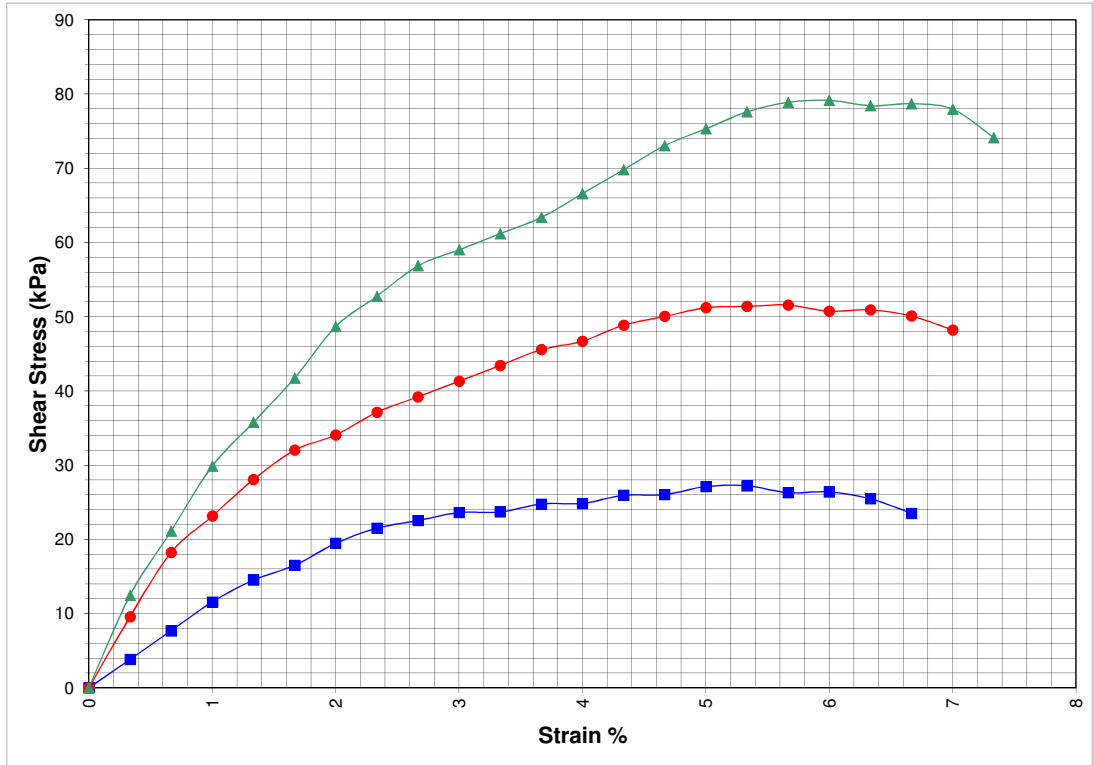


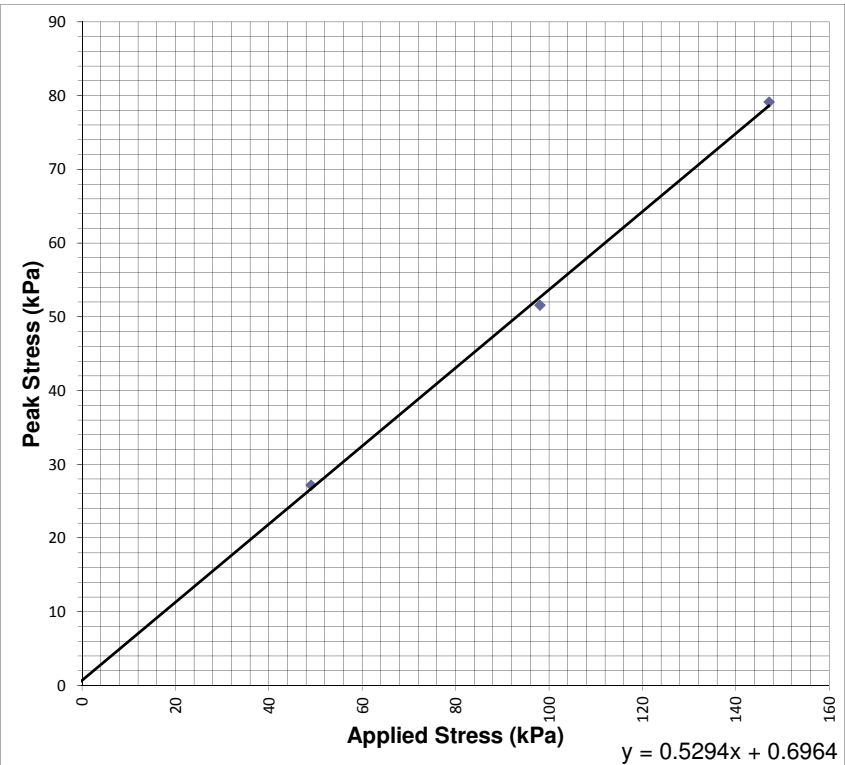
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	52
▲	Stage 3	147	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	0.70 kPa

