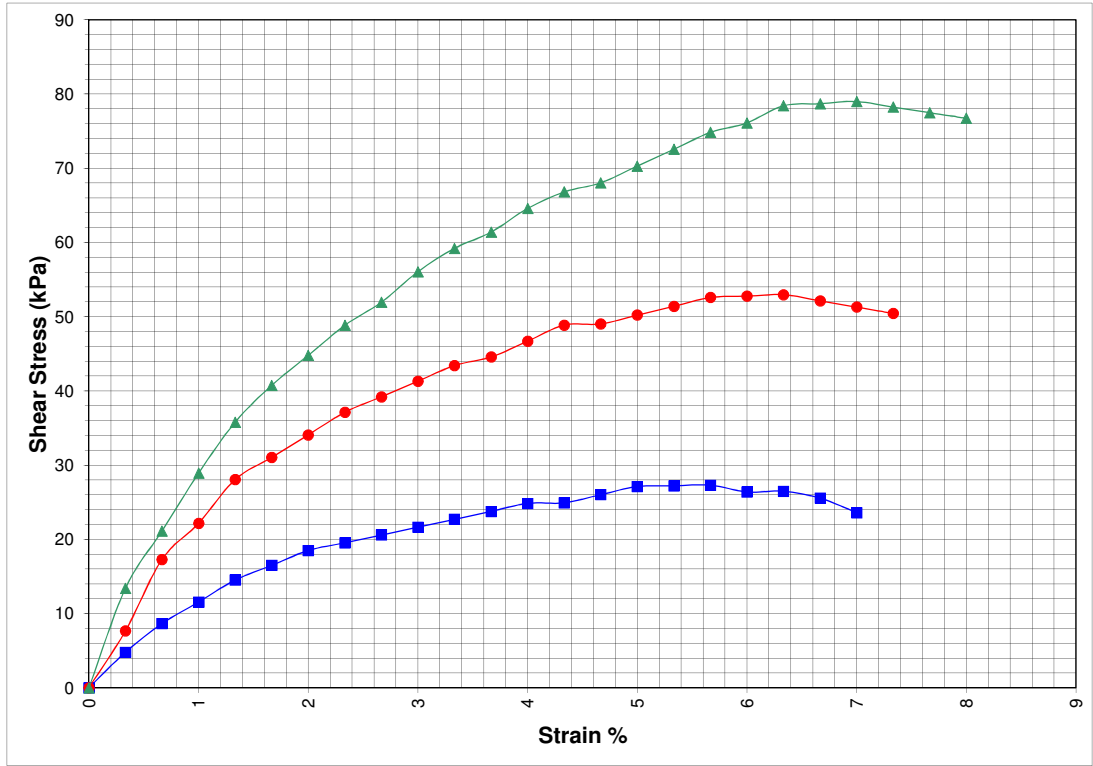
Borehole: LBH-07-Opt.1

Sample Type: SPT-14

Depth: 22.50-22.95 m

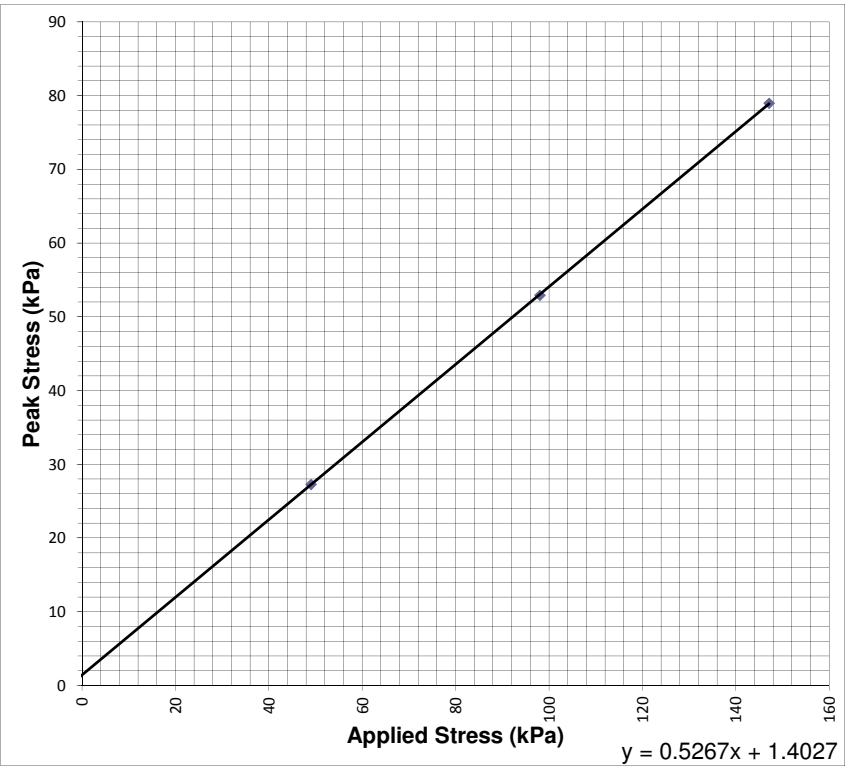
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	53
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



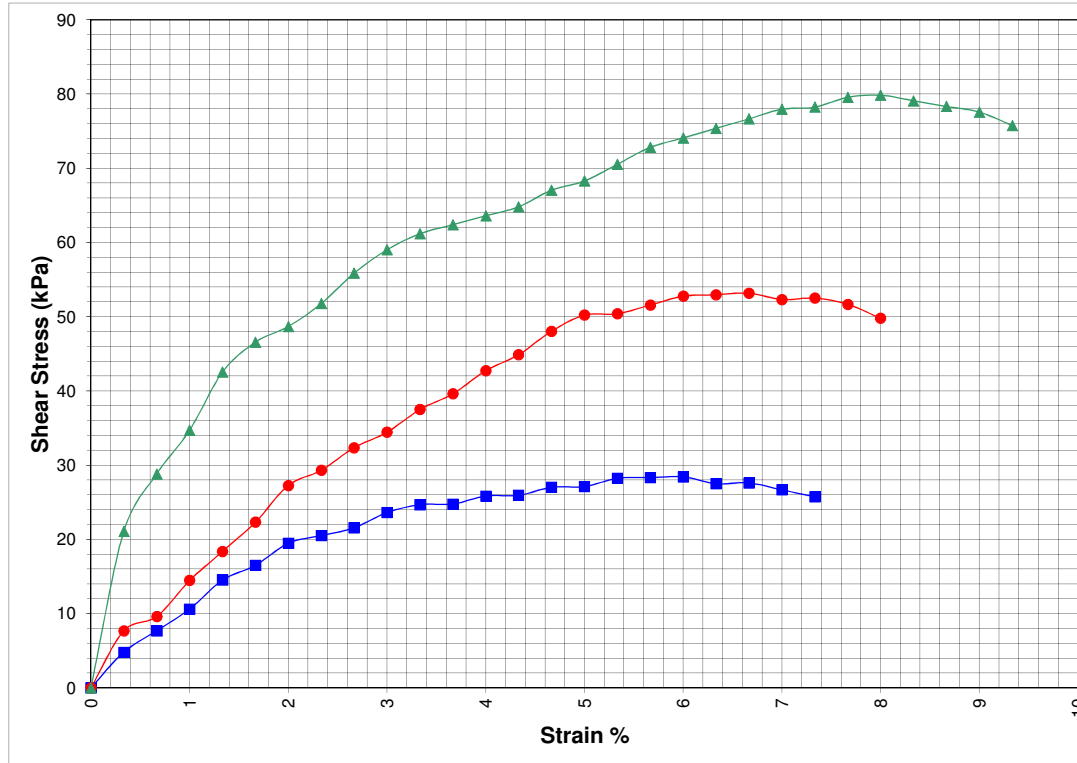
Angle of Friction	27.78 °
Apparent Cohesion	1.40 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

Borehole: LBH-07-Opt.1
Sample Type: SPT-16
Depth: 25.50-25.95 m

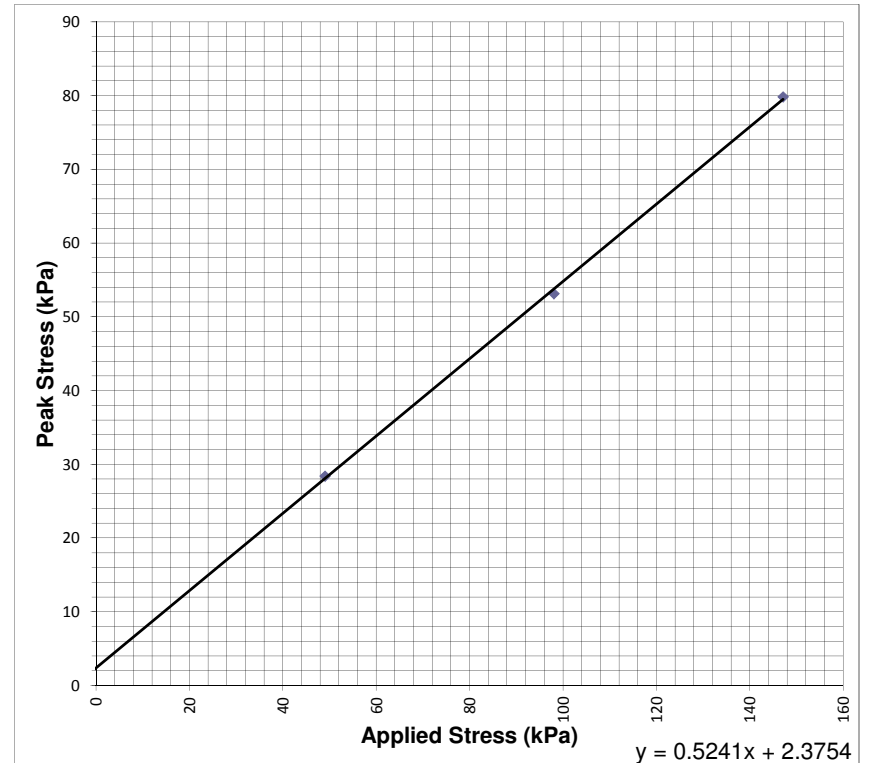
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	53
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.66 °
Apparent Cohesion	2.38 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

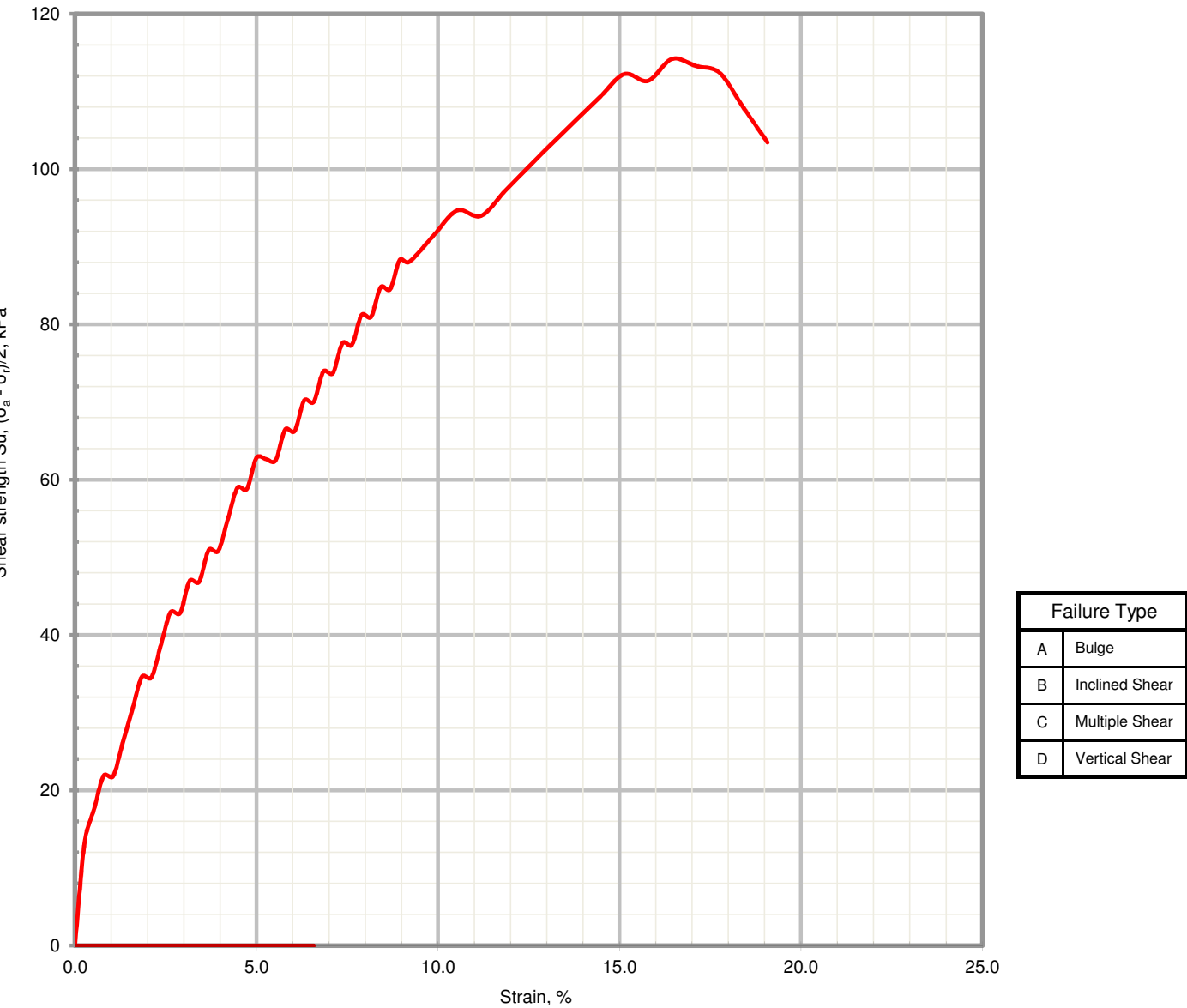
Borehole: LBH-07-Opt.1

Sample Type: SPT-18

Depth: 28.50-28.95 m

Stress - Strain Curves

Unconsolidated Undrained Triaxial Compression Test



Symbol	Sample No	Depth m	ϕ mm	Ht mm	W %	γ kN/m ³	σ_r kN/m ²	S_u kN/m ²	ϵ_f %	ϵ_{50} %	Type of Failure
—	UDS-1	19.50-20.00	38	76	21.7	2.11	400.00	114.19	16.45	4.35	A
—											
—											

SUMMARY OF TEST RESULTS

[illegible]

END OF BOREHOLE

[illegible]

Notes :

DS	: Disturbed Sample
WAX/UDS	: Undisturbed Sample
TUU	: Triaxial Test (Unconsolidated Undrained)
DST	: Direct Shear Test
ϕ	: $^{\circ}$ (deg) Angle of internal friction

- * : Insufficient sample
- LL : Liquid Limit
- PL : Plastic Limit
- NP : Non Plastic
- NS : Not Suitable

: Decayed Wood

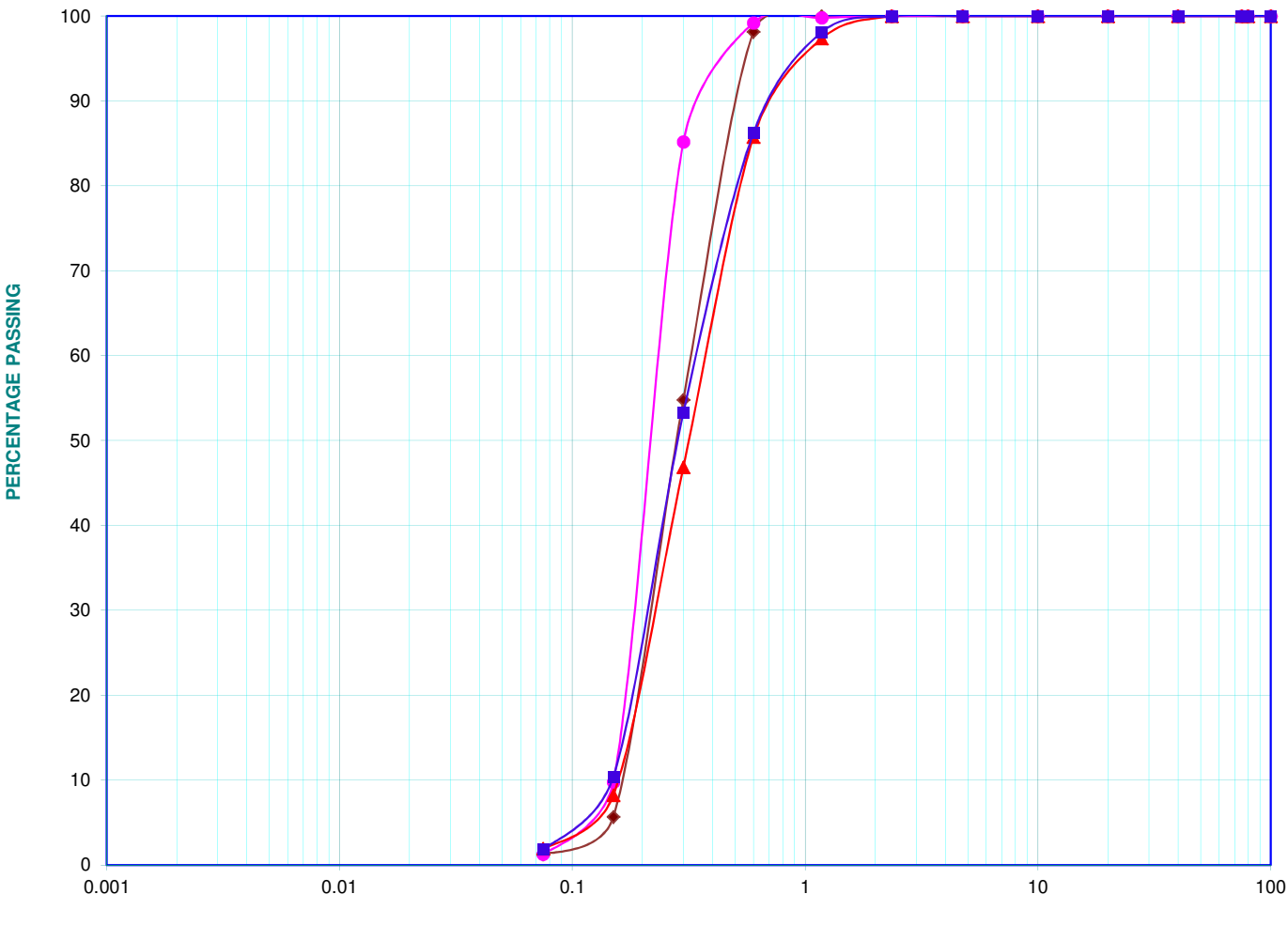
Failure Type

A : Bulge
B : Inclined Shear
C : Multiple Shear
D : Vertical Shear

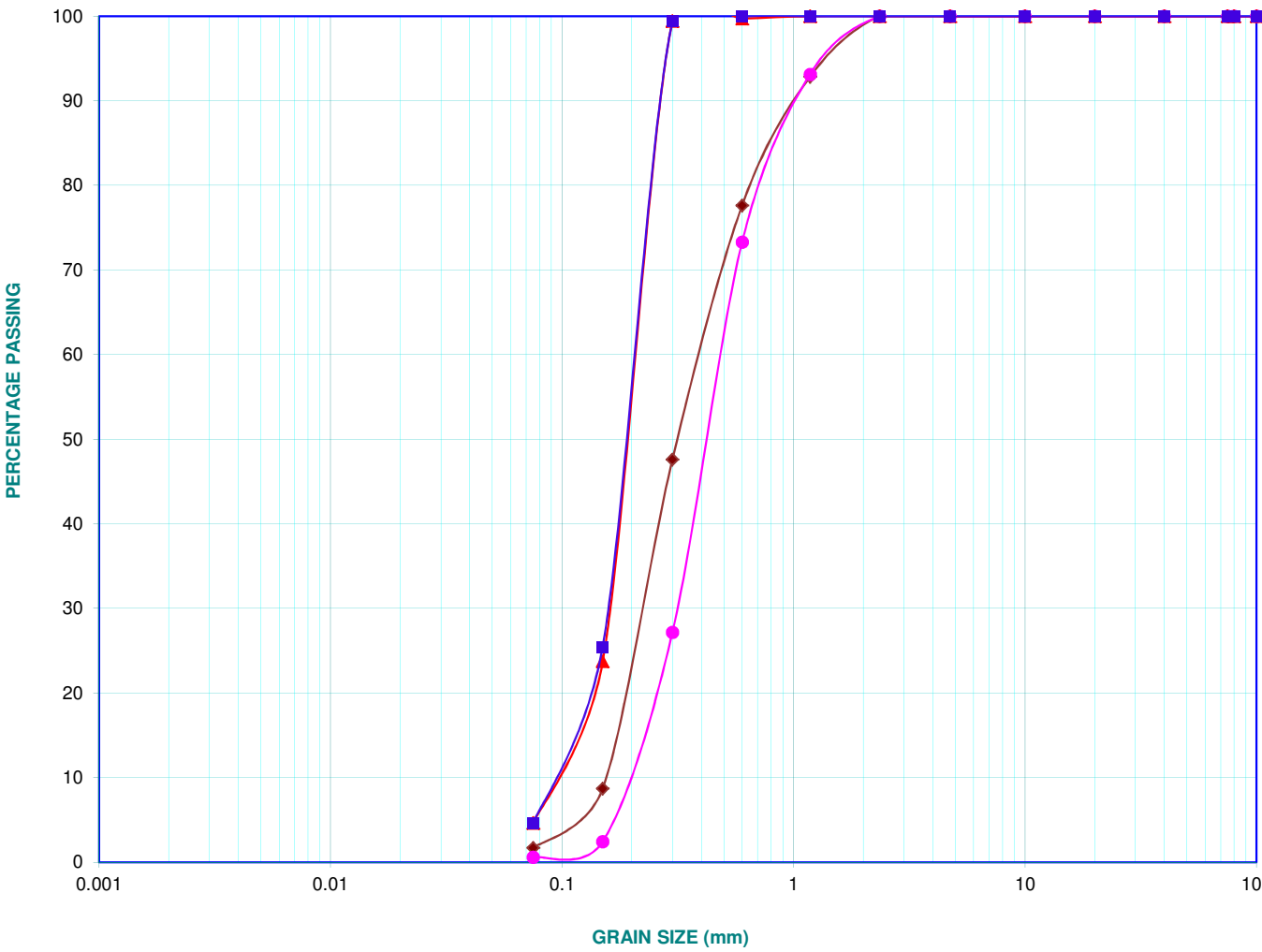
Project : Geotechnical Investigation For Capive Jetty at
Jatadharmuhan, Near Paradip, Dist.
Jagatsinghpur, Odisha

Project Code : CM 19 01 03
Borehole No. : LBH-08

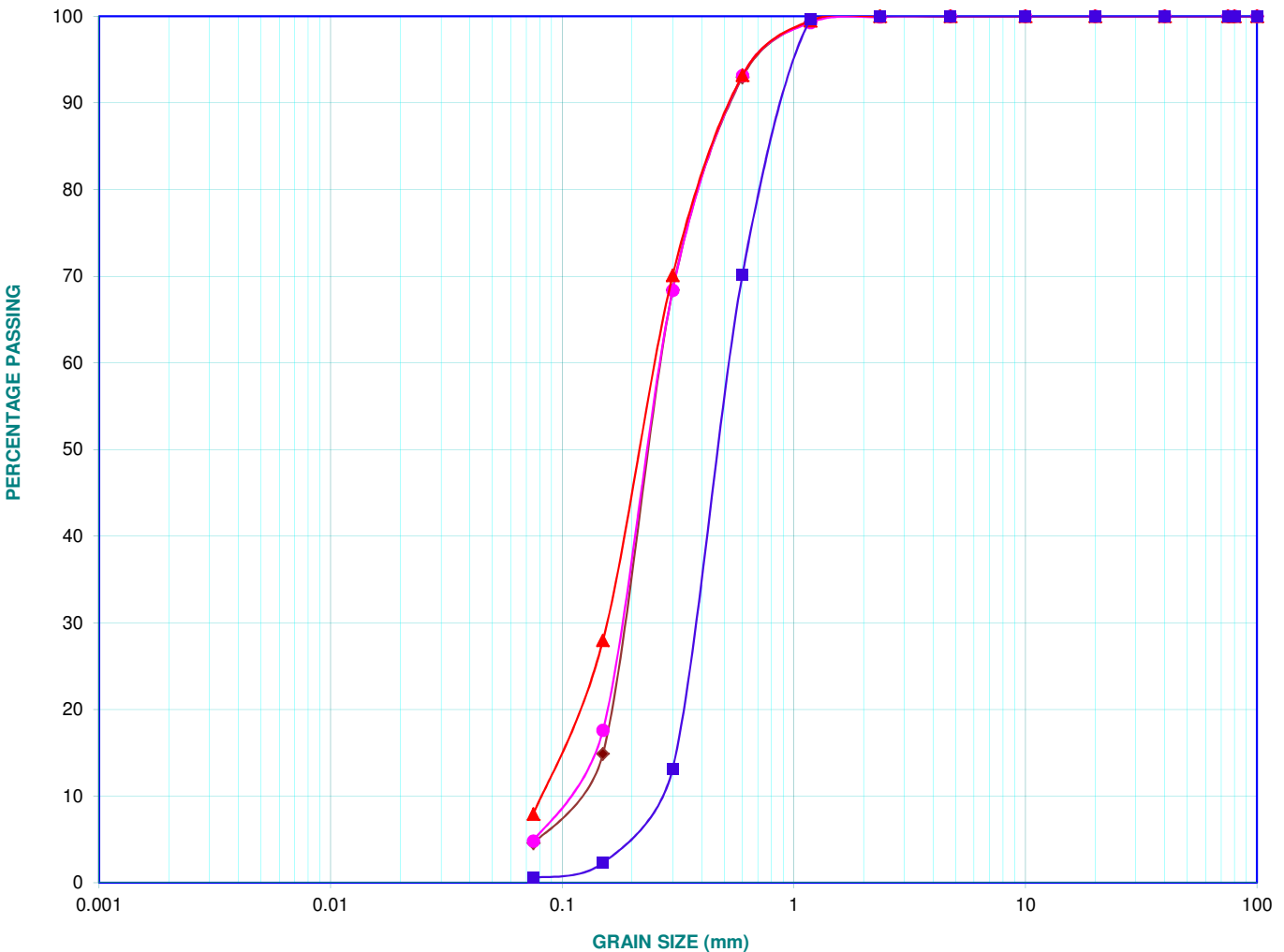
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-08					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-08	LBH-08	LBH-08	LBH-08										
Depth (m)	0.00-0.50	3.00-3.45	7.50-7.95	9.00-9.45										
Sample Type	SPT-1	SPT-3	SPT-6	SPT-7										
Classification	SP	SP	SP	SP										
Gravel %	0	0	0	0										
Sand %	99	99	98	98										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	1	1	2	2										
D60 mm	0.330	0.230	0.390	0.350										
D30 mm	0.220	0.190	0.230	0.210										
D10 mm	0.160	0.150	0.160	0.150										
Cu	2.06	1.53	2.44	2.33										
Cc	0.92	1.05	0.85	0.84										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

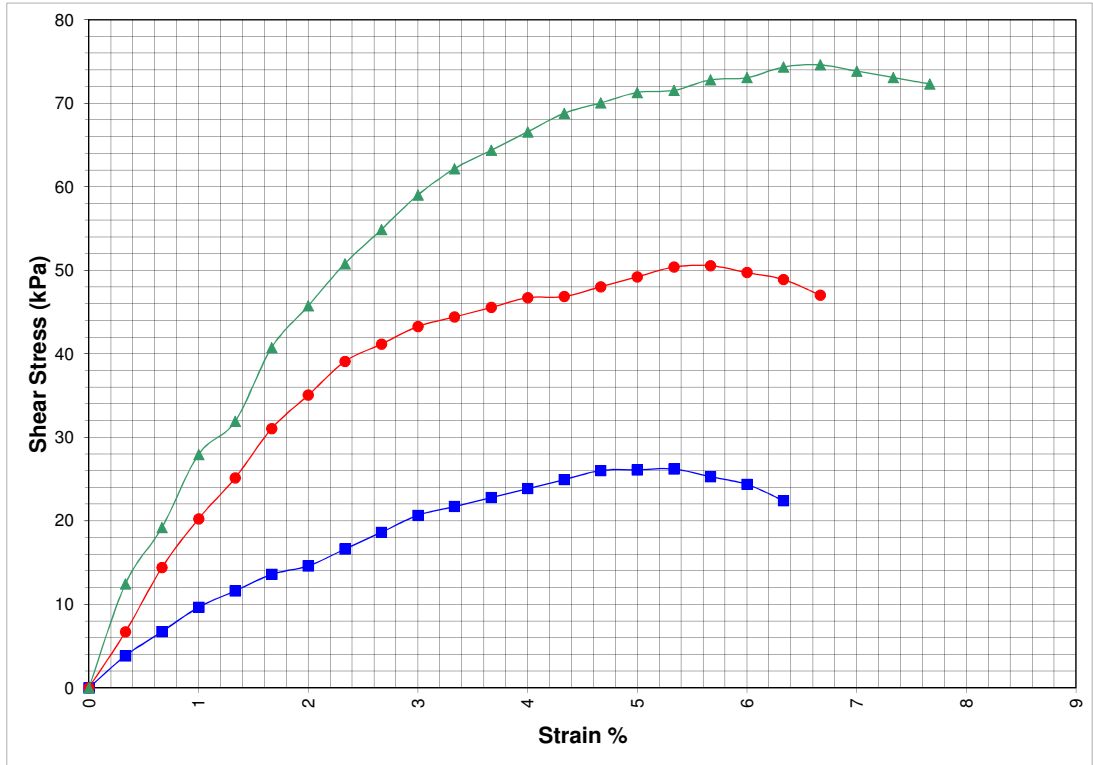
Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-08					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-08	LBH-08	LBH-08	LBH-08										
Depth (m)	12.00-12.45	13.50-13.95	16.50-16.95	18.00-18.45										
Sample Type	SPT-9	SPT-10	SPT-12	SPT-13										
Classification	SP	SP	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	98	99	95	95										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	2	1	5	5										
D60 mm	0.400	0.490	0.200	0.200										
D30 mm	0.220	0.310	0.160	0.160										
D10 mm	0.160	0.200	0.100	0.099										
Cu	2.50	2.45	2.00	2.02										
Cc	0.76	0.98	1.28	1.29										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-08					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-08	LBH-08	LBH-08	LBH-08										
Depth (m)	19.50-19.95	22.50-22.95	24.00-24.45	27.00-27.45										
Sample Type	SPT-14	SPT-16	SPT-17	SPT-19										
Classification	SP-SM	SP-SM	SP-SM	SP										
Gravel %	0	0	0	0										
Sand %	95	95	92	99										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	5	5	8	1										
D60 mm	0.260	0.280	0.250	0.510										
D30 mm	0.190	0.180	0.160	0.390										
D10 mm	0.130	0.110	0.080	0.2800										
Cu	2.00	2.55	3.13	1.82										
Cc	1.07	1.05	1.28	1.07										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

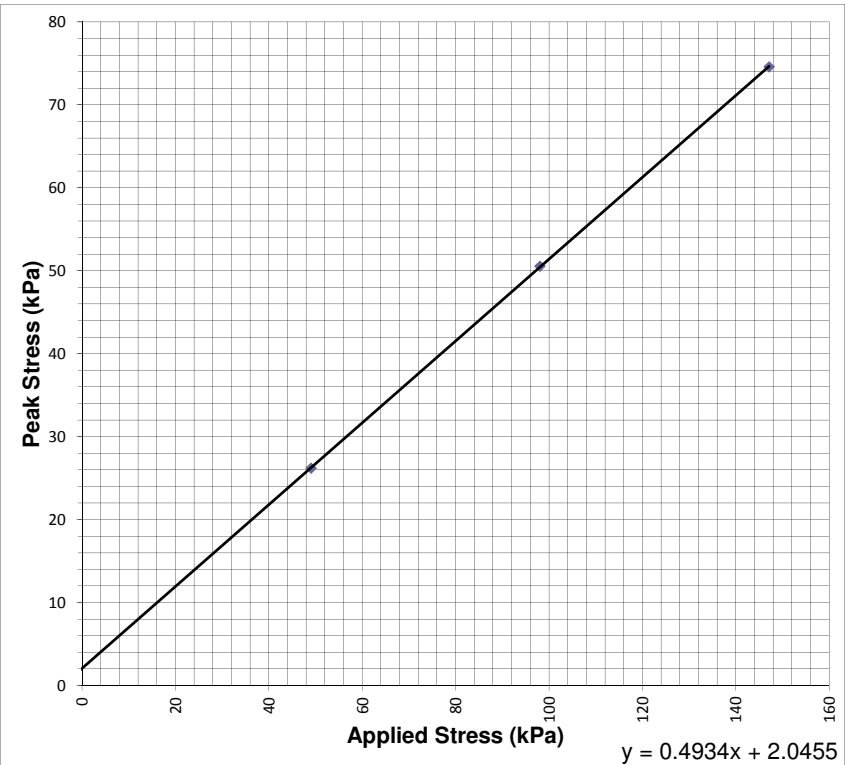
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	51
▲	Stage 3	147	75

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.26 °
Apparent Cohesion	2.05 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

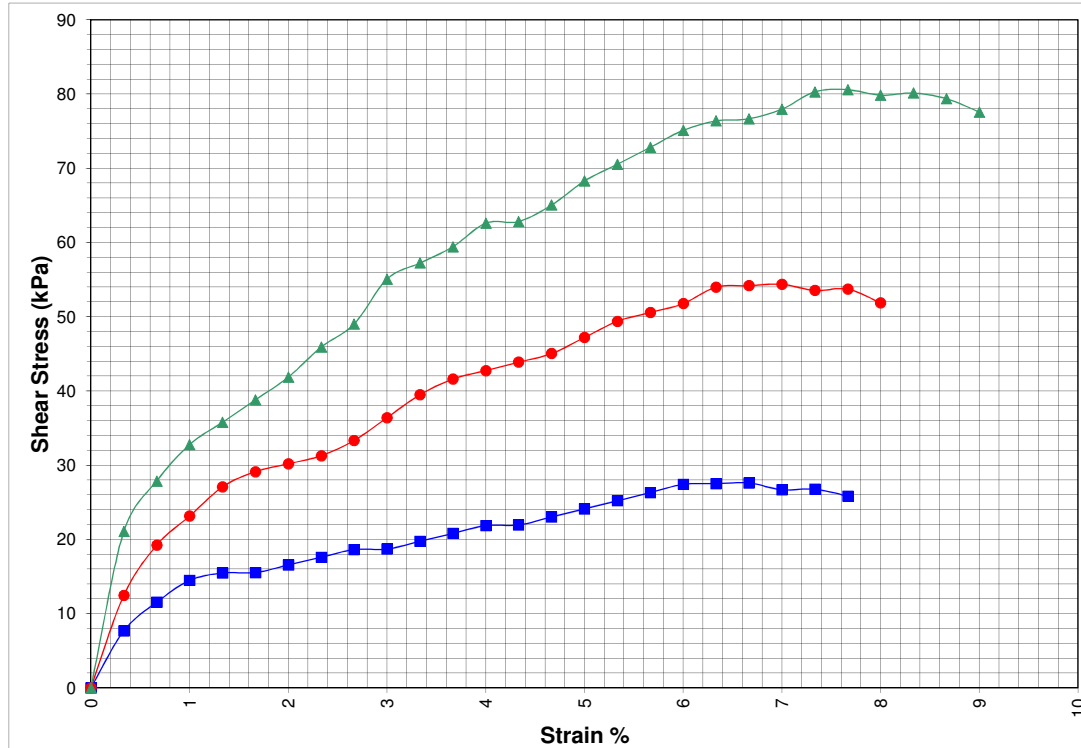
Borehole: LBH-08

Sample Type: SPT-02

Depth: 1.50-1.95 m

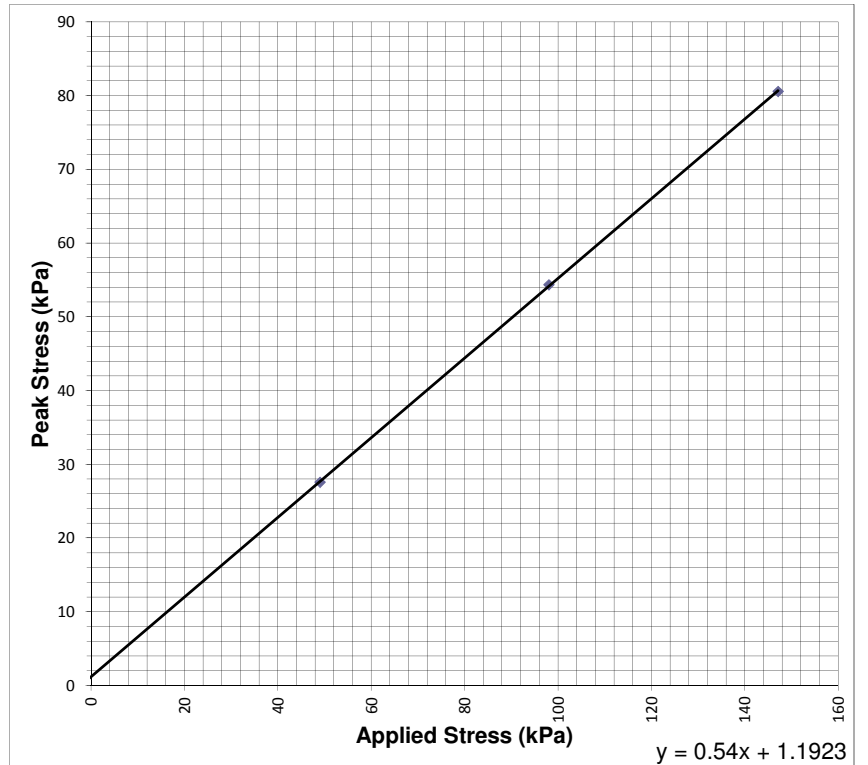
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	81

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.37 °
Apparent Cohesion	1.19 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

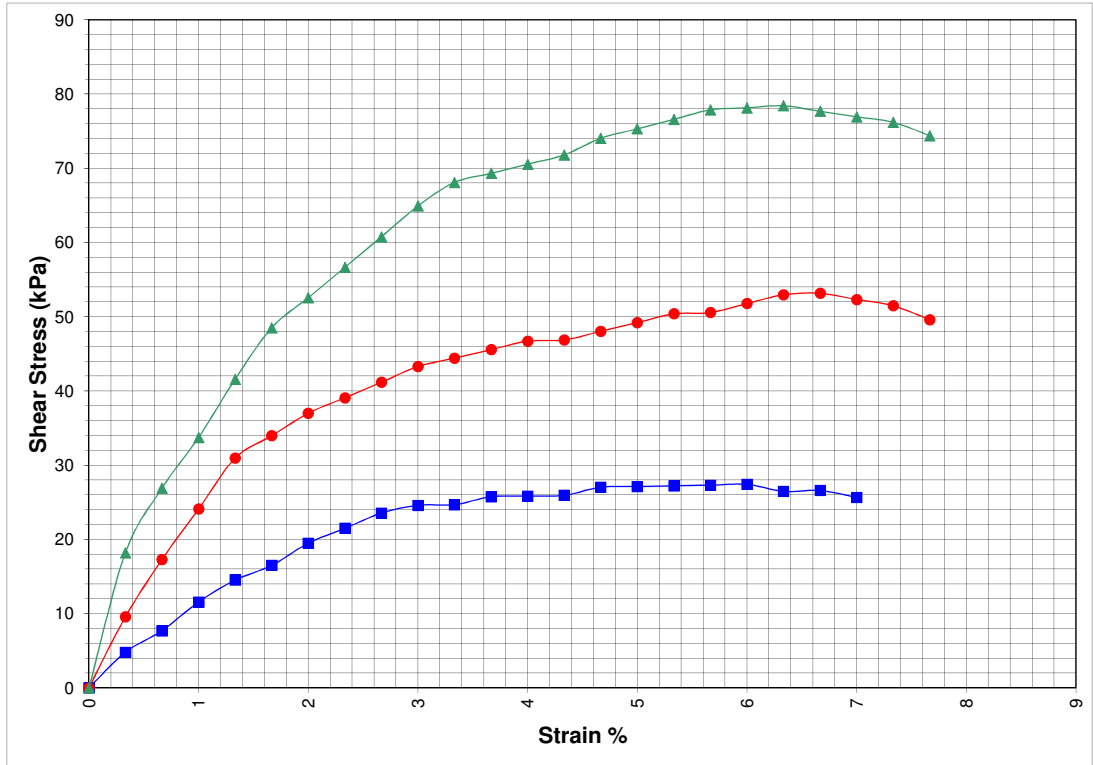
Borehole: LBH-08

Sample Type: SPT-04

Depth: 4.50-4.95 m

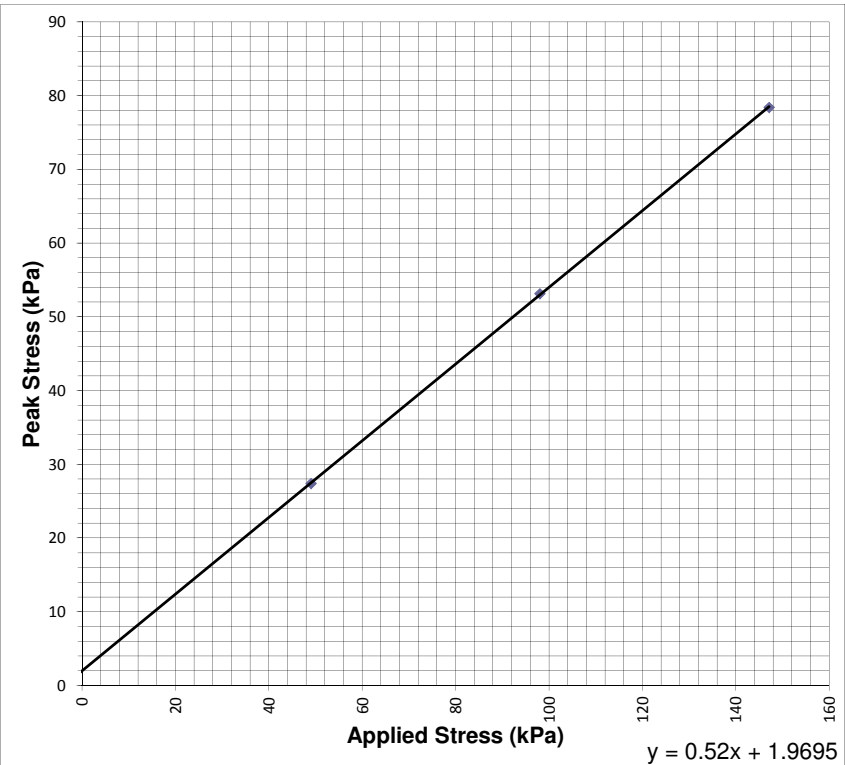
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	53
▲	Stage 3	147	78

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.47 °
Apparent Cohesion	1.97 kPa

Borehole: LBH-08

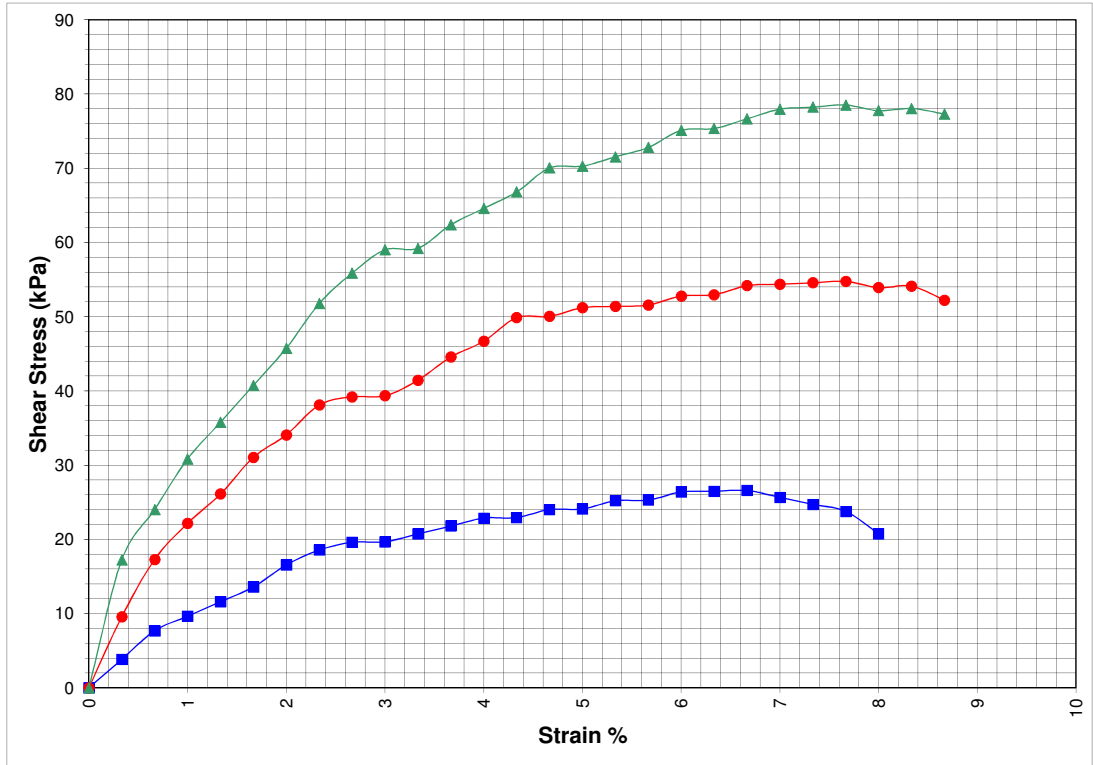
Sample Type: SPT-05

Depth: 6.00-6.45 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

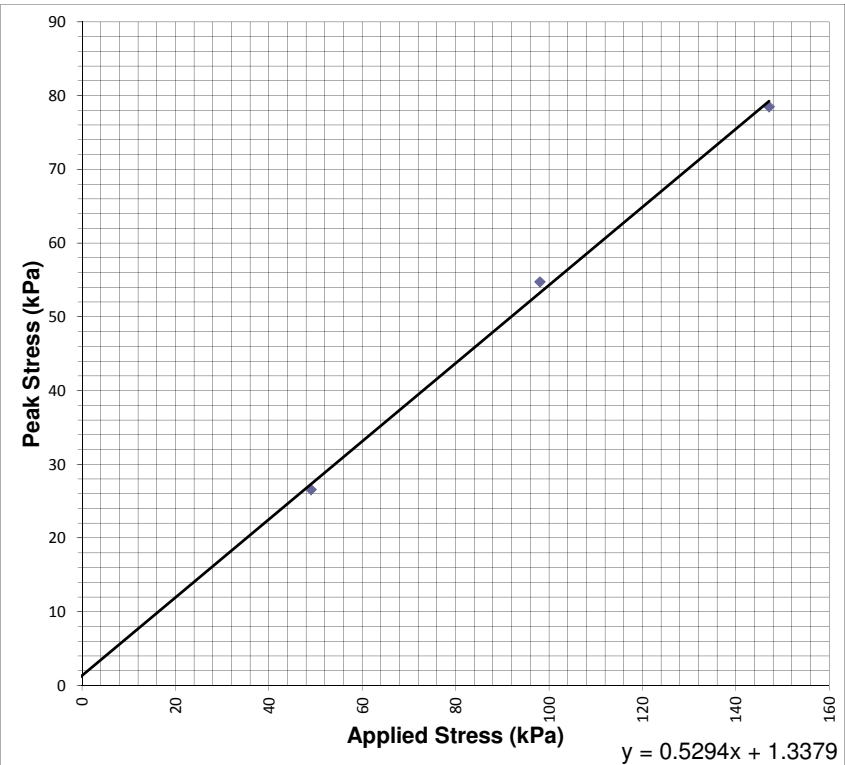
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	55
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.90 °
Apparent Cohesion	1.34 kPa

Borehole: LBH-08

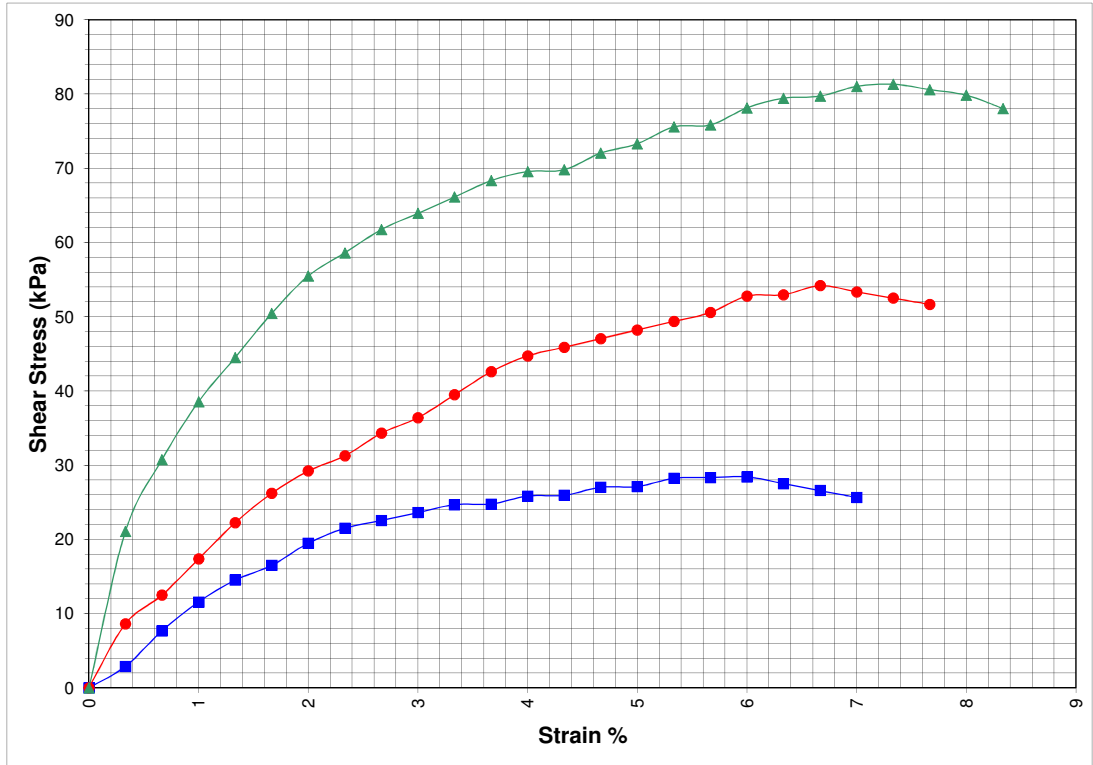
Sample Type: SPT-08

Depth: 10.50-10.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

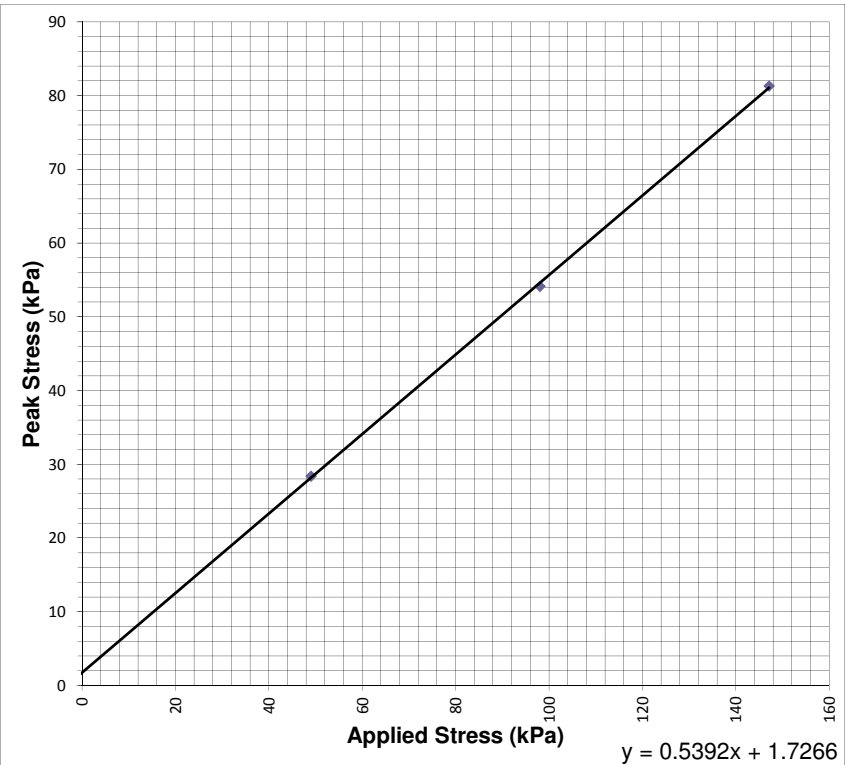
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	81

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.33 °
Apparent Cohesion	1.73 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

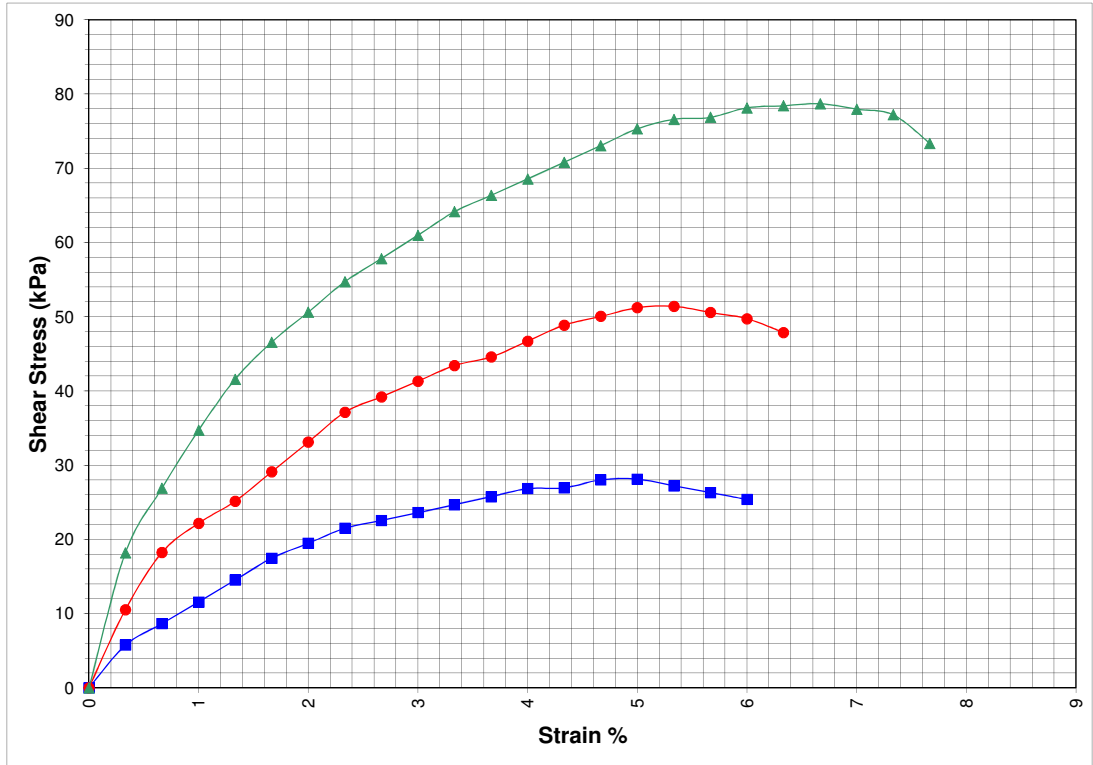
Borehole: LBH-08

Sample Type: SPT-11

Depth: 15.00-15.45 m

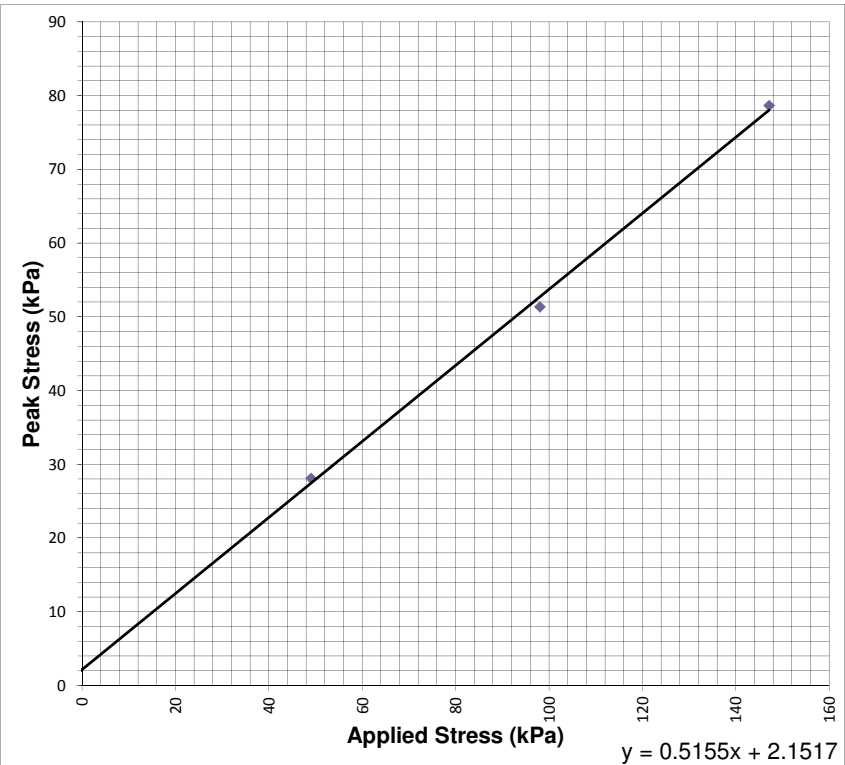
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	51
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.27 °
Apparent Cohesion	2.15 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

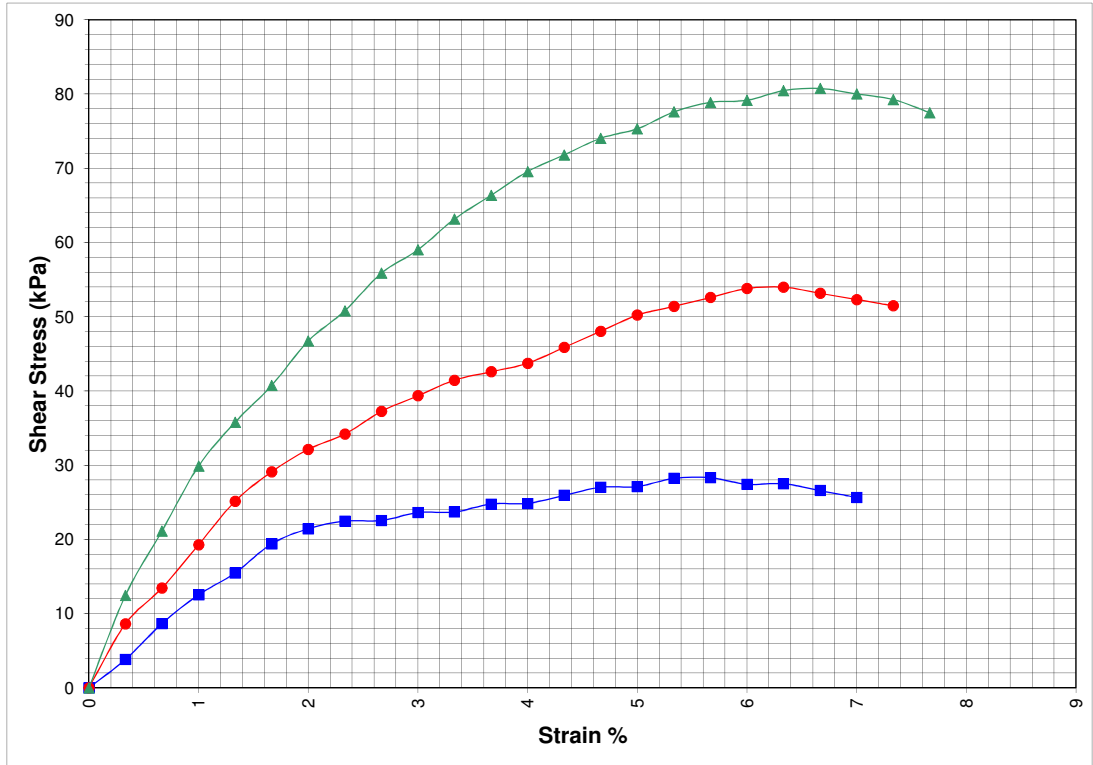
Borehole: LBH-08

Sample Type: SPT-15

Depth: 21.00-21.45 m

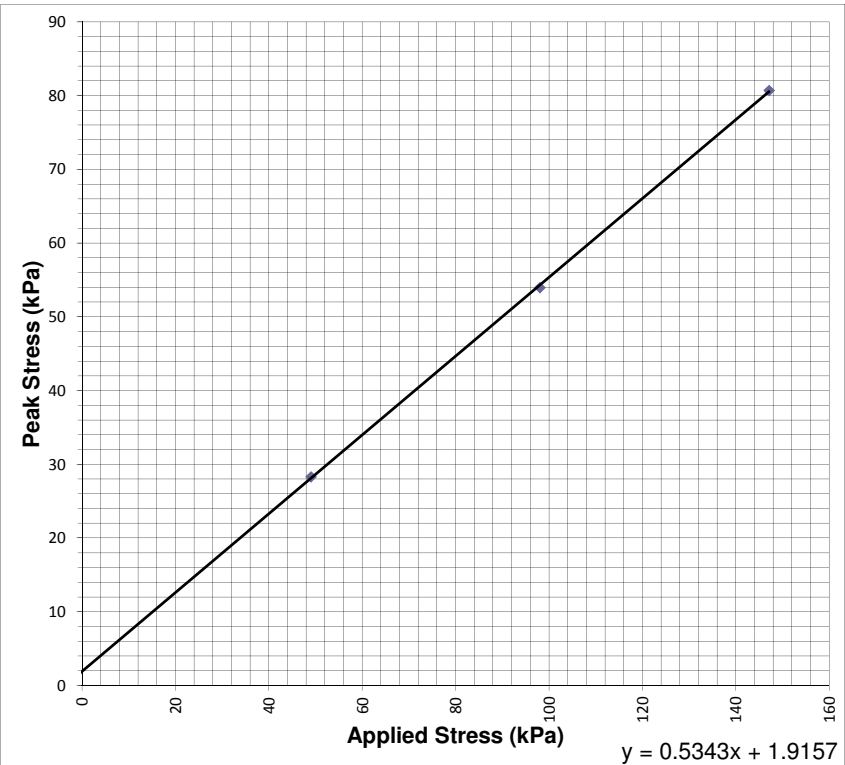
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	81

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.12 °
Apparent Cohesion	1.92 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

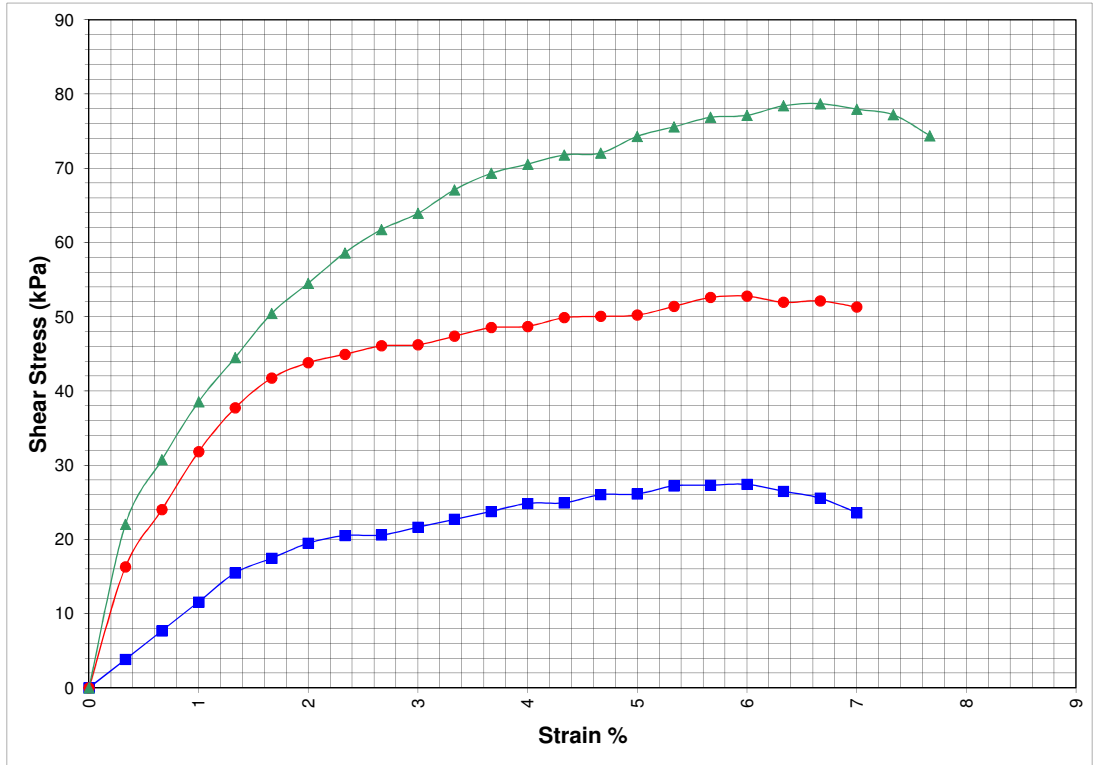
Borehole: LBH-08

Sample Type: SPT-18

Depth: 25.50-25.95 m

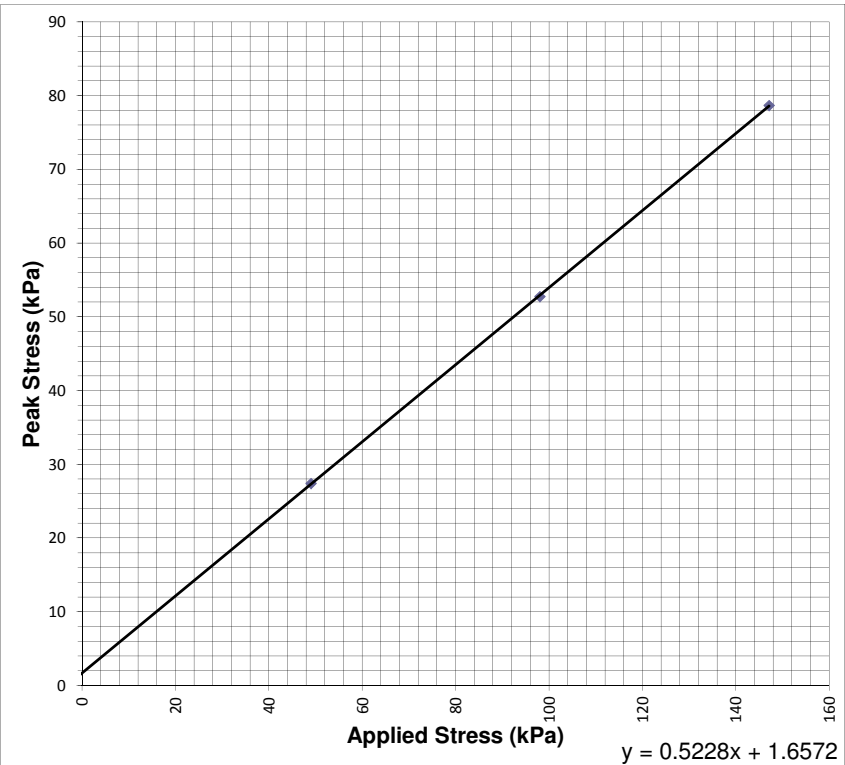
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	53
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.60 °
Apparent Cohesion	1.66 kPa

Borehole: LBH-08

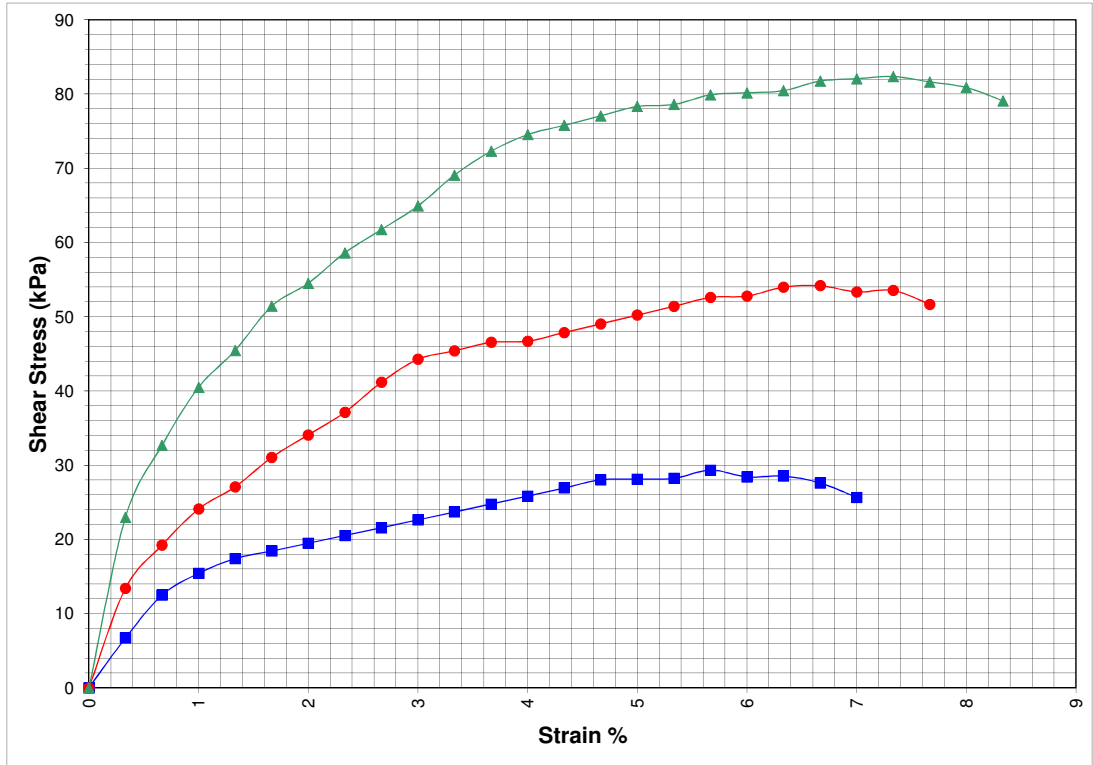
Sample Type: SPT-20

Depth: 28.50-28.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

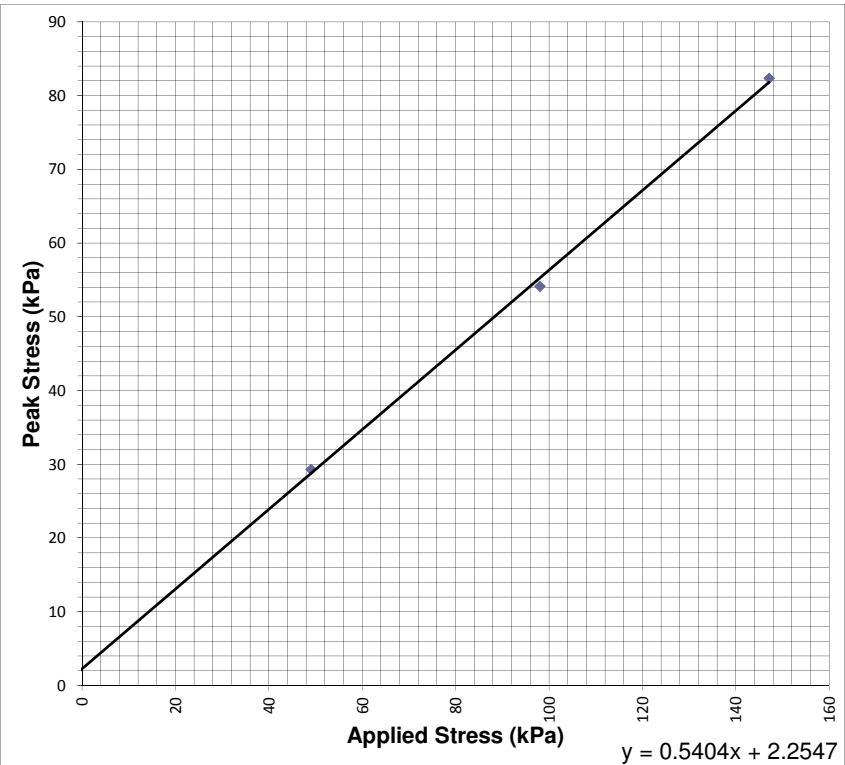
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	54
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.39 °
Apparent Cohesion	2.25 kPa

Borehole: LBH-08

Sample Type: SPT-21

Depth: 30.00-30.45 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

SUMMARY OF TEST RESULTS

SAMPLE DETAILS		Soil Classification	CLASSIFICATION & INDEX												SHEAR STRENGTH TEST								Free swell Index %	Consolidation Tests				Chemical tests								
Sample Type	Depth. m		Atterberg Limits			Physical Properties				Grain Size Distribution					Lateral & Vertical Loading Tests							Initial Void Ratio		Degree of Saturation %	Preconsolidation Pressure (kPa))	Compression Index	pH	Organic content (%)	Carbonate content (%)	Chloride content (ppm)	Sulphate content (ppm)					
			Liquid Limit LL %	Plastic Limit PL %	Plasticity Index PI %	Water Content %	Bulk Density (kN/m³)	Submerged Unit Weight (kN/m³)	Dry Density (kN/m³)	Specific Gravity	Gravel %	Sand %	Silt %	Clay %	Fines % (Silt + Clay)	Type of Test	Shear Strength Su (kpa)	Type of Failure	Cohesion C (kpa)	Internal friction angle Φ °	Torvane (Kpa)											Pocket penetrometer (Kpa)	Miniature Vane			
SPT-1	0.00-0.20	SP-SM				18.8	16.82	6.76	14.15	2.63	0	89	<->	<->	11																					
SPT-2	1.50-1.70	SP-SM				19.4	18.91	8.85	15.83	2.64	0	92	<->	<->	8																					
SPT-3	3.00-3.30					15.3	18.74	8.68	16.26							DST			1.17	30.7																
SPT-4	4.50-4.75	SP				20.6	18.10	8.04	15.01		0	96	<->	<->	4																					
SPT-5	6.00-6.15					20.2	16.72	6.66	13.91	2.60																										
SPT-6	7.50-7.70					22.5	18.50	8.44	15.09	2.61						DST			1.20	31.4																
SPT-7	9.00-9.30					16.0	18.30	8.24	15.77	2.63																										
SPT-8	10.50-10.70	SP				20.8	18.57	8.51	15.37		0	96	<->	<->	4																					
SPT-9	12.00-12.30					20.9	18.58	8.52	15.37							DST			1.58	29.7																
SPT-10	13.50-13.70	SP				18.4	18.30	8.24	15.46		0	99	<->	<->	1																					
SPT-11	15.00-15.45	CL	28.0	12.9	15.1	27.2	19.73	9.67	15.50	2.58	0	49	39	12	51																					
SPT-12	16.50-16.75	SP-SM				16.0	18.05	7.99	15.55		0	92	<->	<->	8																					
SPT-13	18.00-18.30	SP				19.3	18.00	7.94	15.08		0	97	<->	<->	3																					
SPT-14	19.50-19.70					19.3	17.55	7.49	14.71							DST			1.52	27.7																
SPT-15	21.00-21.25	SP-SM				18.2	17.60	7.54	14.89		0	92	<->	<->	8																					
SPT-16	22.50-22.70					20.0	17.70	7.64	14.75							DST			1.92	25.9																
SPT-17	24.00-24.30	SP-SM				20.2	17.98	7.92	14.96		0	93	<->	<->	7																					
SPT-18	25.50-25.75	SP-SM				20.5	17.57	7.51	14.58	2.61	0	91																								

Notes :

DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	<u>Failure Type</u>		
WAX/UDS	: Undisturbed Sample	LL	: Liquid Limit			A : Bulge	Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.
TUU	: Triaxial Test (Unconsolidated Undrained)	PL	: Plastic Limit			B : Inclined Shear		
DST	: Direct Shear Test	NP	: Non Plastic			C : Multiple Shear	Project Code	: CM 19 01 03
Φ	: ° (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	: MBH-09

SUMMARY OF TEST RESULTS

[illegible]

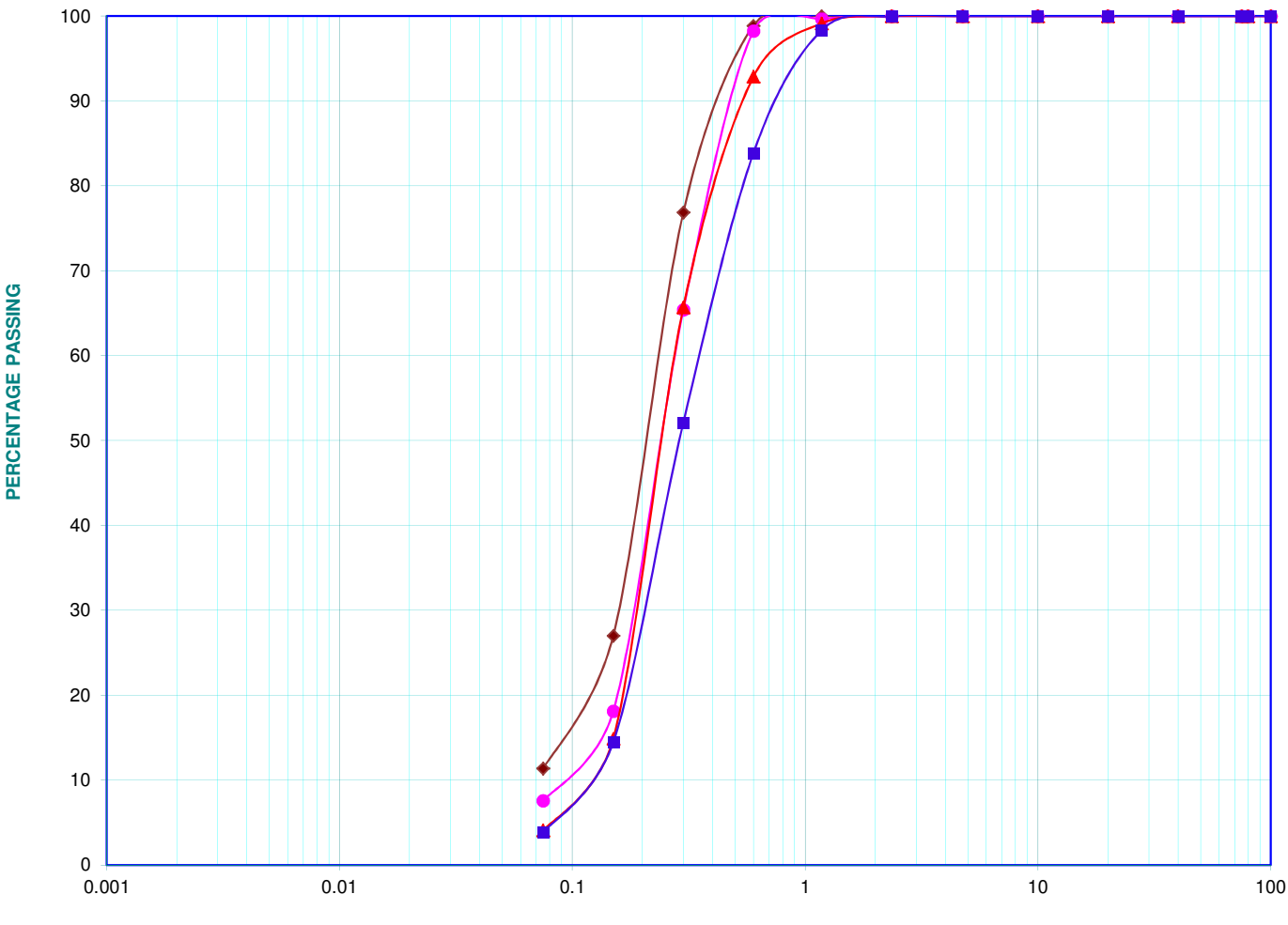
END OF BOREHOLE

[illegible]

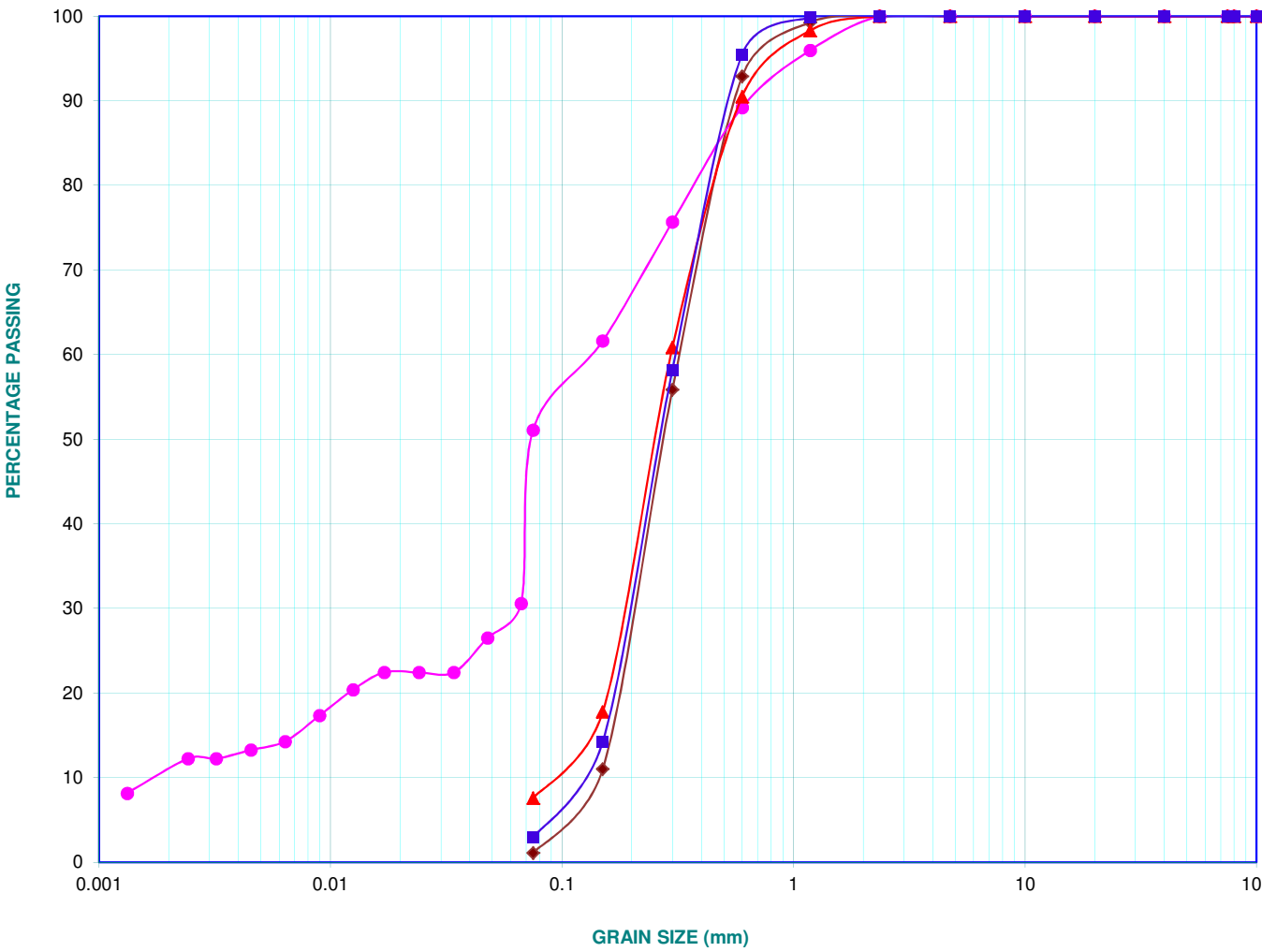
Notes :	
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DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	<u>Failure Type</u>	Project	:	Geotechnical Investigation For Capive Jetty at
WAX/UDS	: Undisturbed Sample	LL	: Liquid Limit			A : Bulge			Jatadharmuhan, Near Paradip, Dist.
TUU	: Triaxial Test (Unconsolidated Undrained)	PL	: Plastic Limit			B : Inclined Shear			Jagatsinghpur, Odisha
DST	: Direct Shear Test	NP	: Non Plastic			C : Multiple Shear	Project Code	:	CM 19 01 03
Φ	: ° (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	:	MBH-09

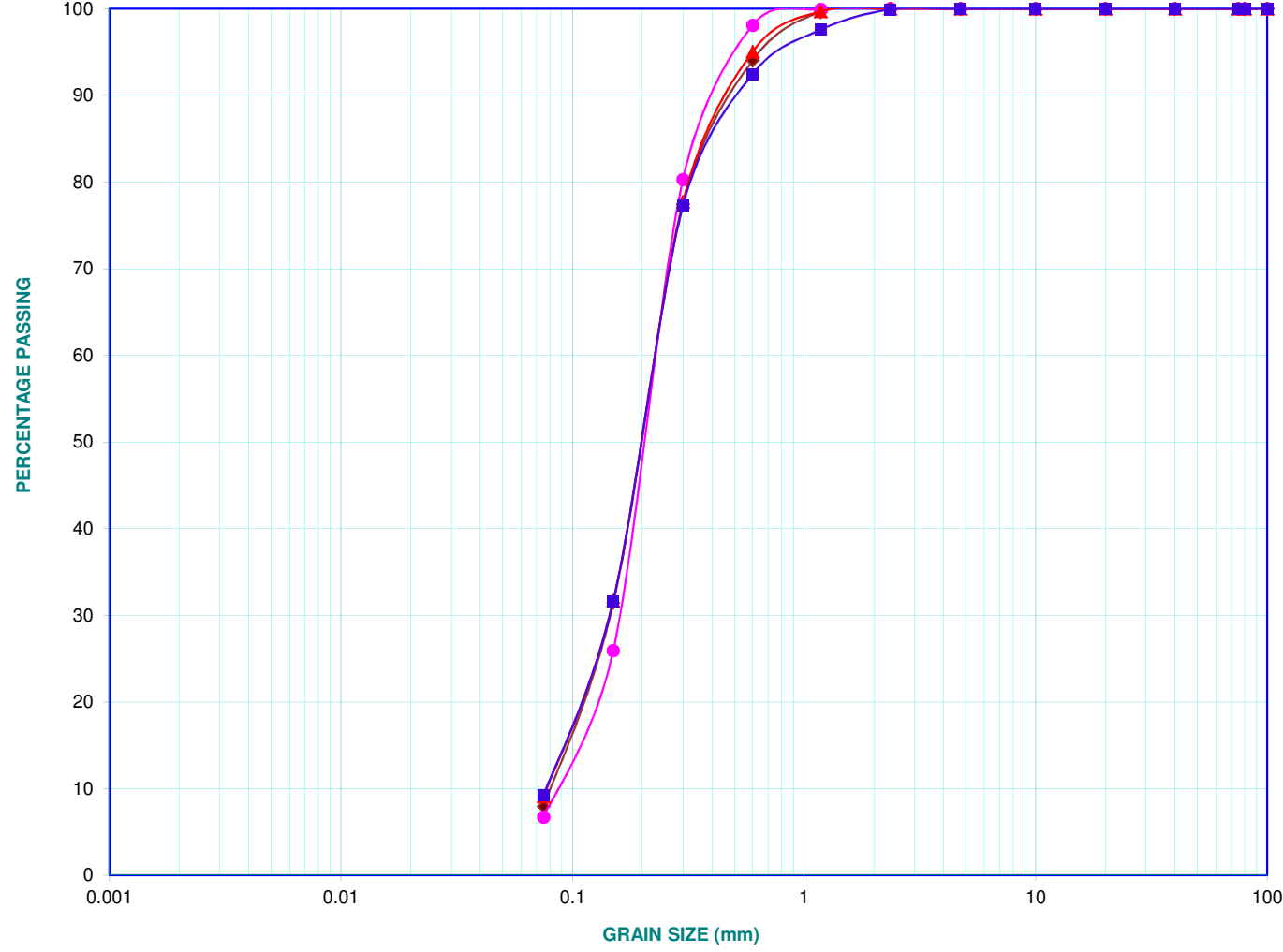
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-09					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY		SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-09	MBH-09	MBH-09	MBH-09										
Depth (m)	0.00-0.20	1.50-1.70	4.50-4.75	10.50-10.70										
Sample Type	SPT-01	SPT-02	SPT-04	SPT-08										
Classification	SP-SM	SP-SM	SP	SP										
Gravel %	0	0	0	0										
Sand %	89	92	96	96										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	11	8	4	4										
D60 mm	0.230	0.290	0.290	0.350										
D30 mm	0.170	0.190	0.190	0.210										
D10 mm	0.075	0.099	0.130	0.130										
Cu	3.07	2.93	2.23	2.69										
Cc	1.68	1.26	0.96	0.97										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

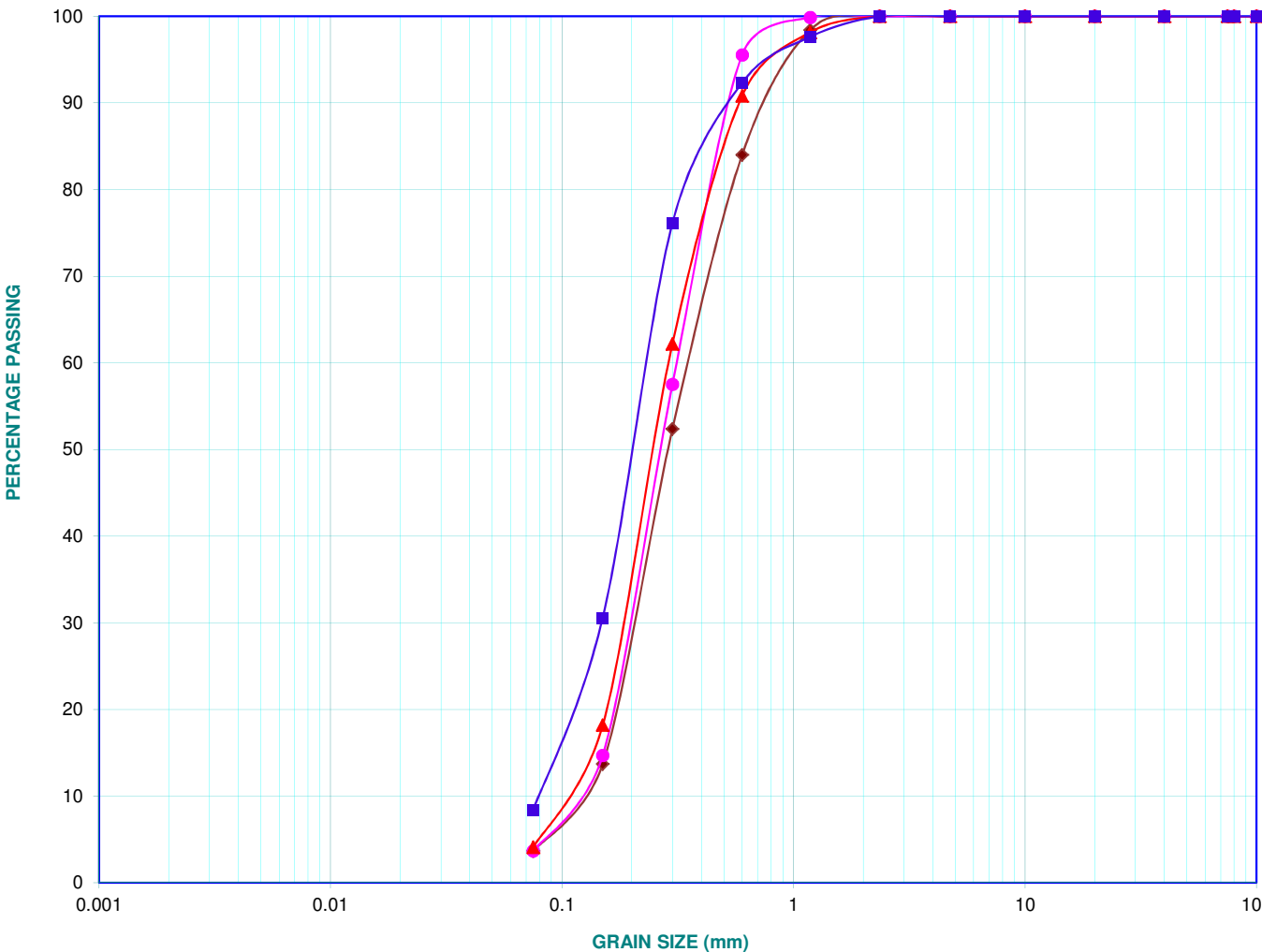
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-09					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-09	MBH-09	MBH-09	MBH-09										
Depth (m)	13.50-13.70	15.00-15.45	16.50-16.75	18.00-18.30										
Sample Type	SPT-10	SPT-11	SPT-12	SPT-13										
Classification	SP	CL	SP-SM	SP										
Gravel %	0	0	0	0										
Sand %	99	49	92	97										
Silt %	<---->	39	<---->	<---->										
Clay %	<---->	12	<---->	<---->										
Fines % (Silt+Clay)	1	51	8	3										
D60 mm	0.310	0.150	0.300	0.300										
D30 mm	0.200	0.067	0.190	0.200										
D10 mm	0.150	0.002	0.099	0.140										
Cu	2.07	78.95	3.03	2.14										
Cc	0.86	15.75	1.22	0.95										
Liquid Limit %	---	28.0	---	---										
Plastic Limit %	---	12.9	---	---										
Plasticity Index	---	15.1	---	---										
									Checked By :					

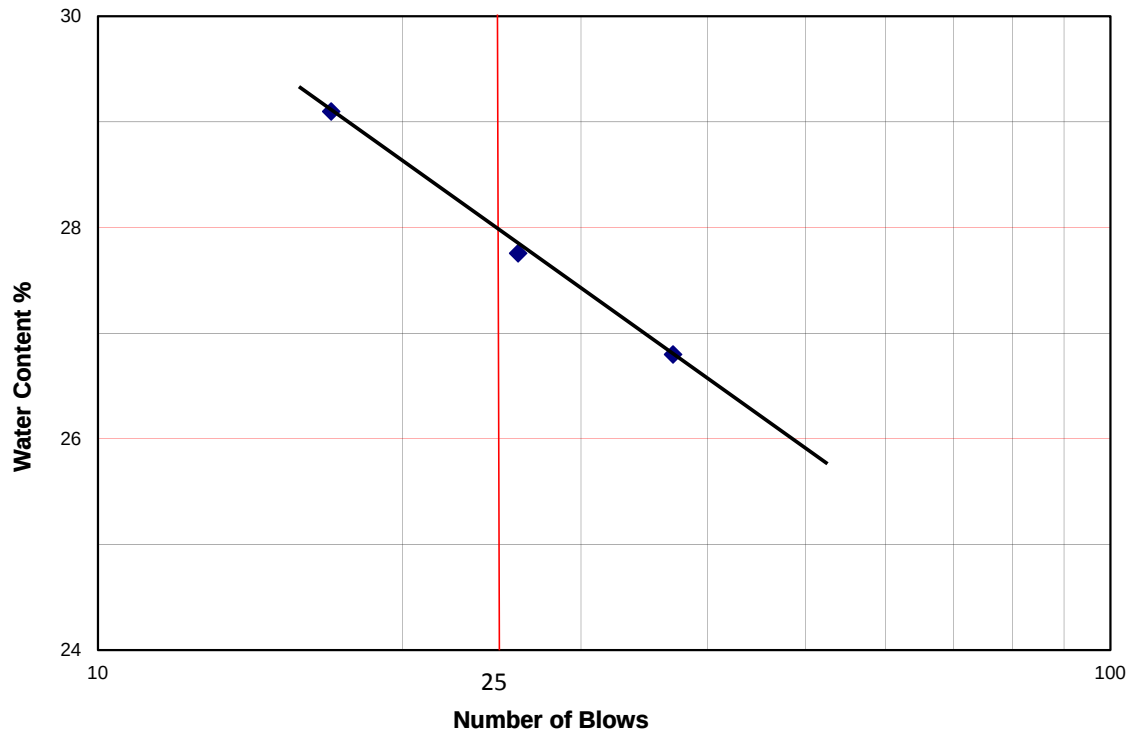
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-09					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-09	MBH-09	MBH-09	MBH-09										
Depth (m)	21.00-21.25	24.00-24.30	25.50-25.75	27.00-27.20										
Sample Type	SPT-15	SPT-17	SPT-18	SPT-19										
Classification	SP-SM	SP-SM	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	92	93	91	91										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	8	7	9	9										
D60 mm	0.220	0.220	0.220	0.220										
D30 mm	0.150	0.170	0.150	0.150										
D10 mm	0.080	0.090	0.078	0.078										
Cu	2.75	2.44	2.82	2.821										
Cc	1.28	1.46	1.31	1.311										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-09					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-09	MBH-09	MBH-09	MBH-09										
Depth (m)	30.00-30.20	32.00-32.15	36.50-36.70	40.00-40.15										
Sample Type	SPT-21	SPT-22	SPT-25	SPT-27										
Classification	SP	SP	SP	SP-SM										
Gravel %	0	0	0	0										
Sand %	96	96	96	92										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	4	4	4	8										
D60 mm	0.350	0.300	0.290	0.220										
D30 mm	0.200	0.200	0.190	0.150										
D10 mm	0.130	0.120	0.110	0.080										
Cu	2.69	2.50	2.64	2.75										
Cc	0.88	1.11	1.13	1.28										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	32.39	36.83	33.81		
Dry Weight + Can (g)	27.99	31.69	29.14		
Can Weight (g)	11.57	13.17	13.09		
Water Content, %	26.8	27.8	29.1		
Number of Blows	37	26	17		

Plastic Limit %

Wet Weight + Can (g)	20.35	18.28	15.31
Dry Weight + Can (g)	19.11	17.23	14.63
Can Weight (g)	9.51	9.22	9.24
Water Content, %	12.9	13.1	12.6

Liquid Limit % 28.0
 Plastic Limit % 12.9
 Plasticity Index % 15.1

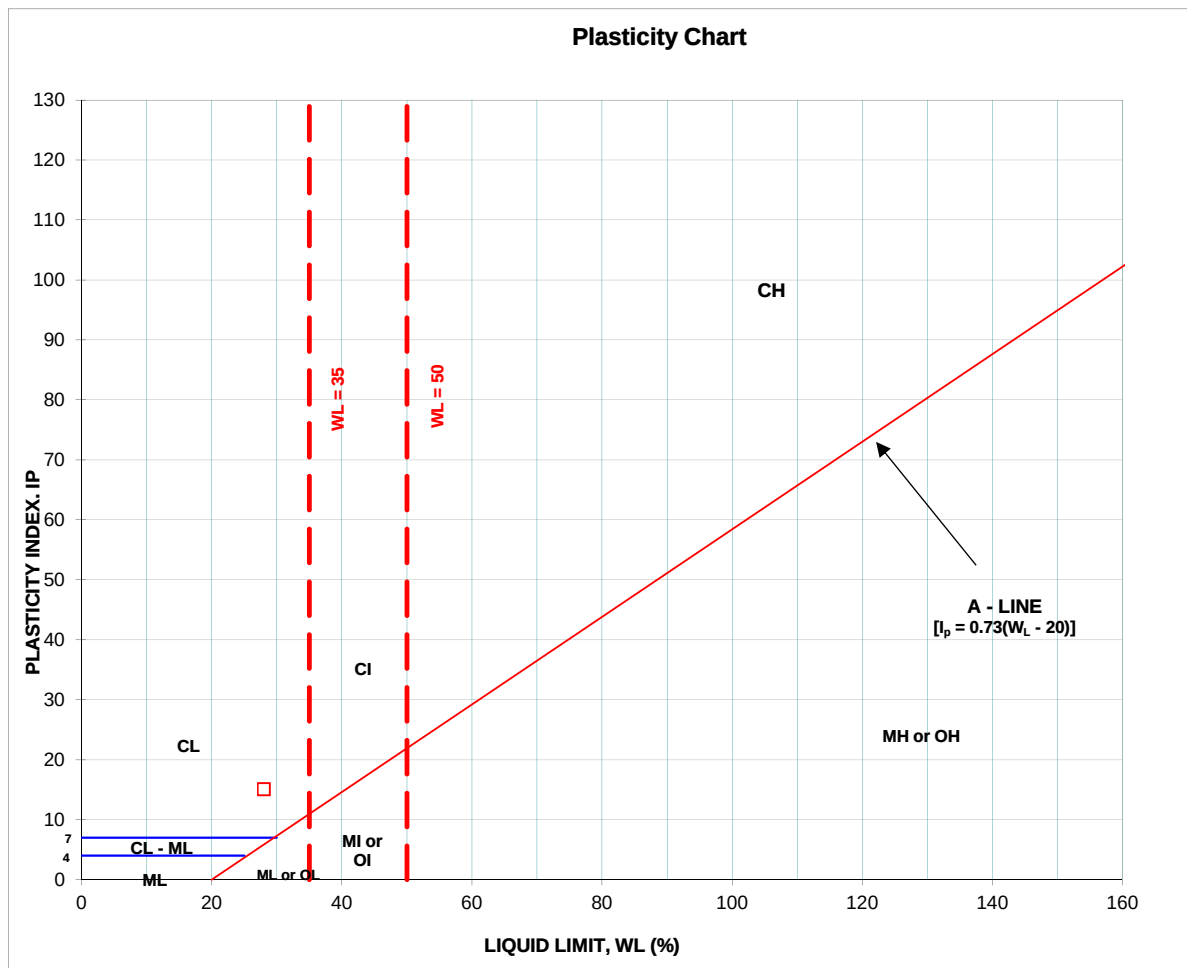
Preparation of Sample :
 Dry State

Sample Type: SPT-11

Borehole no.: MBH-9

Depth :15.00-15.45

Project: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.