Borehole: LBH-14

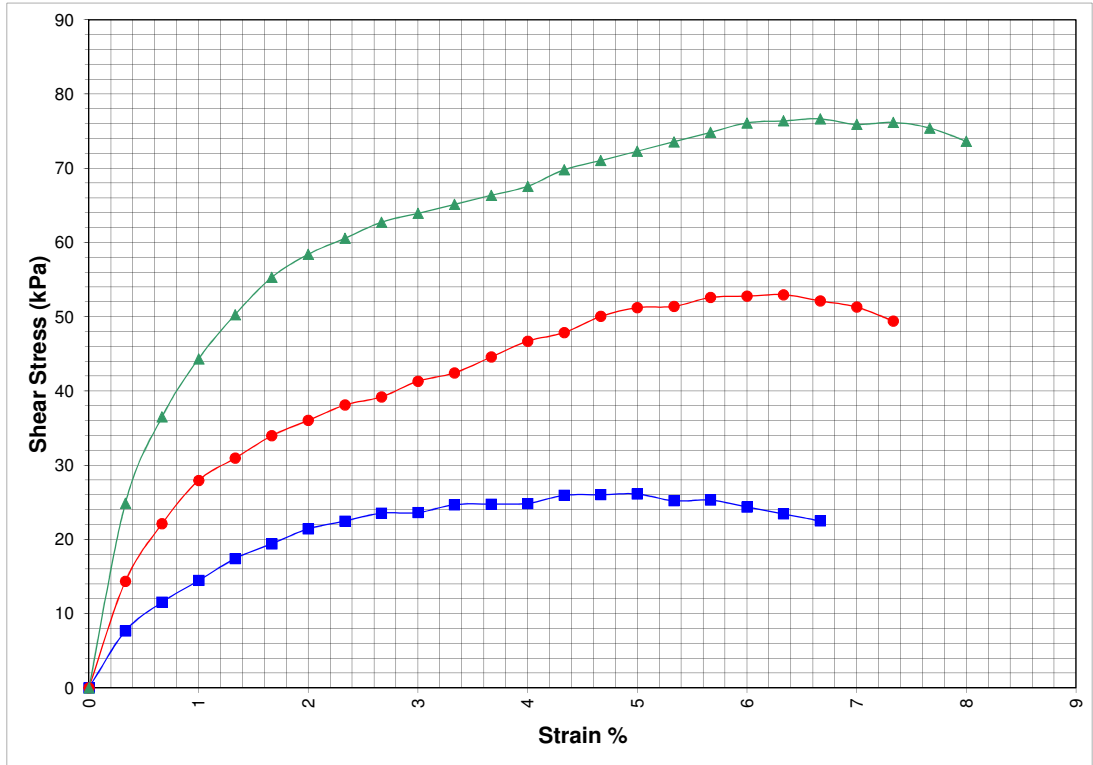
Sample Type: SPT-12

Depth: 18.00-18.45 m

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

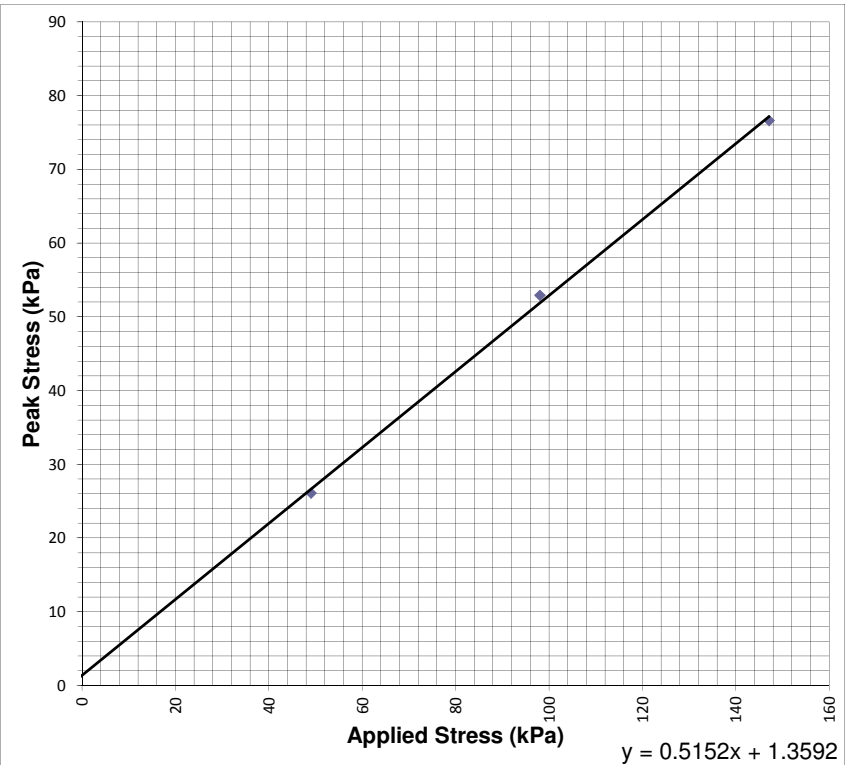
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	53
▲	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	27.26 °
Apparent Cohesion	1.36 kPa

Borehole: LBH-14

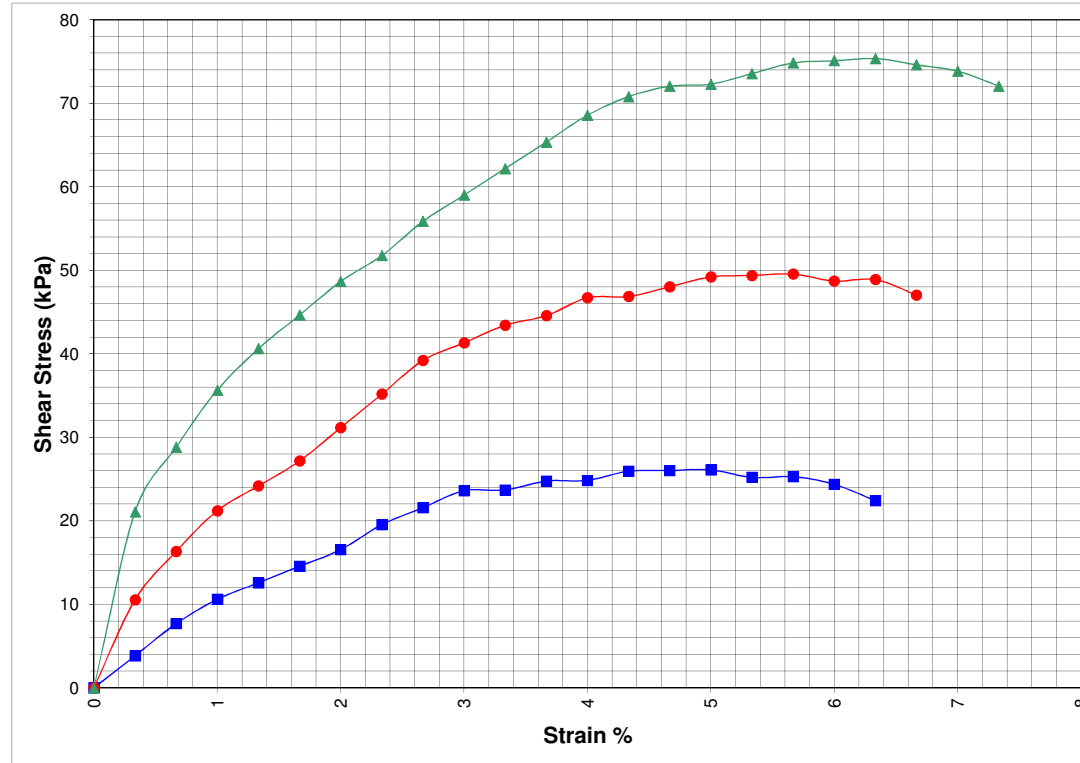
Sample Type: SPT-15

Depth: 22.50-22.95 m

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

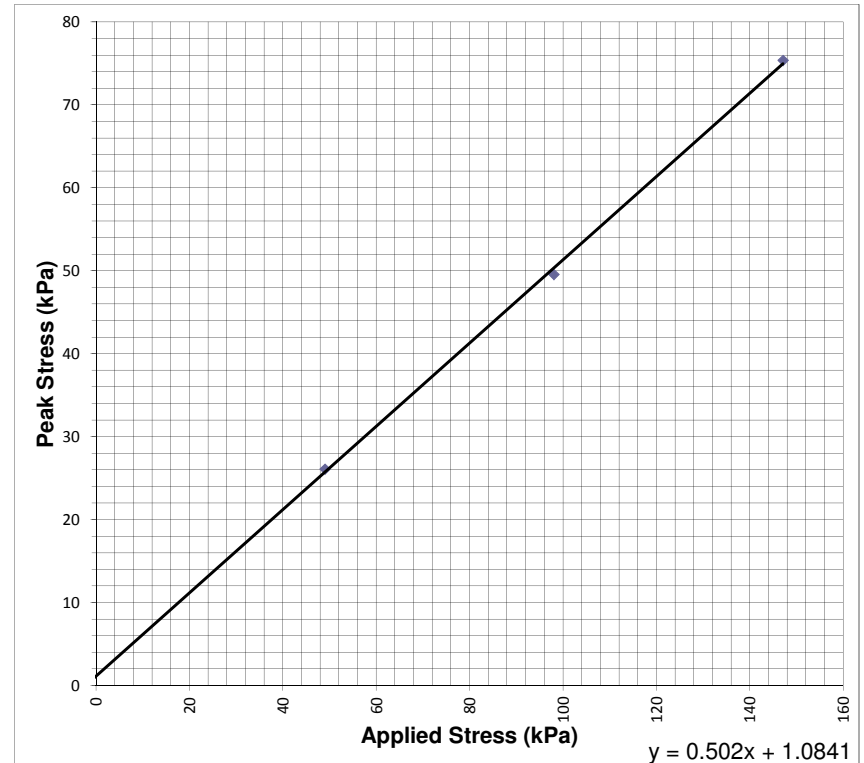
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	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	26.66 °
Apparent Cohesion	1.08 kPa