	Sample Type	Depth (m)	W_L	W_P	I_p	Remarks
□	SPT-11	15.00-15.45	28.0	12.9	15.1	CL: Inorganic clays of low to medium plasticity.
◇						
△						
●						
+						
■						

ML Inorganic silts, very fine sands, rock flour, silty or clayey fine sands

MH Inorganic silts, or diatomaceous fine sands or silts, elastic silts

CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

CH Inorganic clays of high plasticity, fat clays

OL Organic silts and organic silty clays of low plasticity

OH Organic silts and organic clays of medium to high plasticity

CI Clays with Intermediate plasticity

MI Silt with intermediate plasticity

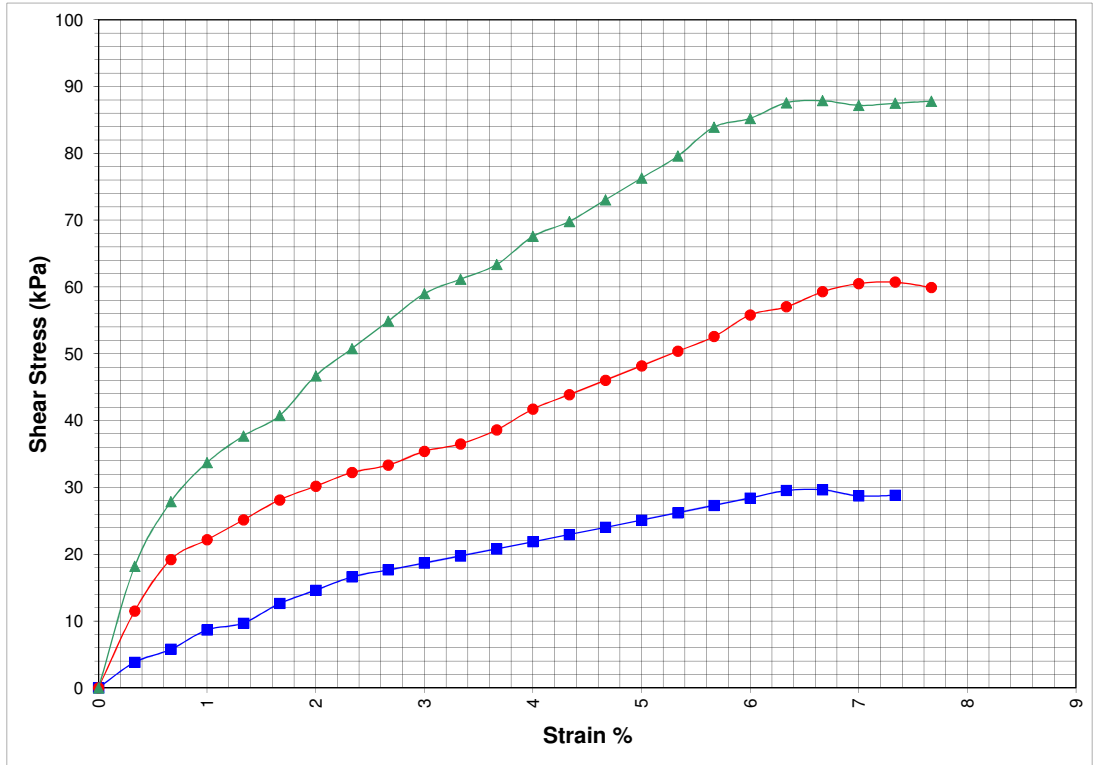
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-9

Project: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.

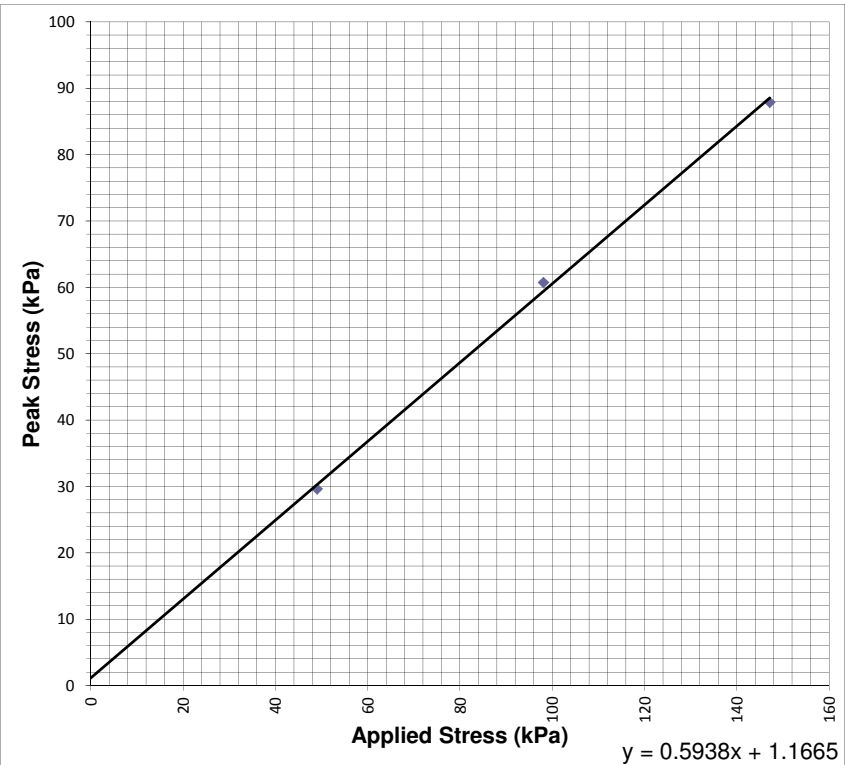
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	61
▲	Stage 3	147	88

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	30.70 °
Apparent Cohesion	1.17 kPa

k

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

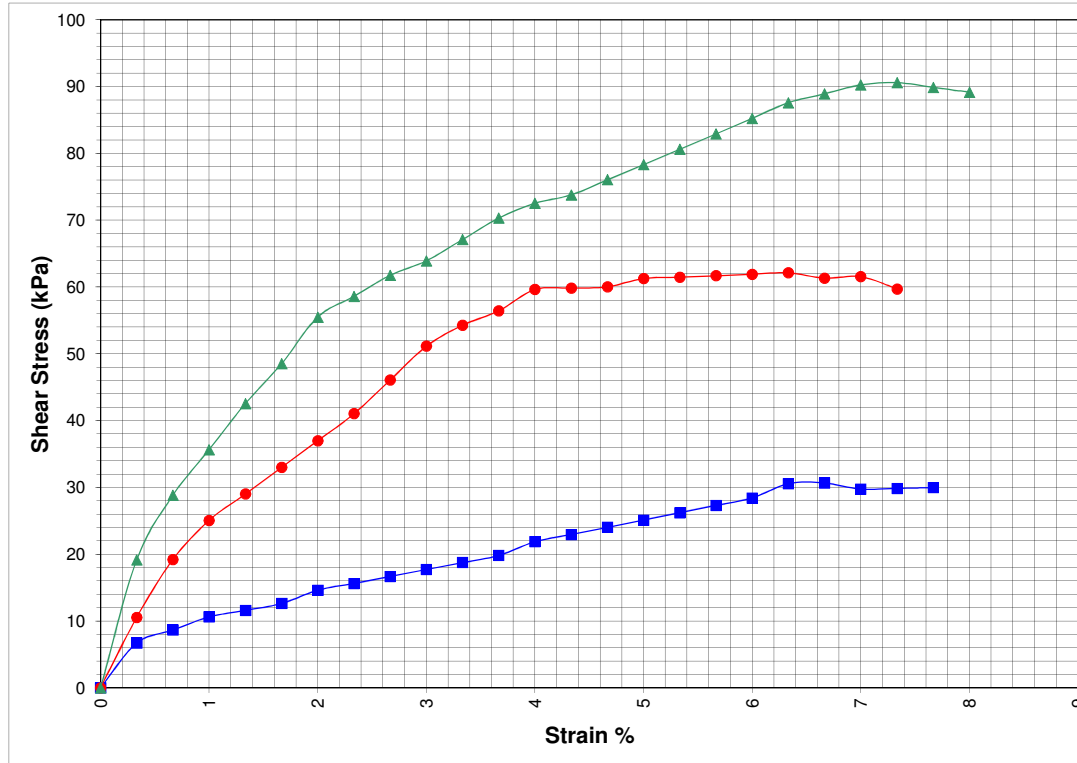
Borehole: MBH-09

Sample Type: SPT-03

Depth: 3.00-3.30 m

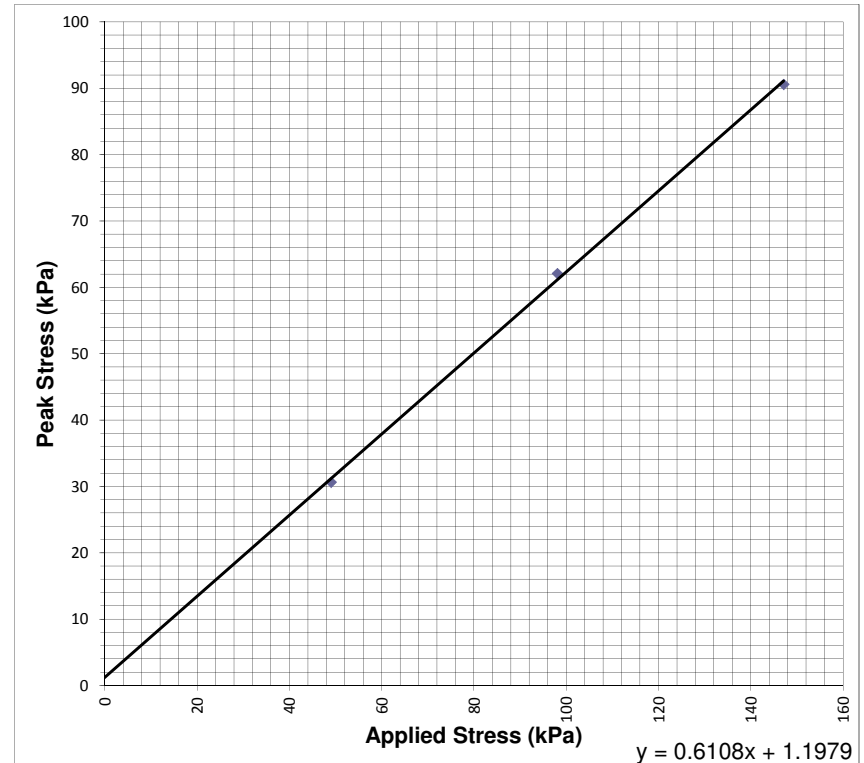
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	62
▲	Stage 3	147	91

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	31.42 °
Apparent Cohesion	1.20 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

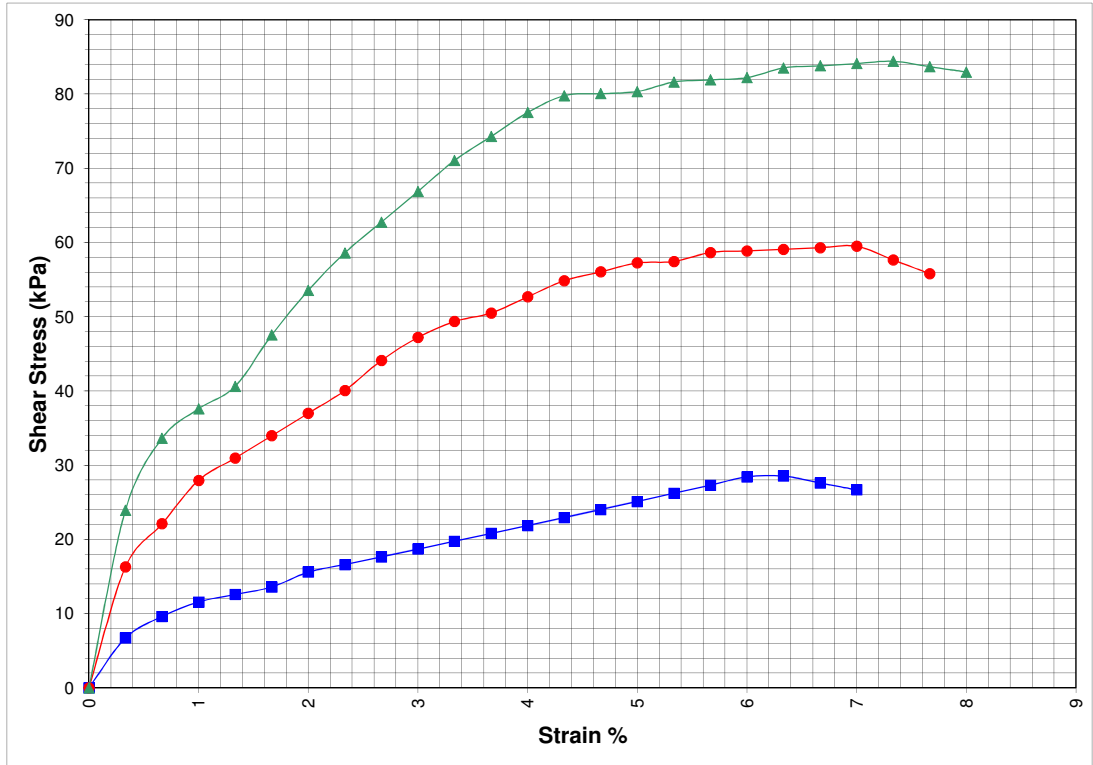
Borehole: MBH-09

Sample Type: SPT-06

Depth: 7.50-7.70 m

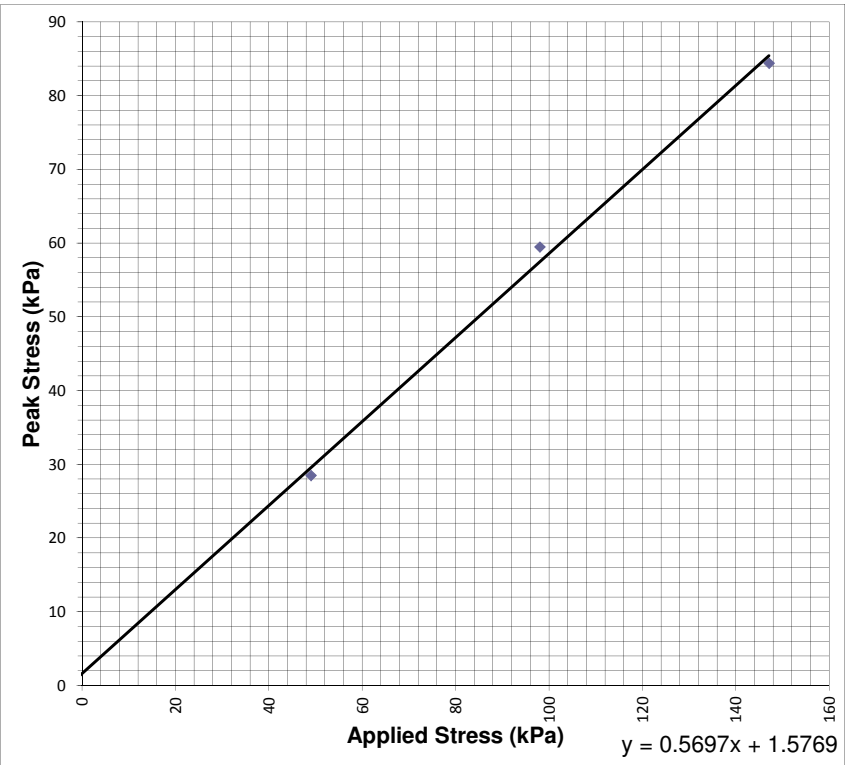
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	59
▲	Stage 3	147	84

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	29.67 °
Apparent Cohesion	1.58 kPa

Borehole: MBH-09

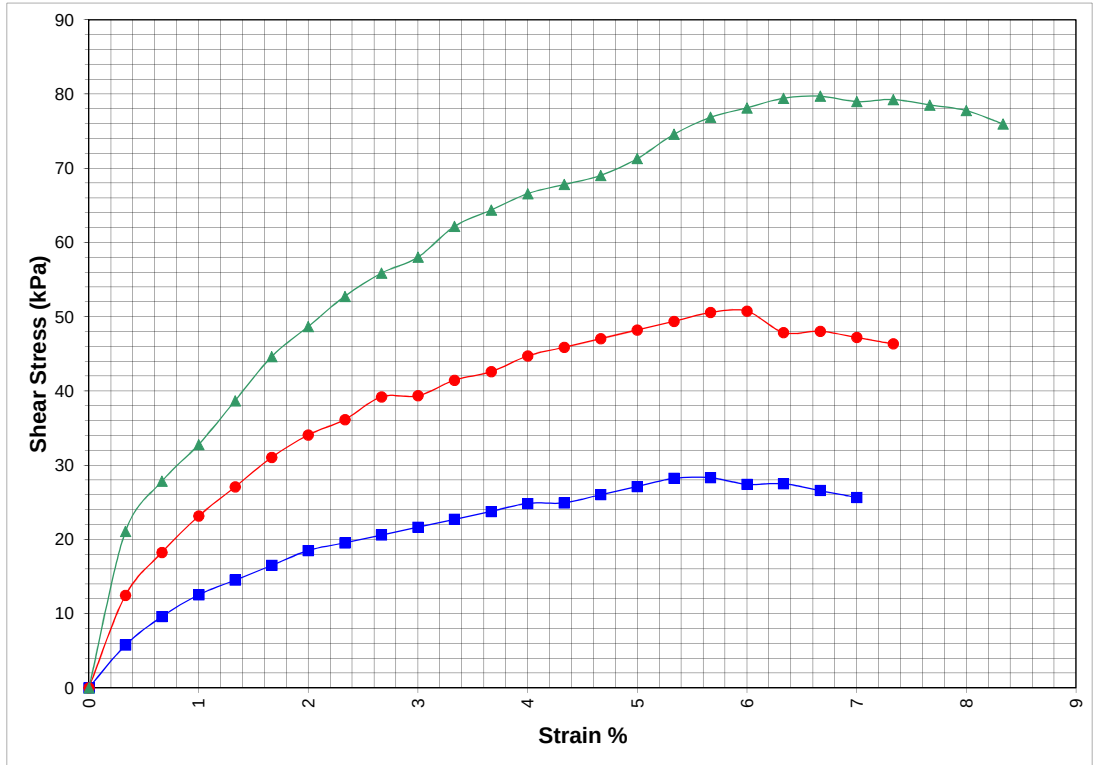
Sample Type: SPT-09

Depth: 12.00-12.30 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

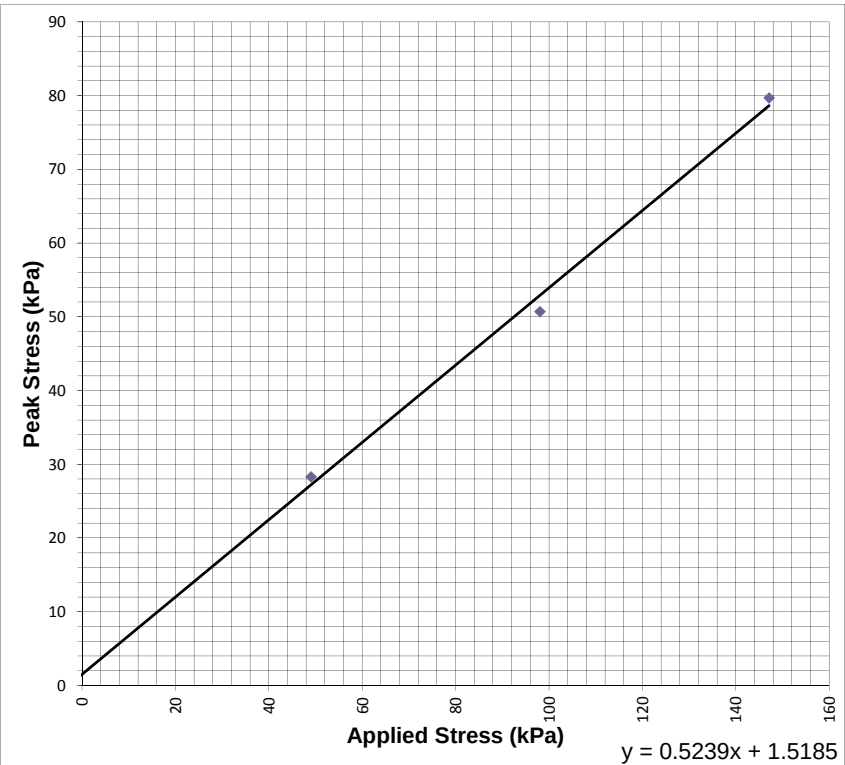
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	51
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.65 °
Apparent Cohesion	1.52 kPa

Borehole: MBH-09

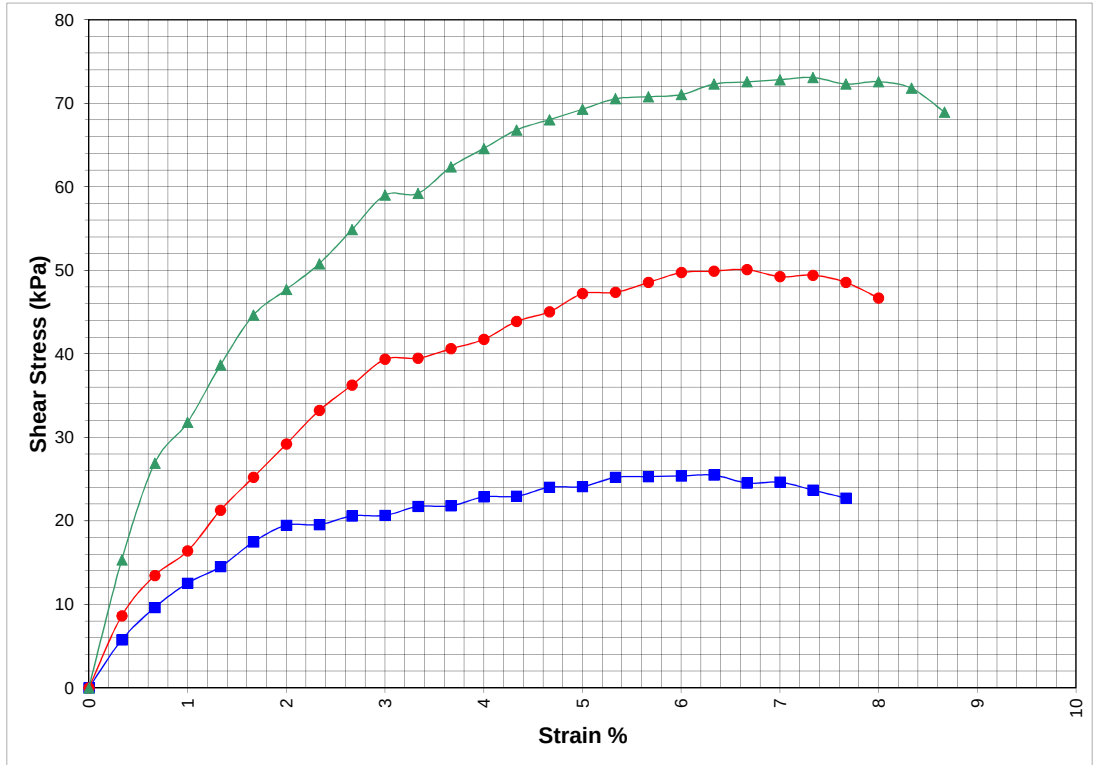
Sample Type: SPT-14

Depth: 19.50-19.70 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

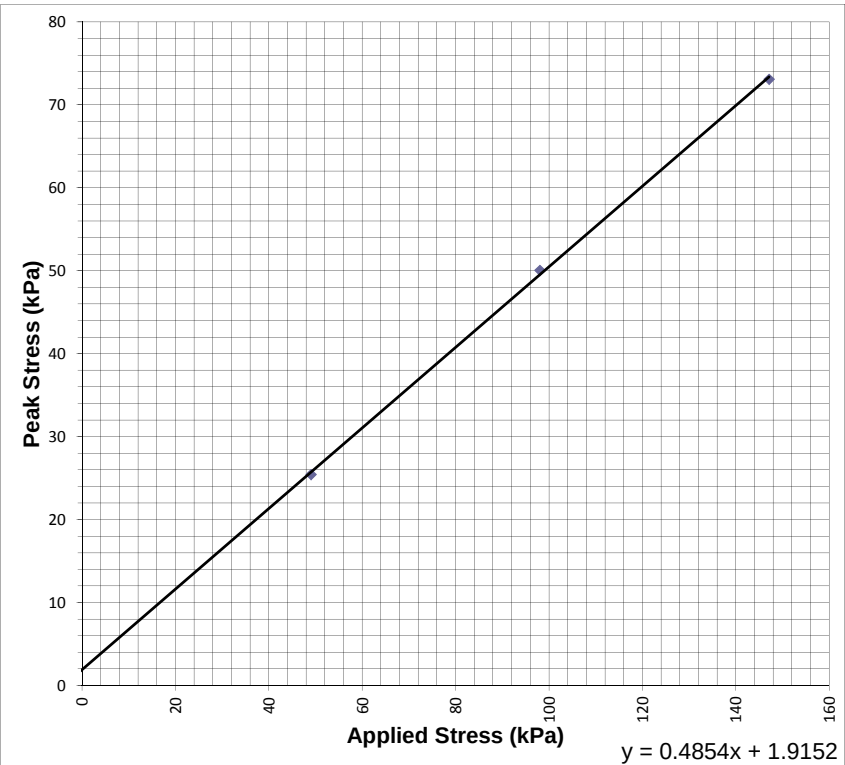
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	50
▲	Stage 3	147	73

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	25.89 °
Apparent Cohesion	1.92 kPa

Borehole: MBH-09

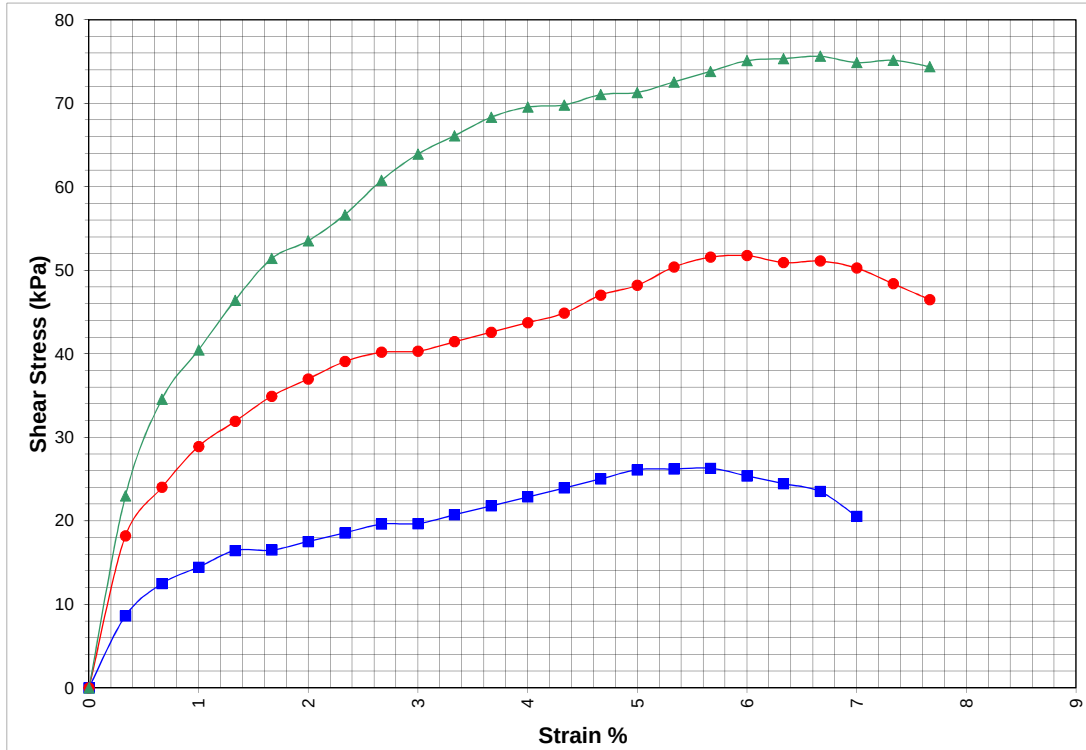
Sample Type: SPT-16

Depth: 22.50-22.70 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

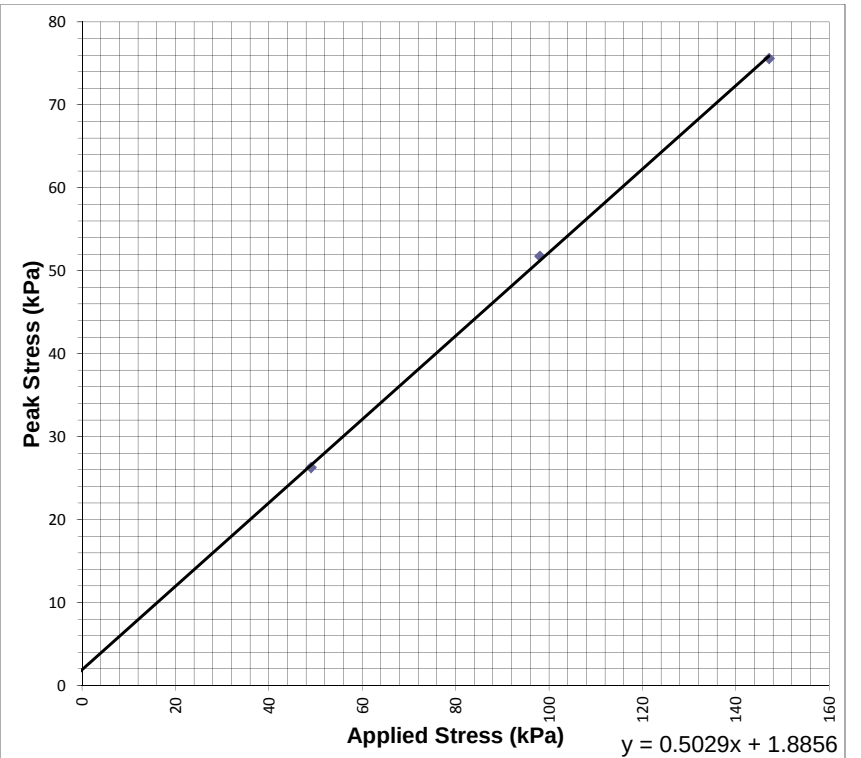
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	52
▲	Stage 3	147	76

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.70 °
Apparent Cohesion	1.89 kPa

Borehole: MBH-09

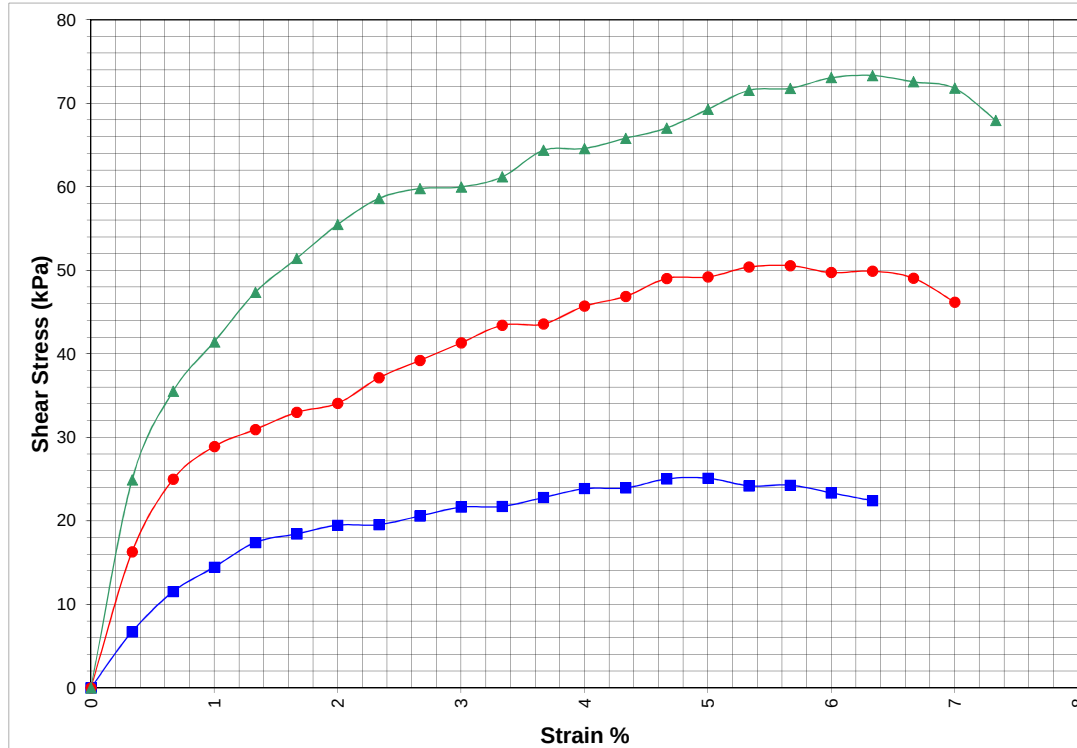
Sample Type: SPT-20

Depth: 28.50-28.80 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

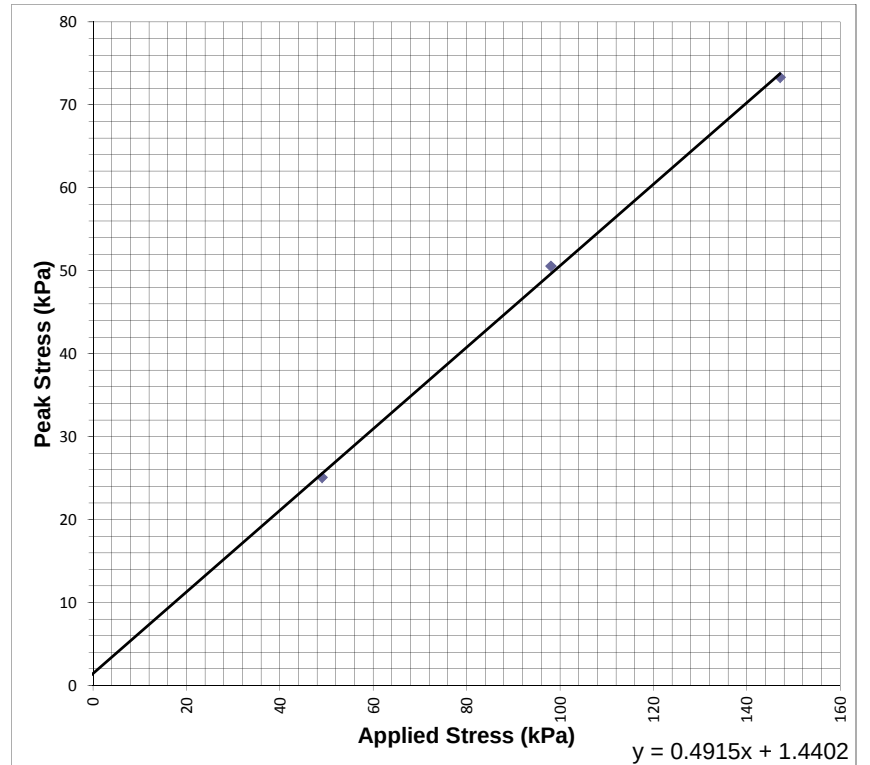
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	51
▲	Stage 3	147	73

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	26.17 °
Apparent Cohesion	1.44 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

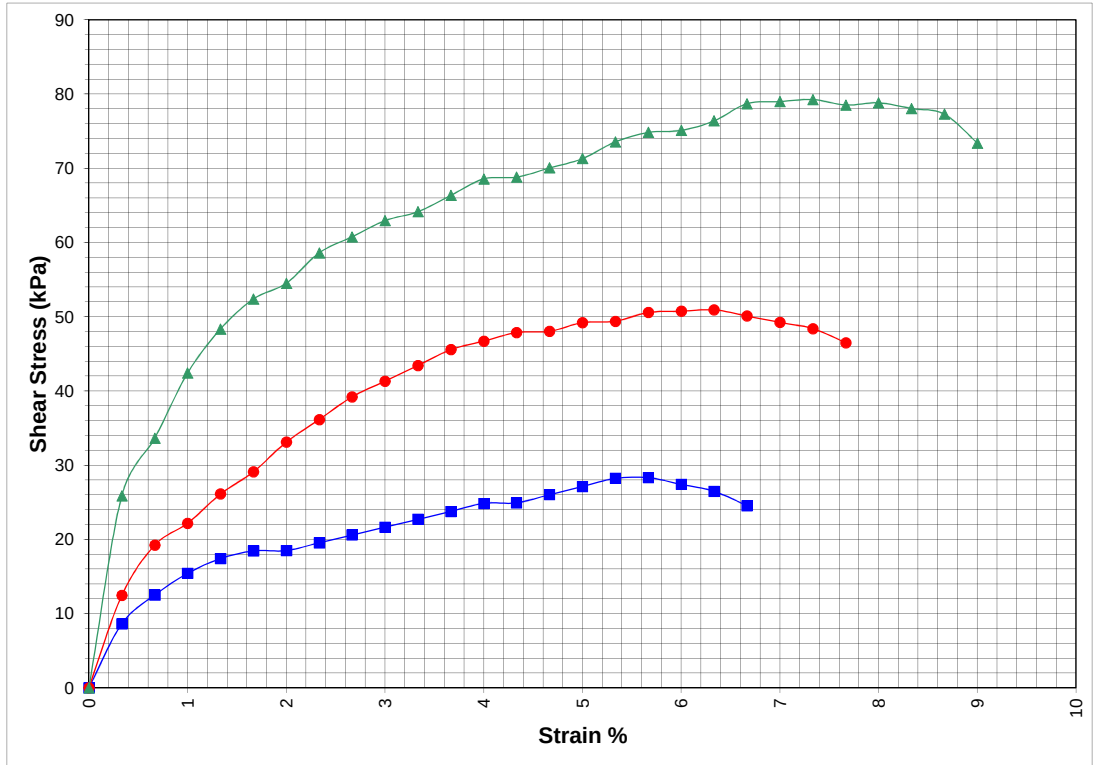
Borehole: MBH-09

Sample Type: SPT-23

Depth: 33.50-33.70 m

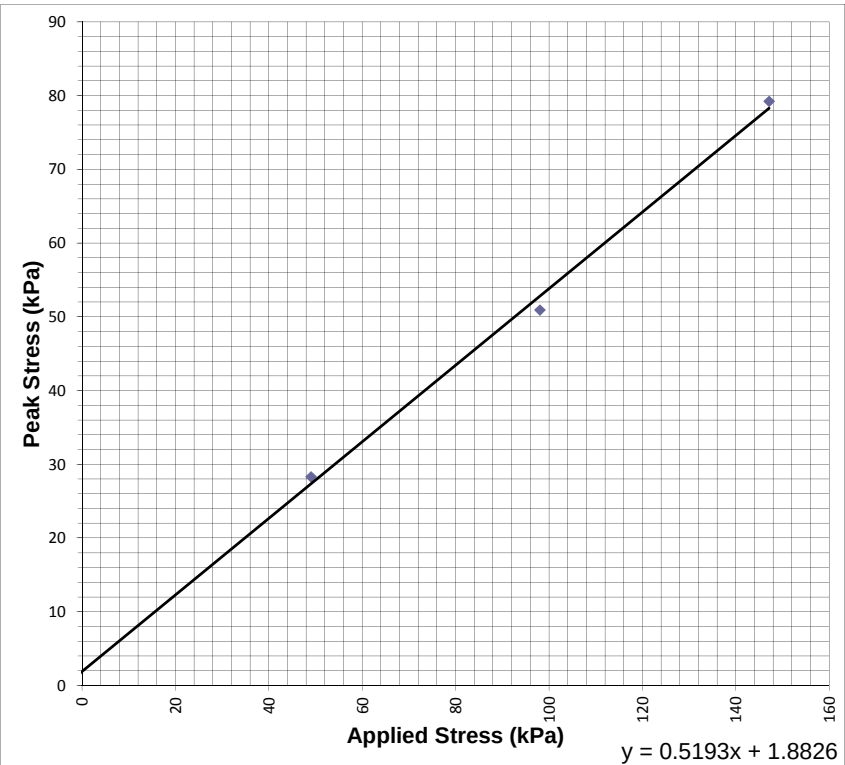
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	51
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.44 °
Apparent Cohesion	1.88 kPa

Borehole: MBH-09

Sample Type: SPT-26

Depth: 38.00-38.25 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

SUMMARY OF TEST RESULTS

[illegible]

Notes :

DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	<u>Failure Type</u>		
WAX/UDS	: Undisturbed Sample	LL	: Liquid Limit			A : Bulge	Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.
TUU	: Triaxial Test (Unconsolidated Undrained)	PL	: Plastic Limit			B : Inclined Shear		
DST	: Direct Shear Test	NP	: Non Plastic			C : Multiple Shear	Project Code	: CM 19 01 03
Φ	: ° (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	: MBH-10

SUMMARY OF TEST RESULTS

[illegible]

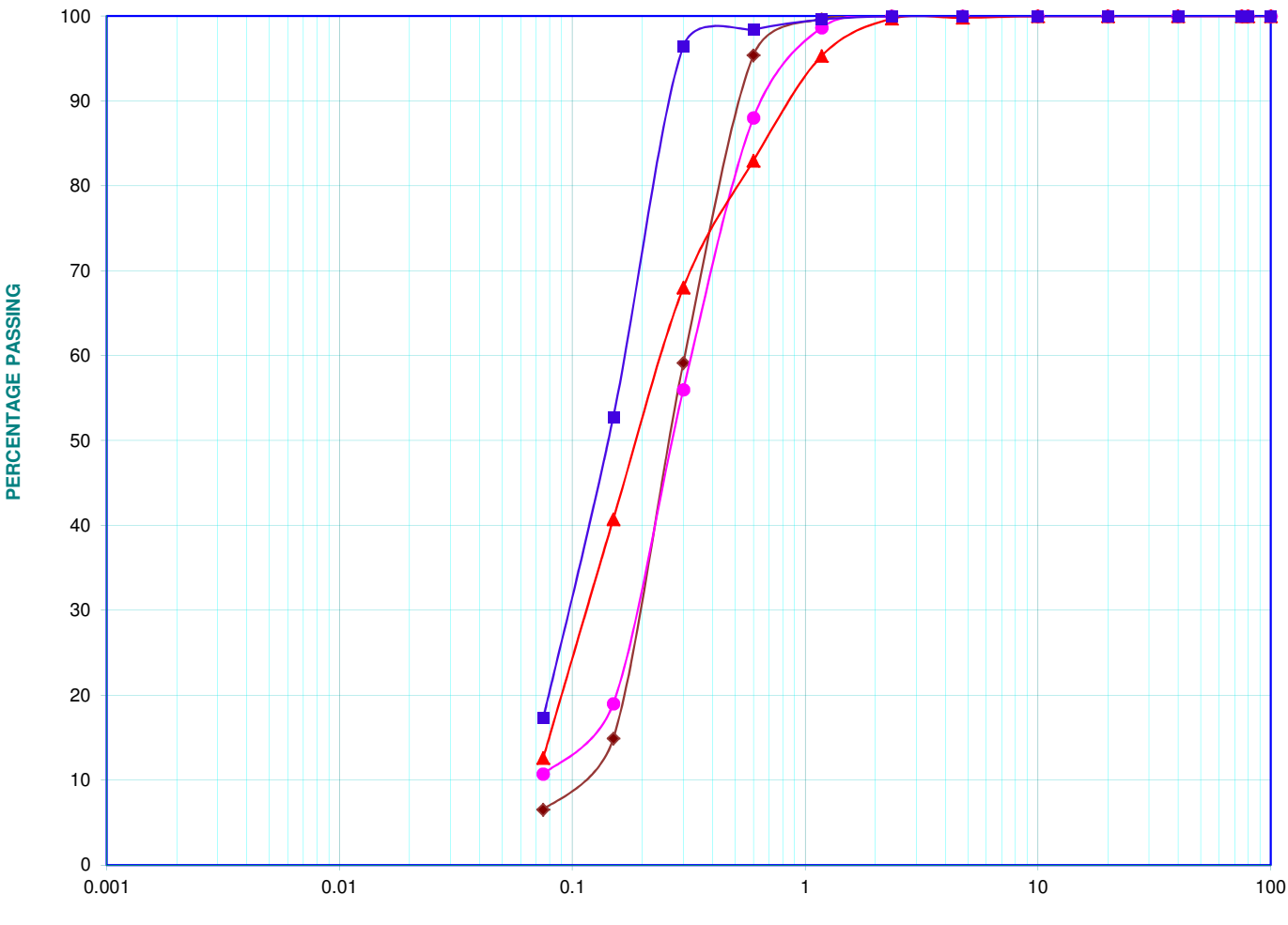
END OF BOREHOLE

[illegible]

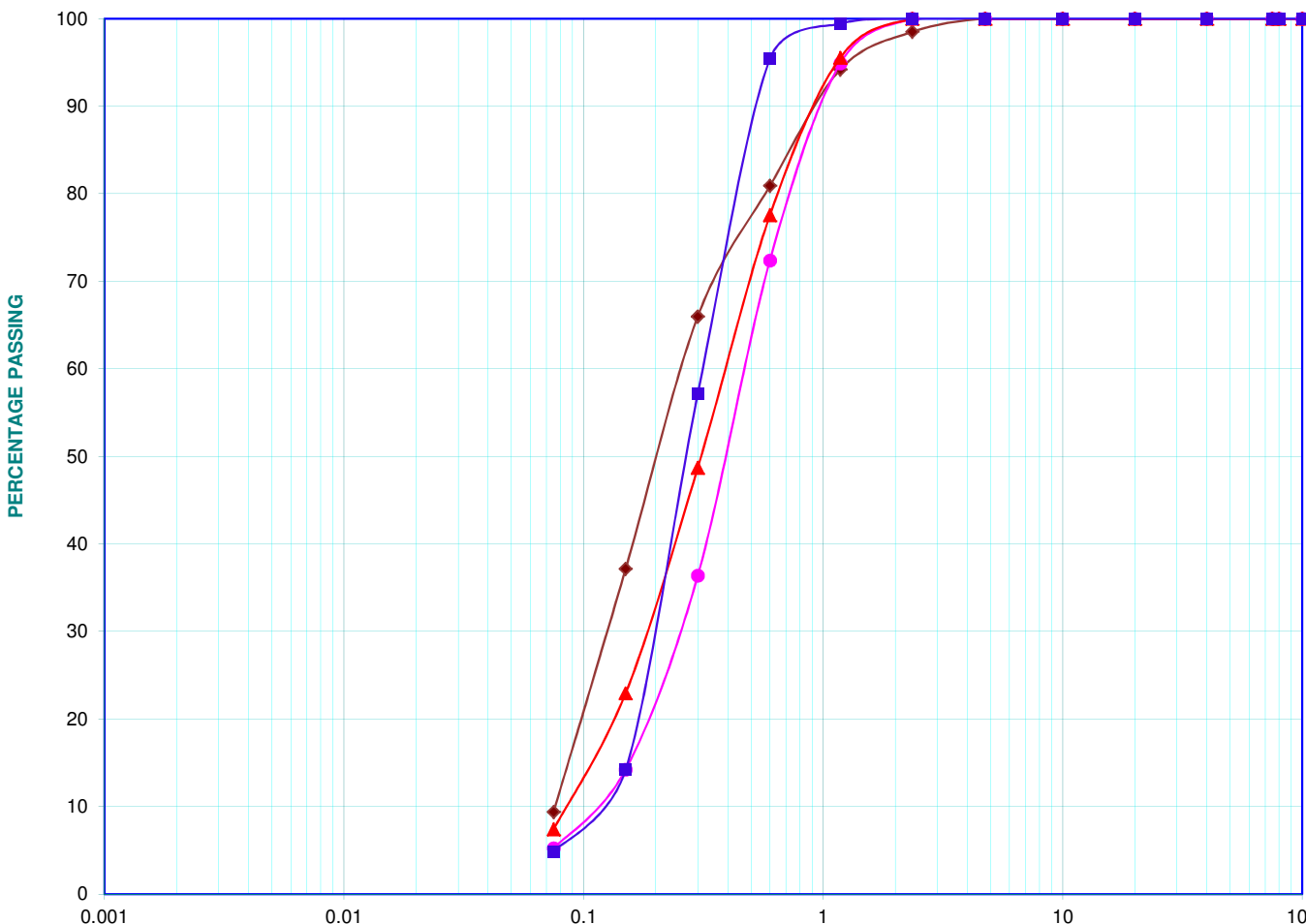
Notes :	
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[illegible]

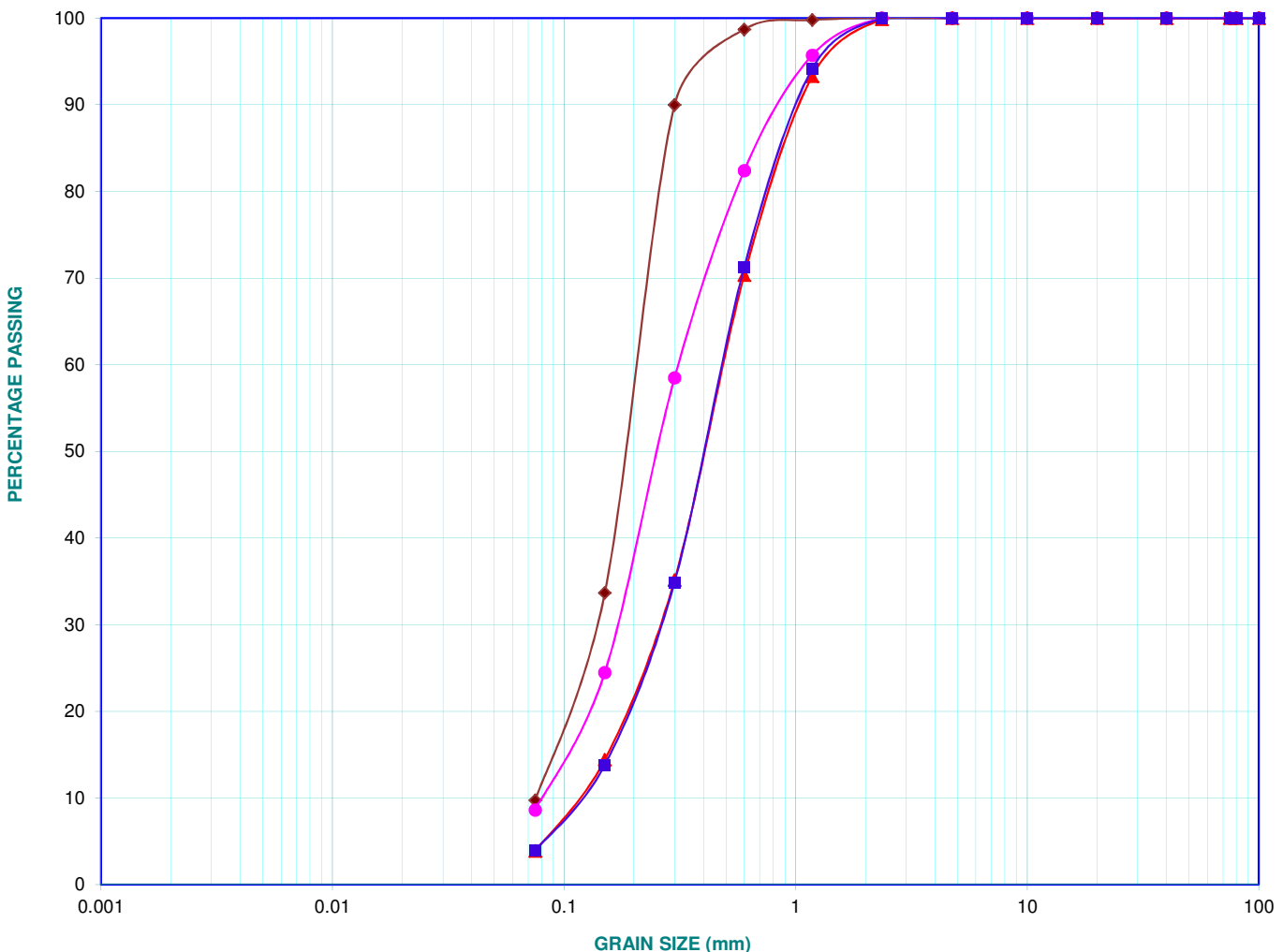
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-10					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY		SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-10	MBH-10	MBH-10	MBH-10										
Depth (m)	0.00-0.30	1.50-1.80	7.50-7.70	9.00-9.25										
Sample Type	SPT-01	SPT-02	SPT-06	SPT-07										
Classification	SP-SM	SP-SM	SM / SC	SM / SC										
Gravel %	0	0	0	0										
Sand %	93	89	87	83										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	7	11	13	17										
D60 mm	0.300	0.320												
D30 mm	0.199	0.200												
D10 mm	0.110	0.075												
Cu	2.73	4.27												
Cc	1.20	1.67												
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

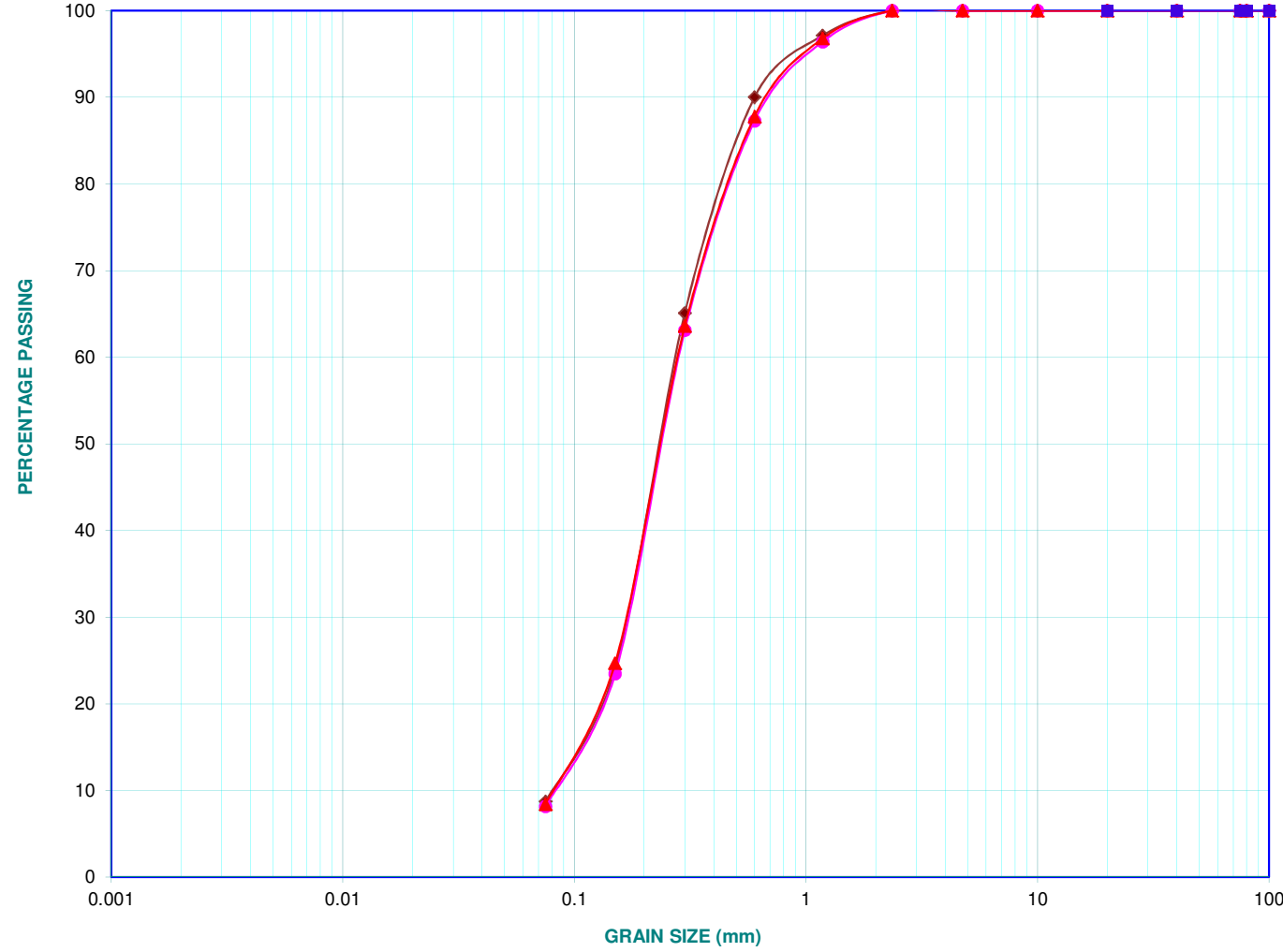
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03		Borehole No. : MBH-10					Date :		7-Jun-19				
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-10	MBH-10	MBH-10	MBH-10										
Depth (m)	12.00-12.25	15.00-15.45	18.00-18.45	21.00-21.30										
Sample Type	SPT-09	SPT-11	SPT-13	SPT-15										
Classification	SP-SM	SP-SM	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	91	95	93	95										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	9	5	7	5										
D60 mm	0.260	0.480	0.400	0.310										
D30 mm	0.120	0.260	0.190	0.200										
D10 mm	0.075	0.120	0.089	0.130										
Cu	3.47	4.00	4.49	2.38										
Cc	0.74	1.17	1.01	0.99										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
								Checked By :						

GRAIN SIZE ANALYSIS

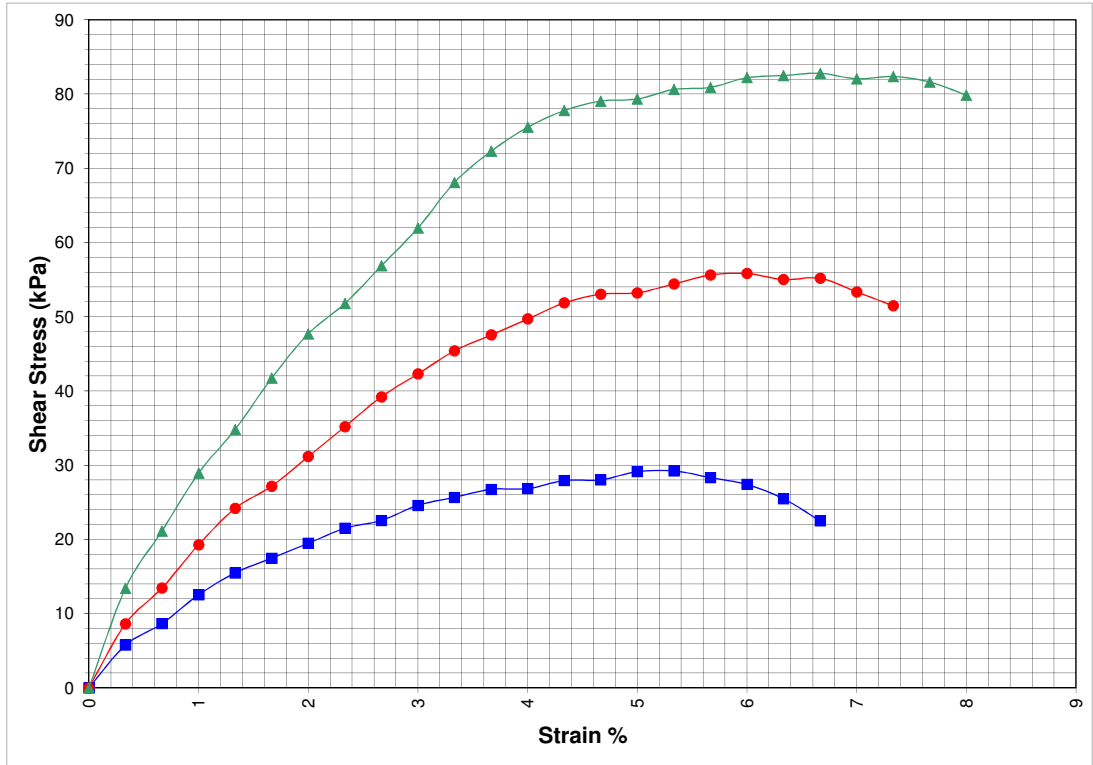
Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-10					Date :		7-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-10	MBH-10	MBH-10	MBH-10										
Depth (m)	24.00-24.30	28.50-28.80	30.00-30.40	33.00-33.30										
Sample Type	SPT-17	SPT-20	SPT-21	SPT-23										
Classification	SP-SM	SP-SM	SP	SP										
Gravel %	0	0	0	0										
Sand %	90	91	96	96										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	10	9	4	4										
D60 mm	0.200	0.300	0.500	0.500										
D30 mm	0.150	0.180	0.280	0.280										
D10 mm	0.075	0.080	0.120	0.120										
Cu	2.67	3.75	4.17	4.167										
Cc	1.50	1.35	1.31	1.307										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-10					Date :		7-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-10	MBH-10	MBH-10		PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	36.00-36.20	39.00-39.35	40.00-40.25											
Sample Type	SPT-25	SPT-27	SPT-28											
Classification	SP-SM	SP-SM	SP-SM											
Gravel %	0	0	0											
Sand %	91	92	92											
Silt %	<---->	<---->	<---->											
Clay %	<---->	<---->	<---->											
Fines % (Silt+Clay)	9	8	8											
D60 mm	0.270	0.280	0.280											
D30 mm	0.180	0.180	0.180											
D10 mm	0.080	0.081	0.080											
Cu	3.38	3.46	3.50											
Cc	1.50	1.43	1.45											
Liquid Limit %	---	---	---											
Plastic Limit %	---	---	---											
Plasticity Index	---	---	---											
									Checked By :					

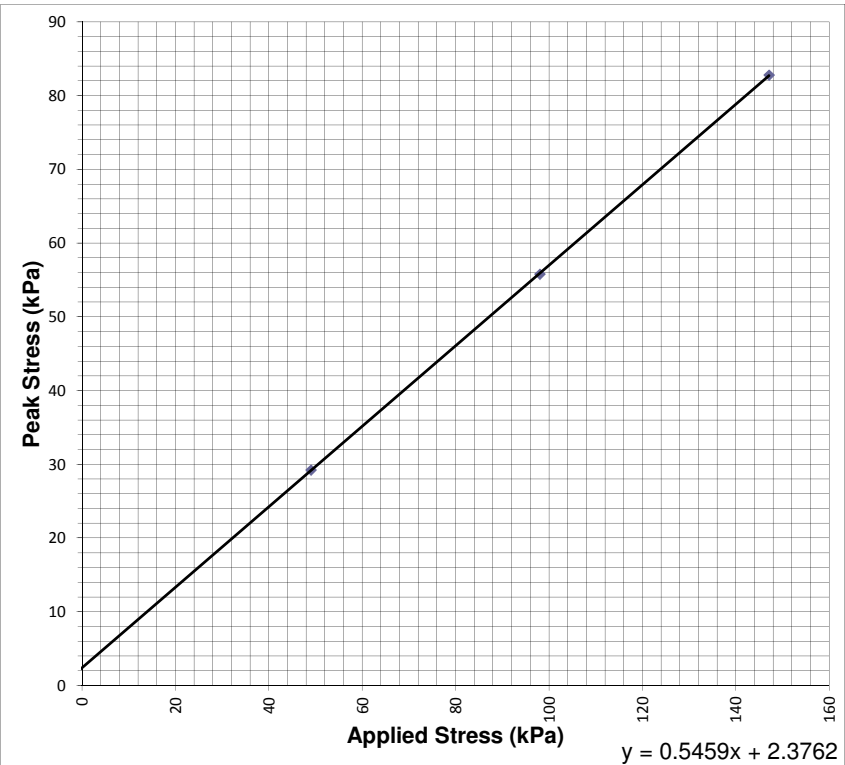
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	56
▲	Stage 3	147	83

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.63 °
Apparent Cohesion	2.38 kPa

Borehole: MBH-10

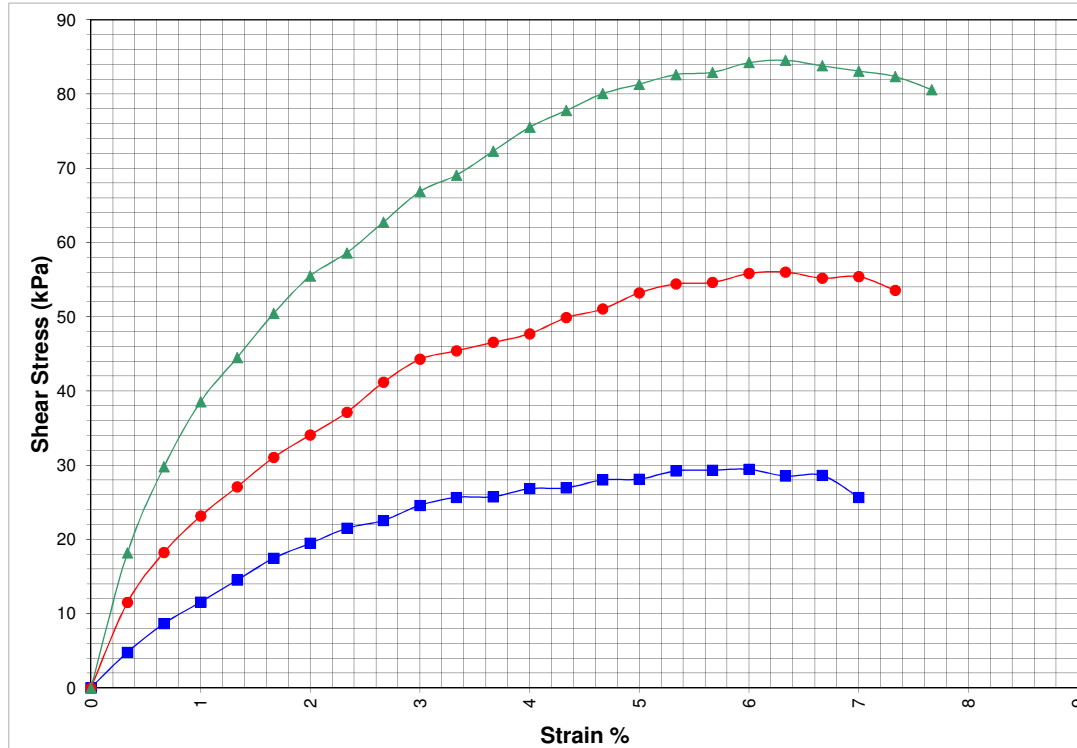
Sample Type: SPT-05

Depth: 6.00-6.28 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

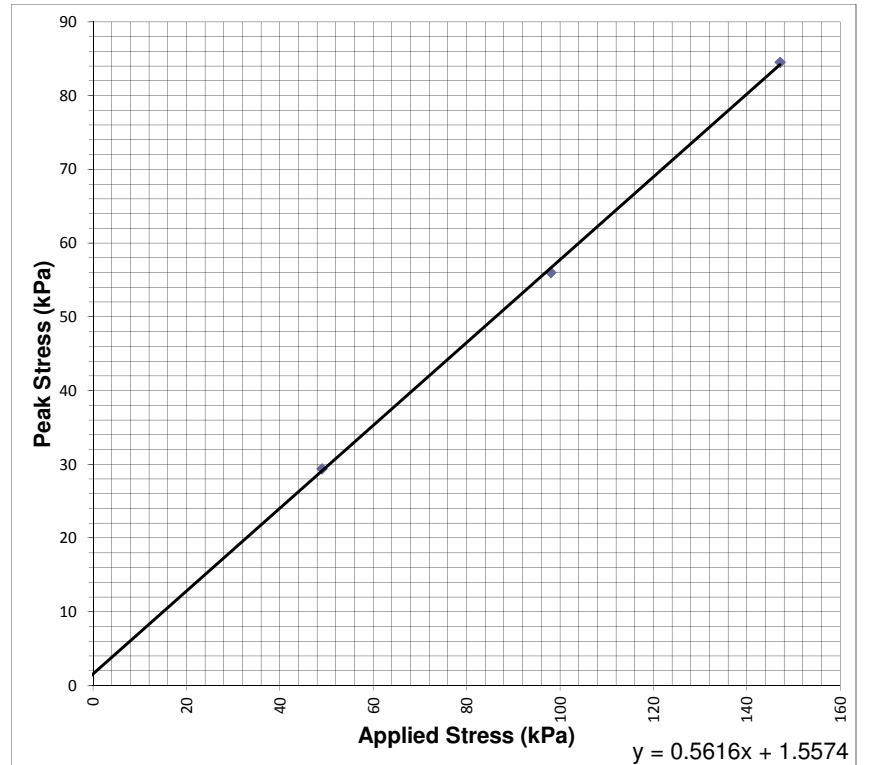
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	56
▲	Stage 3	147	85

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	29.32 °
Apparent Cohesion	1.56 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

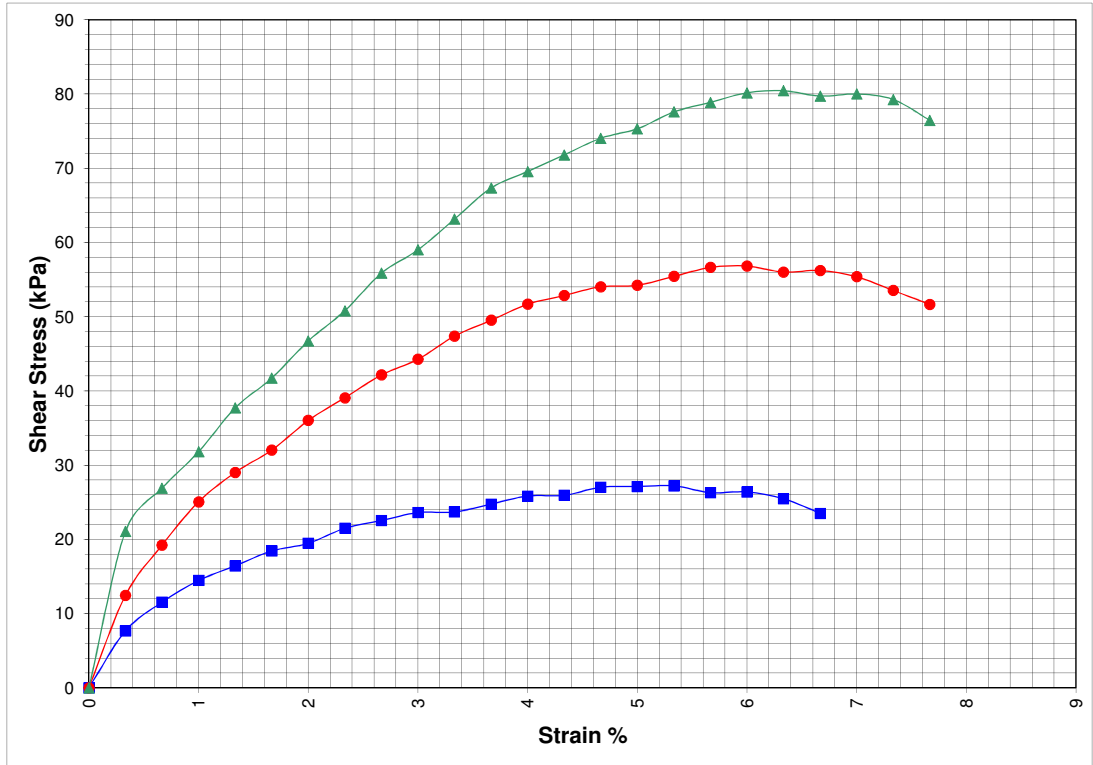
Borehole: MBH-10

Sample Type: SPT-08

Depth: 10.50-10.80 m

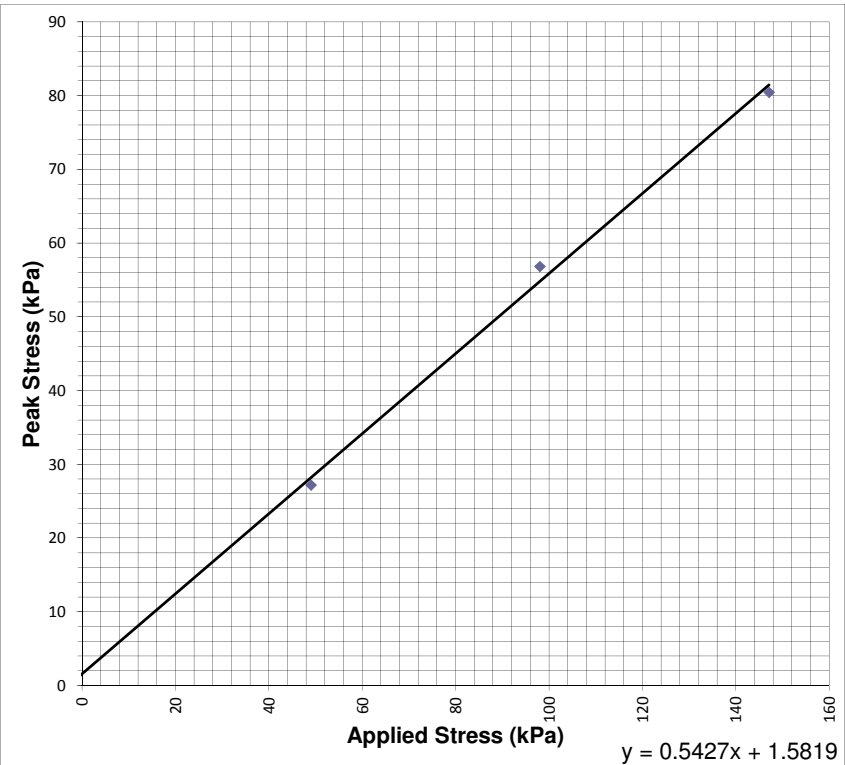
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	57
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.69 °
Apparent Cohesion	1.58 kPa

Borehole: MBH-10

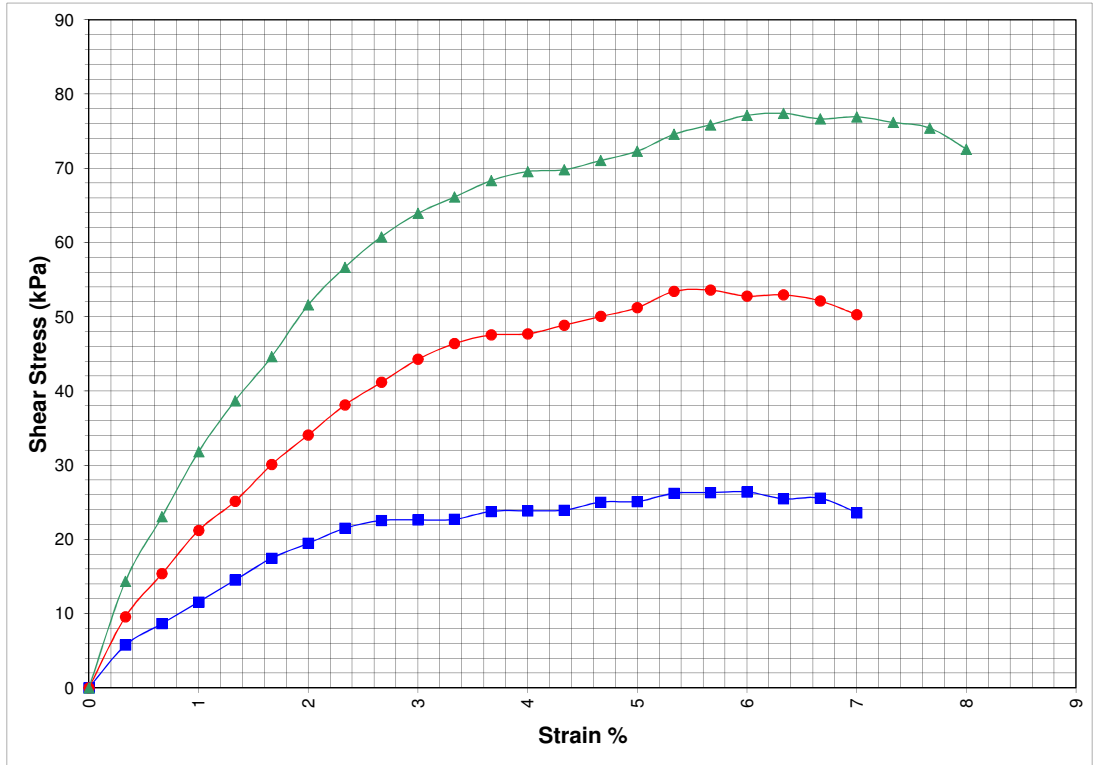
Sample Type: SPT-10

Depth: 13.50-13.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

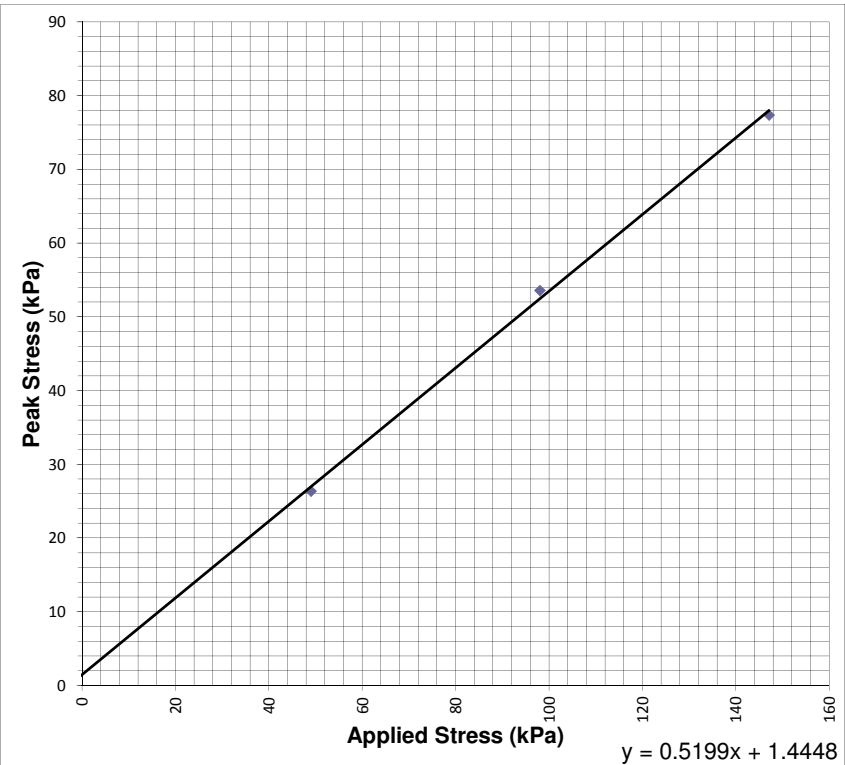
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	54
▲	Stage 3	147	77

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.47 °
Apparent Cohesion	1.44 kPa

Borehole: MBH-10

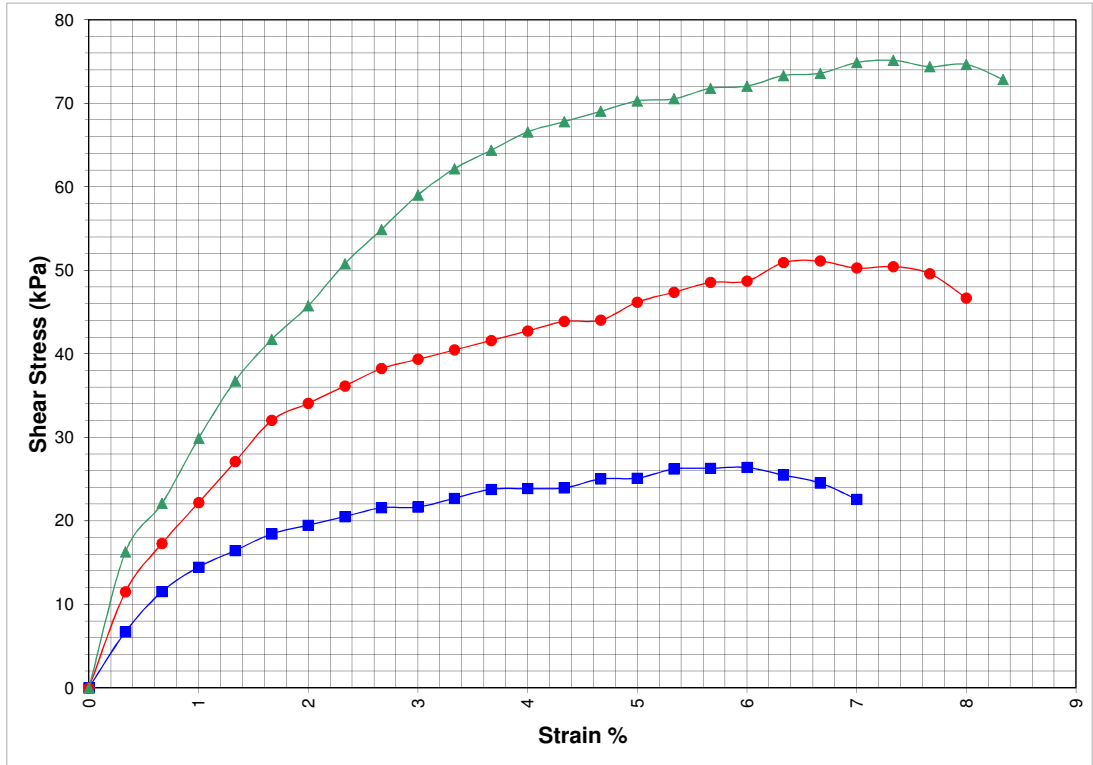
Sample Type: SPT-12

Depth: 16.50-16.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

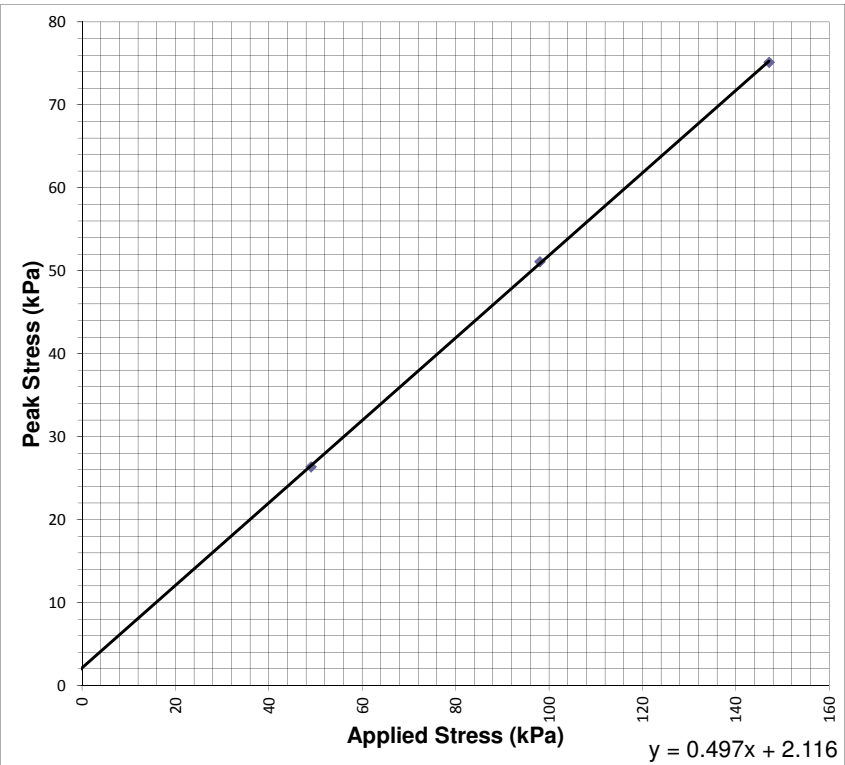
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	51
▲	Stage 3	147	75

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.43 °
Apparent Cohesion	2.12 kPa

Borehole: MBH-10

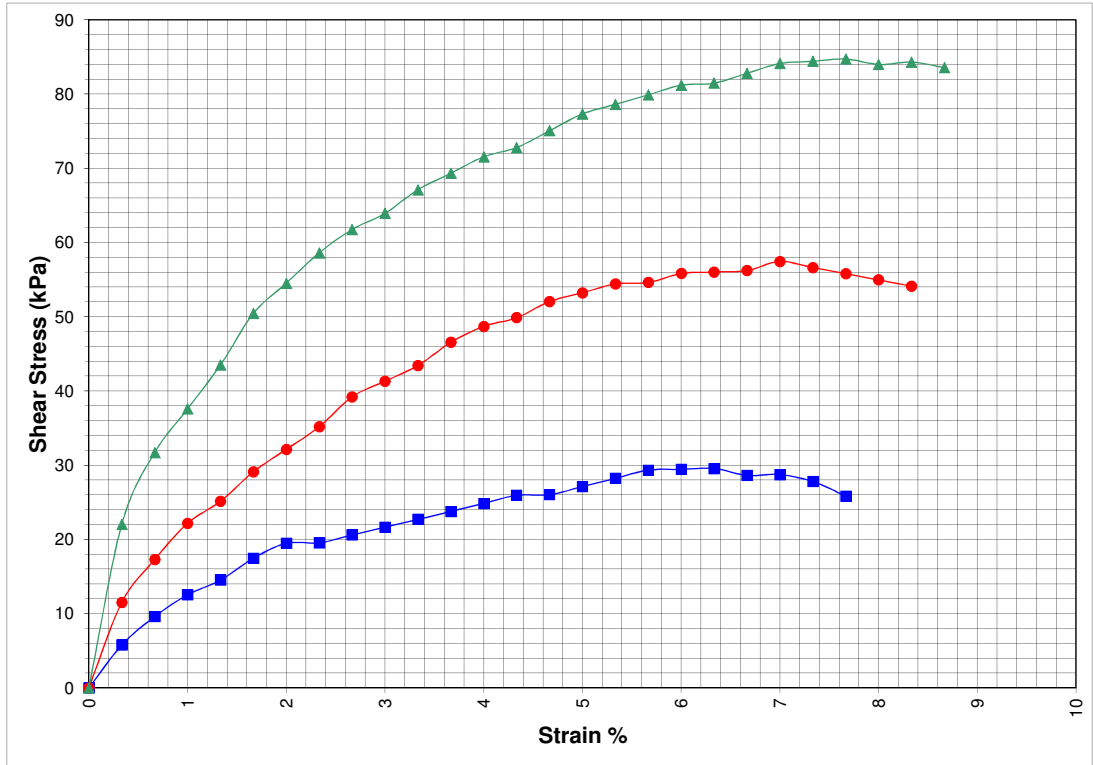
Sample Type: SPT-16

Depth: 22.50-22.80 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

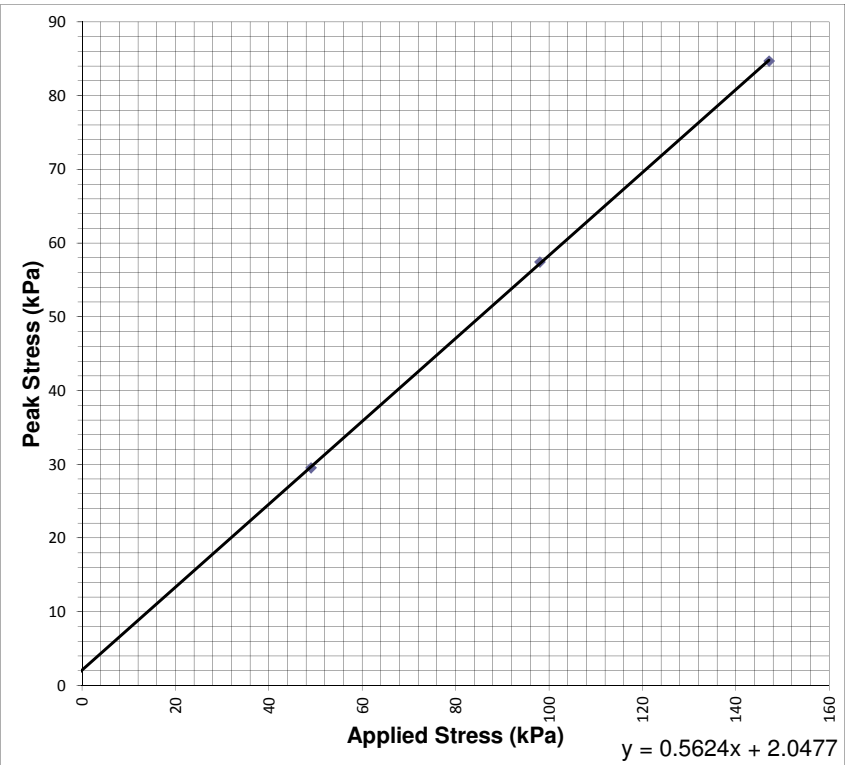
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	57
▲	Stage 3	147	85

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	29.35 °
Apparent Cohesion	2.05 kPa

Borehole: MBH-10

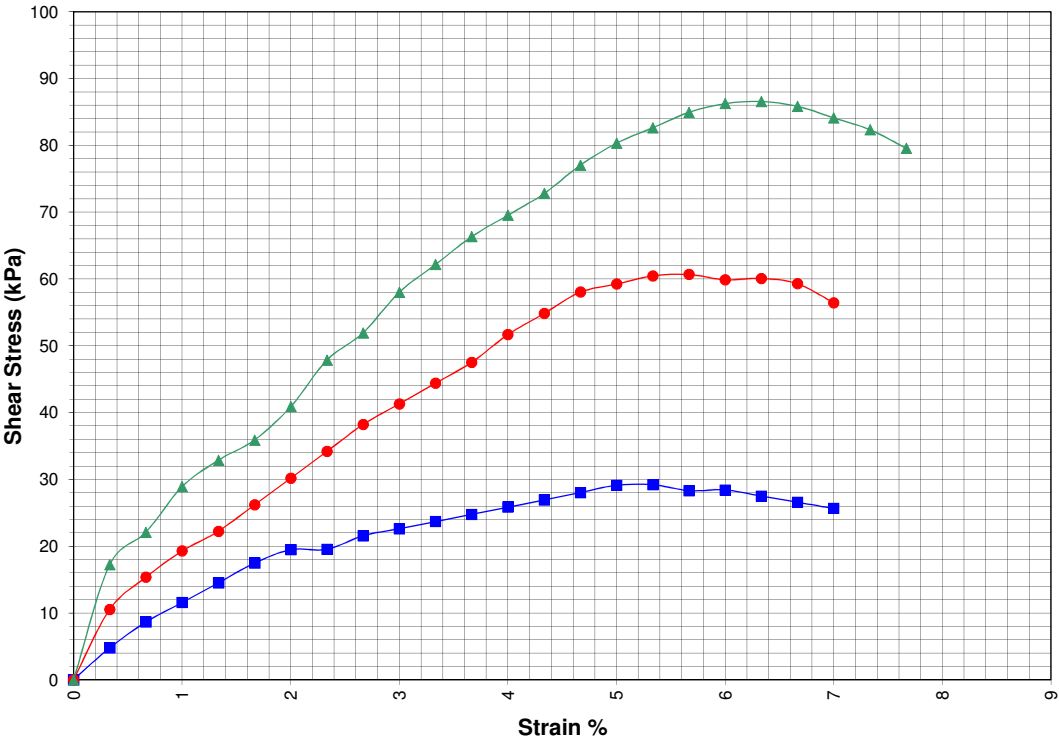
Sample Type: SPT-19

Depth: 27.00-27.20 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

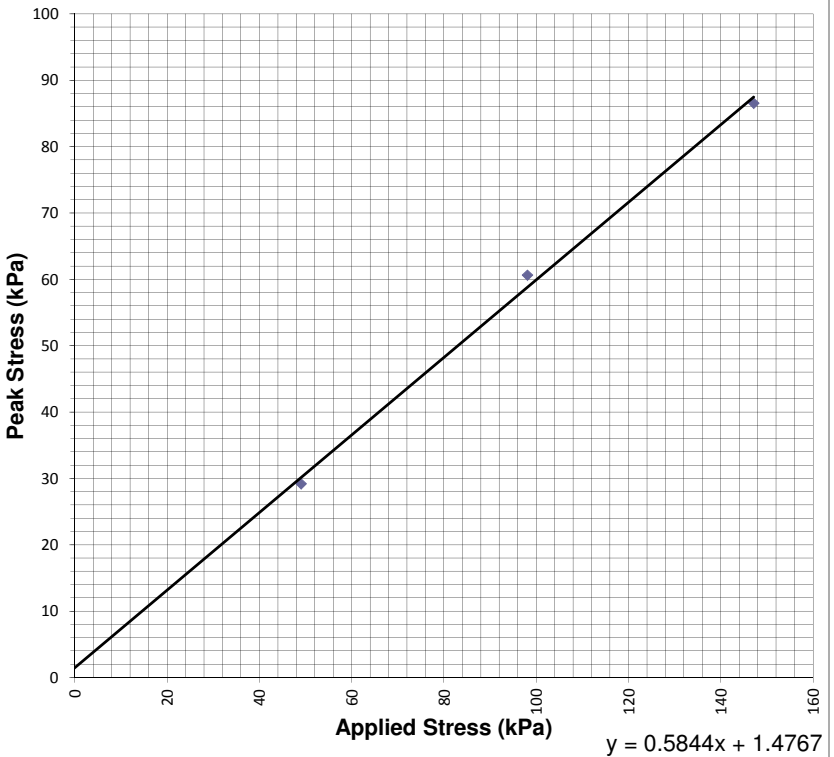
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	61
▲	Stage 3	147	87

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	30.30 °
Apparent Cohesion	1.48 kPa

Borehole: MBH-10

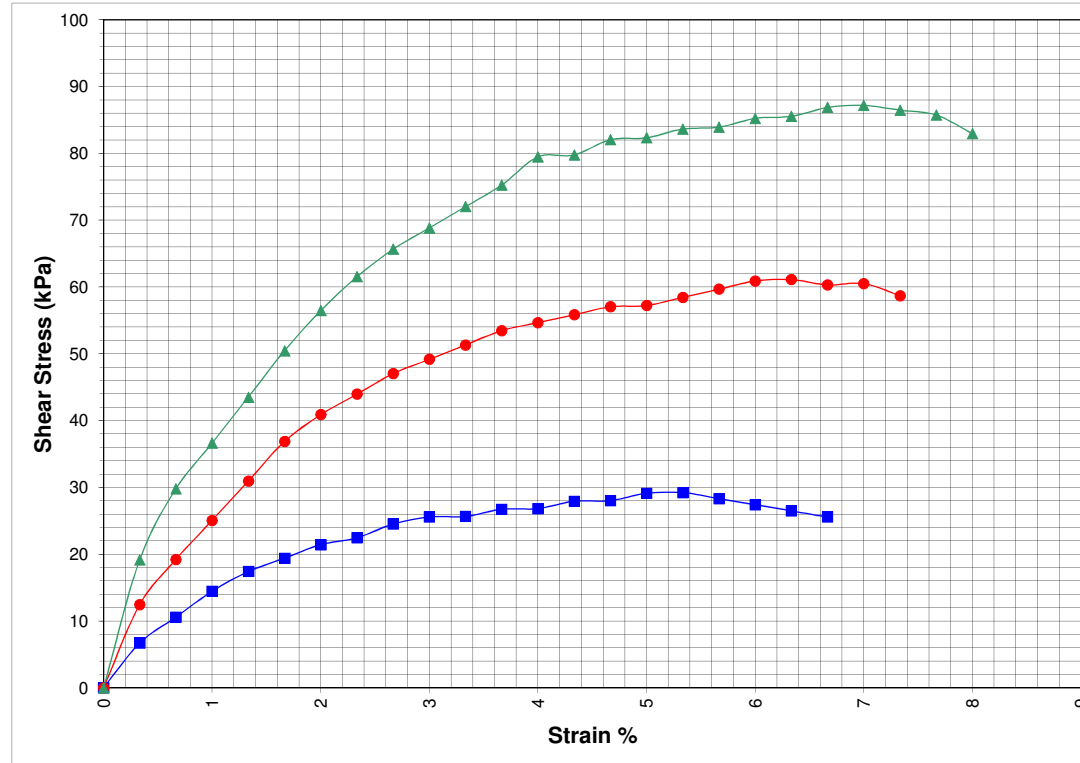
Sample Type: SPT-22

Depth: 31.50-31.70 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

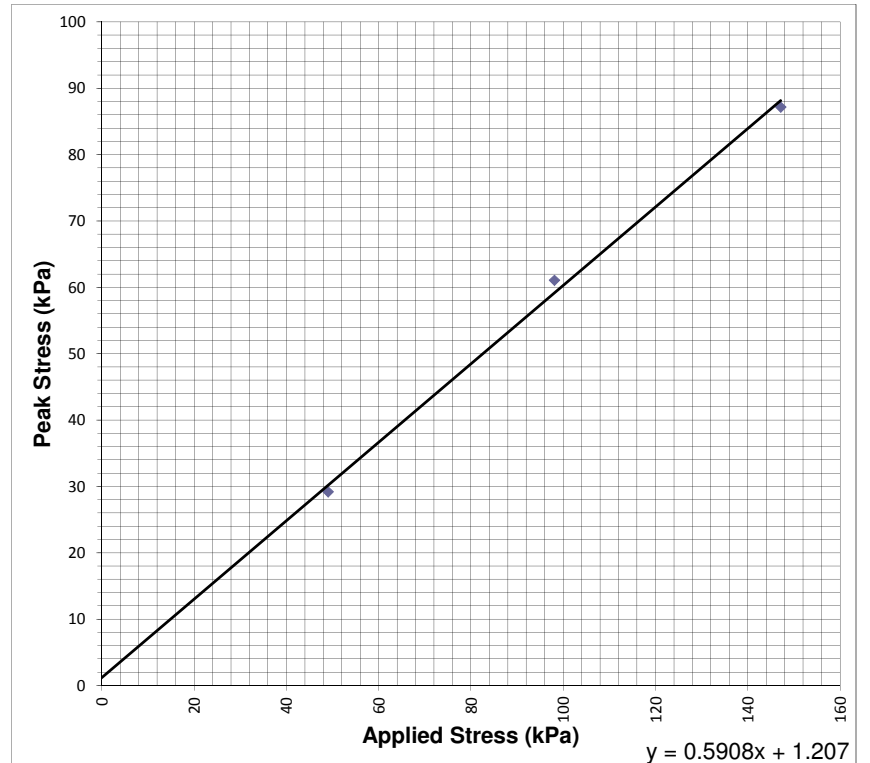
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	61
▲	Stage 3	147	87

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	30.57 °
Apparent Cohesion	1.21 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

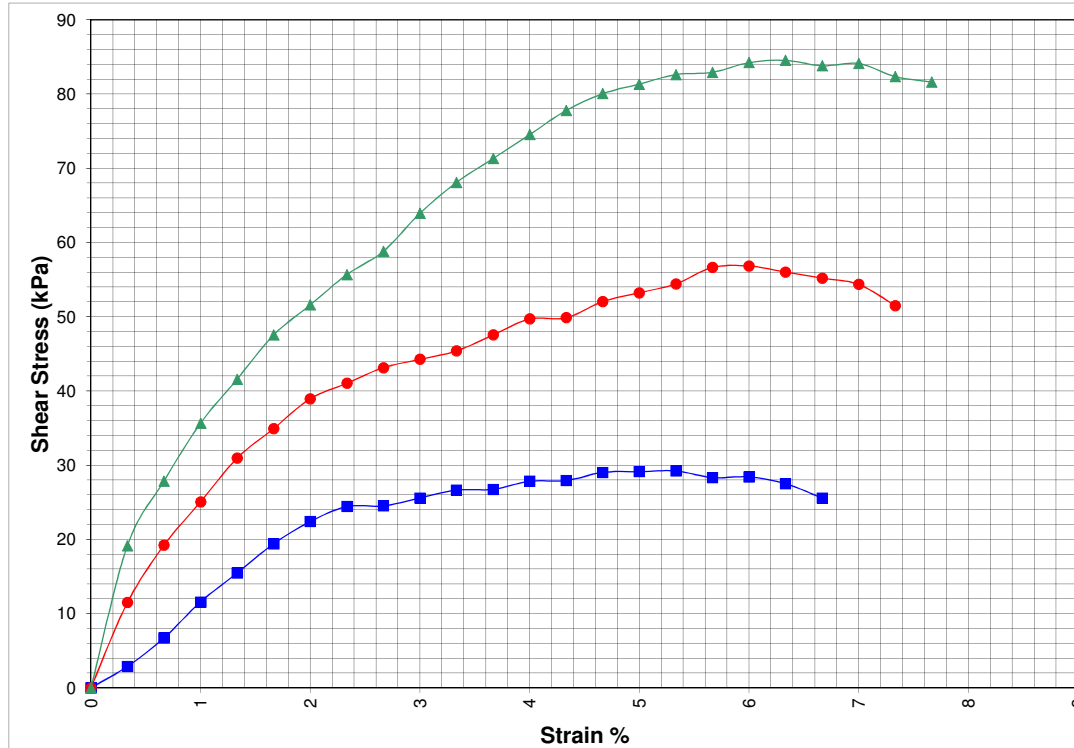
Borehole: MBH-10

Sample Type: SPT-24

Depth: 34.50-34.80 m

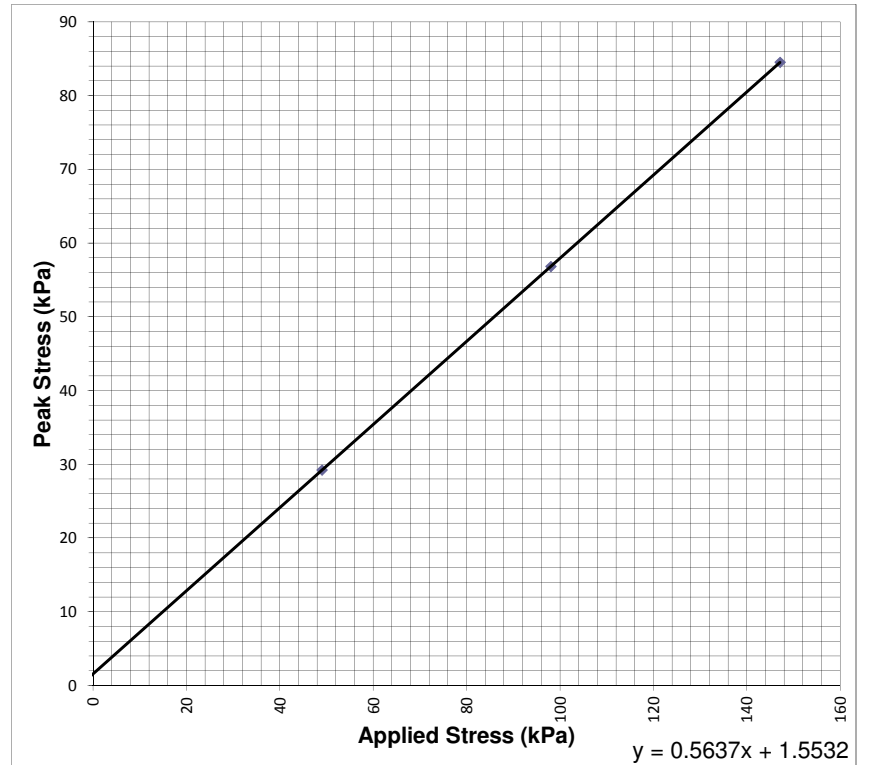
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	57
▲	Stage 3	147	85