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

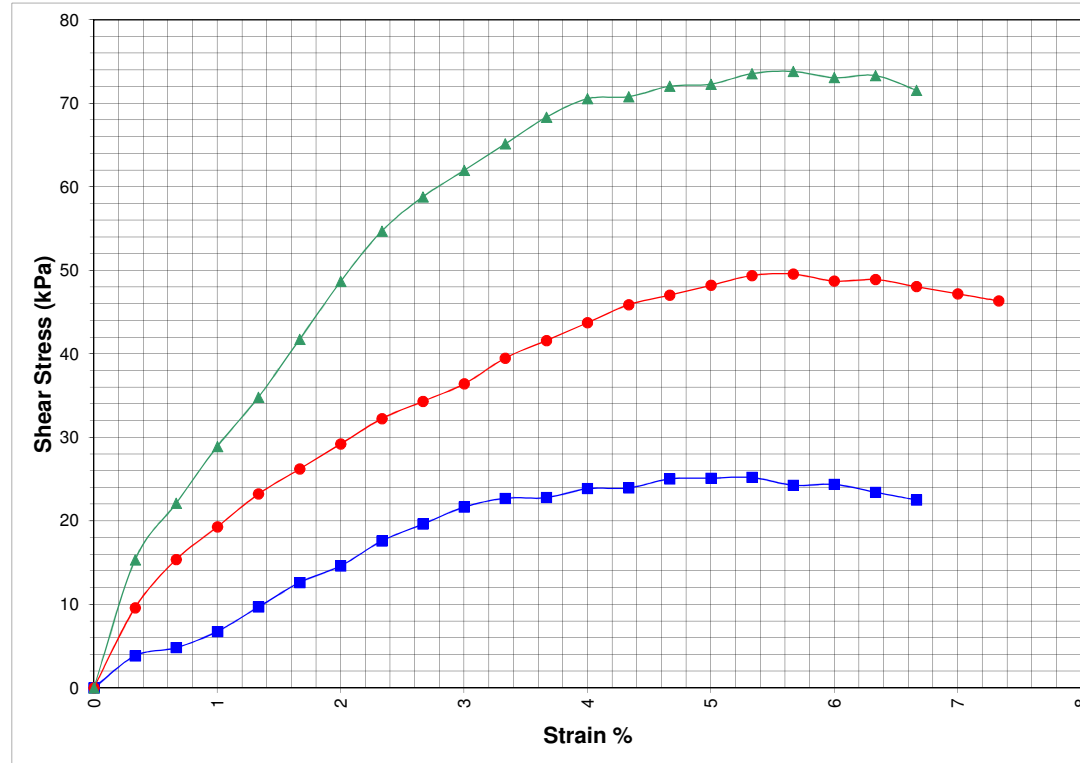
Borehole: LBH-14

Sample Type: SPT-16

Depth: 24.00-24.45 m

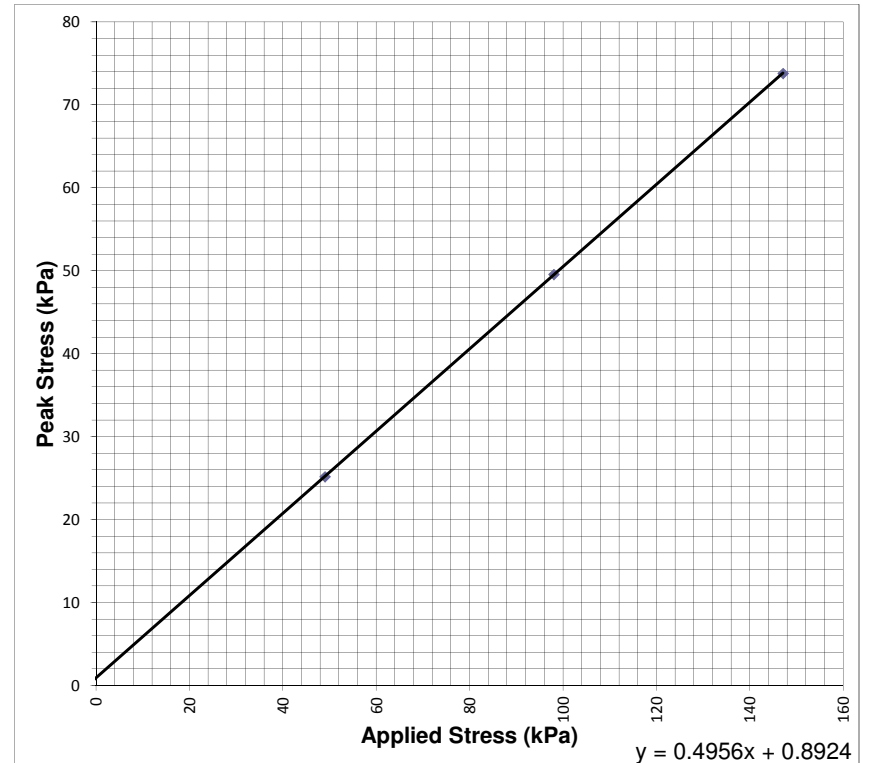
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	50
▲	Stage 3	147	74