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	29.41 °
Apparent Cohesion	1.55 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

Borehole: MBH-10

Sample Type: SPT-26

Depth: 37.50-37.65 m

SUMMARY OF TEST RESULTS																																				
SAMPLE DETAILS		Soil Classification	CLASSIFICATION & INDEX												SHEAR STRENGTH TEST										Free swell Index %	Consolidation Tests				Chemical tests						
			Atterberg Limits			Physical Properties					Grain Size Distribution				Lateral & Vertical Loading Tests											Initial Void Ratio	Degree of Saturation %	Preconsolidation Pressure (kPa))	Compression Index	pH	Organic content (%)	Carbonate content (%)	Chloride content (ppm)	Sulphate content (ppm)		
Sample Type	Depth, m		Liquid Limit LL %	Plastic Limit PL %	Plasticity Index PI %	Water Content %	Bulk Density (kN/m ³)	Submerged Unit Weight (kN/m ³)	Dry Density (kN/m ³)	Specific Gravity	Gravel %	Sand %	Silt %	Clay %	Fines % (Silt +Clay)	Type of Test	Shear Strength Su (kpa)	Type of Failure	Cohesion C (kpa)	Internal friction angle Φ °	Torvane (Kpa)	Pocket penetrometer (Kpa)	Miniature Vane													
SPT-1	0.00-0.18	SP-SM				19.3	19.33	9.27	16.21	2.62	0	89	<->	<->	11																					
SPT-2	1.50-1.75					19.4	17.73	7.67	14.85	2.59						DST			0.72	32.4																
SPT-3	3.00-3.22	SP				11.6	15.73	5.67	14.09		0	98	<->	<->	2																					
SPT-4	4.50-4.65	SP				16.9	15.76	5.70	13.48		0	97	<->	<->	3																					
SPT-5	6.00-6.18					15.1	17.43	7.37	15.15	2.63						DST			1.65	31.8																
SPT-6	7.50-7.70	SP				15.4	17.45	7.39	15.12		0	97	<->	<->	3																	8.05	0.80	2.00	700	10620
SPT-7	9.00-9.30	SP				15.5	17.83	7.77	15.43	2.63	0	96	<->	<->	4																					
SPT-8	10.50-10.75					18.3	17.80	7.74	15.04							DST			1.55	29.3																
SPT-9	12.00-12.28					19.5	19.13	9.07	16.02	2.63																										
SPT-10	13.50-13.75					18.0	19.15	9.09	16.24							DST			1.76	28.8																
SPT-11	15.00-15.22	SP-SM				15.4	17.80	7.74	15.42	2.64	0	92	<->	<->	8																					
SPT-12	16.50-16.80	SP-SM				19.3	17.79	7.73	14.91		0	91	<->	<->	9																					
SPT-13	18.00-18.28					20.4	17.80	7.74	14.78							DST			1.60	30.2																
SPT-14	19.50-19.75					18.9	17.80	7.74	14.96	2.62																						8.34	1.00	2.00	1400	5310
SPT-15	21.00-21.25	SP				20.6	18.08	8.02	15.00		0	96	<->	<->	4																					
SPT-16	22.50-22.72					23.0	18.06	8.00	14.69	2.60																										
SPT-17	24.00-24.20					22.7	18.04	7.98	14.70							DST			1.90	29.7																
SPT-18	25.50-25.70	SP-SM				23.4	18.53	8.47	15.02		0	91	<->	<->	9																					
SPT-19	27.00-27.18					23.6	18.08	8.02	14.63	2.59																										
SPT-20	28.50-28.70	SP-SM				19.9	18.53	8.47	15.46		0	90	<->	<->	10																					
Notes :																																				
DS : Disturbed Sample						* : Insufficient sample						# : Decayed Wood						Failure Type						Project : Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.												
WAX/UDS :Undisturbed Sample						LL : Liquid Limit												A : Bulge																		
TUU : Triaxial Test (Unconsolidated Undrained)						PL : Plastic Limit												B : Inclined Shear																		
DST : Direct Shear Test						NP : Non Plastic												C : Multiple Shear						Project Code : CM 19 01 03												
Φ : ° (deg) Angle of internal friction						NS : Not Suitable												D : Vertical Shear						Borehole No. : MBH-11												

SUMMARY OF TEST RESULTS

[illegible]

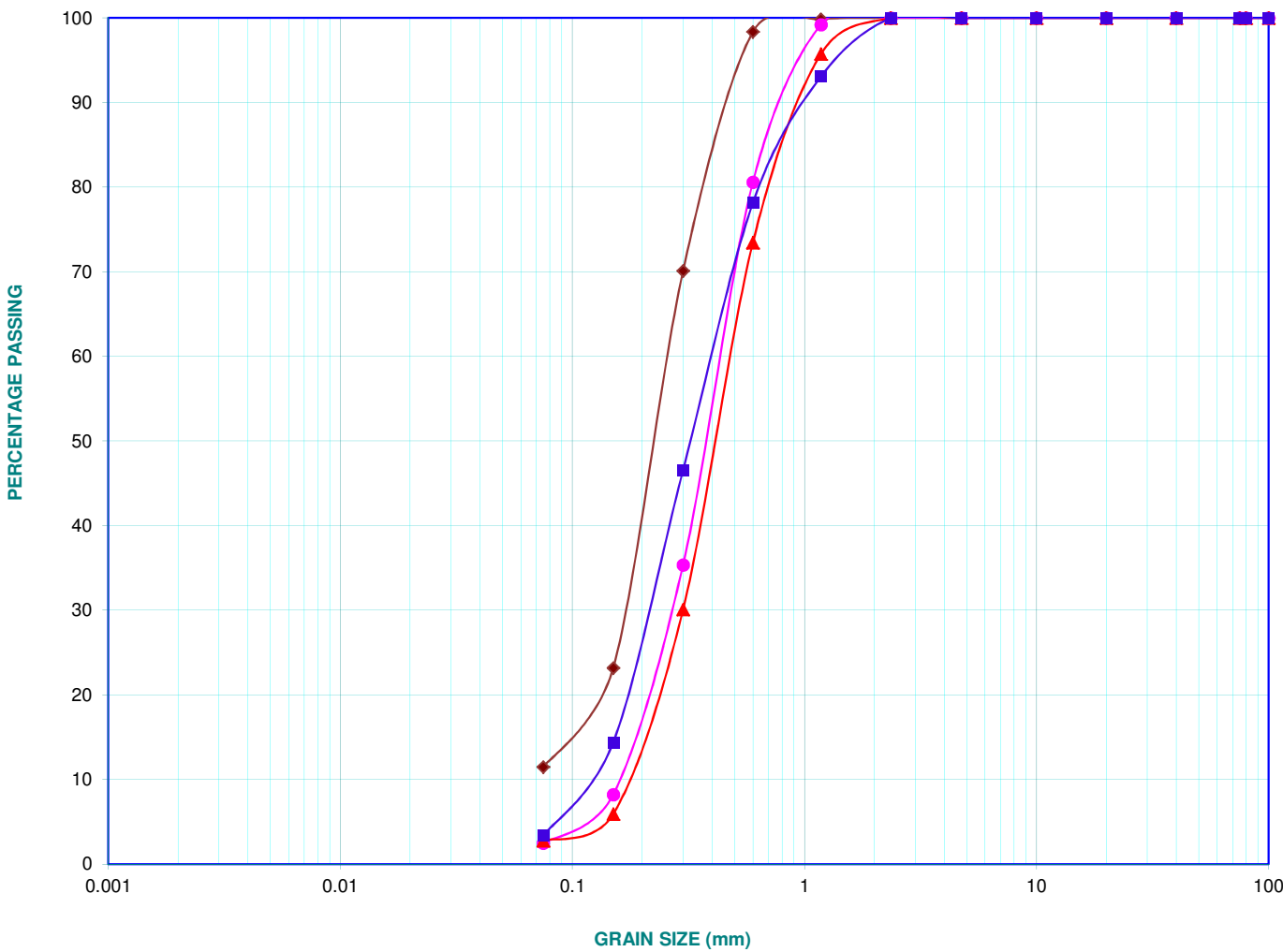
END OF BOREHOLE

[illegible]

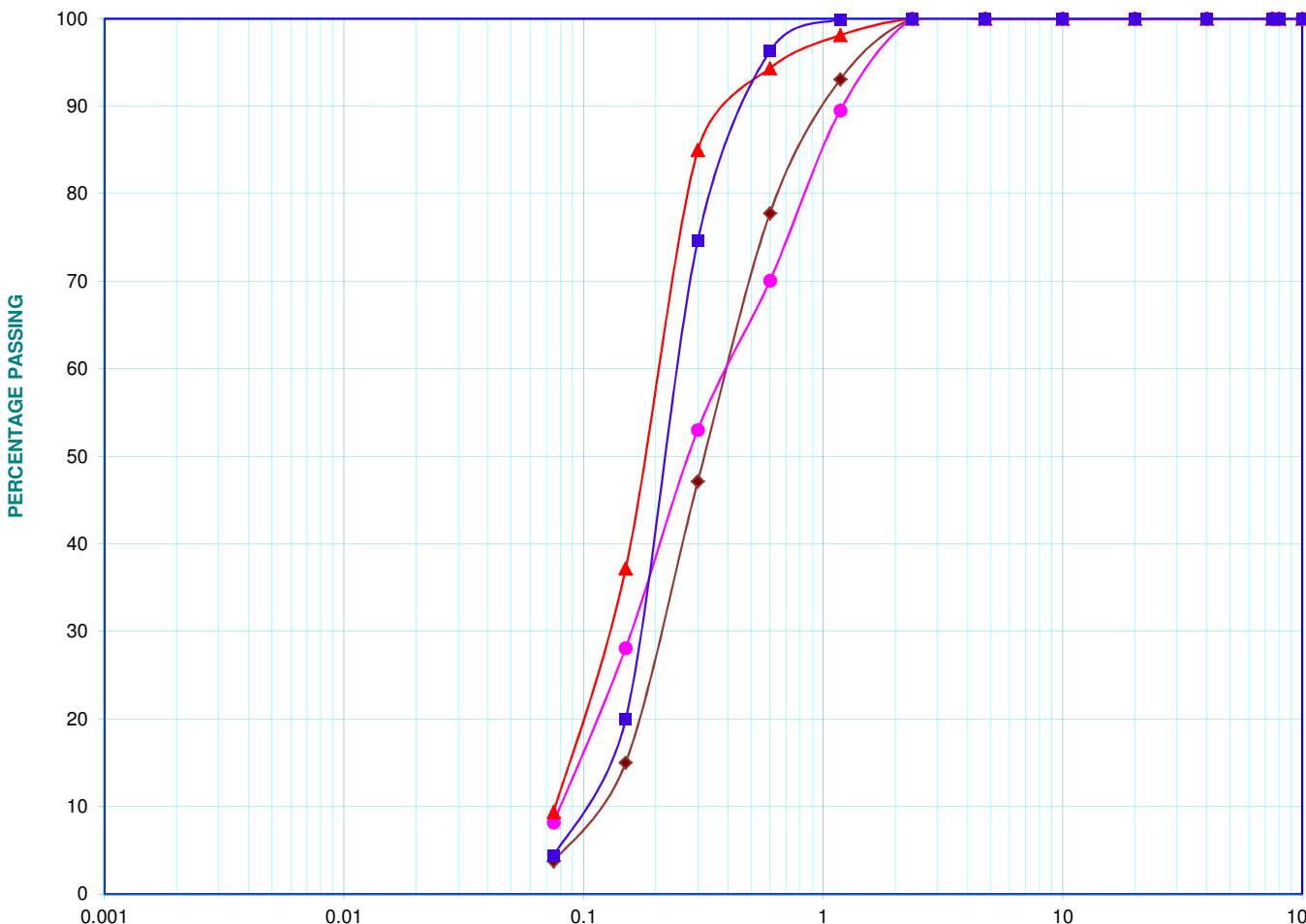
Notes :	
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DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	<u>Failure Type</u>	Project	: Geotechnical Investigation For Capive Jetty at
WAX/UDS	: Undisturbed Sample	LL	: Liquid Limit			A : Bulge		Jatadharmuhan, Near Paradip, Dist.
TUU	: Triaxial Test (Unconsolidated Undrained)	PL	: Plastic Limit			B : Inclined Shear		Jagatsinghpur, Odisha
DST	: Direct Shear Test	NP	: Non Plastic			C : Multiple Shear	Project Code	: CM 19 01 03
Φ	: ° (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	: MBH-11

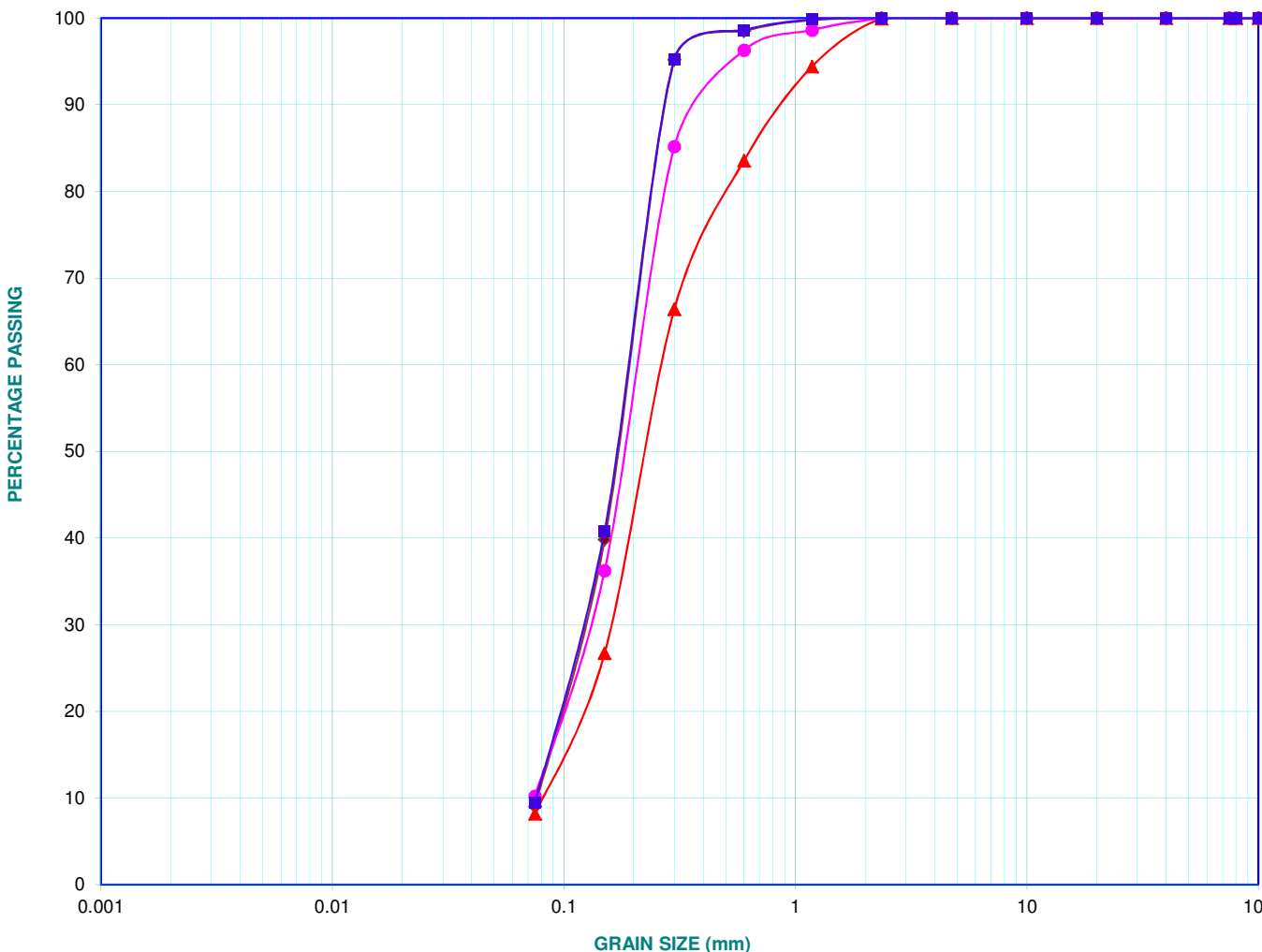
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03		Borehole No. : MBH-11					Date :		15-Jun-19				
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-11	MBH-11	MBH-11	MBH-11										
Depth (m)	0.00-0.18	3.00-3.22	4.50-4.65	7.50-7.70										
Sample Type	SPT-01	SPT-03	SPT-04	SPT-06										
Classification	SP-SM	SP	SP	SP										
Gravel %	0	0	0	0										
Sand %	89	98	97	97										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	11	2	3	3										
D60 mm		0.420	0.500	0.400										
D30 mm		0.280	0.300	0.210										
D10 mm		0.170	0.190	0.130										
Cu	---	2.47	2.63	3.08										
Cc	---	1.10	0.95	0.85										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
								Checked By :						

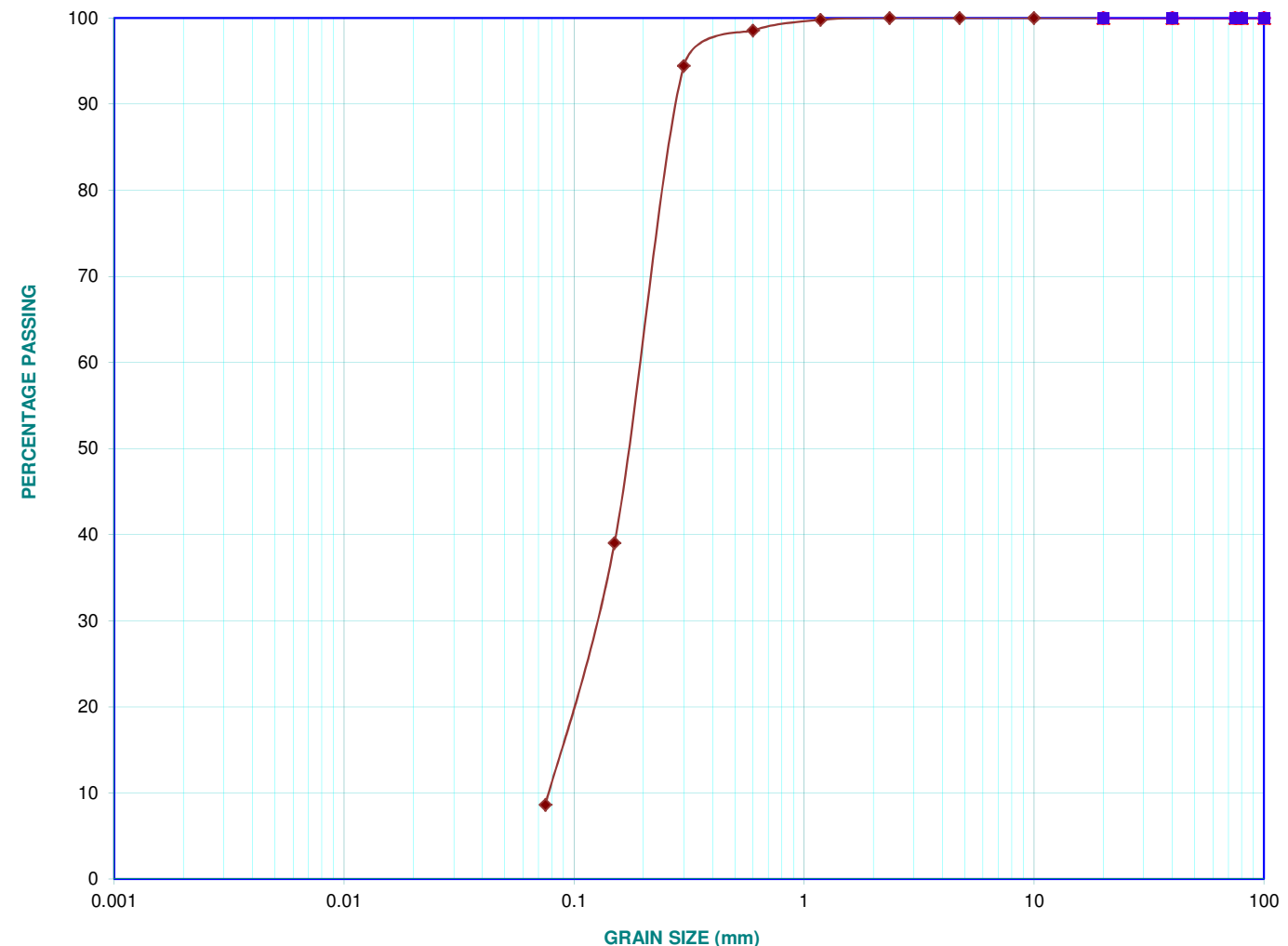
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-11					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-11	MBH-11	MBH-11	MBH-11										
Depth (m)	9.00-9.30	15.00-15.22	16.50-16.80	21.00-21.25										
Sample Type	SPT-07	SPT-11	SPT-12	SPT-15										
Classification	SP	SP-SM	SP-SM	SP										
Gravel %	0	0	0	0										
Sand %	96	92	91	96										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	4	8	9	4										
D60 mm	0.400	0.400	0.200	0.250										
D30 mm	0.210	0.160	0.130	0.180										
D10 mm	0.120	0.080	0.080	0.100										
Cu	3.33	5.00	2.50	2.50										
Cc	0.92	0.80	1.06	1.30										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
								Checked By :						

GRAIN SIZE ANALYSIS

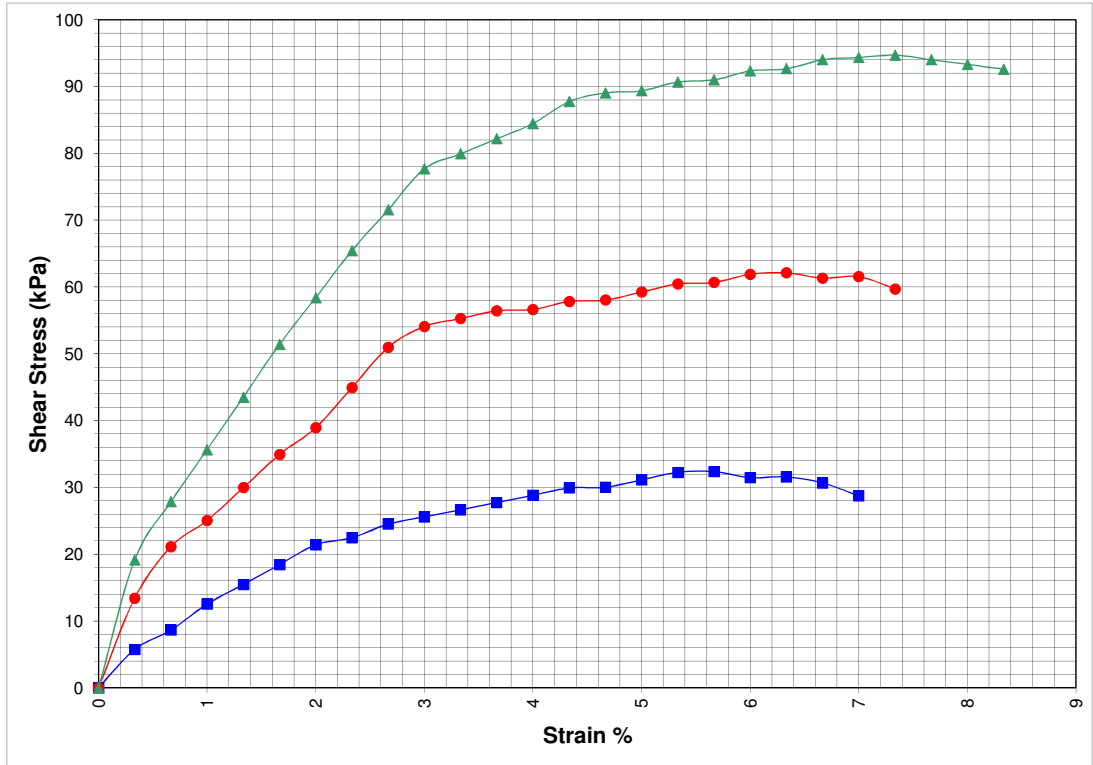
Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-11					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-11	MBH-11	MBH-11	MBH-11										
Depth (m)	25.50-25.70	28.50-28.70	31.50-31.70	36.00-36.20										
Sample Type	SPT-18	SPT-20	SPT-22	SPT-25										
Classification	SP-SM	SP-SM	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	91	90	92	91										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	9	10	8	9										
D60 mm	0.200	0.210	0.280	0.200										
D30 mm	0.120	0.130	0.180	0.120										
D10 mm	0.080	0.075	0.080	0.080										
Cu	2.50	2.80	3.50	2.50										
Cc	0.90	1.07	1.45	0.90										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.												
Job No.	: CM 19 01 03		Borehole No. : MBH-11					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL		
								F	M	C	F	C	
Bore Hole .	MBH-11												
Depth (m)	38.00-38.24												
Sample Type	SPT-26												
Classification	SP-SM												
Gravel %	0												
Sand %	91												
Silt %	<---->												
Clay %	<---->												
Fines % (Silt+Clay)	9												
D60 mm	0.200												
D30 mm	0.120												
D10 mm	0.079												
Cu	2.53												
Cc	0.91												
Liquid Limit %	---												
Plastic Limit %	---												
Plasticity Index	---												
								Checked By :					

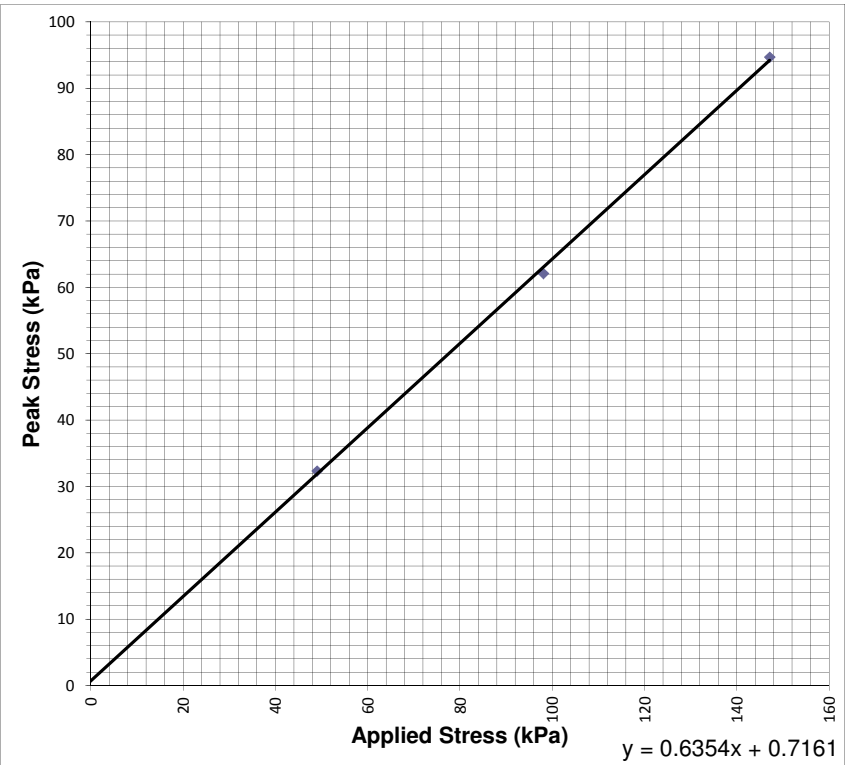
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	32
●	Stage 2	98	62
▲	Stage 3	147	95

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	32.43 °
Apparent Cohesion	0.72 kPa

Borehole: MBH-11

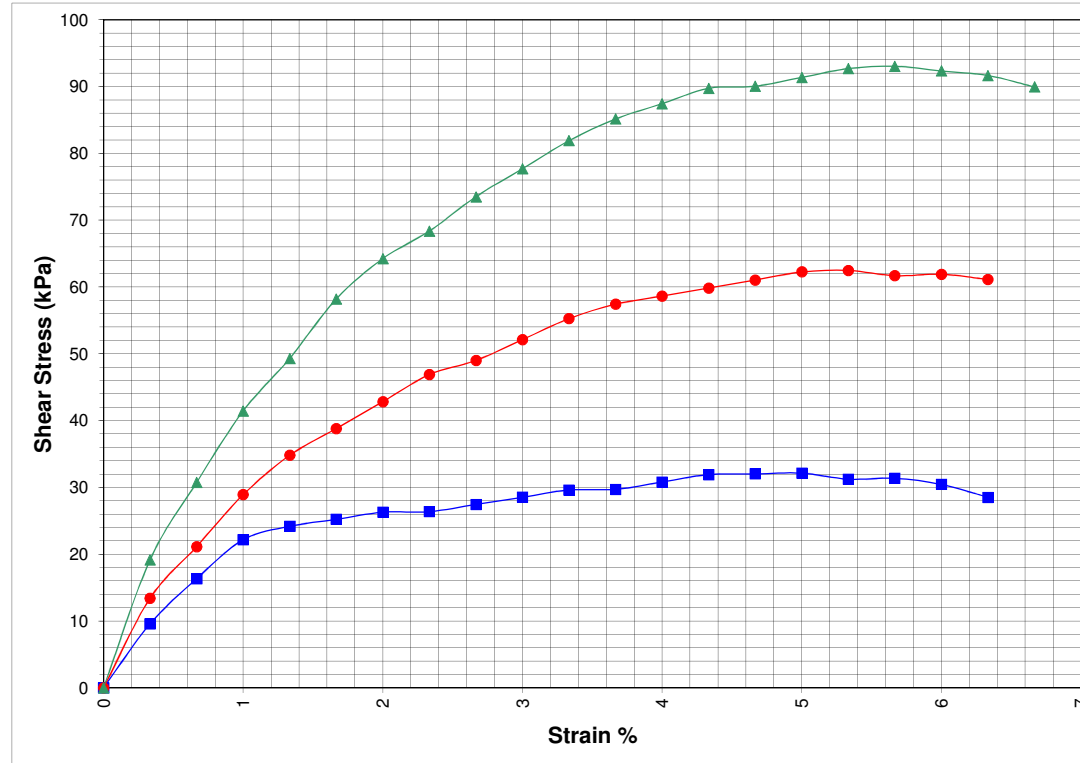
Sample Type: SPT-02

Depth: 1.50-1.75 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

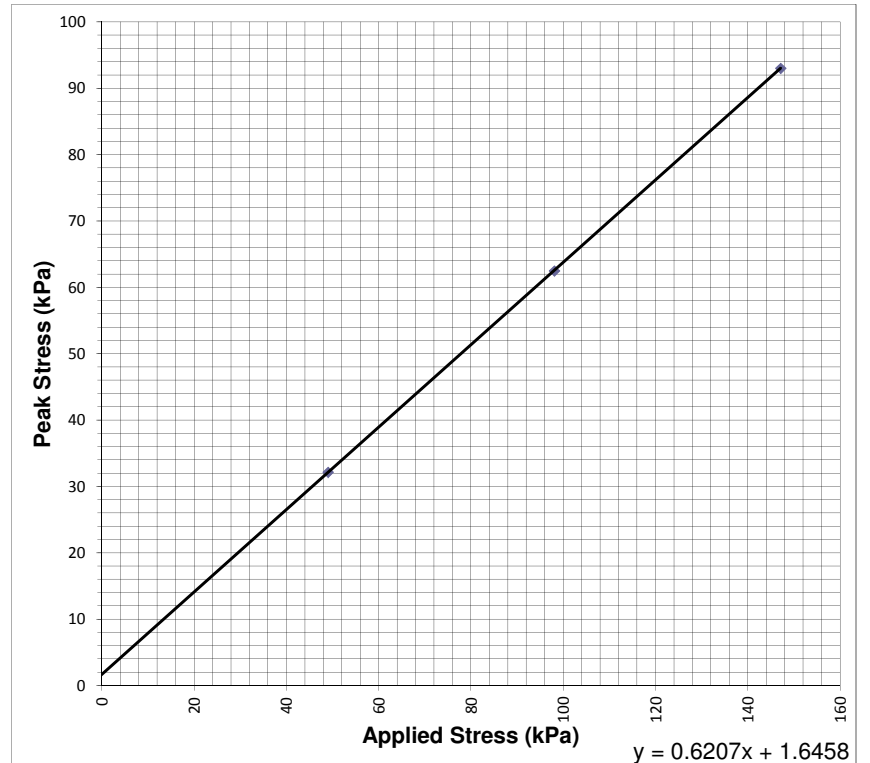
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	32
●	Stage 2	98	62
▲	Stage 3	147	93

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	31.83 °
Apparent Cohesion	1.65 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

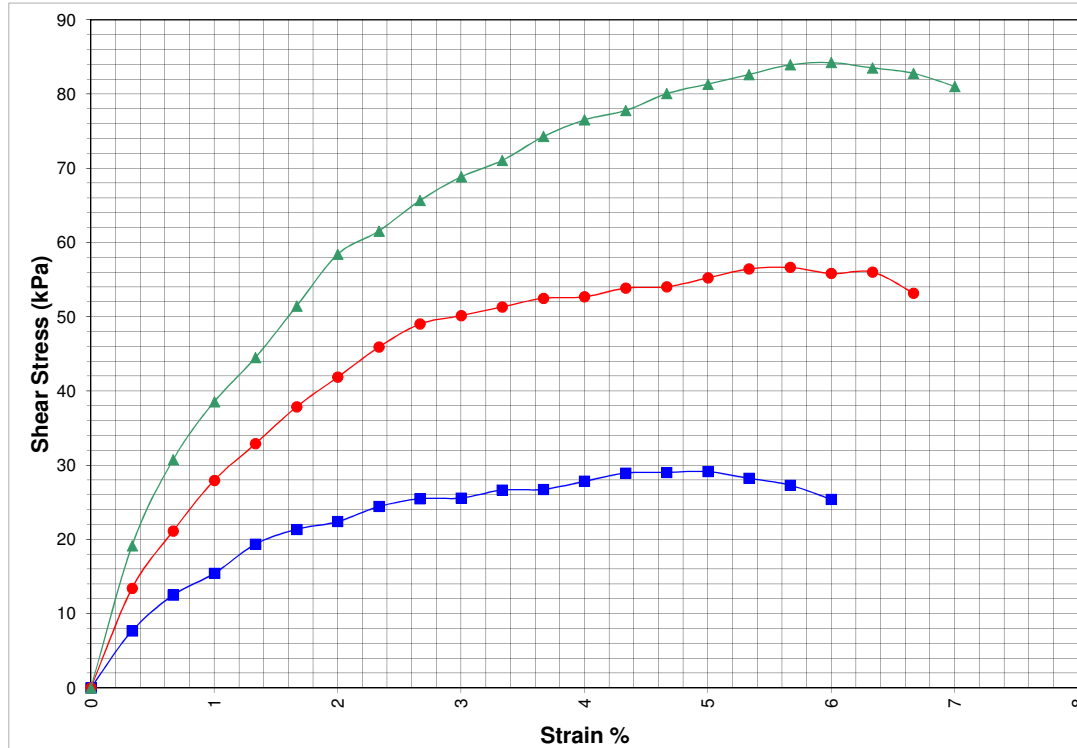
Borehole: MBH-11

Sample Type: SPT-05

Depth: 6.00-6.18 m

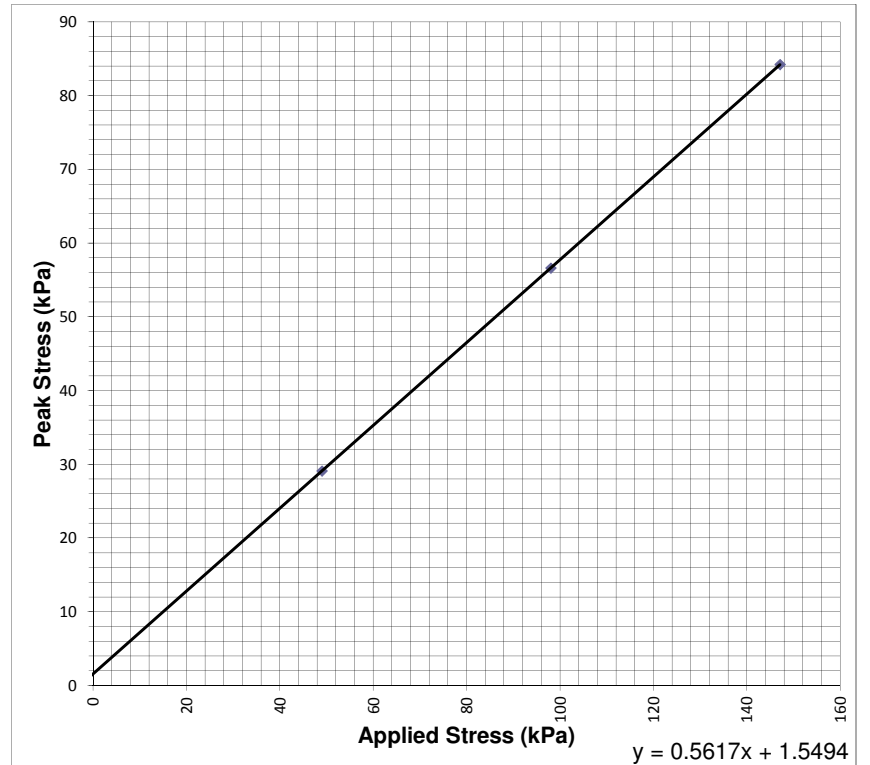
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	57
▲	Stage 3	147	84

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	29.32 °
Apparent Cohesion	1.55 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

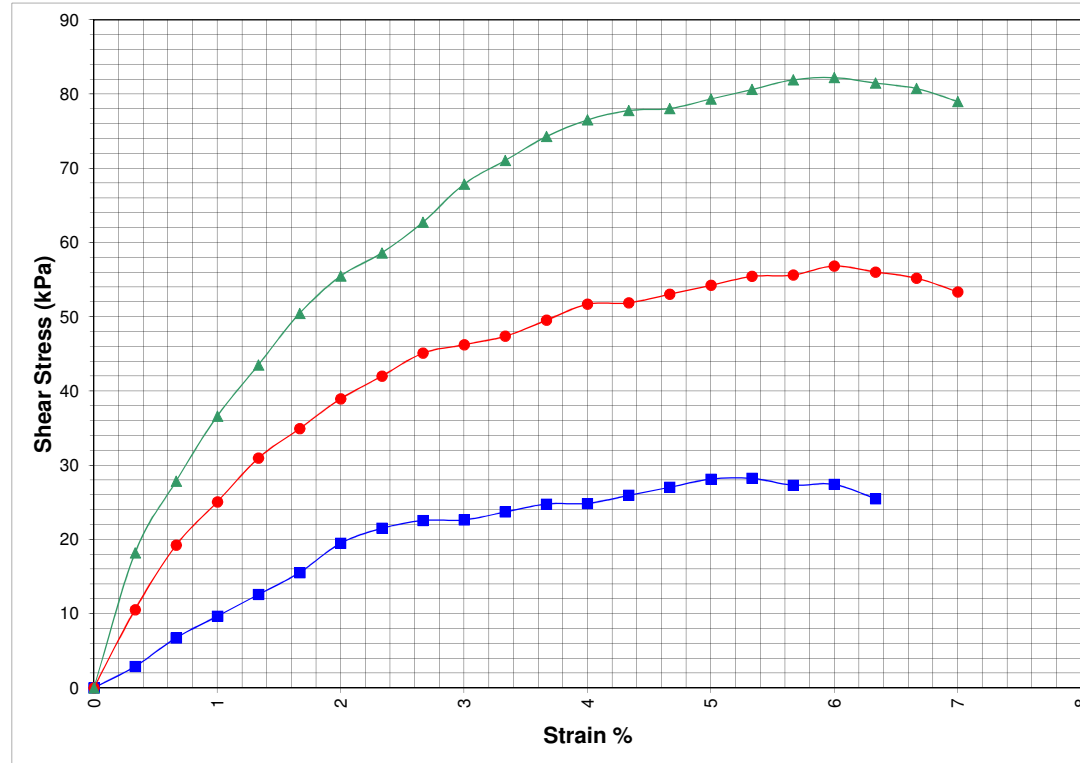
Borehole: MBH-11

Sample Type: SPT-08

Depth: 10.50-10.75 m

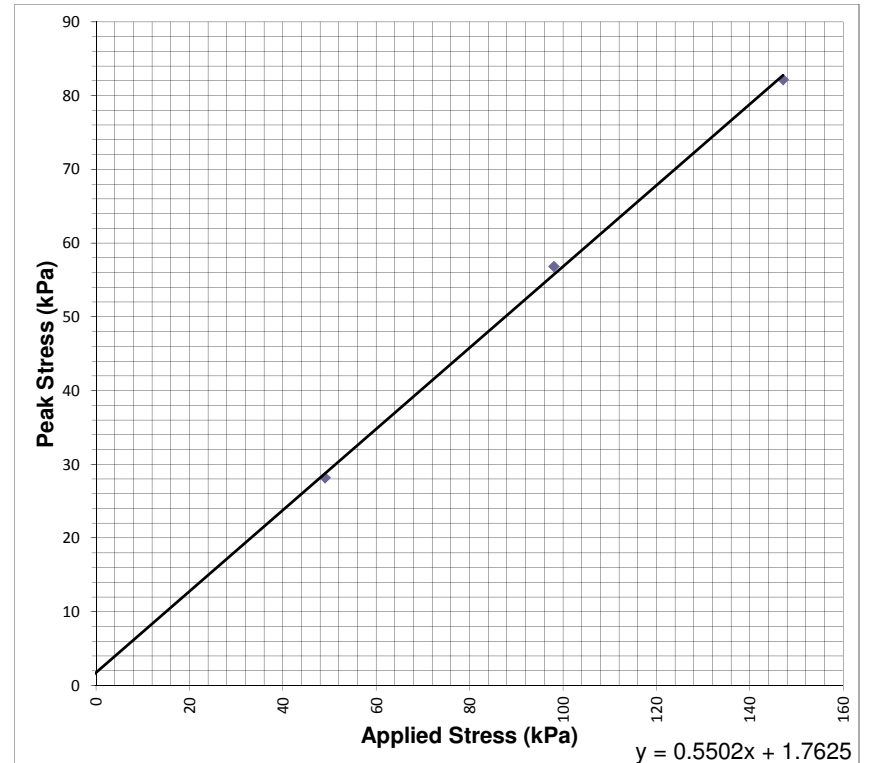
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	57
▲	Stage 3	147	82

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	28.82 °
Apparent Cohesion	1.76 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

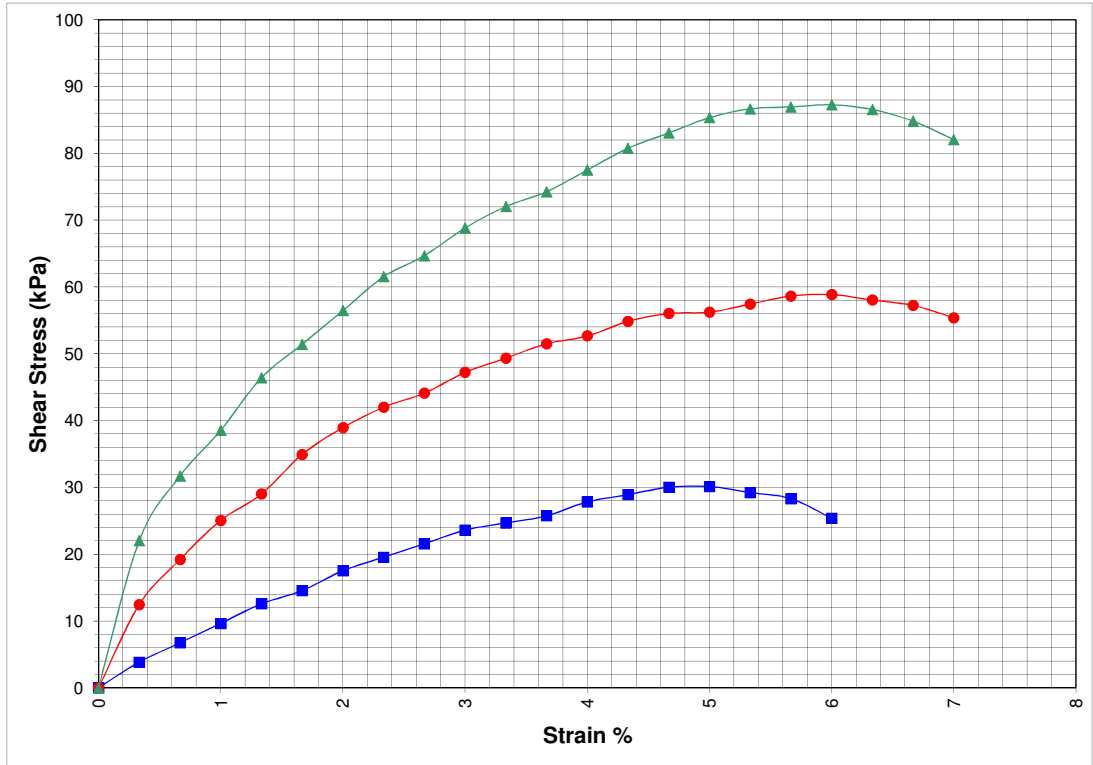
Borehole: MBH-11

Sample Type: SPT-10

Depth: 13.50-13.75 m

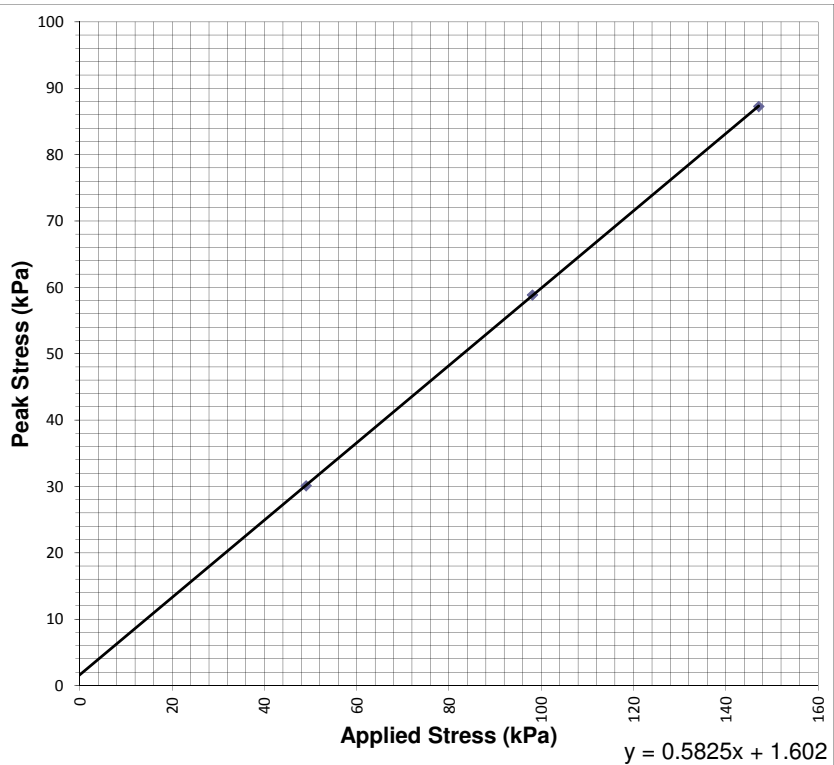
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	59
▲	Stage 3	147	87

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	30.22 °
Apparent Cohesion	1.60 kPa

Borehole: MBH-11

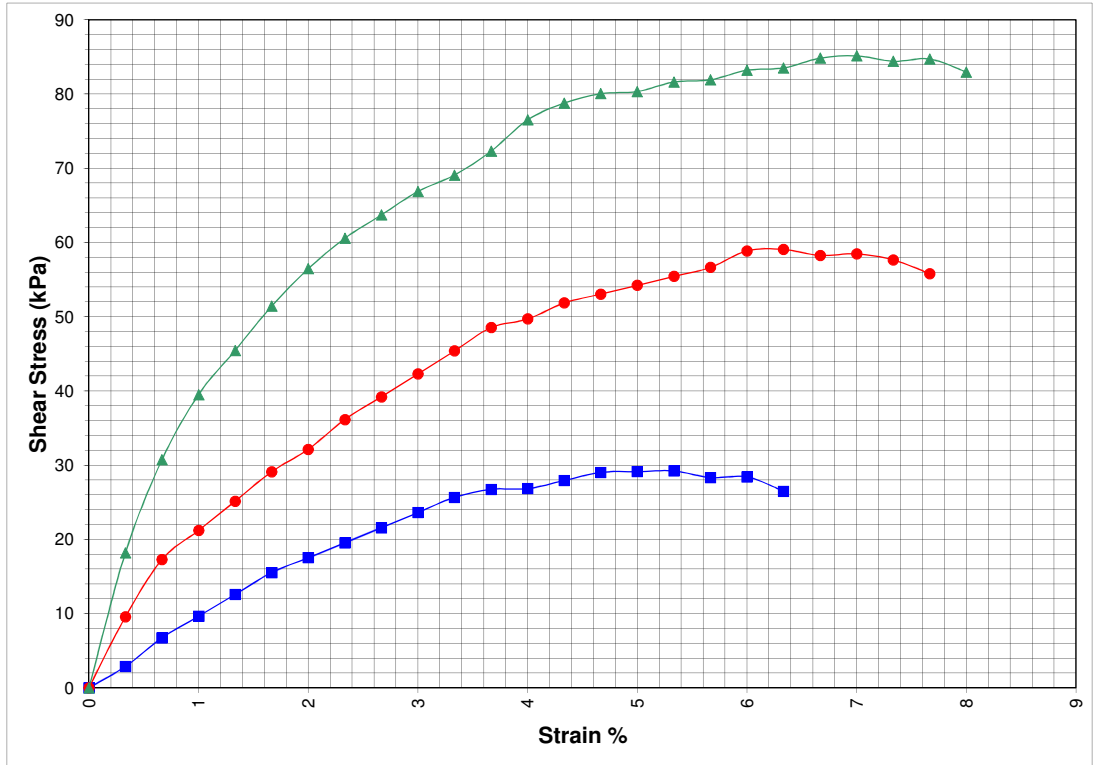
Sample Type: SPT-13

Depth: 18.00-18.28 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

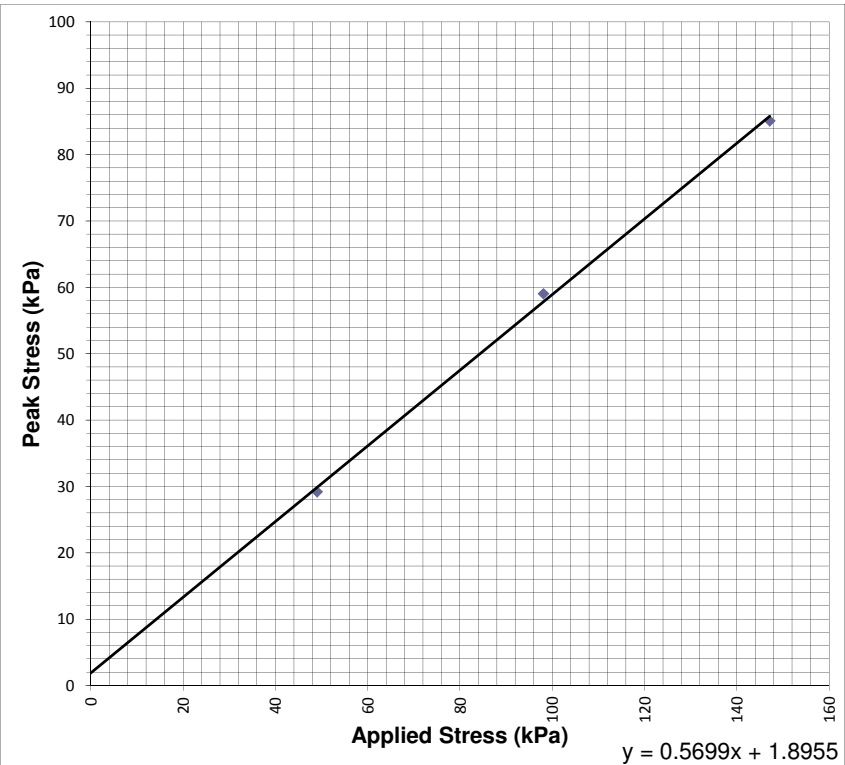
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	59
▲	Stage 3	147	85