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



Angle of Friction	26.36 °
Apparent Cohesion	0.89 kPa

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

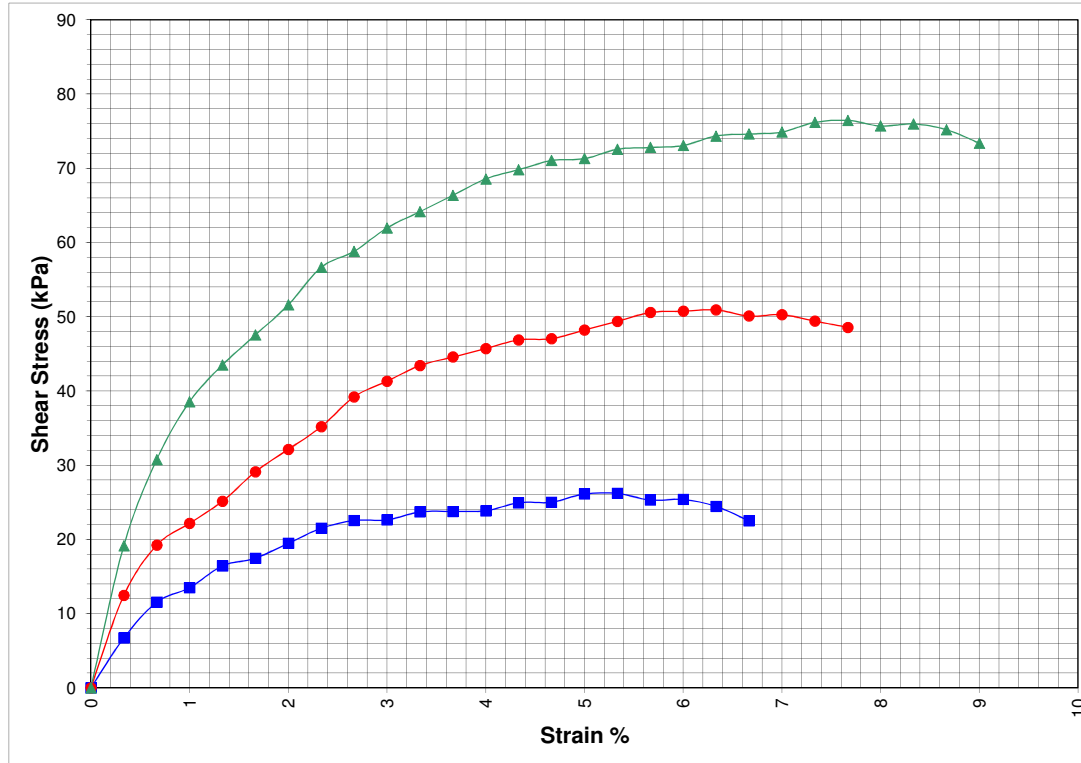
Borehole: LBH-14

Sample Type: SPT-18

Depth: 27.00-27.45 m

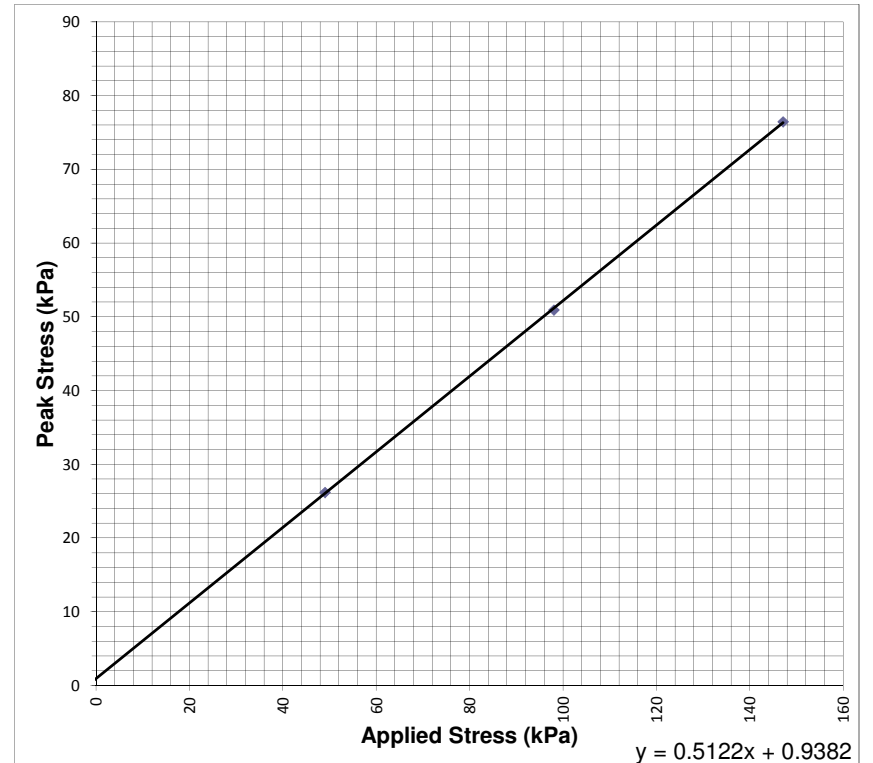
Direct Shear Test Results

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	27.12 °
Apparent Cohesion	0.94 kPa

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

Borehole: LBH-14

Sample Type: SPT-20

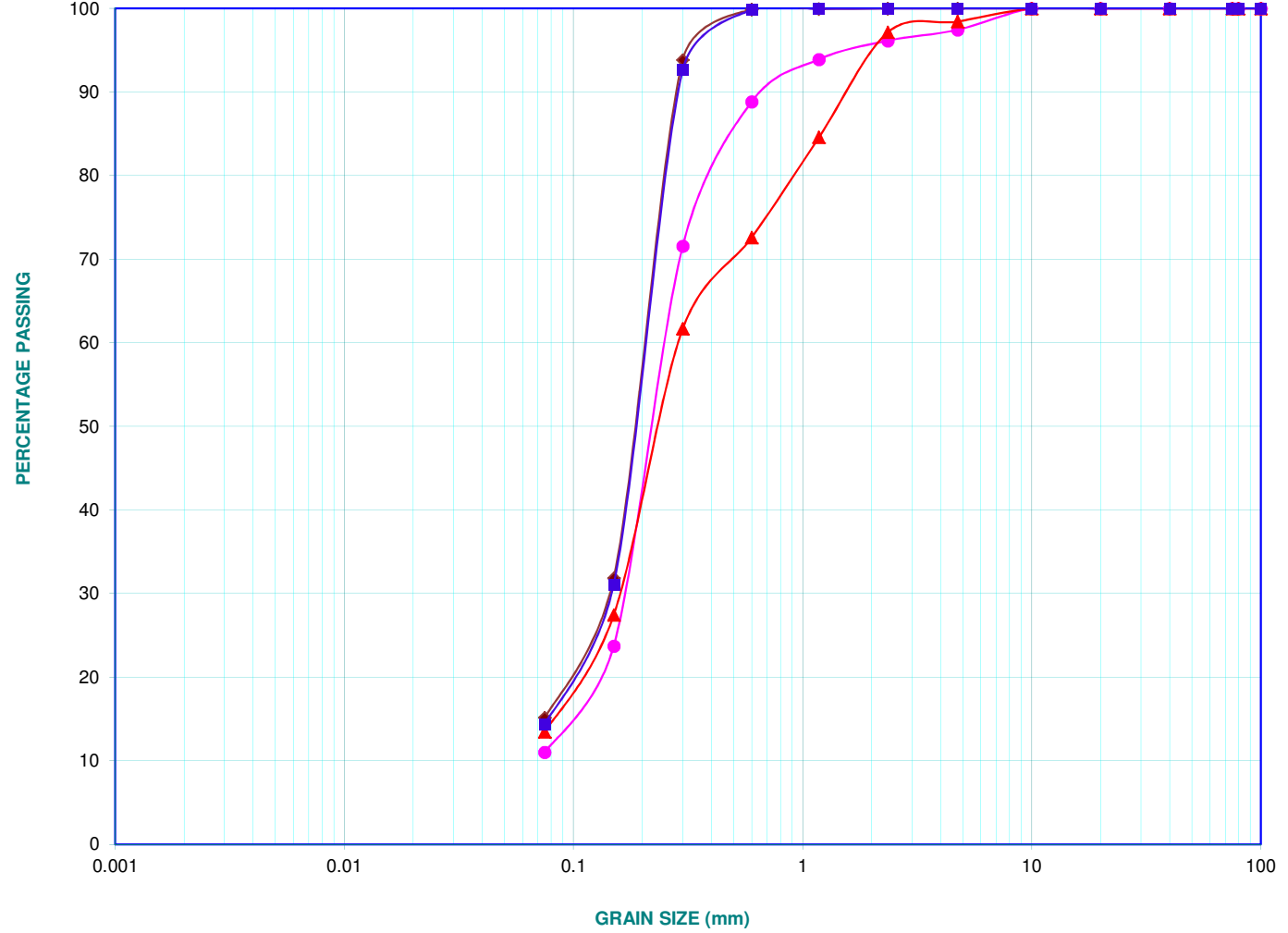
Depth: 30.00-30.45 m

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
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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
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83	84
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87	88
89	90
91	92
93	94
95	96
97	98
99	100