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	29.68 °
Apparent Cohesion	1.90 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

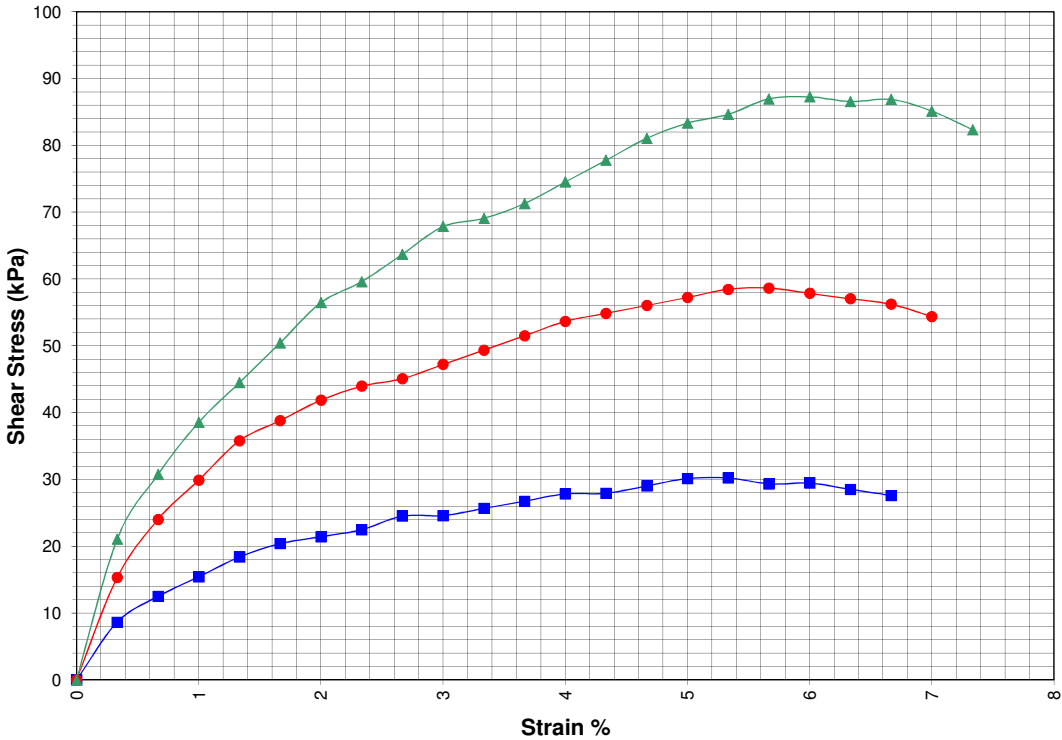
Borehole: MBH-11

Sample Type: SPT-17

Depth: 24.00-24.20 m

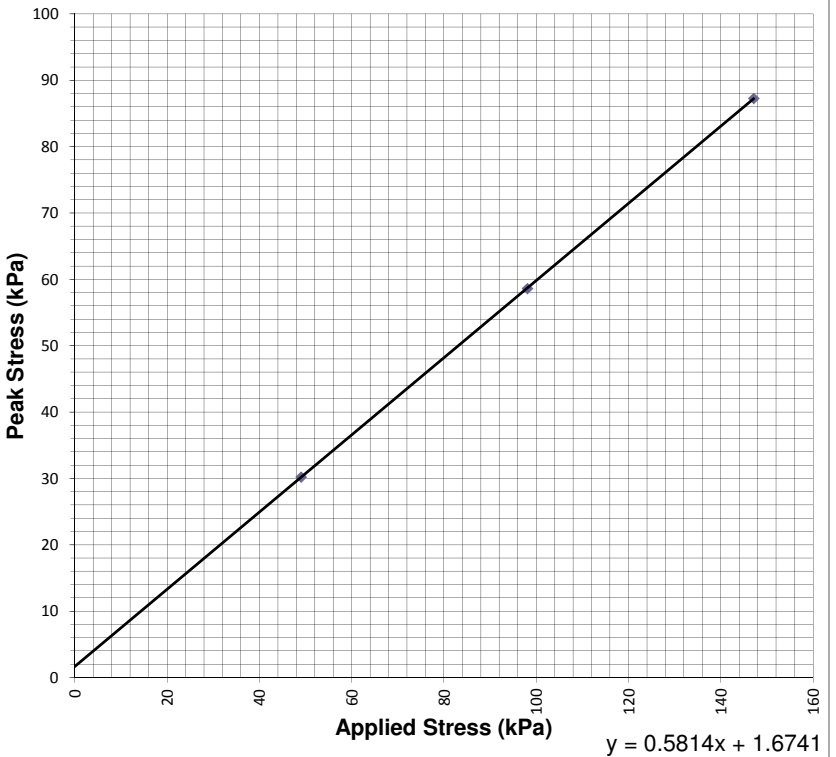
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	59
▲	Stage 3	147	87

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	30.17 °
Apparent Cohesion	1.67 kPa

Borehole: MBH-11

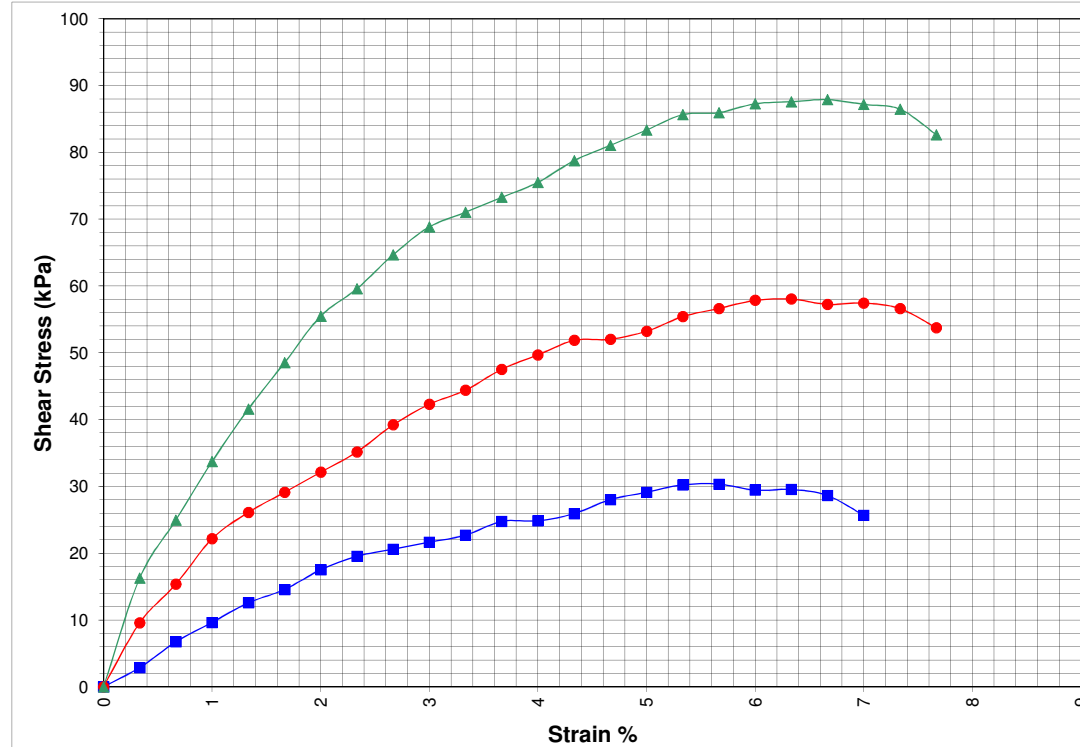
Sample Type: SPT-21

Depth: 30.00-30.22 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

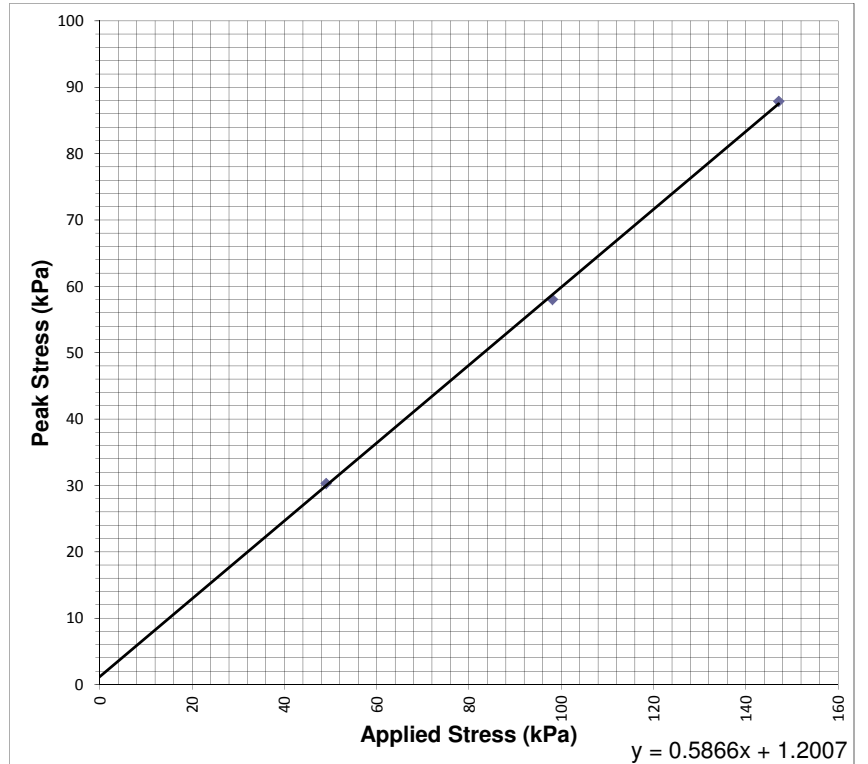
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	58
▲	Stage 3	147	88

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	30.40 °
Apparent Cohesion	1.20 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

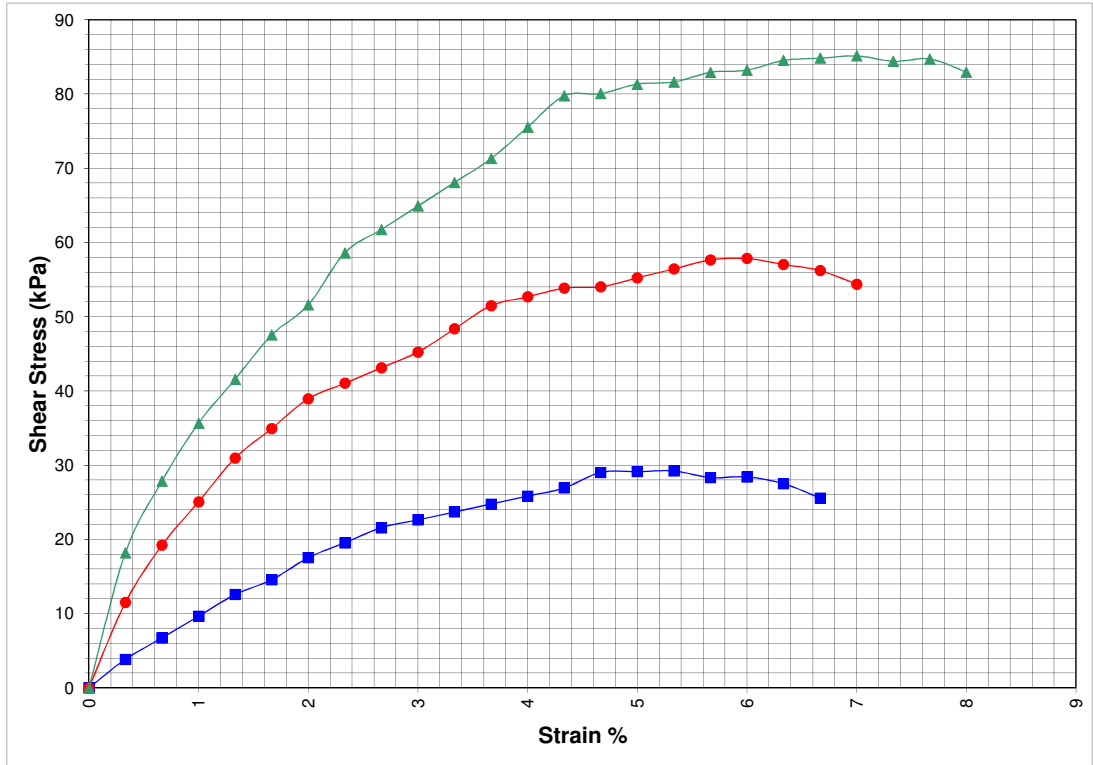
Borehole: MBH-11

Sample Type: SPT-24

Depth: 34.50-34.75 m

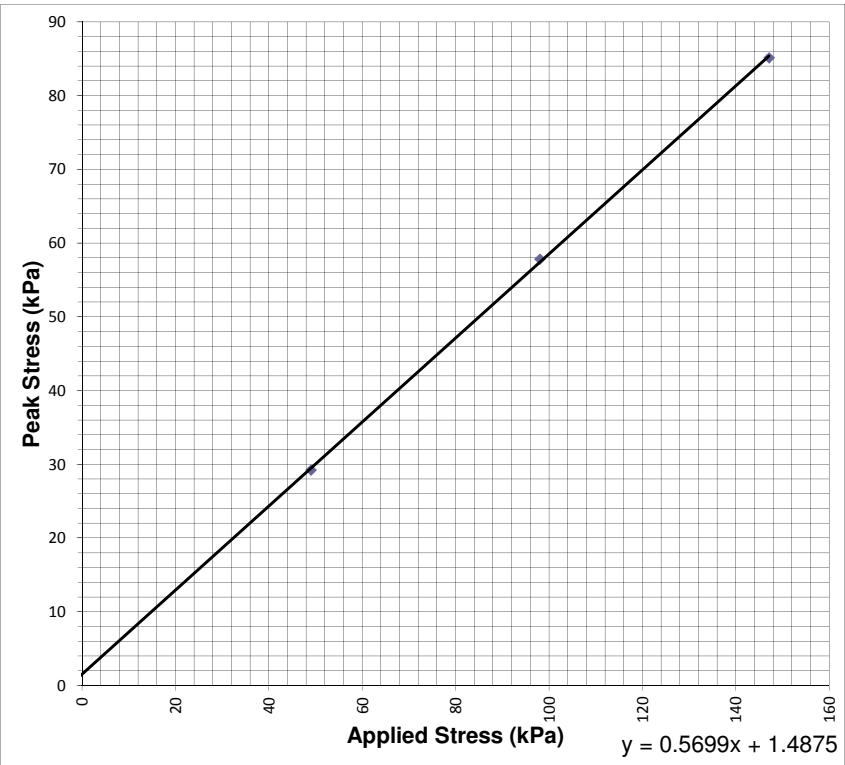
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	58
▲	Stage 3	147	85

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	29.68 °
Apparent Cohesion	1.49 kPa

Borehole: MBH-11

Sample Type: SPT-27

Depth: 40.00-40.18 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

SUMMARY OF TEST RESULTS

[illegible]

Notes :

DS : Disturbed Sample

WAX/UDS :Undisturbed Sample

TUU : Triaxial Test (Unconsolidated Undrained)

DST : Direct Shear Test

Φ : ° (deg) Angle of internal friction

* : Insufficient sample

LL : Liquid Limit

PL : Plastic Limit

NP : Non Plastic

NS : Not Suitable

: Decayed Wood

Failure Type

A : Bulge

B : Inclined Shear

C : Multiple Shear

D : Vertical Shear

Project

: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.

Project Code : CM 19 01 03

Borehole No. : MBH-12

SUMMARY OF TEST RESULTS

[illegible]

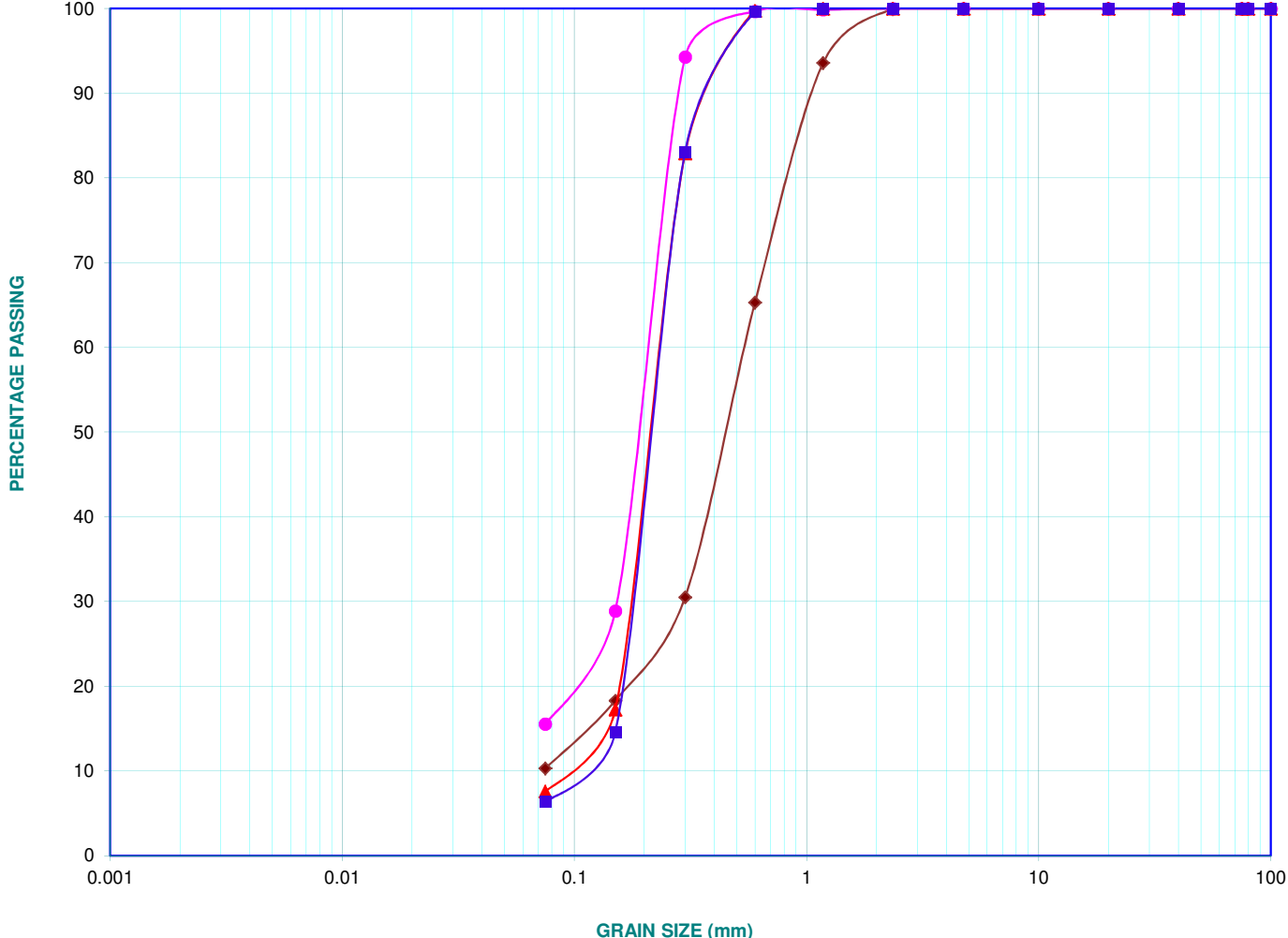
END OF BOREHOLE

[illegible]

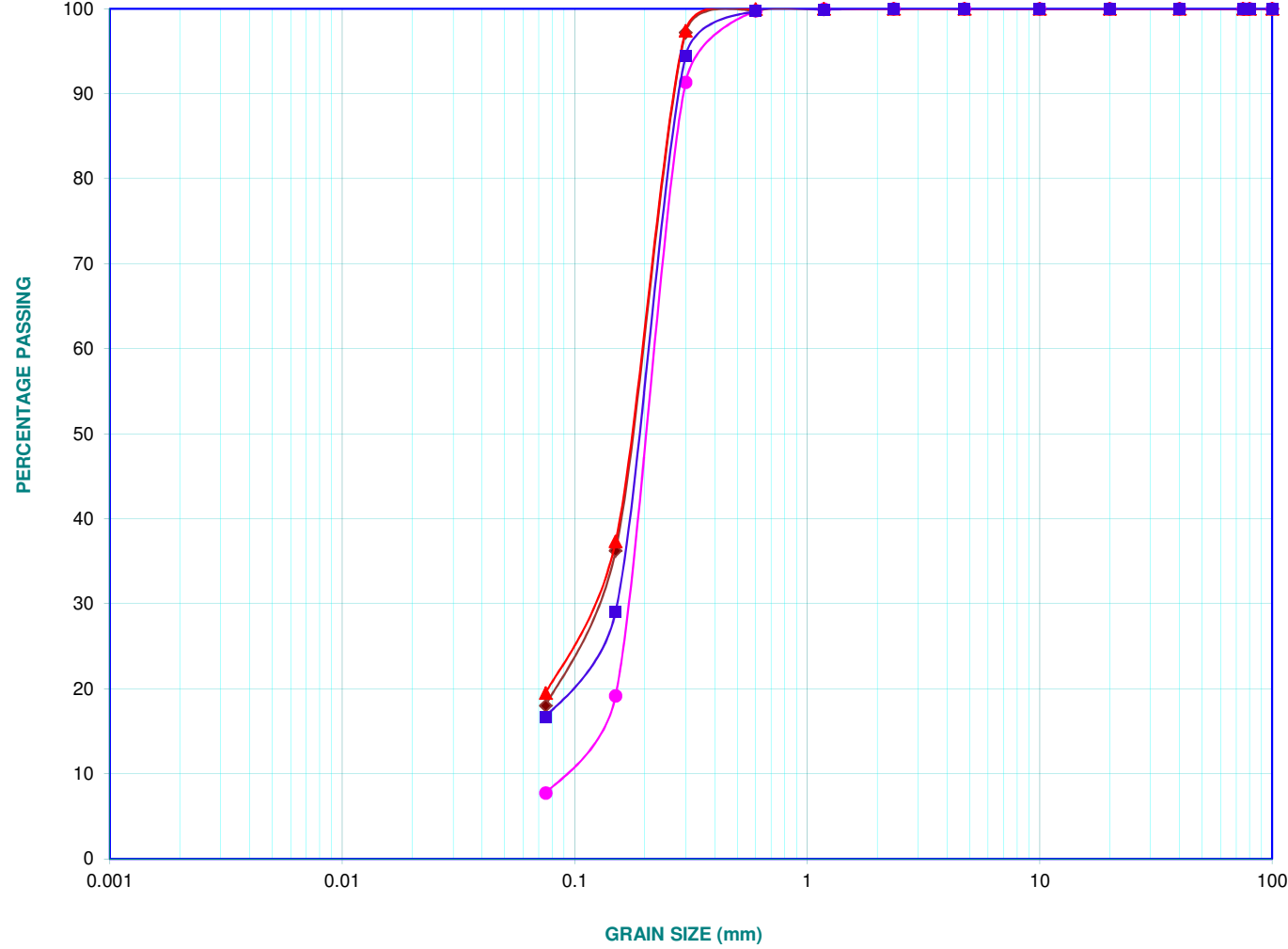
Notes :	
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[illegible]

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-12					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY		SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-12	MBH-12	MBH-12	MBH-12										
Depth (m)	1.50-1.65	7.50-7.80	10.50-10.80	15.00-15.30										
Sample Type	SPT-02	SPT-06	SPT-08	SPT-11										
Classification	SP-SM	SM / SC	SP-SM	SP-SM										
Gravel %	0	0	0	0										
Sand %	90	84	92	94										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	10	16	8	6										
D60 mm	0.550		0.240	0.240										
D30 mm	0.300		0.180	0.180										
D10 mm	0.075		0.100	0.120										
Cu	7.33		2.40	2.00										
Cc	2.18		1.35	1.13										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

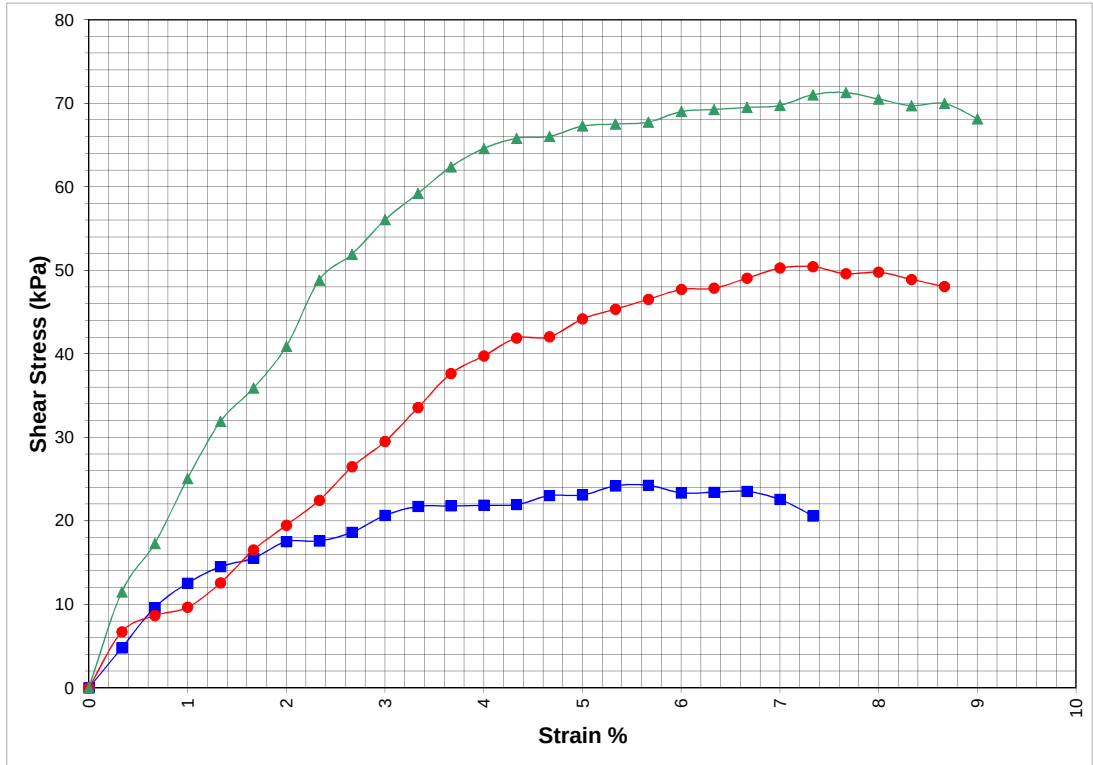
Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-12					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-12	MBH-12	MBH-12	MBH-12										
Depth (m)	18.00-18.30	21.00-21.25	25.50-25.70	33.00-33.15										
Sample Type	SPT-13	SPT-15	SPT-18	SPT-23										
Classification	SM / SC	SP-SM	SM / SC	SM / SC										
Gravel %	0	0	0	0										
Sand %	82	92	81	83										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	18	8	19	17										
D60 mm		0.220												
D30 mm		0.180												
D10 mm		0.095												
Cu		2.32												
Cc		1.55												
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha												
Job No.	: CM 19 01 03		Borehole No. : MBH-12					Date :		7-Jun-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL		
								F	M	C	F	C	
Bore Hole .	MBH-12				PERCENTAGE PASSING GRAIN SIZE (mm)								
Depth (m)	36.00-36.10												
Sample Type	SPT-25												
Classification	SM / SC												
Gravel %	0												
Sand %	84												
Silt %	<---->												
Clay %	<---->												
Fines % (Silt+Clay)	16												
D60 mm													
D30 mm													
D10 mm													
Cu													
Cc													
Liquid Limit %	---												
Plastic Limit %	---												
Plasticity Index	---												
								Checked By :					

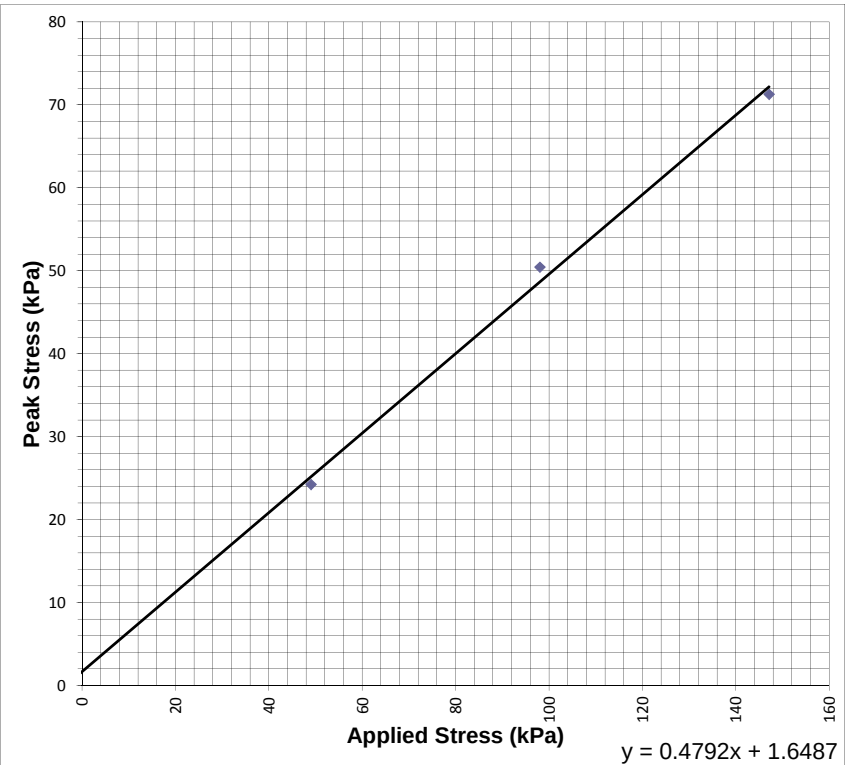
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	24
●	Stage 2	98	50
▲	Stage 3	147	71

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	25.60 °
Apparent Cohesion	1.65 kPa

Borehole: MBH-12

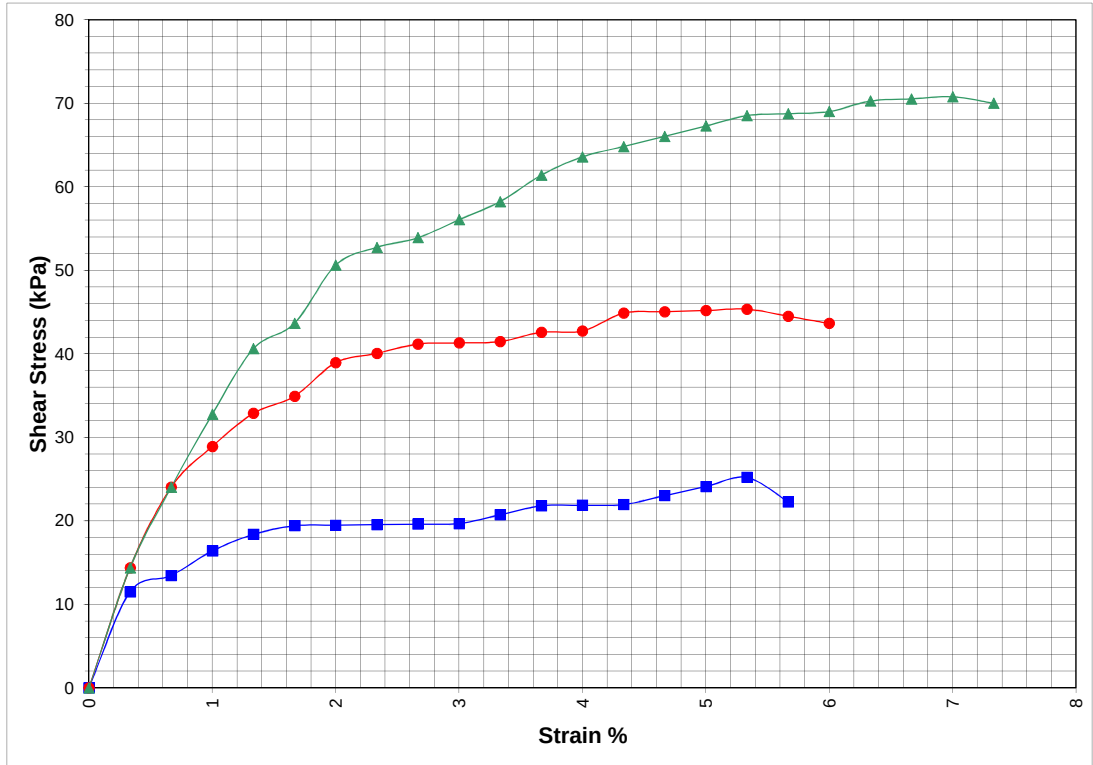
Sample Type: SPT-05

Depth: 6.00-6.30 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

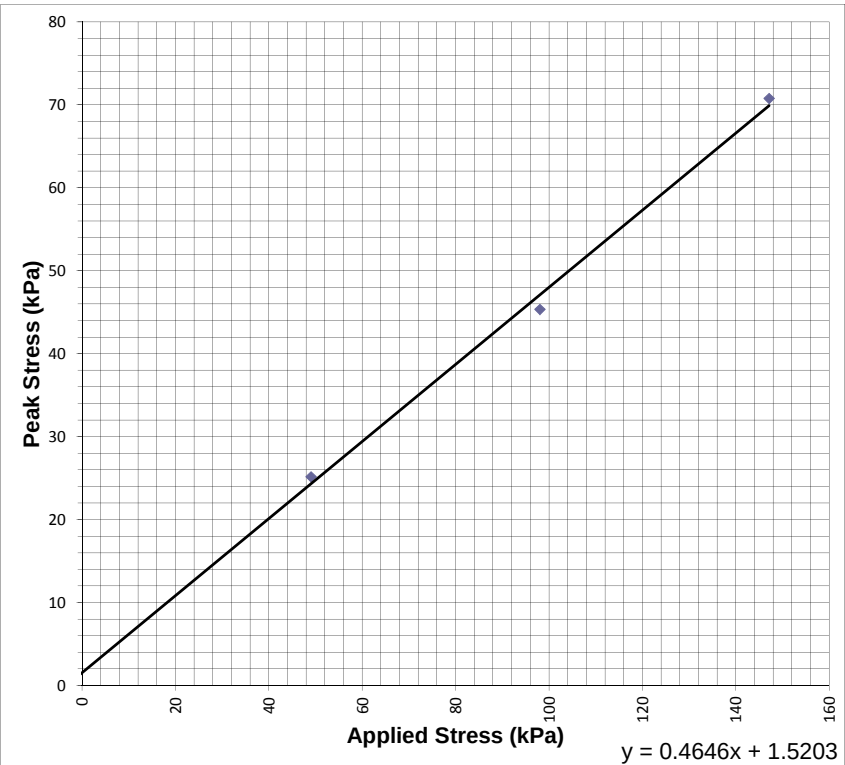
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	45
▲	Stage 3	147	71

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	24.92 °
Apparent Cohesion	1.52 kPa

Borehole: MBH-12

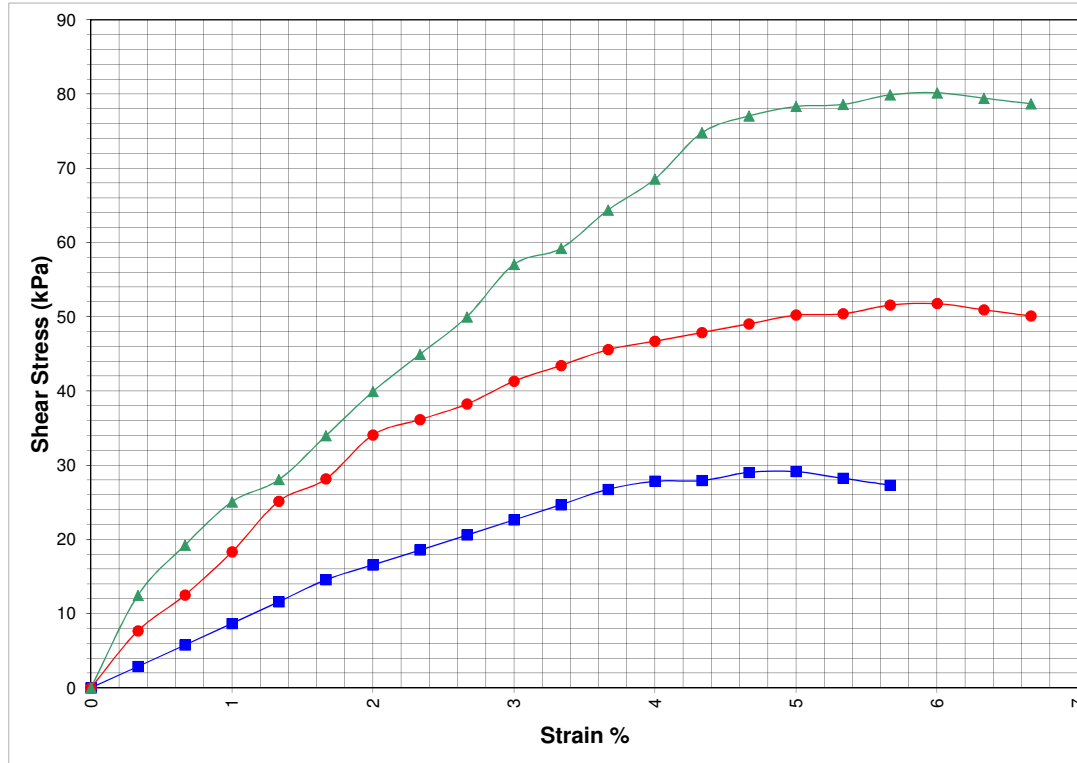
Sample Type: SPT-07

Depth: 9.00-9.45 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

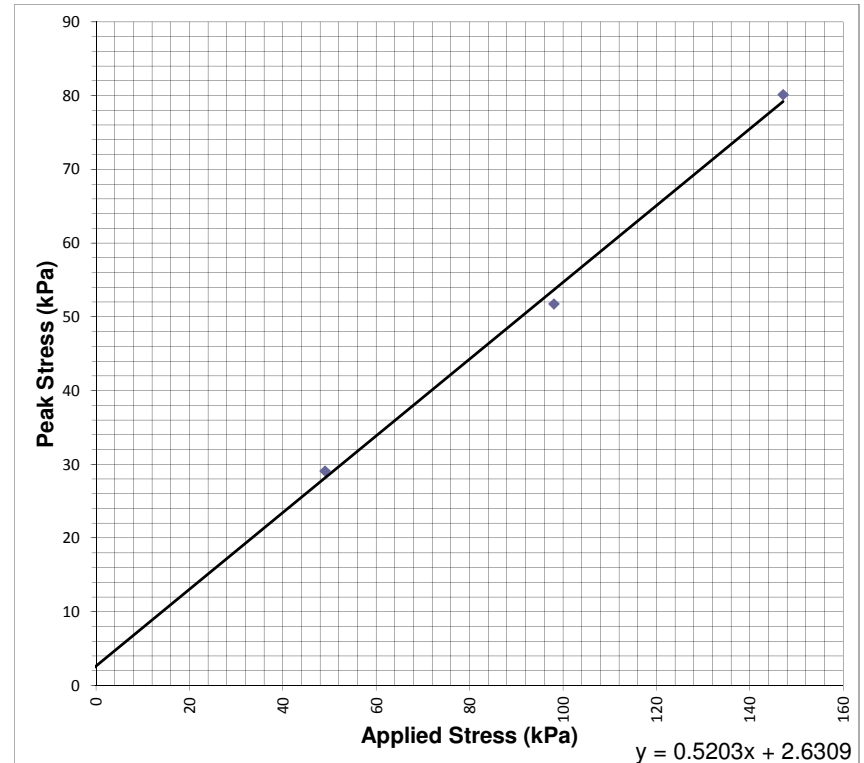
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	52
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.5 °
Apparent Cohesion	2.63 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

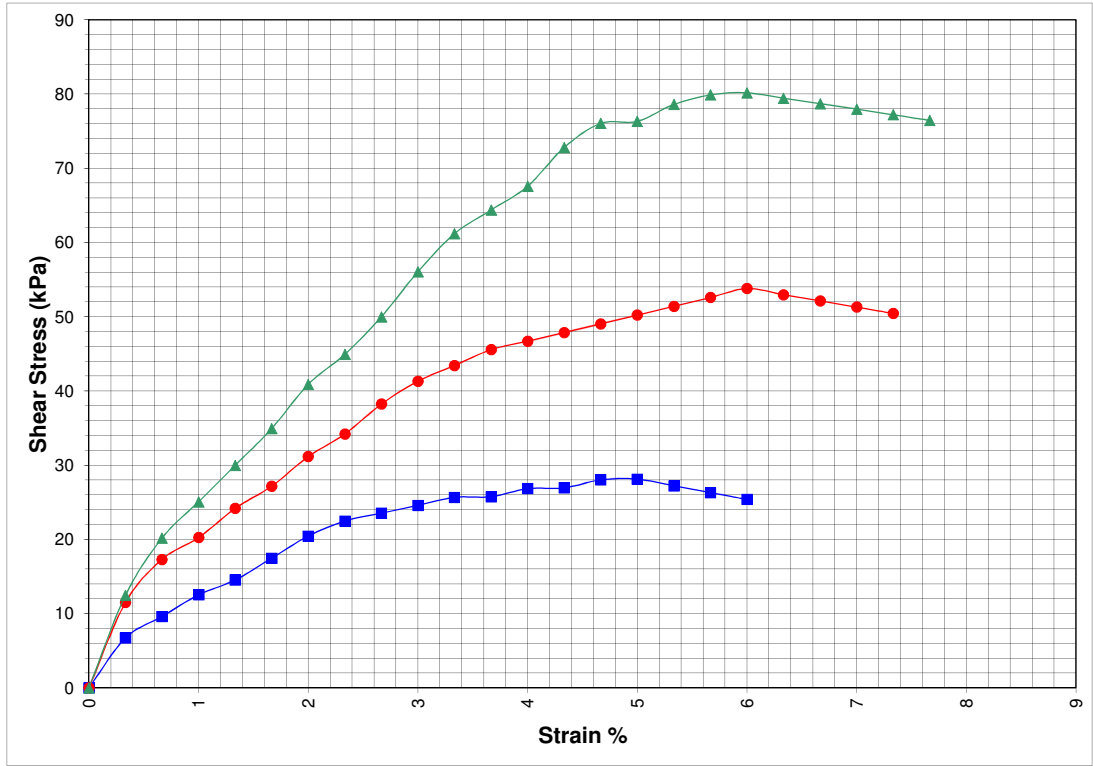
Borehole: MBH-12

Sample Type: SPT-10

Depth: 13.50-13.75 m

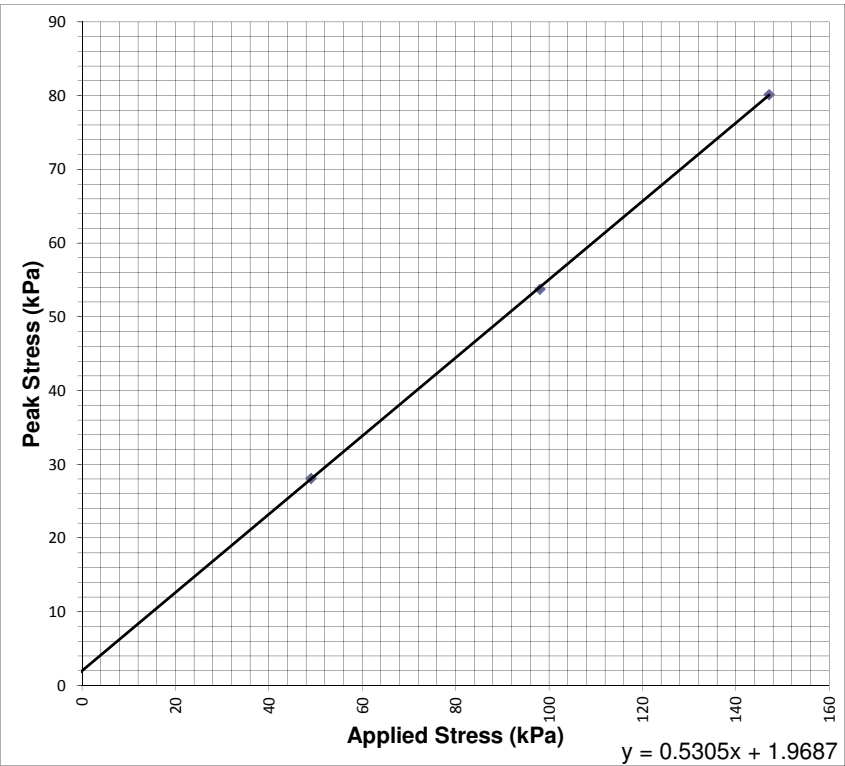
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	54
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	27.9 °
Apparent Cohesion	1.97 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

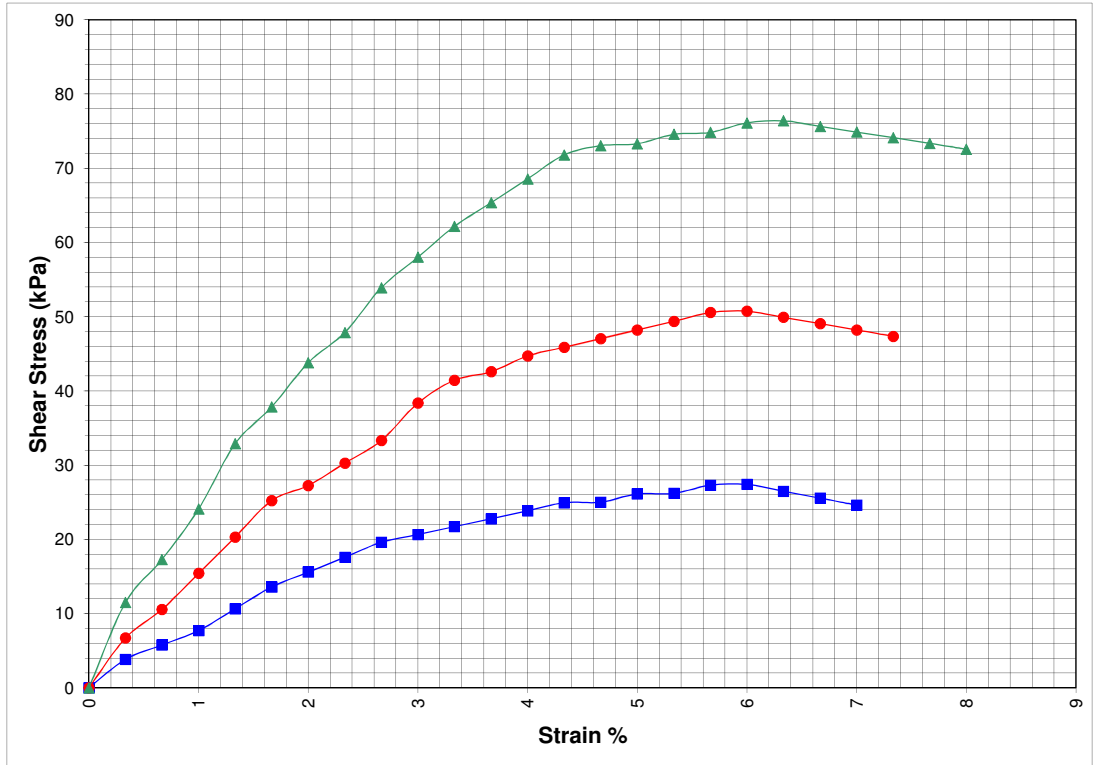
Borehole: MBH-12

Sample Type: SPT-12

Depth: 16.50-16.75 m

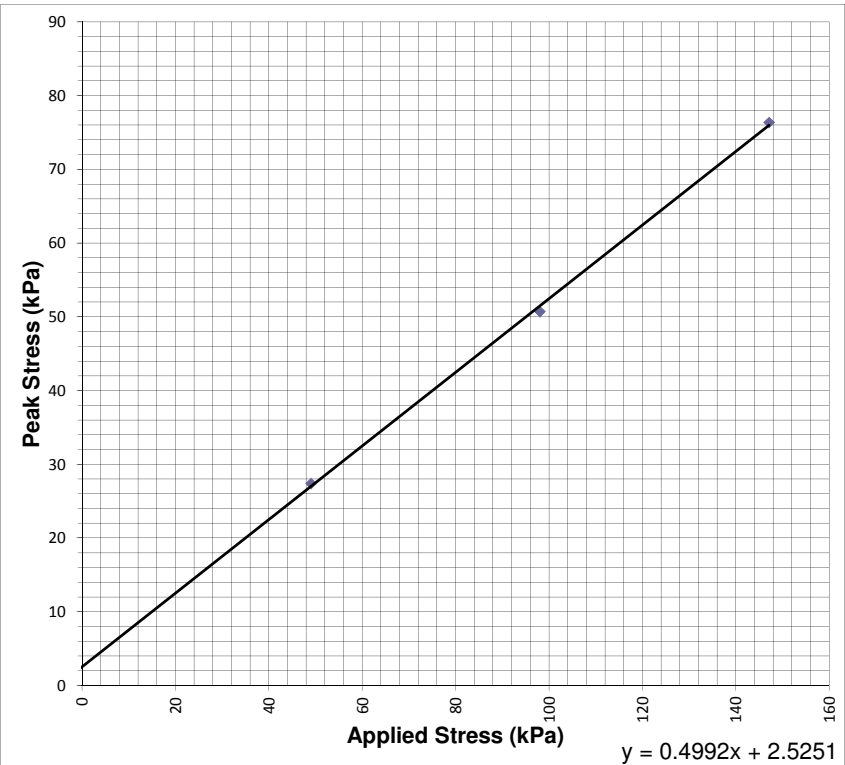
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	51
▲	Stage 3	147	76

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.5 °
Apparent Cohesion	2.38 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

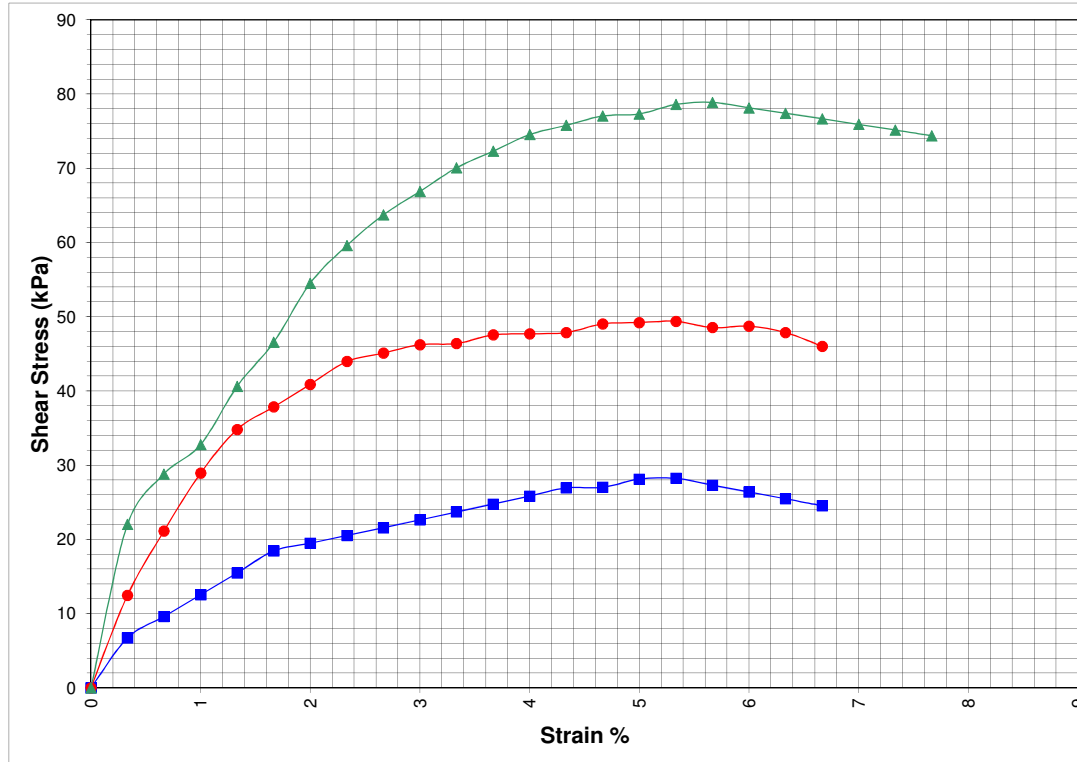
Borehole: MBH-12

Sample Type: SPT-17

Depth: 24.00-24.20 m

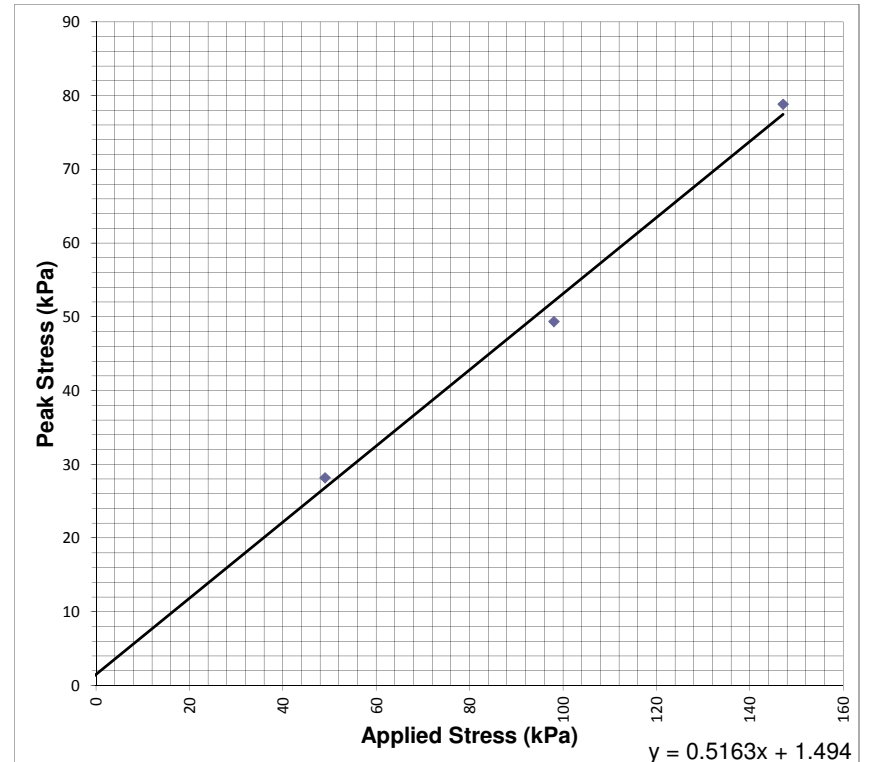
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	49
▲	Stage 3	147	79

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.31 °
Apparent Cohesion	1.50 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

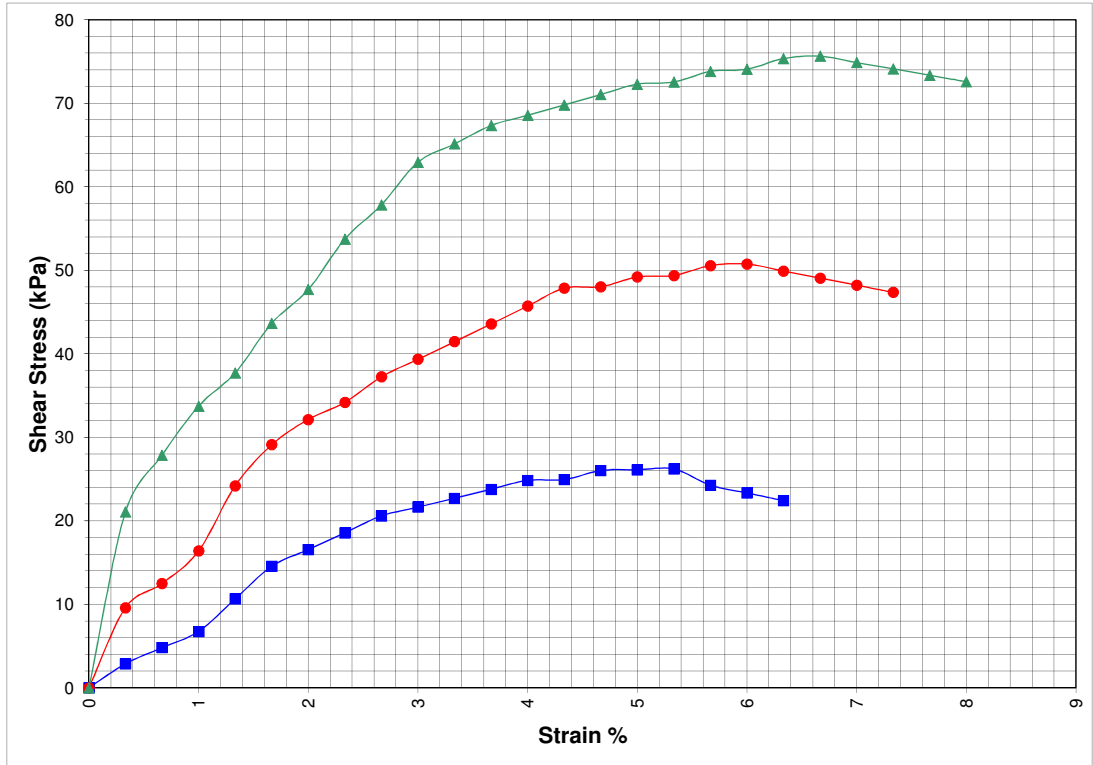
Borehole: MBH-12

Sample Type: SPT-19

Depth: 27.00-27.25 m

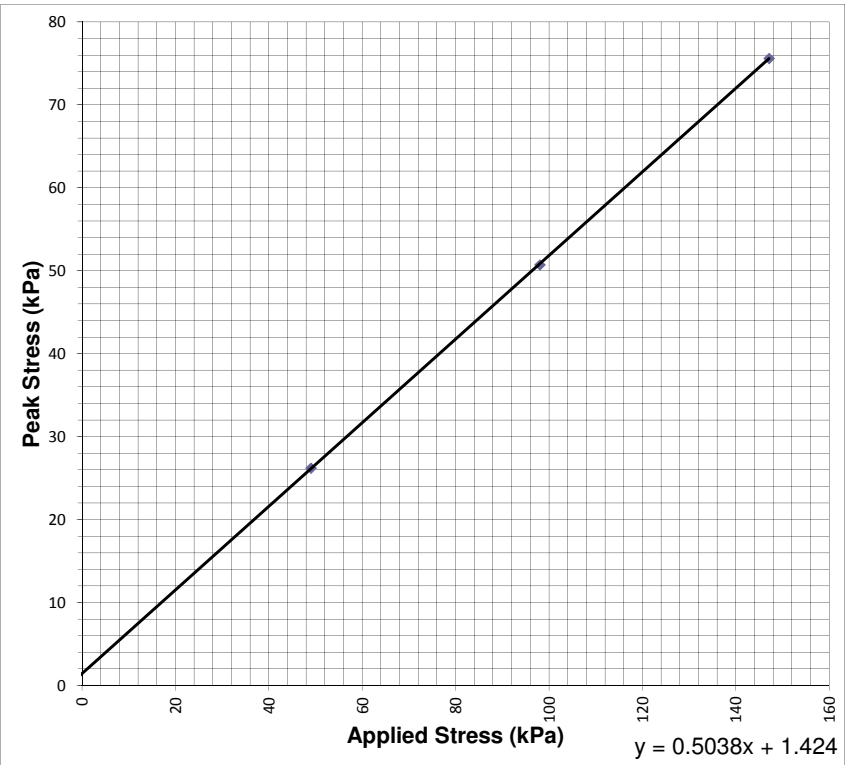
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	51
▲	Stage 3	147	76

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.74 °
Apparent Cohesion	1.42 kPa

Borehole: MBH-12

Sample Type: SPT-22

Depth: 31.50-31.70 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

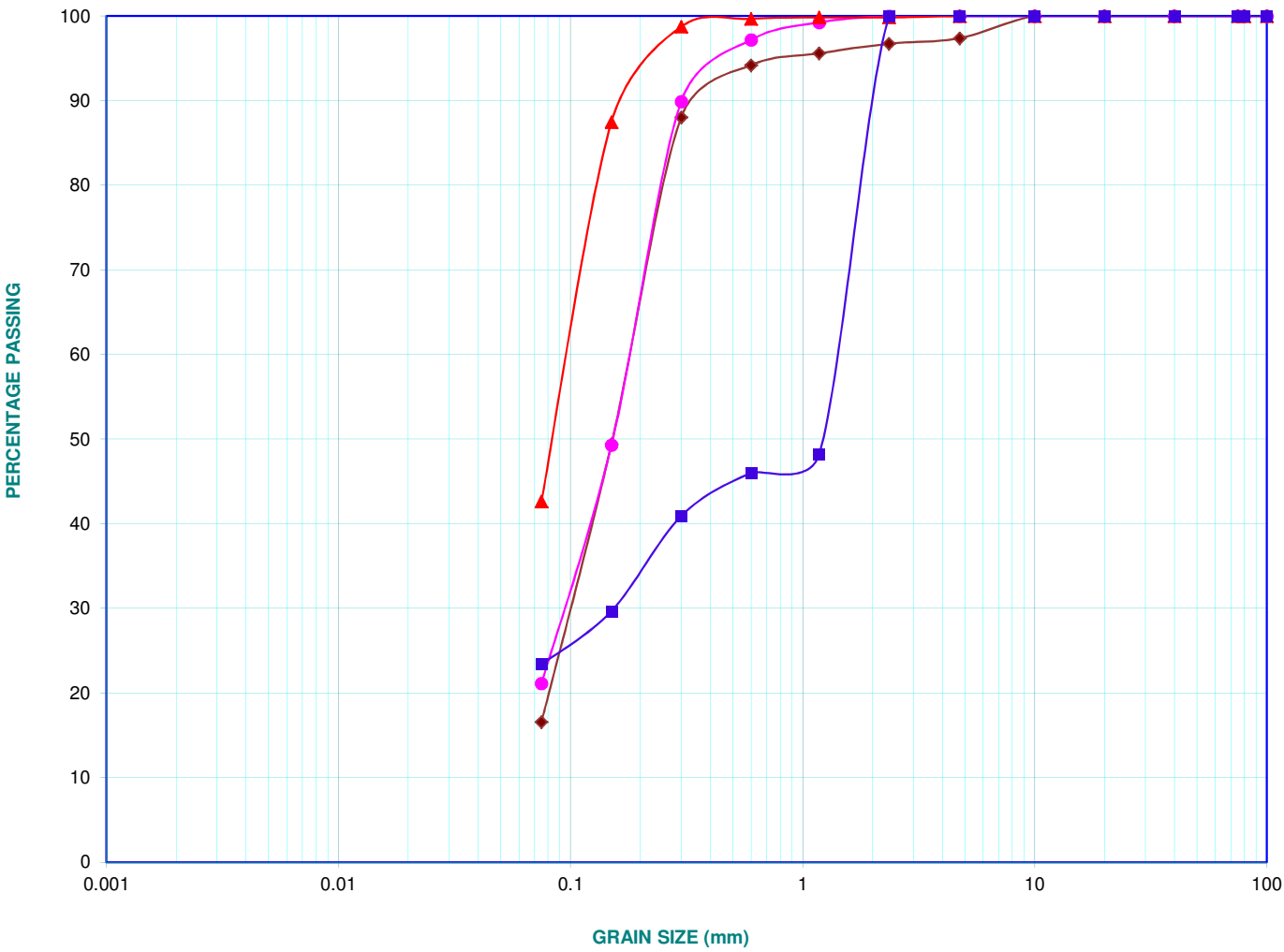
SUMMARY OF TEST RESULTS	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50
51	52
53	54
55	56
57	58
59	60
61	62
63	64
65	66
67	68
69	70
71	72
73	74
75	76
77	78
79	80
81	82
83	84
85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

[illegible]

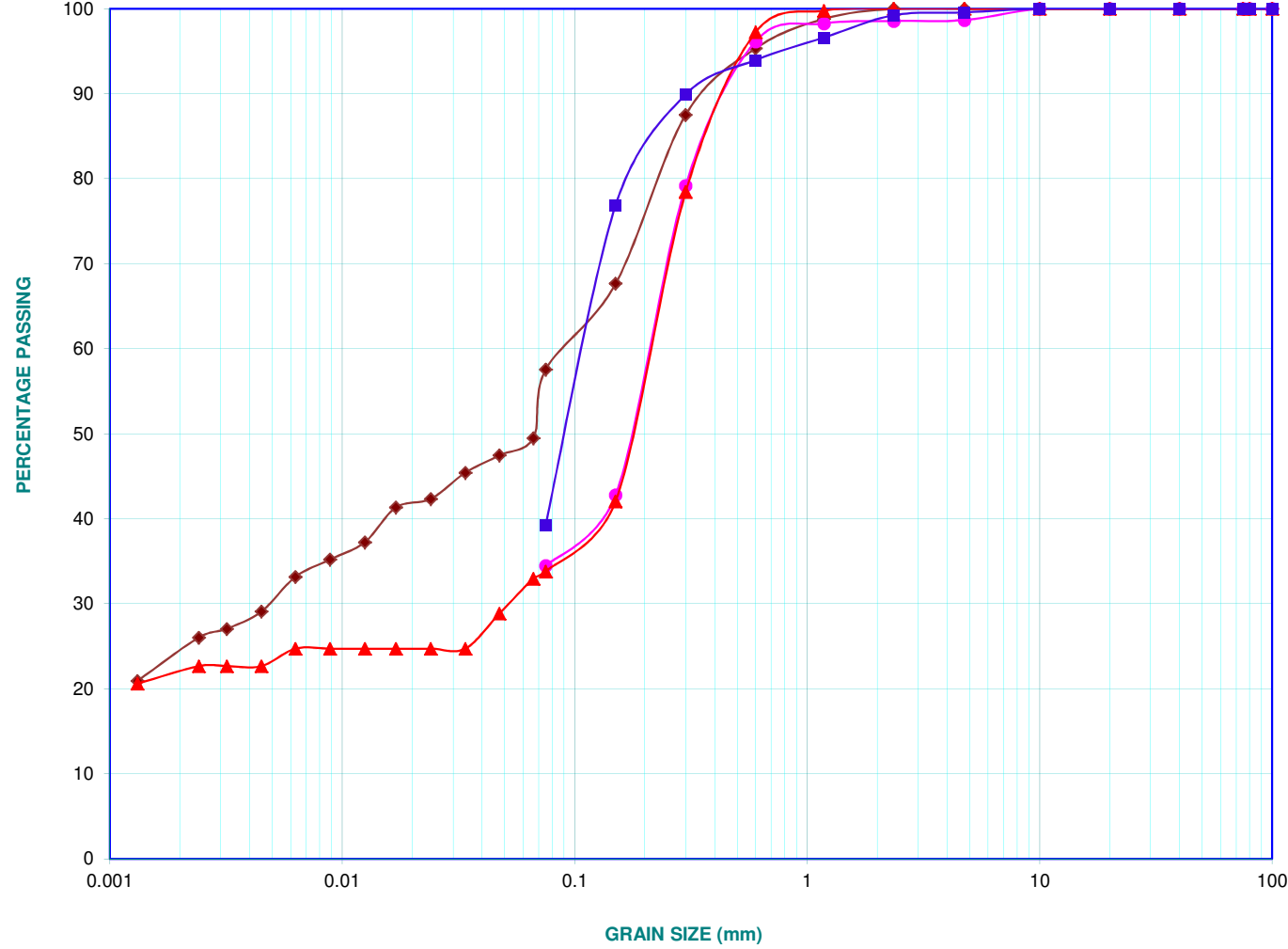
Notes :

DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	<u>Failure Type</u>	Project	: Geotechnical Investigation For Capive Jetty at
WAX/UDS	: Undisturbed Sample	LL	: Liquid Limit			A : Bulge		Jatadharmuhan, Near Paradip, Dist.
TUU	: Triaxial Test (Unconsolidated Undrained)	PL	: Plastic Limit			B : Inclined Shear		Jagatsinghpur, Odisha
DST	: Direct Shear Test	NP	: Non Plastic			C : Multiple Shear	Project Code	: CM 19 01 03
Φ	: ° (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	: MBH-13

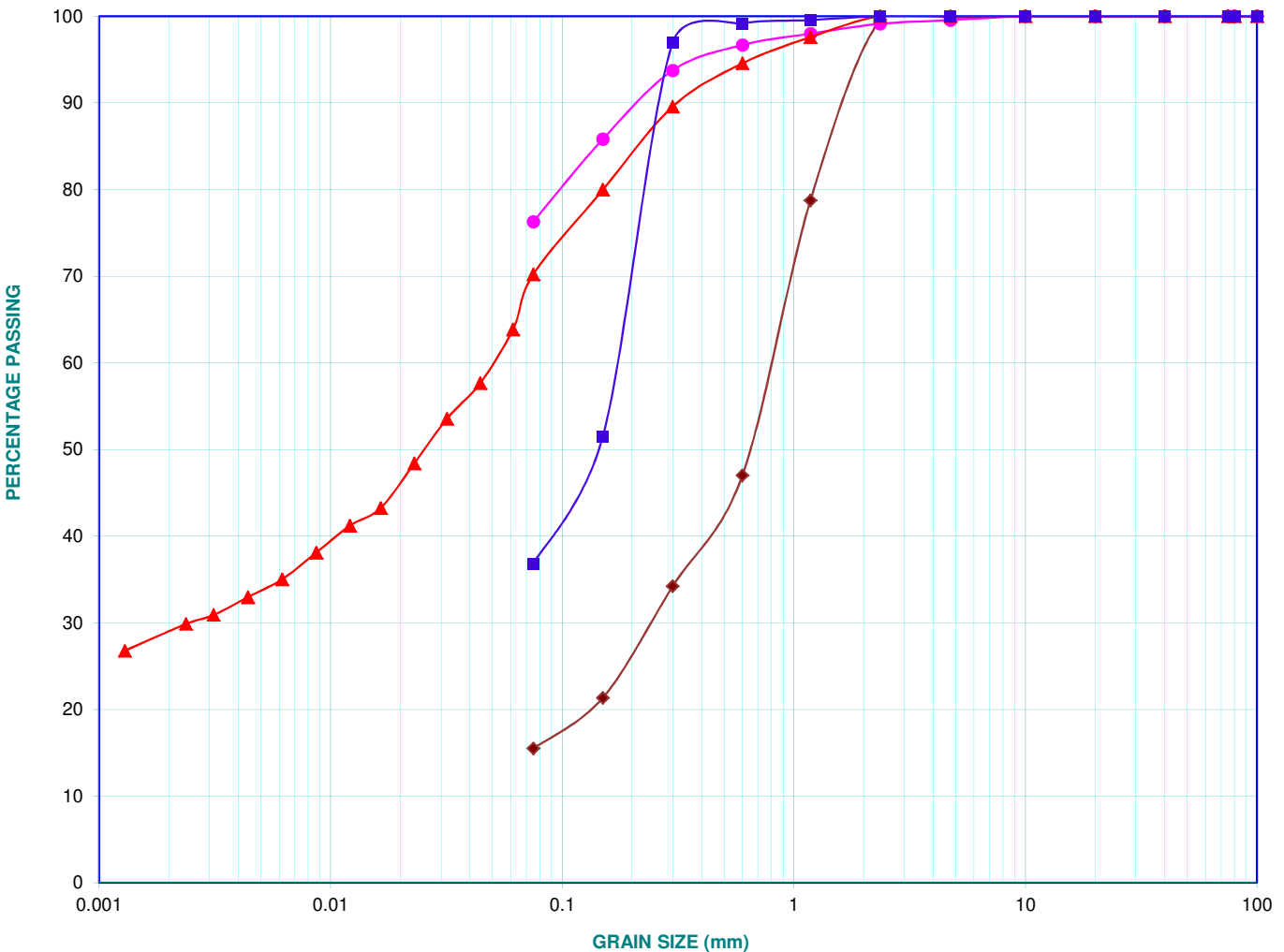
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-13					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT			SAND			GRAVEL	
										F	M	C	F	C
Bore Hole .	MBH-13	MBH-13	MBH-13	MBH-13										
Depth (m)	1.50-1.65	4.60-4.90	7.65-7.95	10.80-11.00										
Sample Type	SPT-1	SPT-4	SPT-6	UDS-1										
Classification	SM / SC	SM / SC	SM / SC	SC										
Gravel %	3	0	0	0										
Sand %	80	79	57	77										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	17	21	43	23										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	43.9										
Plastic Limit %	---	---	---	17.3										
Plasticity Index	---	---	---	26.6										
										Checked By :				

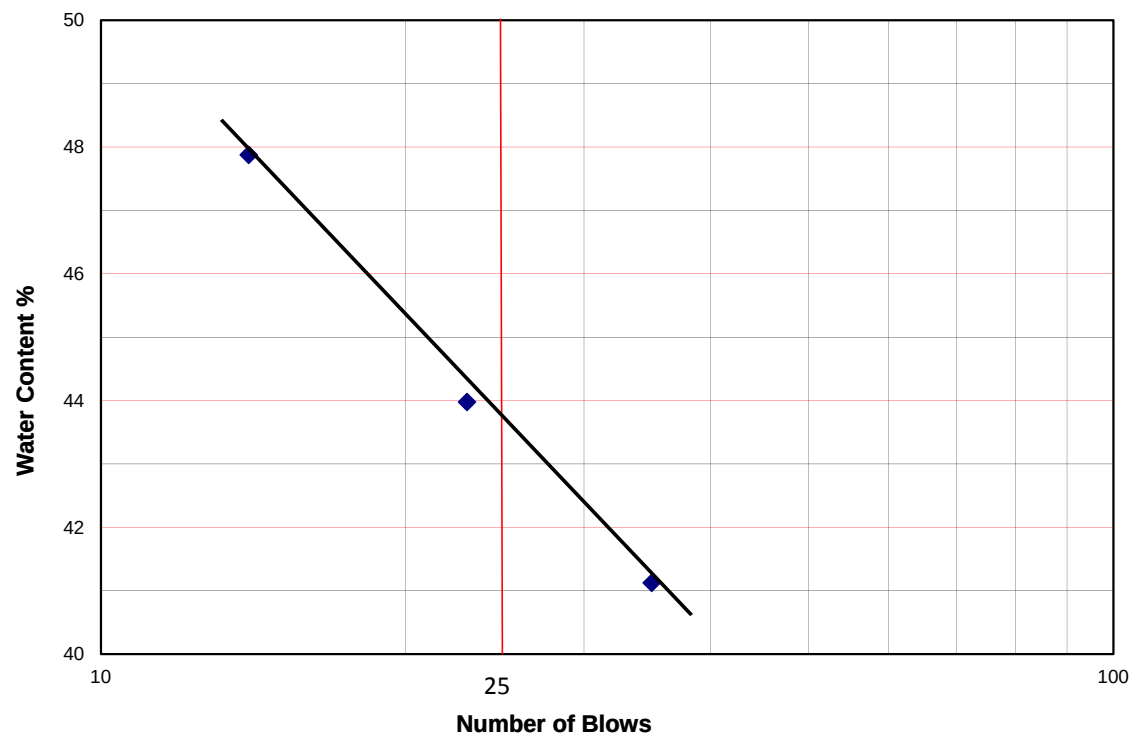
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-13					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-13	MBH-13	MBH-13	MBH-13										
Depth (m)	10.80-11.00	13.50-13.95	13.50-13.95	18.00-18.18										
Sample Type	UDS-1	SPT-8	SPT-8	SPT-11										
Classification	SC	SC	SC	SC										
Gravel %	0	1	0	0										
Sand %	42	65	66	61										
Silt %	32	<---->	11	<---->										
Clay %	26	<---->	23	<---->										
Fines % (Silt+Clay)	58	34	34	39										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	30.4	---	---										
Plastic Limit %	---	13.7	---	---										
Plasticity Index	---	16.7	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-13					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-13	MBH-13	MBH-13	MBH-13										
Depth (m)	22.50-22.95	24.10-24.45	24.10-24.45	26.65-26.95										
Sample Type	SPT-14	SPT-15	SPT-15	SPT-17										
Classification	SM / SC	CI	CI	SM / SC										
Gravel %	0	0	0	0										
Sand %	85	24	30	63										
Silt %	<---->	<---->	40	<---->										
Clay %	<---->	<---->	30	<---->										
Fines % (Silt+Clay)	15	76	70	37										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	37.4	---	---										
Plastic Limit %	---	19.3	---	---										
Plasticity Index	---	18.1	---	---										
									Checked By :					

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	29.35	29.05	27.70		
Dry Weight + Can (g)	24.88	23.10	21.73		
Can Weight (g)	14.01	9.57	9.26		
Water Content, %	41.1	44.0	47.9		
Number of Blows	35	23	14		

Plastic Limit %

Wet Weight + Can (g)	16.32	17.63	16.71
Dry Weight + Can (g)	15.21	17.00	15.55
Can Weight (g)	8.87	13.33	8.84
Water Content, %	17.5	17.2	17.3

Liquid Limit % 43.9
Plastic Limit % 17.3
Plasticity Index % 26.6

Preparation of Sample :
Dry State

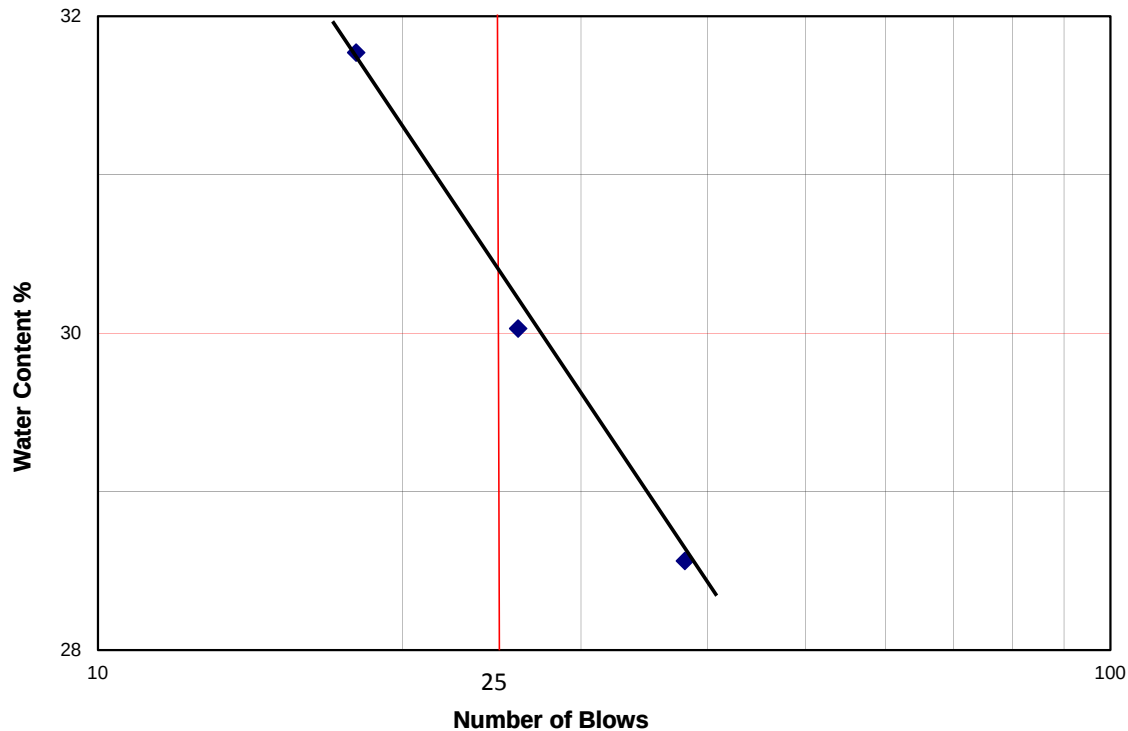
Sample Type: UDS-01

Borehole no.: MBH-13

Depth :10.80-11.00

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	35.73	30.64	28.89		
Dry Weight + Can (g)	30.84	26.55	24.15		
Can Weight (g)	13.72	12.93	9.23		
Water Content, %	28.6	30.0	31.8		
Number of Blows	38	26	18		

Plastic Limit %

Wet Weight + Can (g)	17.47	17.48	18.22
Dry Weight + Can (g)	16.95	16.46	17.63
Can Weight (g)	13.17	8.93	13.33
Water Content, %	13.8	13.5	13.7

Liquid Limit % 30.4
Plastic Limit % 13.7
Plasticity Index % 16.7

Preparation of Sample :
Dry State

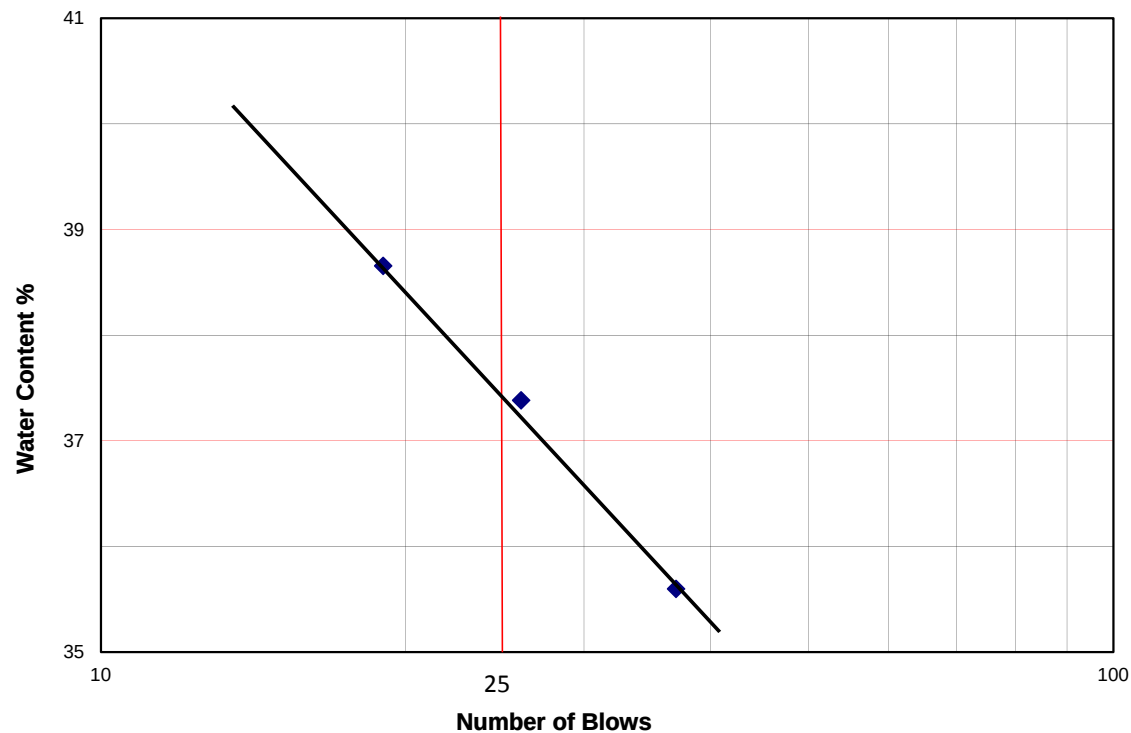
Sample Type: SPT-08

Borehole no.: MBH-13

Depth :10.80-11.00

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

LL, PL & PI of Soils - IS : 2720 (part-5) & ASTM D 4318 - 1998



Liquid Limit %

Wet Weight + Can (g)	32.06	30.52	27.82		
Dry Weight + Can (g)	27.03	24.55	22.71		
Can Weight (g)	12.90	8.58	9.49		
Water Content, %	35.6	37.4	38.7		
Number of Blows	37	26	19		

Plastic Limit %

Wet Weight + Can (g)	18.52	17.25	16.50
Dry Weight + Can (g)	17.76	16.46	15.34
Can Weight (g)	13.85	12.40	9.24
Water Content, %	19.4	19.5	19.0

Liquid Limit % 37.4
Plastic Limit % 19.3
Plasticity Index % 18.1

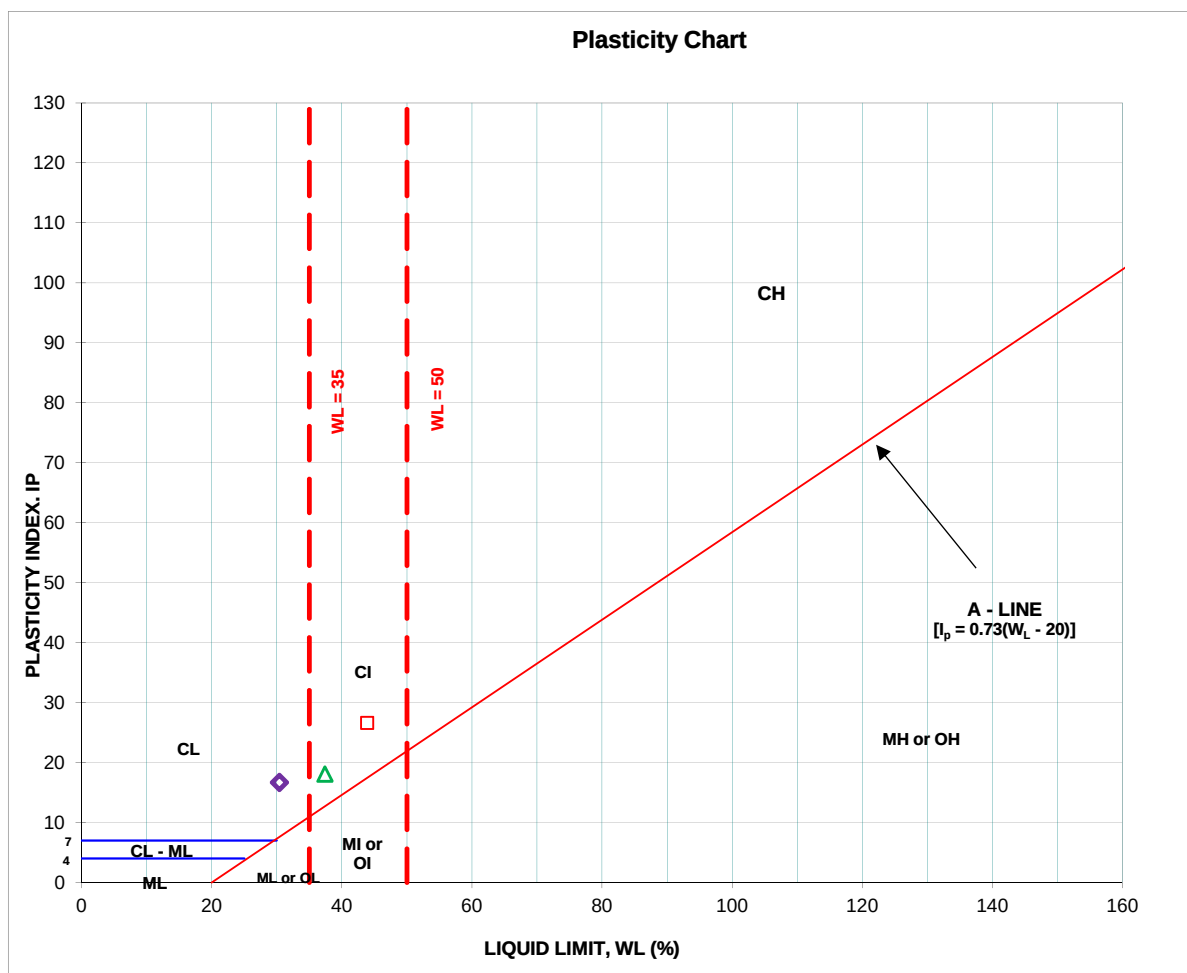
Preparation of Sample :
Dry State

Sample Type: SPT-15

Borehole no.: MBH-13

Depth :10.80-11.00

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.



	Sample Type	Depth (m)	W _L	W _p	I _p	Remarks
□	UDS-01	10.80-11.00	43.9	17.3	26.6	CI: Clays with Intermediate plasticity
◇	SPT-08	13.50-13.95	30.4	13.7	16.7	CL: Inorganic clays of low to medium plasticity.
△	SPT-15	24.10-24.45	37.4	19.3	18.1	CI: Clays with Intermediate plasticity
●						
+						
■						
○						

ML Inorganic silts, very fine sands, rock flour, silty or clayey fine sands

MH Inorganic silts, or diatomaceous fine sands or silts, elastic silts

CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

CH Inorganic clays of high plasticity, fat clays

OL Organic silts and organic silty clays of low plasticity

OH Organic silts and organic clays of medium to high plasticity

CI Clays with Intermediate plasticity

MI Silt with intermediate plasticity

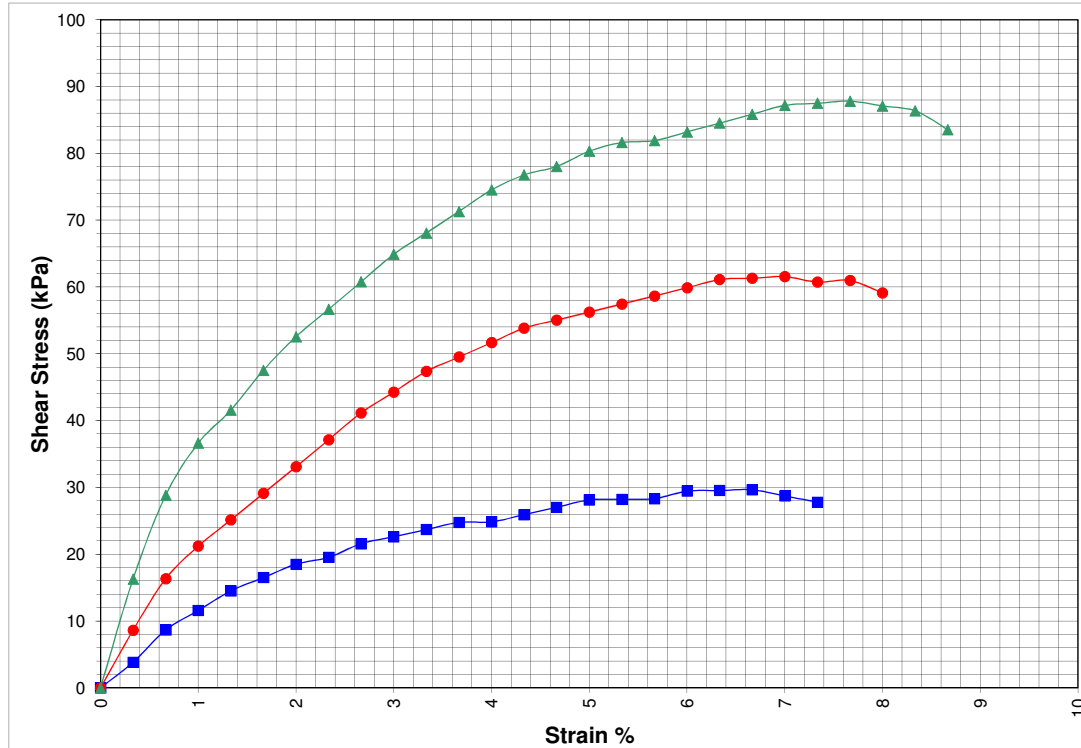
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-13

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

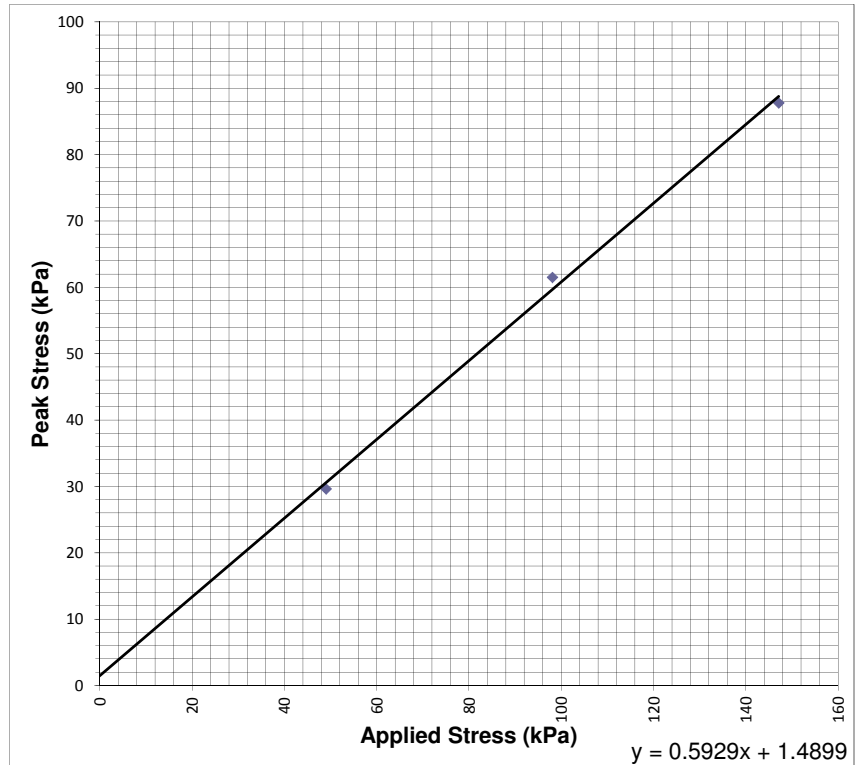
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	62
▲	Stage 3	147	88

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	30.7 °
Apparent Cohesion	1.49 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

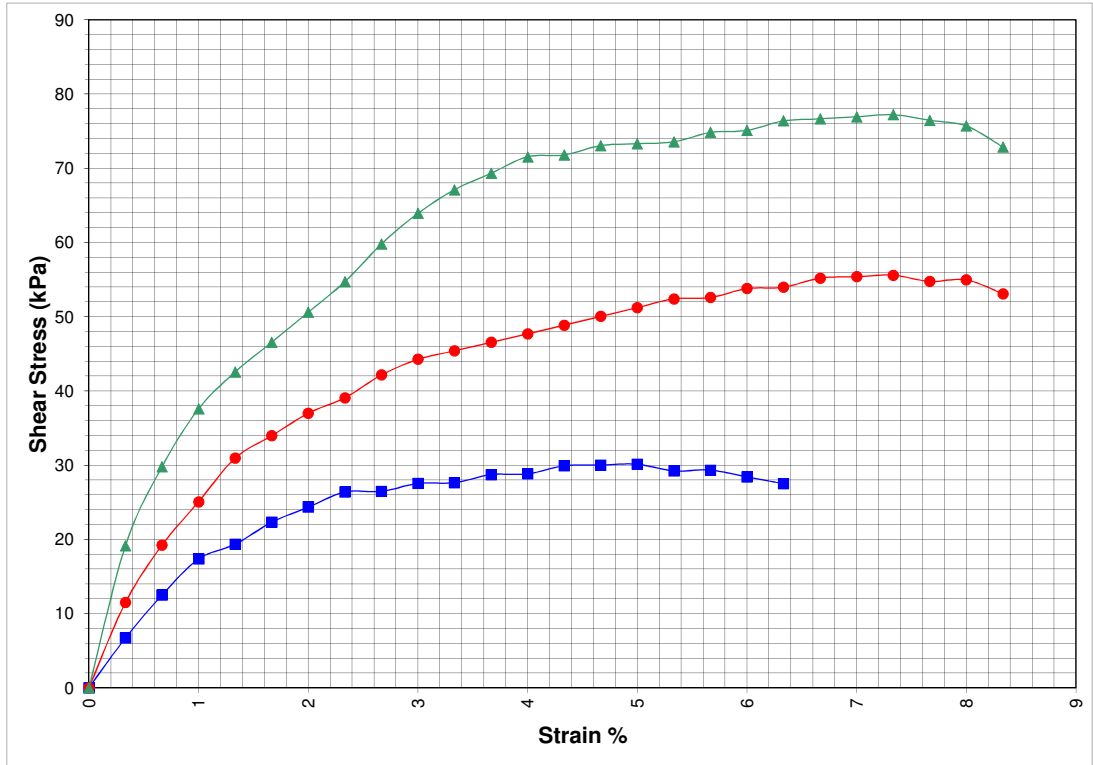
Borehole: MBH-13

Sample Type: SPT-4

Depth: 4.60-4.90 m

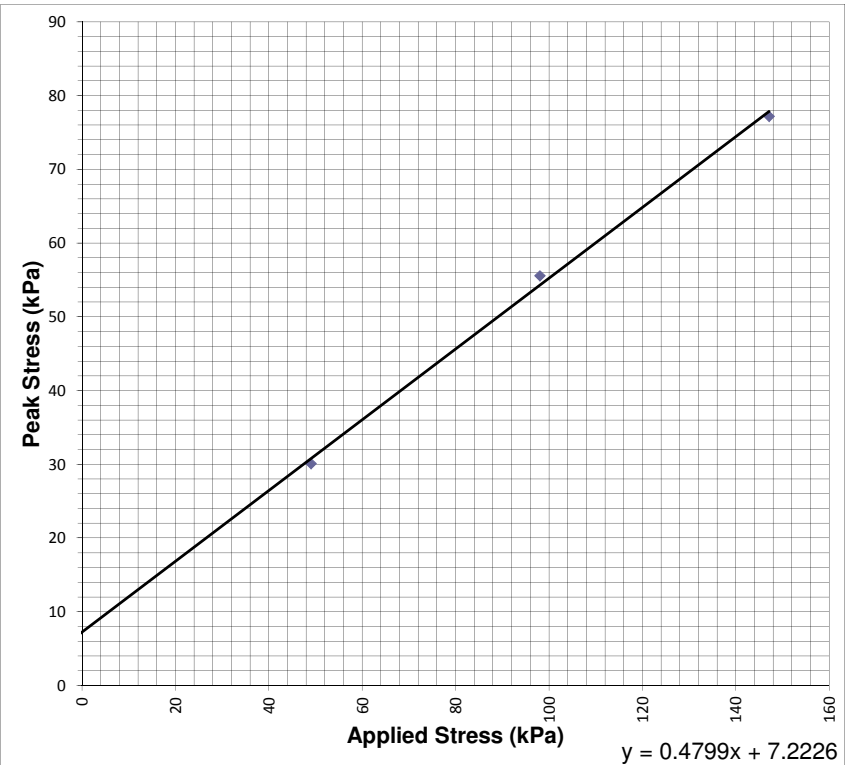
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	56
▲	Stage 3	147	77

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	25.6 °
Apparent Cohesion	7.22 kPa

Borehole: MBH-13

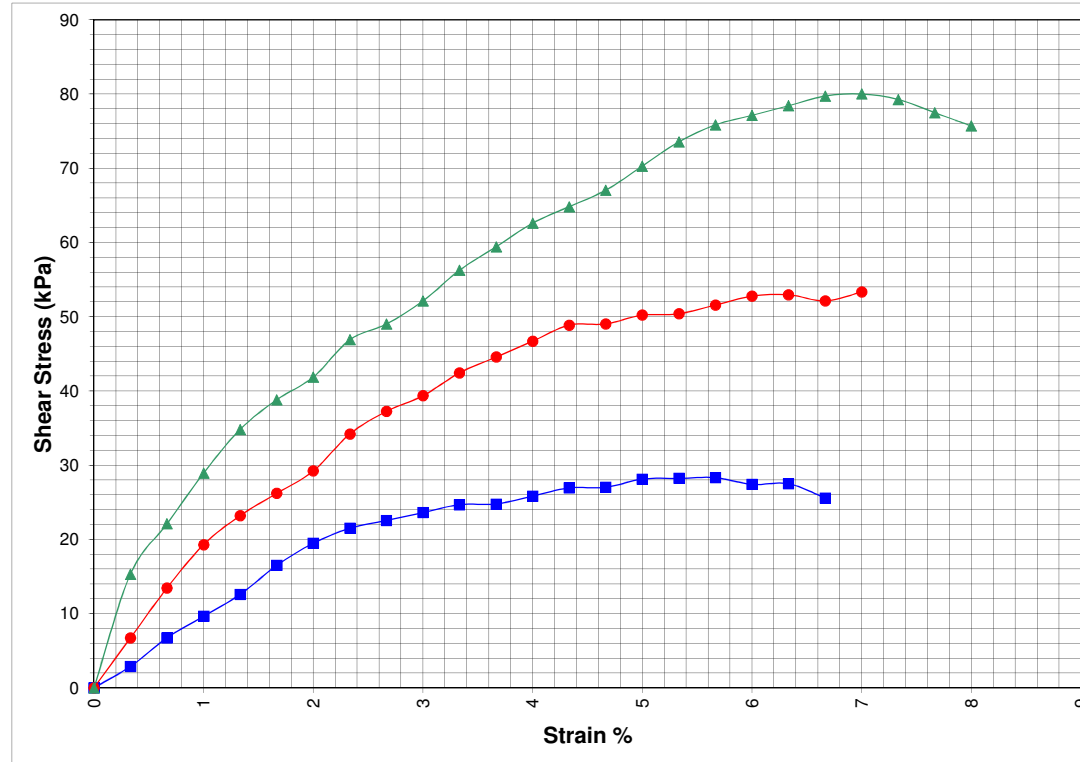
Sample Type: SPT-11

Depth: 18.00-18.18 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

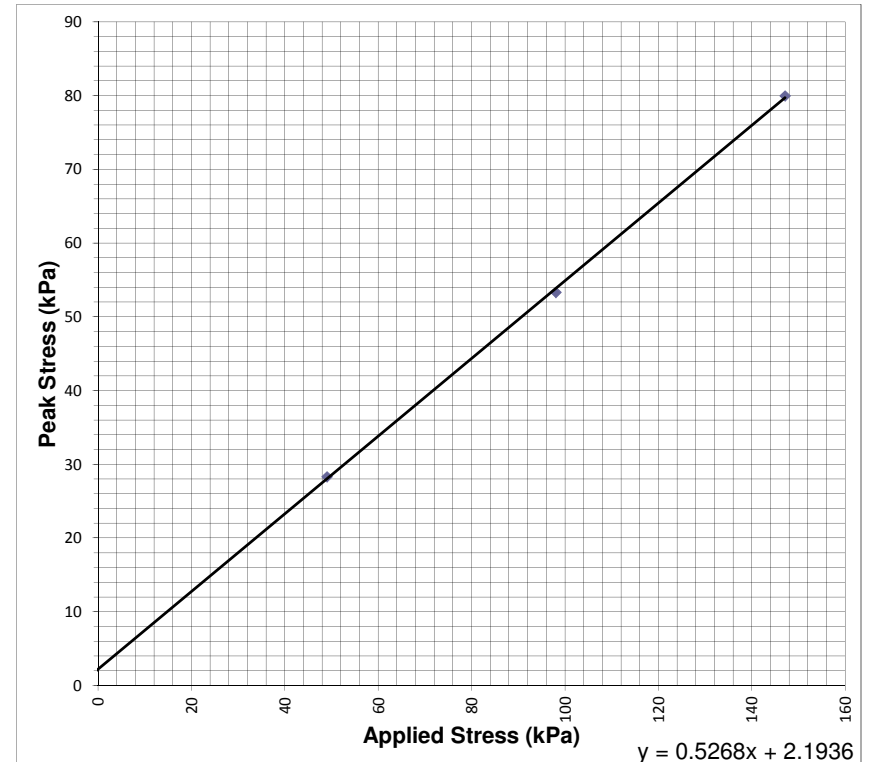
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	53
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	27.8 °
Apparent Cohesion	2.19 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