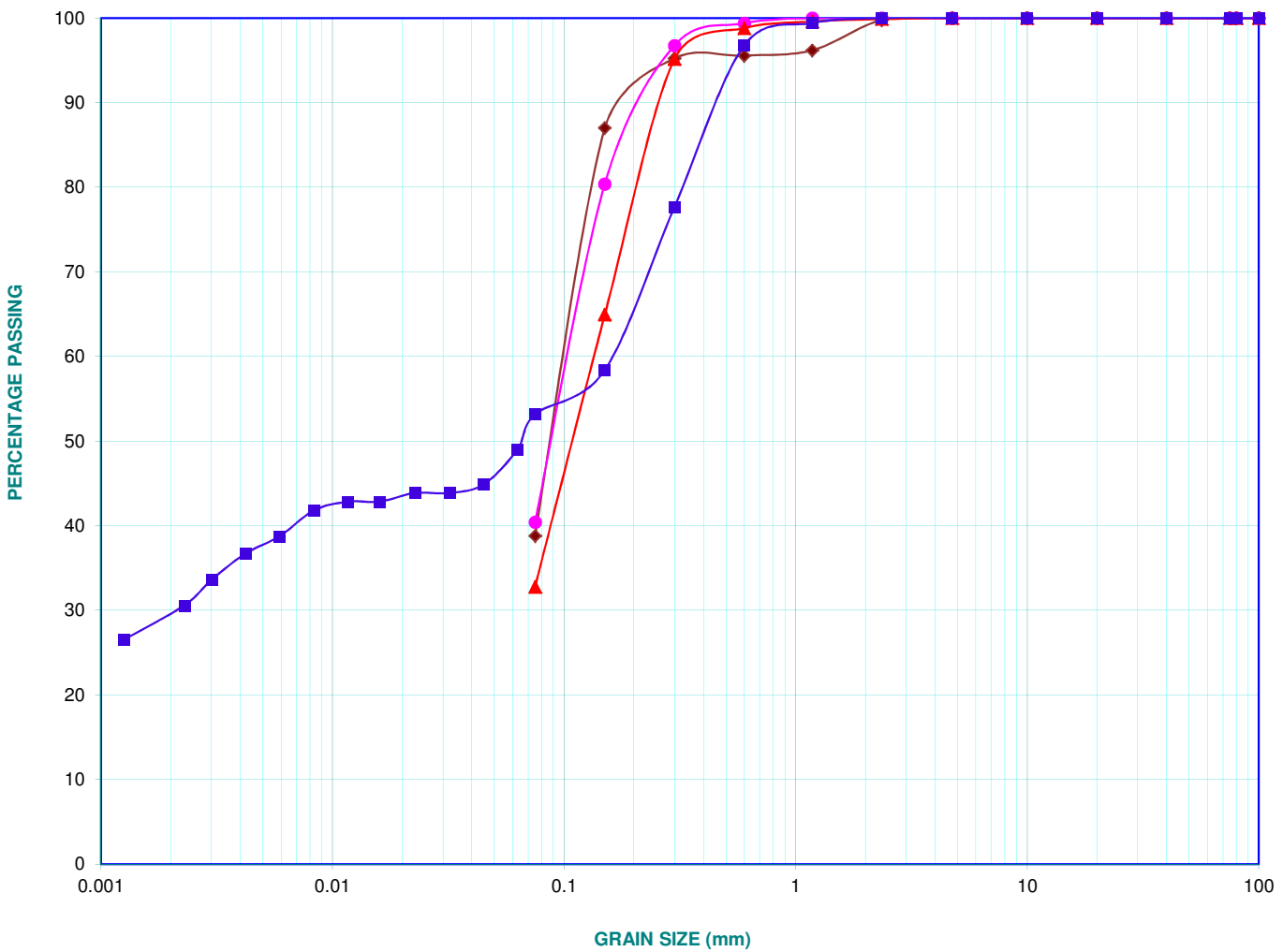
SAMPLE DETAILS		Soil Classification	CLASSIFICATION & INDEX													SHEAR STRENGTH TEST									Free swell Index %	Consolidation Tests				Chemical tests					
			Atterberg Limits			Physical Properties				Grain Size Distribution					Lateral & Vertical Loading Tests									Initial Void Ratio		Degree of Saturation %	Preconsolidation Pressure (kPa))	Compression Index	pH	Organic content (%)	Carbonate content (%)	Chloride content (ppm)	Sulphate content (ppm)		
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	SM / SC				22.2	19.22	9.16	15.73		0	85	<->	<->	15																				
SPT-2	1.50-1.65					20.2	19.51	9.45	15.97	2.60	3	86	<->	<->	11	DST			0.54	31.3															
SPT-3	3.00-3.22					18.0	19.18	9.12	15.70		2	85	<->	<->	13																				
SPT-4	4.50-4.68					21.9	19.22	9.16	15.76		0	86	<->	<->	14	DST			0.16	32.8															
SPT-5	6.00-6.16	SM / SC				24.5	18.78	8.72	15.08		0	61	<->	<->	39																				
SPT-6	7.50-7.70					25.2	18.78	8.72	15.00	2.63	0	60	<->	<->	40																				
SPT-7	9.00-9.15					25.6	19.10	9.04	15.21		0	67	<->	<->	33																				
SPT-8	10.50-10.95	CI	42.8	15.5	27.3	19.3	19.65	9.59	16.48	2.57	0	47	22	31	53																				
SPT-9	12.00-12.45					17.4	19.66	9.60	16.75	2.55	0	49	22	29	51																				
SPT-10	13.50-13.60	SC	32.1	14.9	17.2	20.4	19.19	9.13	15.94	2.58	0	75	9	16	25																				
SPT-11	15.30-15.45					16.1	19.52	9.46	16.82		0	87	<->	<->	13	DST			0.99	27.6															
SPT-12	16.65-16.85					17.2	19.68	9.62	16.78	2.64	0	77	<->	<->	23	DST			1.85	30.7															
SPT-13	18.15-18.30	SM / SC				20.3	19.22	9.16	15.98		0	59	<->	<->	41																				
SPT-14	19.65-19.95					22.3	19.25	9.19	15.74	2.61	0	74	<->	<->	26	DST			1.11	31.4															
SPT-15	21.20-21.45				18.6	19.37	9.31	16.33	2.54	0	44	27	29	56																					
SPT-16	22.50-22.95	SM / SC				18.2	20.31	10.25	17.18	2.56	0	79	15	6	21																				
SPT-17	24.00-24.45	CI	45.0	18.2	26.8	24.2	19.65	9.59	15.83	2.55	0	28	43	29	72																				
SPT-18	25.50-25.95					21.6	19.66	9.60	16.17	2.54	0	17	51	32	83																				
SPT-19	27.20-27.38					26.7	19.65	9.59	15.51	2.61	0	18	<->	<->	82																				
END OF BOREHOLE																																			

[illegible]

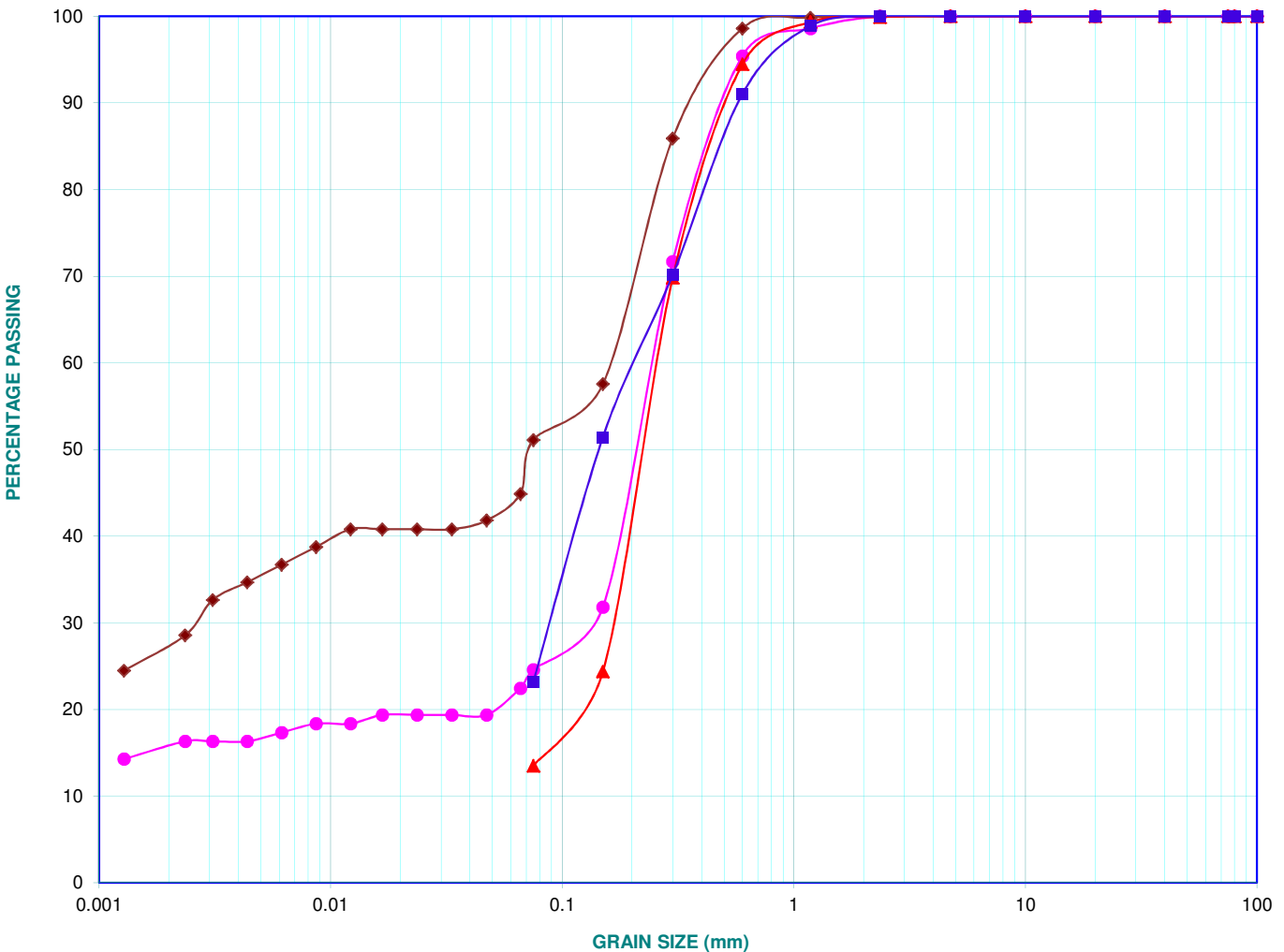
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-15					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-15	MBH-15	MBH-15	MBH-15										
Depth (m)	0.00-0.20	1.50-1.65	3.00-3.22	4.50-4.68										
Sample Type	SPT-1	SPT-2	SPT-3	SPT-4										
Classification	SM / SC	SM / SC	SM / SC	SM / SC										
Gravel %	0	3	2	0										
Sand %	85	86	85	86										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	15	11	13	14										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

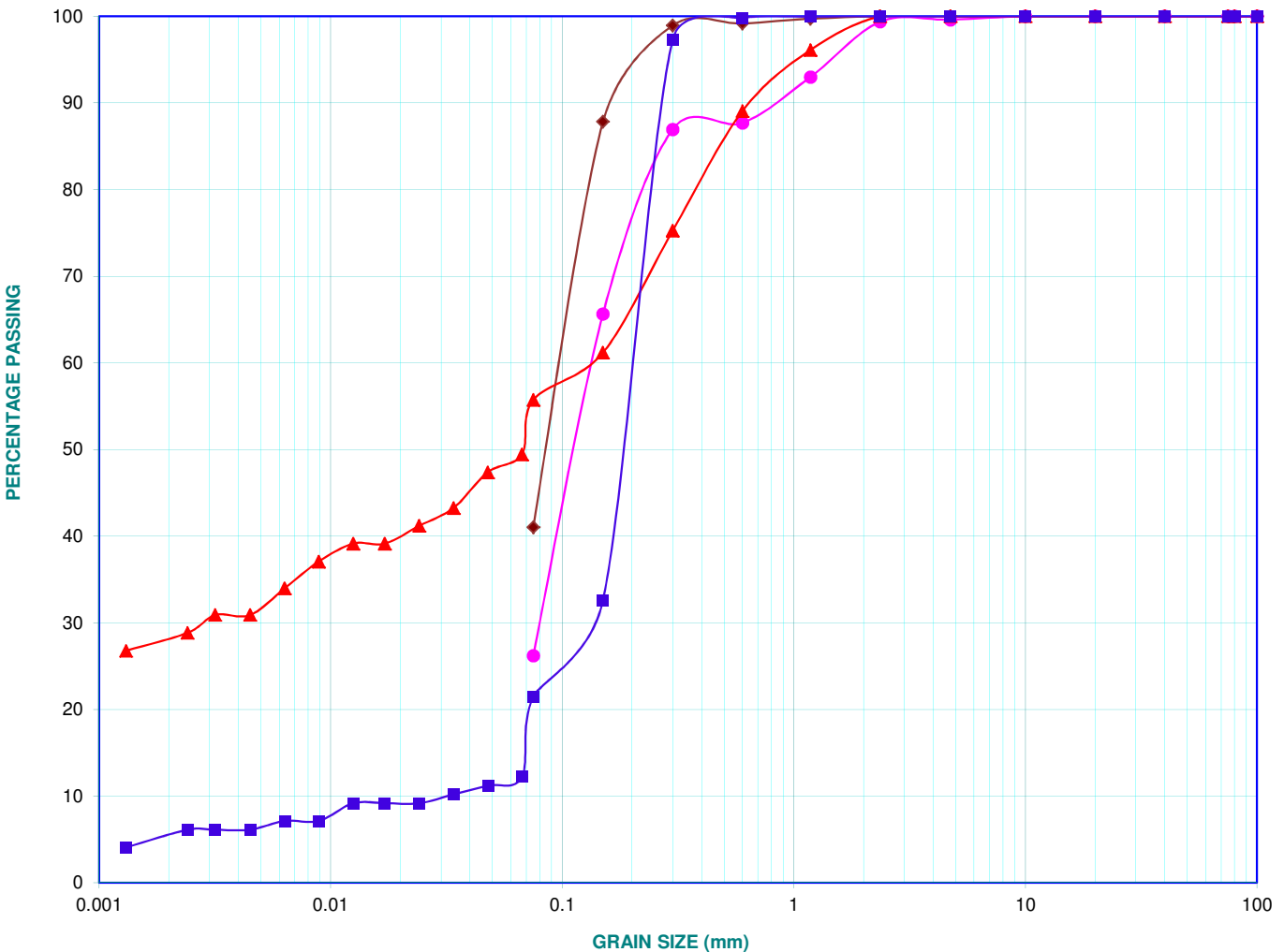
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-15					Date :		8-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-15	MBH-15	MBH-15	MBH-15										
Depth (m)	6.00-6.16	7.50-7.70	9.00-9.15	10.50-10.95										
Sample Type	SPT-5	SPT-6	SPT-7	SPT-8										
Classification	SM / SC	SM / SC	SM / SC	CI										
Gravel %	0	0	0	0										
Sand %	61	60	67	47										
Silt %	<---->	<---->	<---->	22										
Clay %	<---->	<---->	<---->	31										
Fines % (Silt+Clay)	39	40	33	53										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	42.8										
Plastic Limit %	---	---	---	15.5										
Plasticity Index	---	---	---	27.3										
									Checked By :					