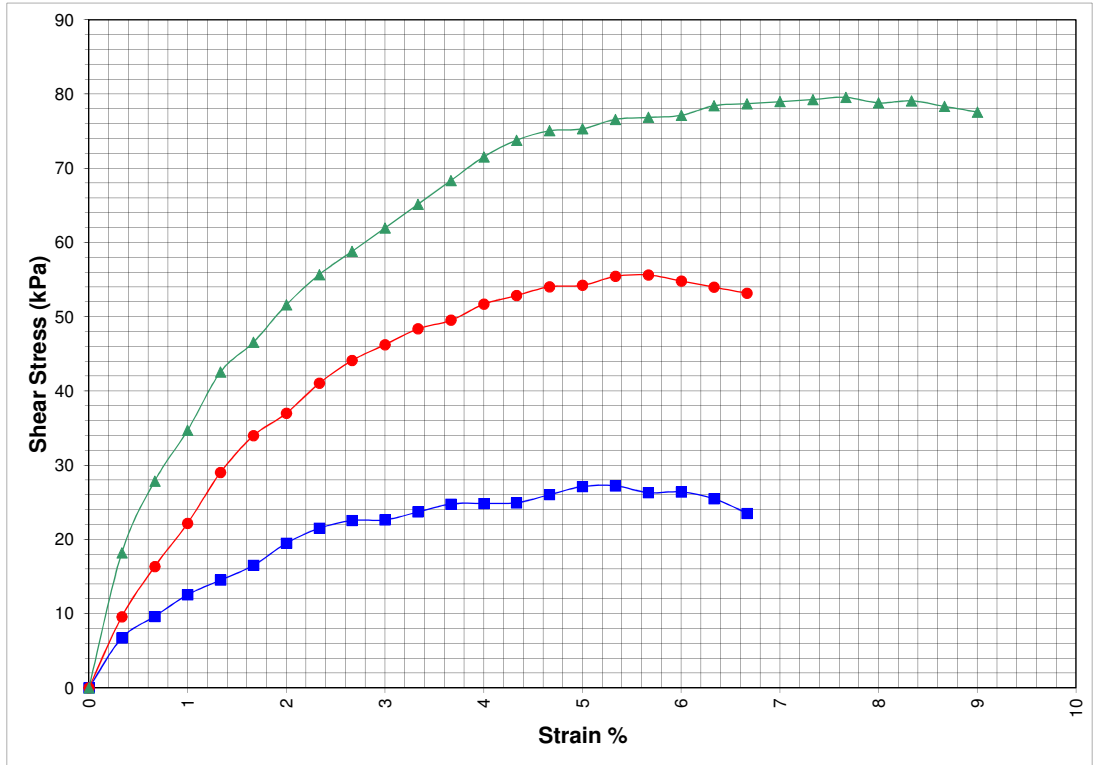
Borehole: MBH-13

Sample Type: SPT-16

Depth: 22.50-22.95 m

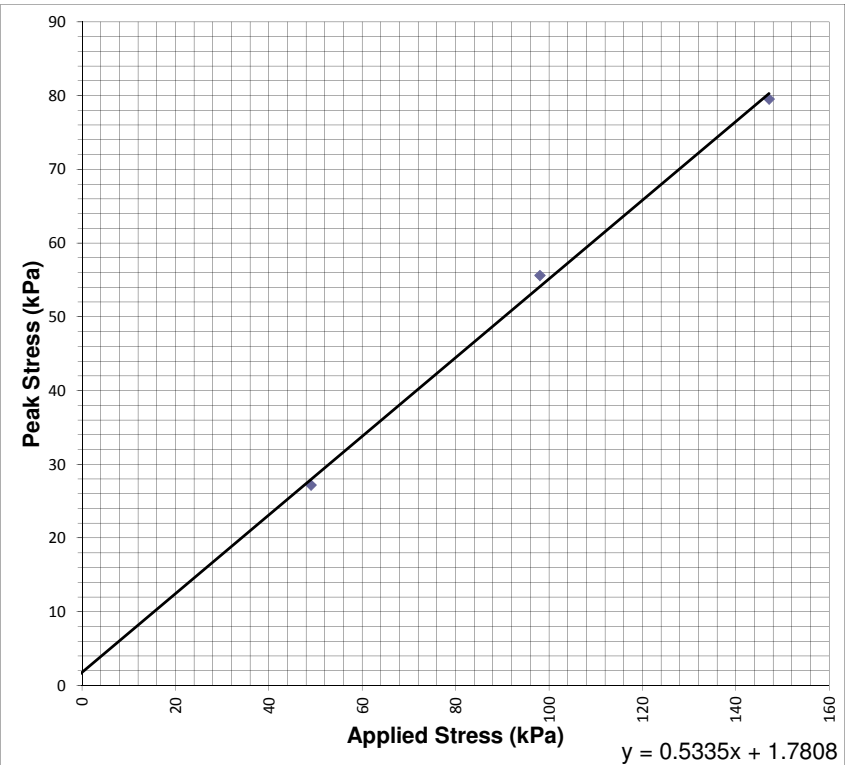
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	56
▲	Stage 3	147	80

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	28.1 °
Apparent Cohesion	1.78 kPa

Borehole: MBH-13

Sample Type: SPT-17

Depth: 26.65-26.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

SUMMARY OF TEST RESULTS

[illegible]

END OF BOREHOLE

[illegible]

Notes :

DS	: Disturbed Sample
WAX/UDS	: Undisturbed Sample
TUU	: Triaxial Test (Unconsolidated Undrained)
DST	: Direct Shear Test
ϕ	: $^{\circ}$ (deg) Angle of internal friction

- * : Insufficient sample
- LL : Liquid Limit
- PL : Plastic Limit
- NP : Non Plastic
- NS : Not Suitable

: Decayed Wood

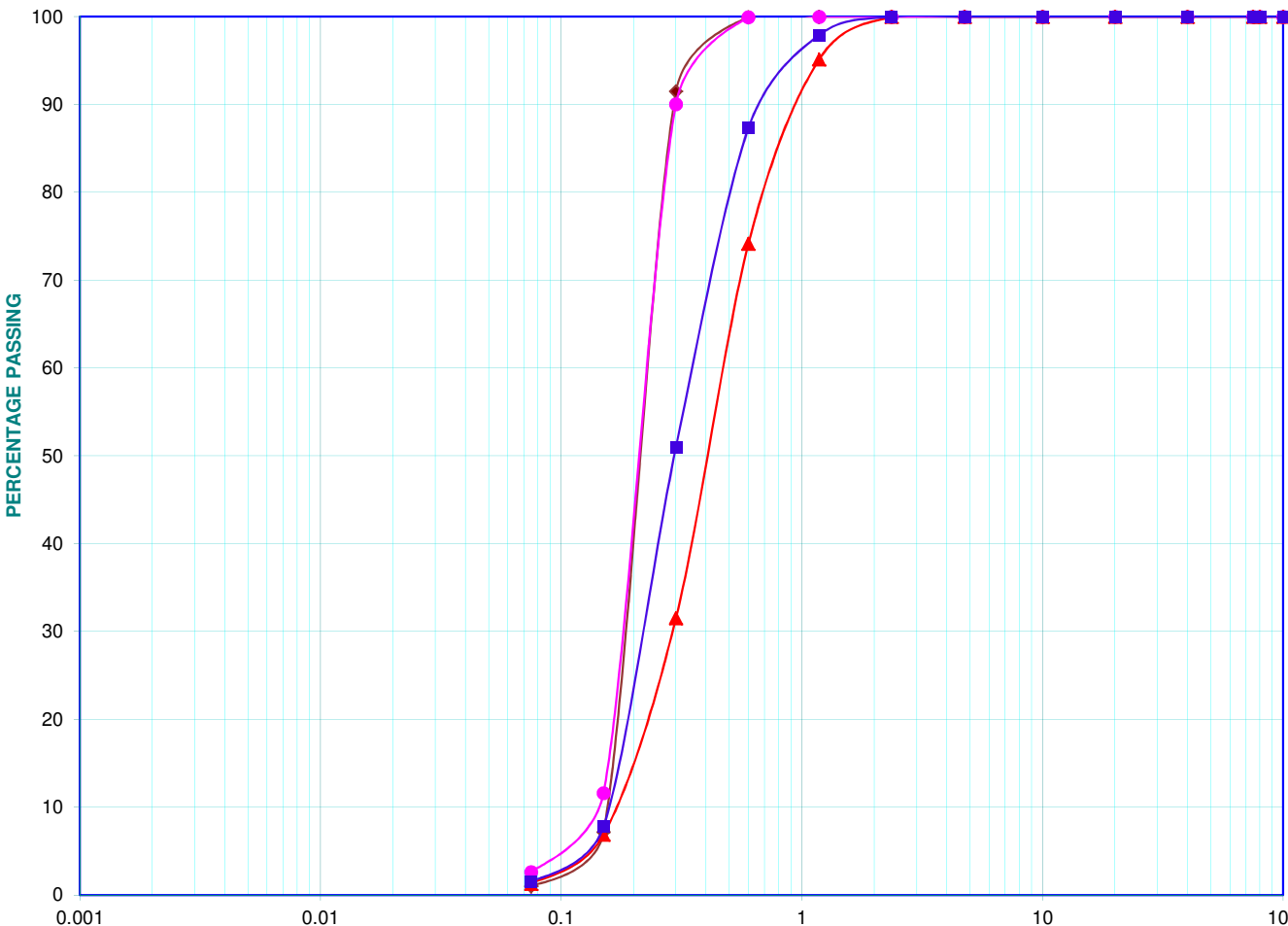
Failure Type

A : Bulge
B : Inclined Shear
C : Multiple Shear
D : Vertical Shear

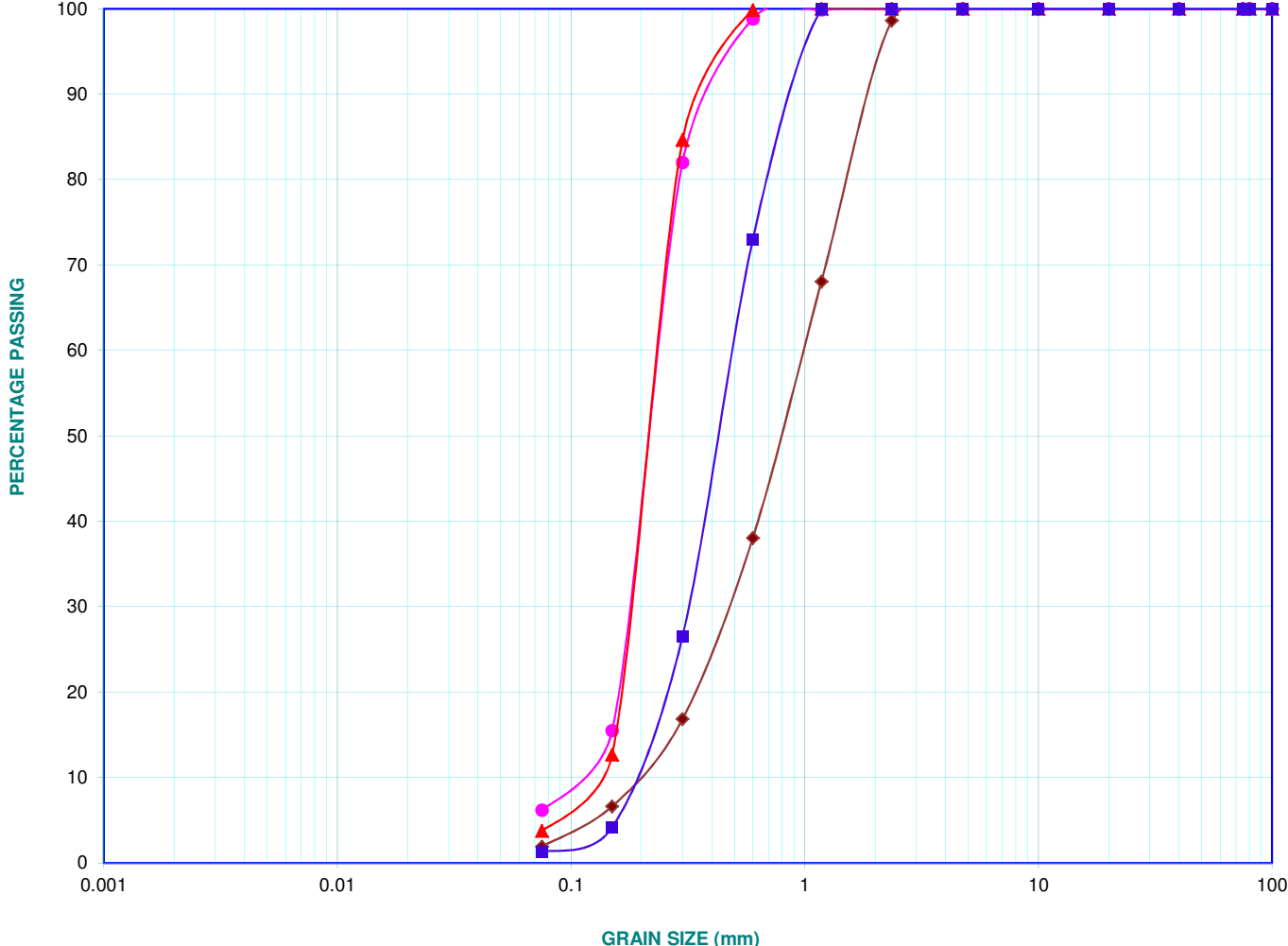
Project : Geotechnical Investigation For Capive Jetty at
Jatadharmuhan, Near Paradip, Dist.
Jagatsinghpur, Odisha

Project Code : CM 19 01 03
Borehole No. : LBH-14

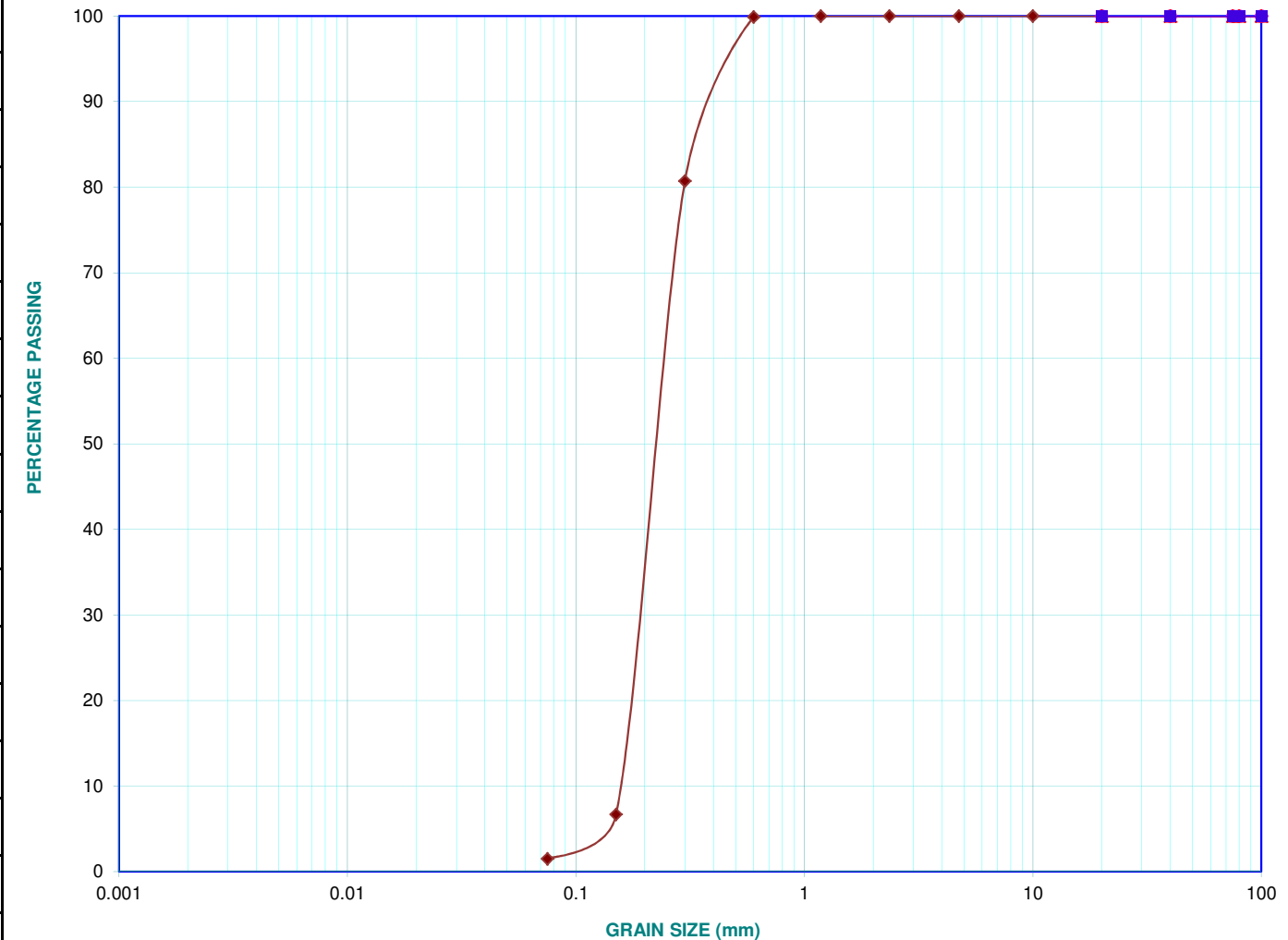
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-14					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	LBH-14	LBH-14	LBH-14	LBH-14										
Depth (m)	0.00-0.50	3.00-3.45	6.00-6.45	10.50-10.95										
Sample Type	DS	SPT-2	SPT-4	SPT-7										
Classification	SP	SP	SP	SP										
Gravel %	0	0	0	0										
Sand %	99	97	99	99										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	1	3	1	1										
D60 mm	0.220	0.220	0.480	0.350										
D30 mm	0.190	0.180	0.300	0.220										
D10 mm	0.160	0.150	0.170	0.160										
Cu	1.38	1.47	2.82	2.19										
Cc	1.03	0.98	1.10	0.86										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
										Checked By :				

GRAIN SIZE ANALYSIS

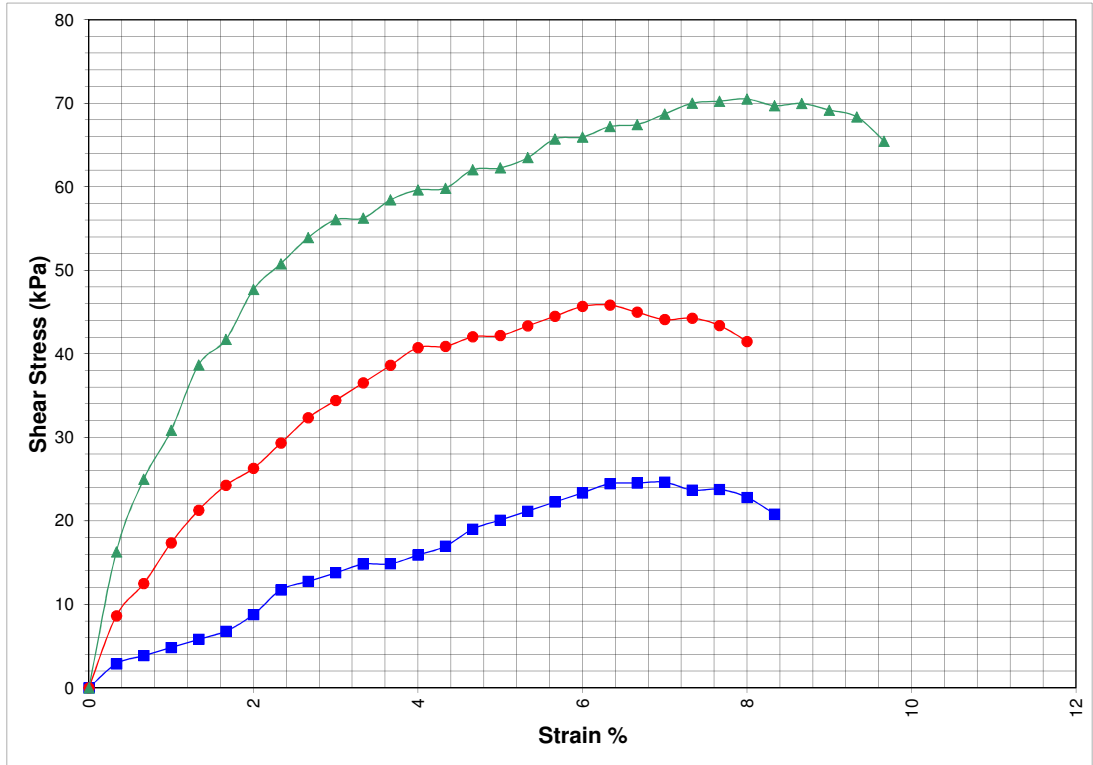
Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : LBH-14					Date :			31-May-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	LBH-14	LBH-14	LBH-14	LBH-14										
Depth (m)	15.00-15.45	19.50-19.95	21.00-21.45	25.50-25.95										
Sample Type	SPT-10	SPT-13	SPT-14	SPT-17										
Classification	SP	SP-SM	SP	SP										
Gravel %	0	0	0	0										
Sand %	98	94	96	99										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	2	6	4	1										
D60 mm	1.000	0.230	0.230	0.560										
D30 mm	0.480	0.180	0.180	0.310										
D10 mm	0.200	0.120	0.140	0.190										
Cu	5.00	1.92	1.64	2.95										
Cc	1.15	1.17	1.01	0.90										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha												
Job No.	: CM 19 01 03		Borehole No. : LBH-14					Date :		31-May-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL	
									F	M	C	F	C
Bore Hole .	LBH-14												
Depth (m)	28.50-28.95												
Sample Type	SPT-19												
Classification	SP												
Gravel %	0												
Sand %	99												
Silt %	<---->												
Clay %	<---->												
Fines % (Silt+Clay)	1												
D60 mm	0.240												
D30 mm	0.190												
D10 mm	0.160												
Cu	1.50												
Cc	0.94												
Liquid Limit %	---												
Plastic Limit %	---												
Plasticity Index	---												
								Checked By :					

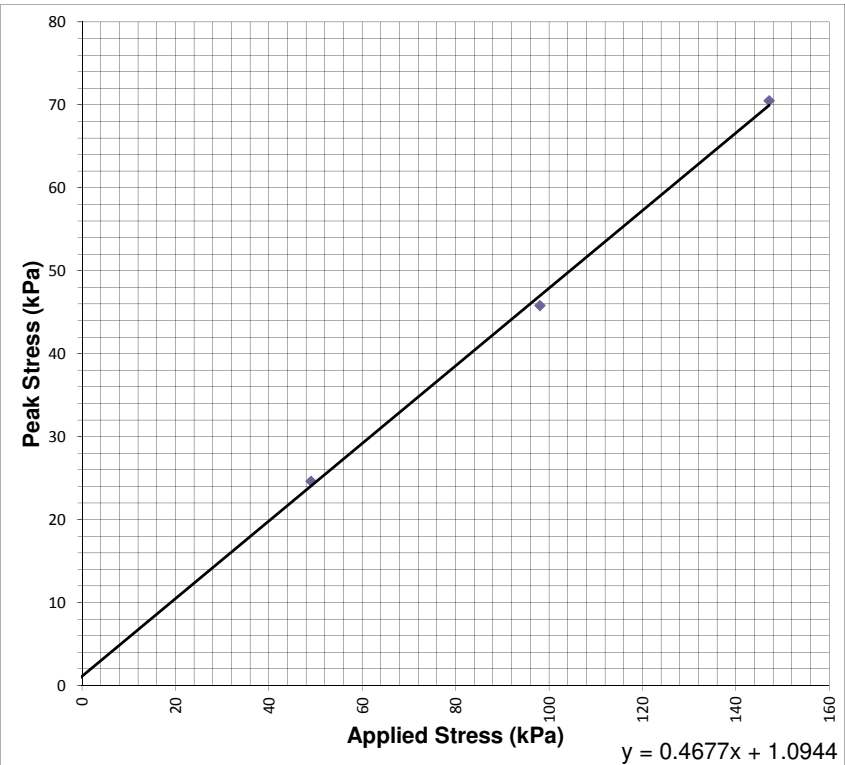
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	46
▲	Stage 3	147	70

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	25.07 °
Apparent Cohesion	1.09 kPa

Borehole: LBH-14

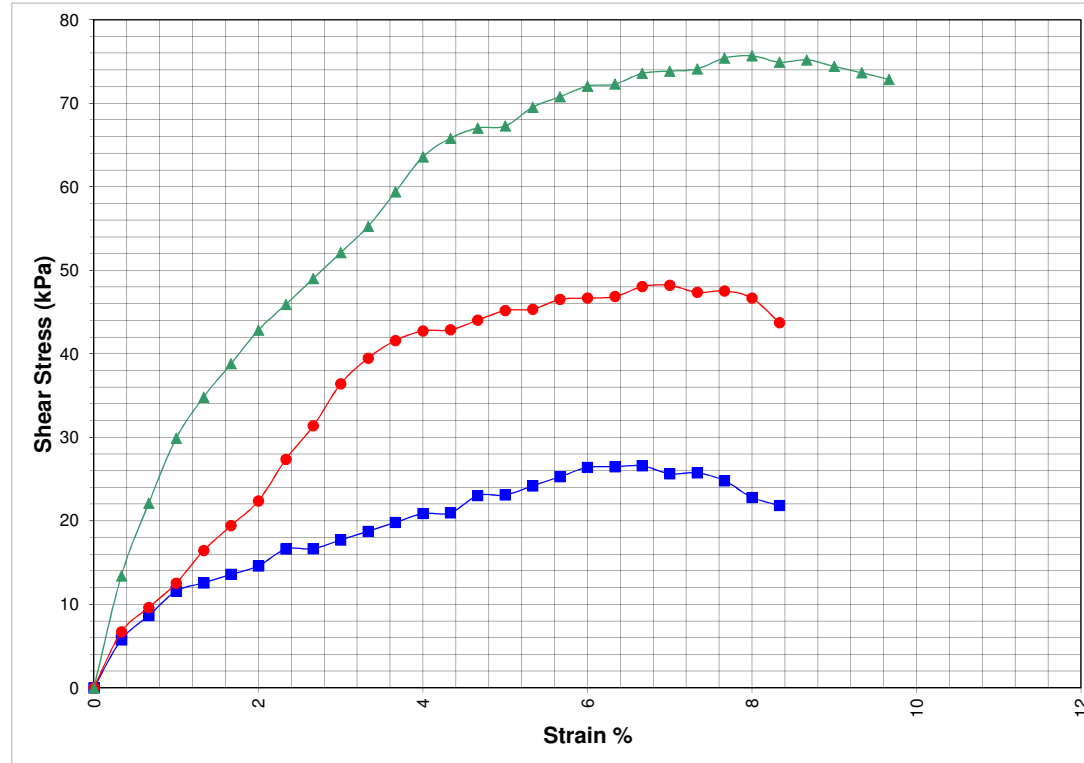
Sample Type: SPT-01

Depth: 1.50-1.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

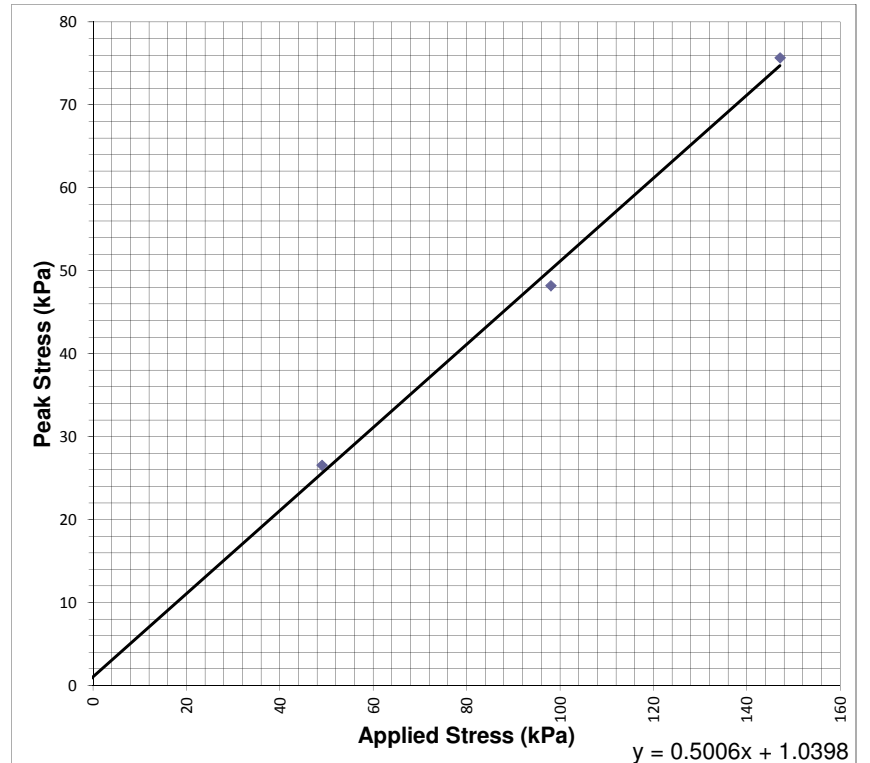
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	48
▲	Stage 3	147	76

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	26.59 °
Apparent Cohesion	1.04 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

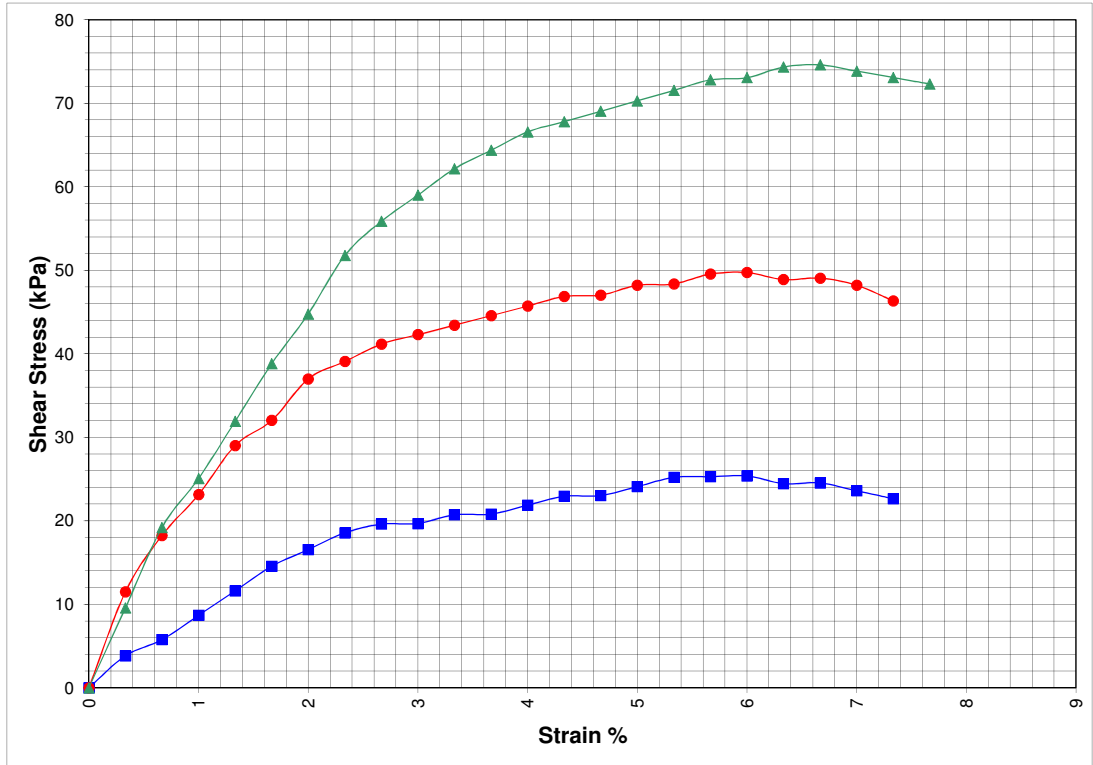
Borehole: LBH-14

Sample Type: SPT-03

Depth: 4.50-4.95 m

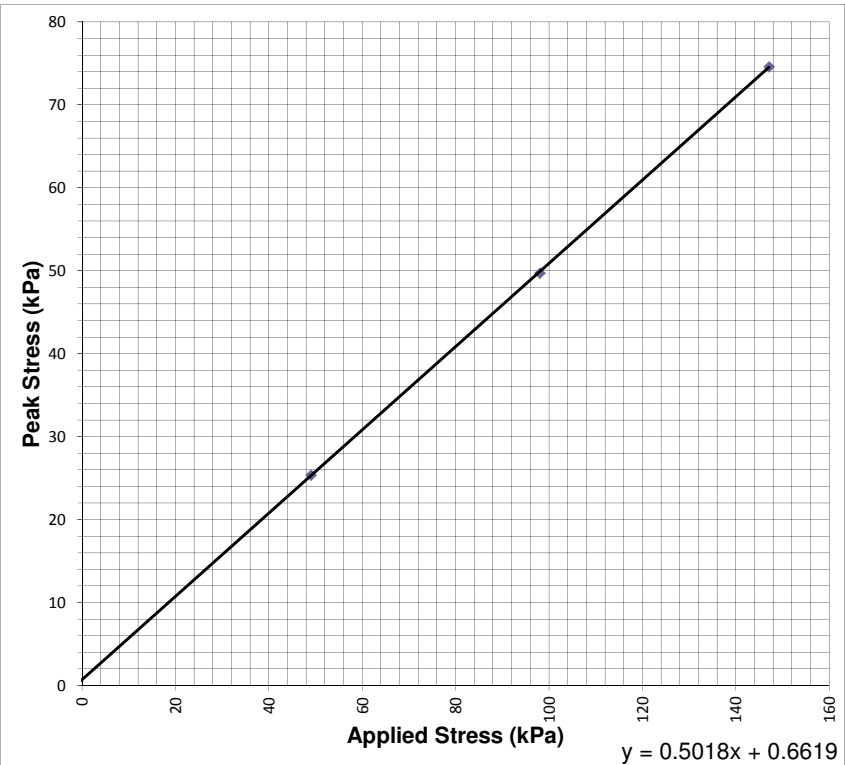
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	50
▲	Stage 3	147	75

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.6 °
Apparent Cohesion	0.66 kPa

Borehole: LBH-14

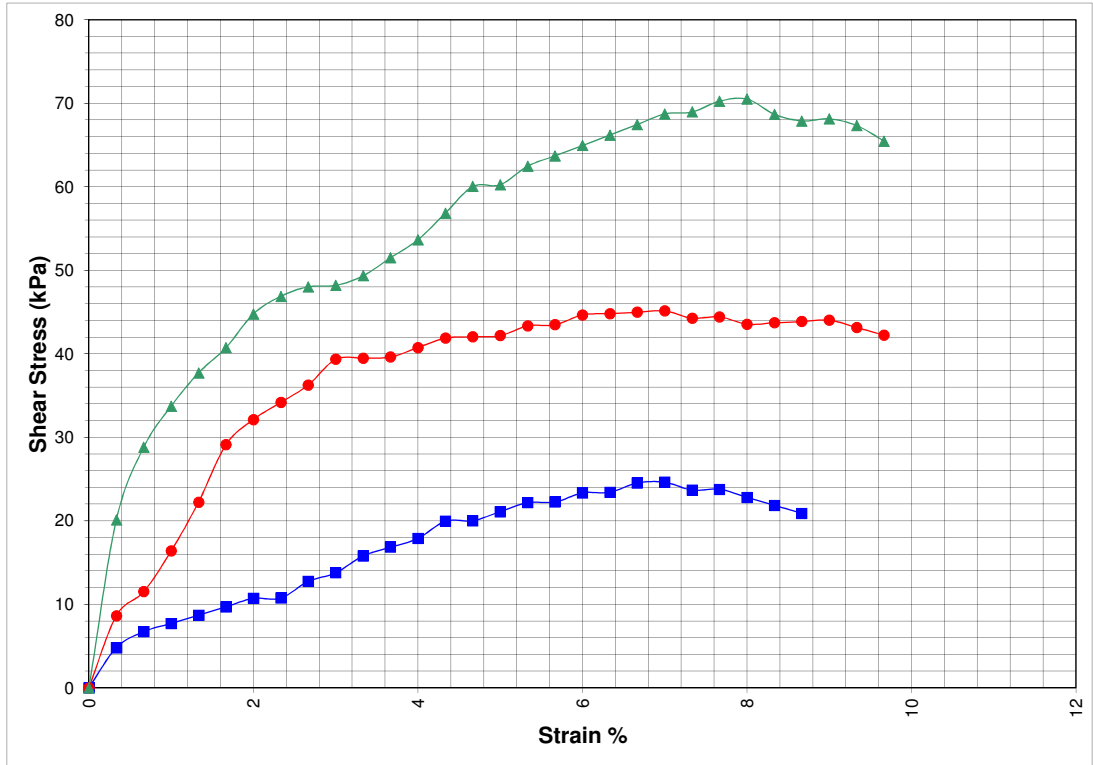
Sample Type: SPT-05

Depth: 7.50-7.95 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

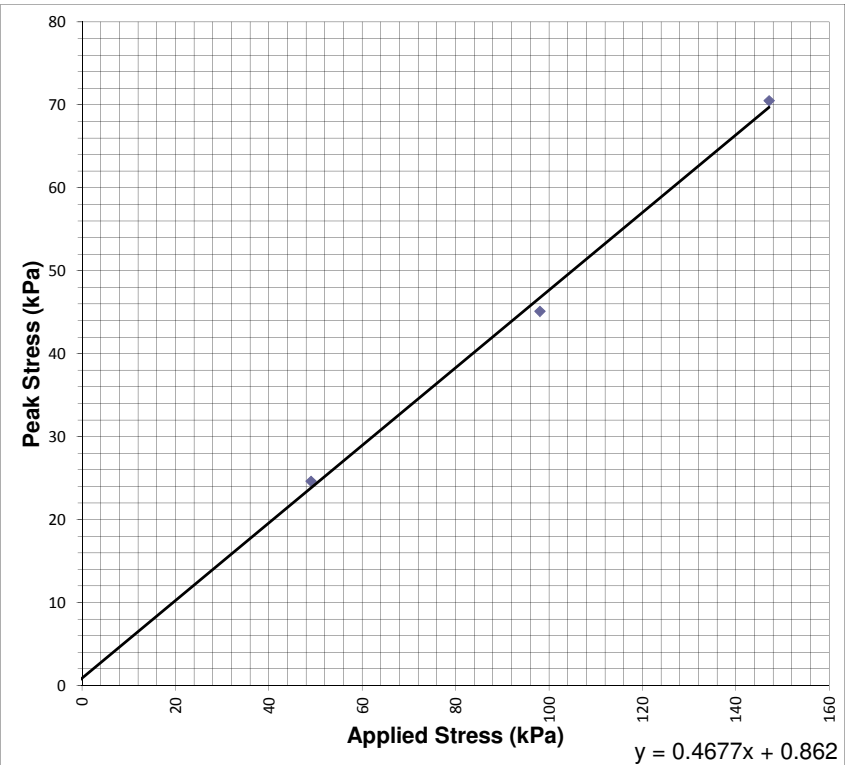
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	45
▲	Stage 3	147	70

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	25.07 °
Apparent Cohesion	0.86 kPa

Borehole: LBH-14

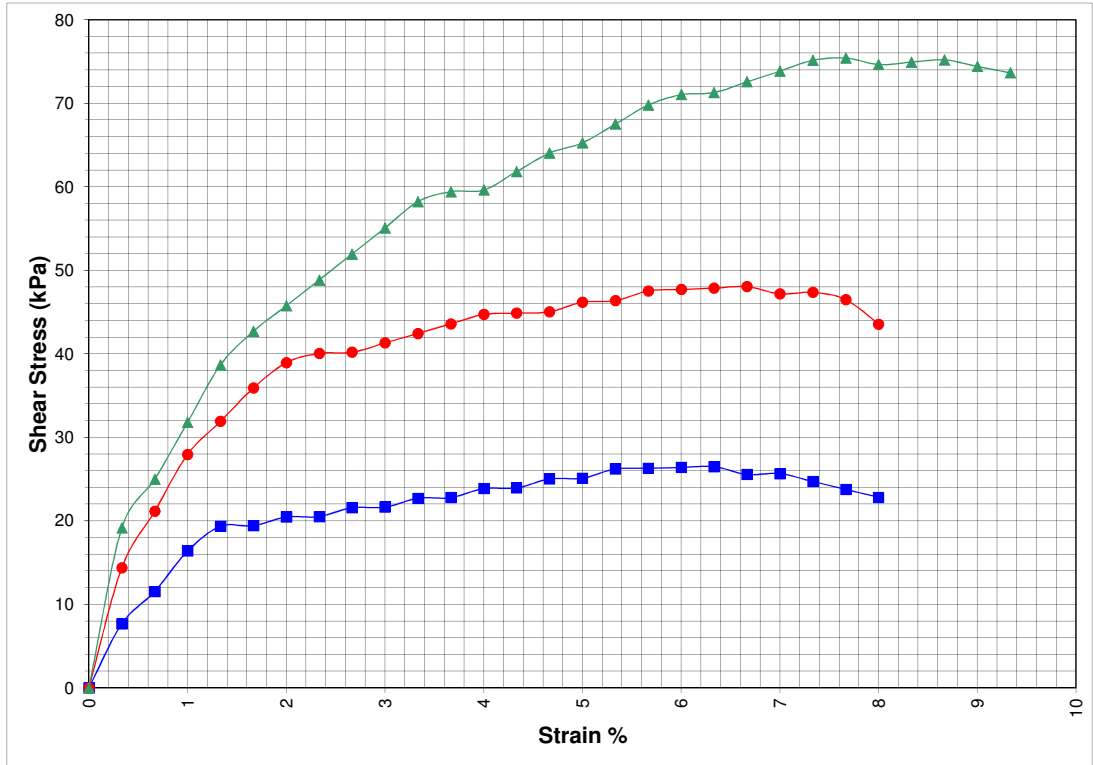
Sample Type: SPT-06

Depth: 9.00-9.45 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

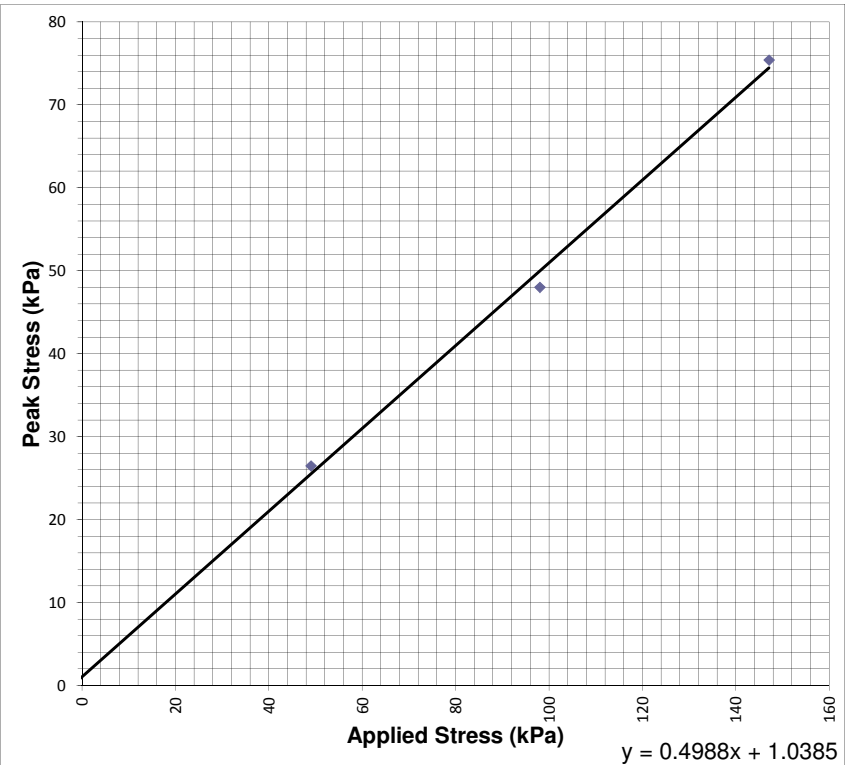
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	48
▲	Stage 3	147	75

Area of the specimen = 3600 mm²
Height of the specimen = 25.4 mm
Rate of Displacement = 1.25 mm/min



Angle of Friction	26.51 °
Apparent Cohesion	1.04 kPa

Borehole: LBH-14

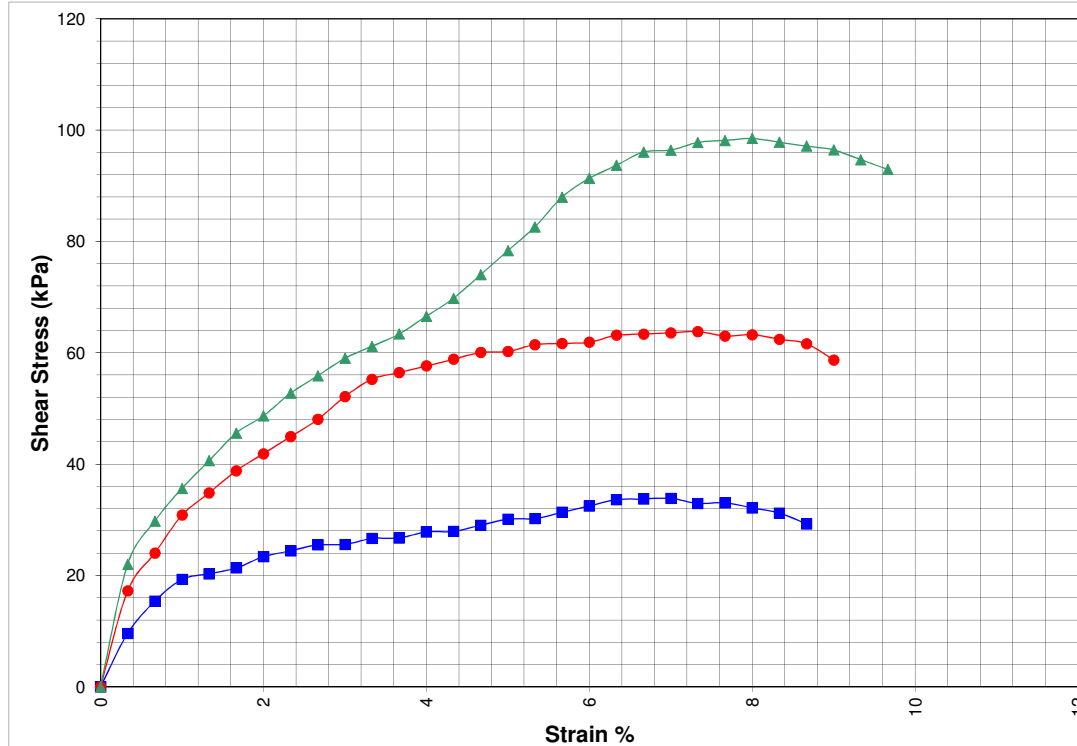
Sample Type: SPT-08

Depth: 12.00-12.45 m

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist. Jagatsinghpur, Odisha.

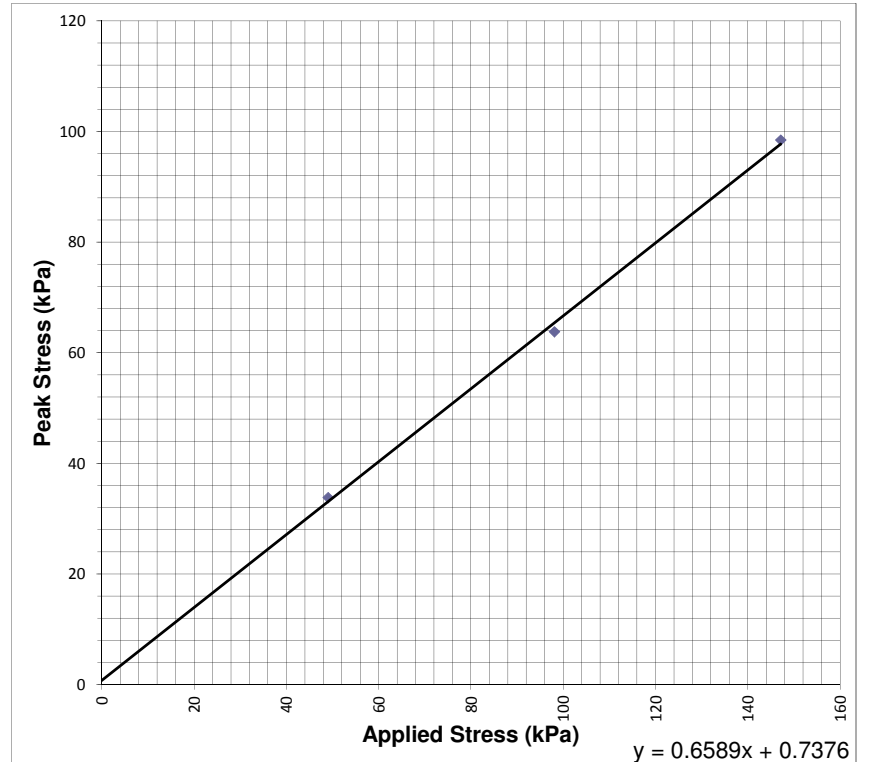
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	34
●	Stage 2	98	64
▲	Stage 3	147	98

Area of the specimen = 3600 mm²
 Height of the specimen = 25.4 mm
 Rate of Displacement = 1.25 mm/min



Angle of Friction	33.38 °
Apparent Cohesion	0.74 kPa

Project: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paragpur, Dist. Jagatsinghpur, Odisha.

Signature Not Verified

Digitally signed by Sasupalli Vighneswara Prasad

Date: 2026.04.01 13:21:33 IST

Location: eProcure-ERP

Borehole: LBH-14

Sample Type: SPT-11

Depth: 16.50-16.95 m