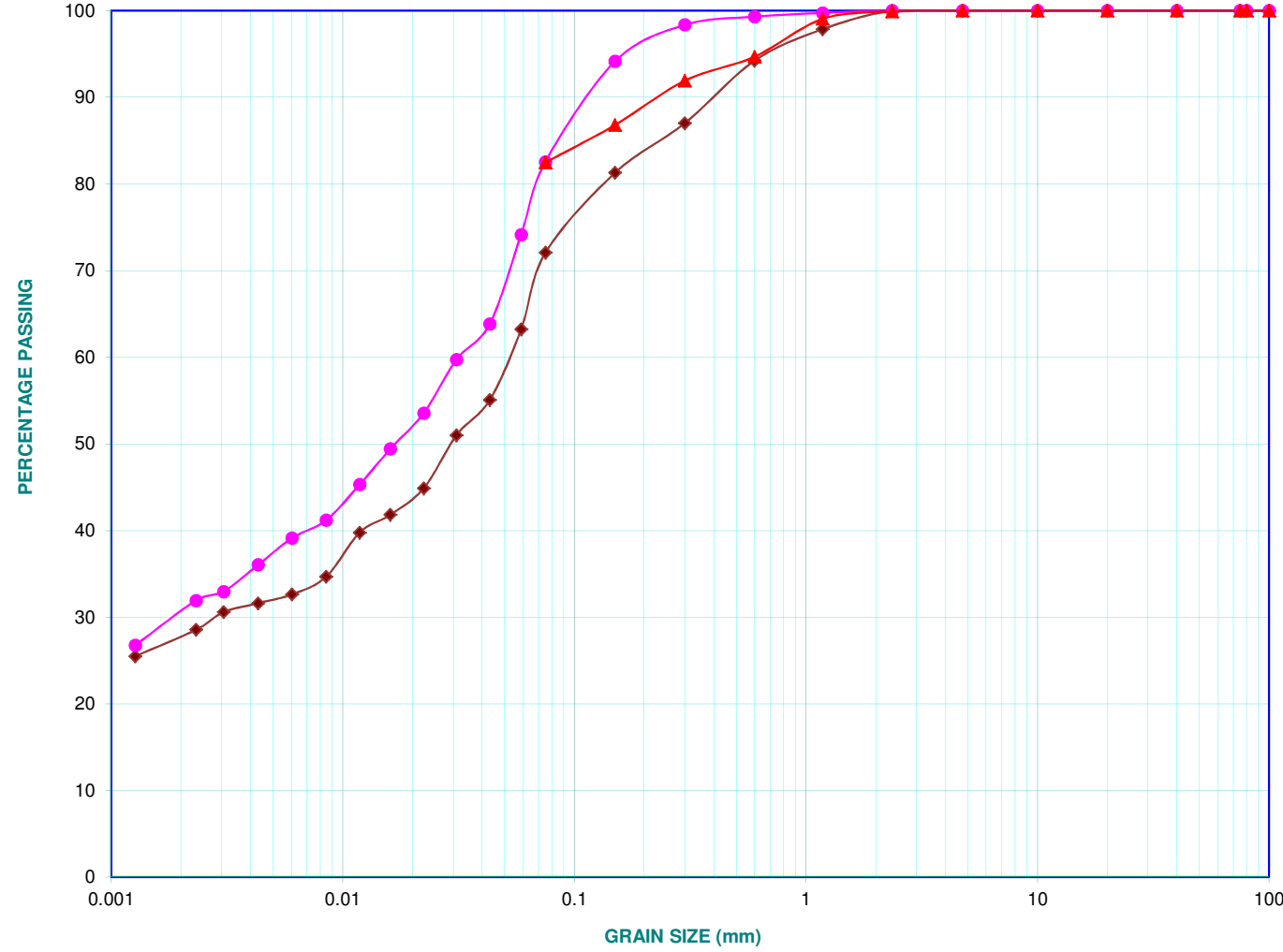
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-15					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-15	MBH-15	MBH-15	MBH-15										
Depth (m)	12.00-12.45	13.50-13.60	15.30-15.45	16.65-16.85										
Sample Type	SPT-9	SPT-10	SPT-11	SPT-12										
Classification		SC	SC	SC										
Gravel %	0	0	0	0										
Sand %	49	75	87	77										
Silt %	22	9	<---->	<---->										
Clay %	29	16	<---->	<---->										
Fines % (Silt+Clay)	51	25	13	23										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	32.1	---	---										
Plastic Limit %	---	14.9	---	---										
Plasticity Index	---	17.2	---	---										
									Checked By :					

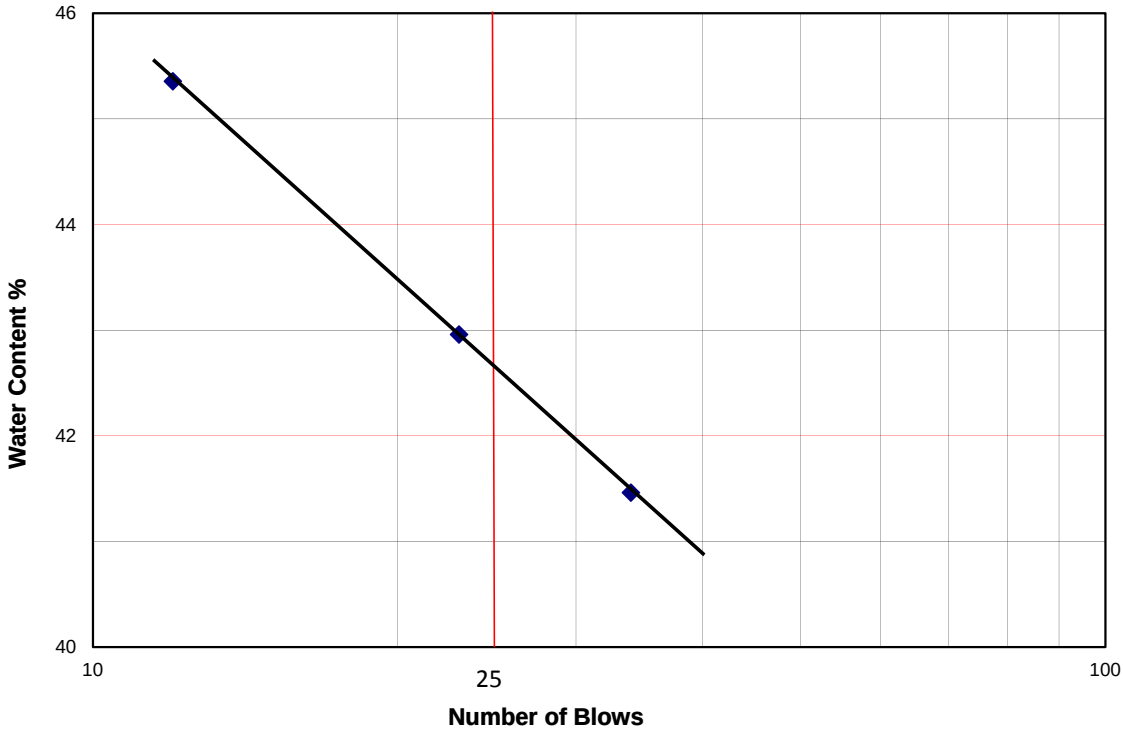
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-15					Date :			8-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-15	MBH-15	MBH-15	MBH-15										
Depth (m)	18.15-18.30	19.65-19.95	21.20-21.45	22.50-22.95										
Sample Type	SPT-13	SPT-14	SPT-15	SPT-16										
Classification	SC	SM / SC		SM / SC										
Gravel %	0	0	0	0										
Sand %	59	74	44	79										
Silt %	<---->	<---->	27	15										
Clay %	<---->	<---->	29	6										
Fines % (Silt+Clay)	41	26	56	21										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-15					Date :		8-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-15	MBH-15	MBH-15											
Depth (m)	24.00-24.45	25.50-25.95	27.20-27.38											
Sample Type	SPT-17	SPT-18	SPT-19											
Classification	CI	CI	CI											
Gravel %	0	0	0											
Sand %	28	17	18											
Silt %	43	51	<---->											
Clay %	29	32	<---->											
Fines % (Silt+Clay)	72	83	82											
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	45.0	---	---											
Plastic Limit %	18.2	---	---											
Plasticity Index	26.8	---	---											
									Checked By :					

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



Liquid Limit %

Wet Weight + Can (g)	24.17	29.23	32.04		
Dry Weight + Can (g)	19.58	24.38	25.89		
Can Weight (g)	8.51	13.09	12.33		
Water Content, %	41.5	43.0	45.4		
Number of Blows	34	23	12		

Plastic Limit %

Wet Weight + Can (g)	16.23	17.67	15.54
Dry Weight + Can (g)	15.18	16.51	15.21
Can Weight (g)	8.50	8.93	13.09
Water Content, %	15.7	15.3	15.6

Liquid Limit % 42.8
Plastic Limit % 15.5
Plasticity Index % 27.3

Preparation of Sample :
Dry State

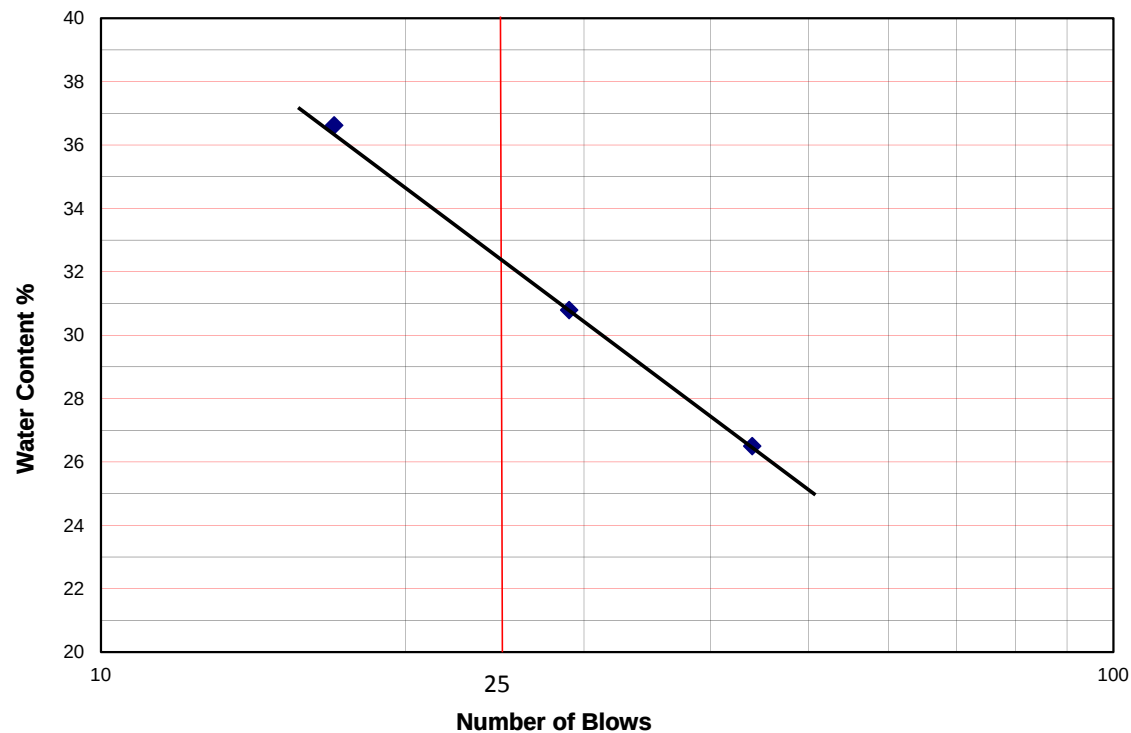
Sample Type: SPT-8

Borehole no.: MBH-15

Depth :10.50-10.95

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)	25.28	27.38	30.91		
Dry Weight + Can (g)	22.58	23.75	26.34		
Can Weight (g)	12.39	11.96	13.86		
Water Content, %	26.5	30.8	36.6		
Number of Blows	44	29	17		

Plastic Limit %

Wet Weight + Can (g)	15.57	16.32	16.77
Dry Weight + Can (g)	14.78	15.19	15.72
Can Weight (g)	9.51	7.60	8.63
Water Content, %	15.0	14.9	14.8

Liquid Limit % 32.1
Plastic Limit % 14.9
Plasticity Index % 17.2

Preparation of Sample :
Dry State

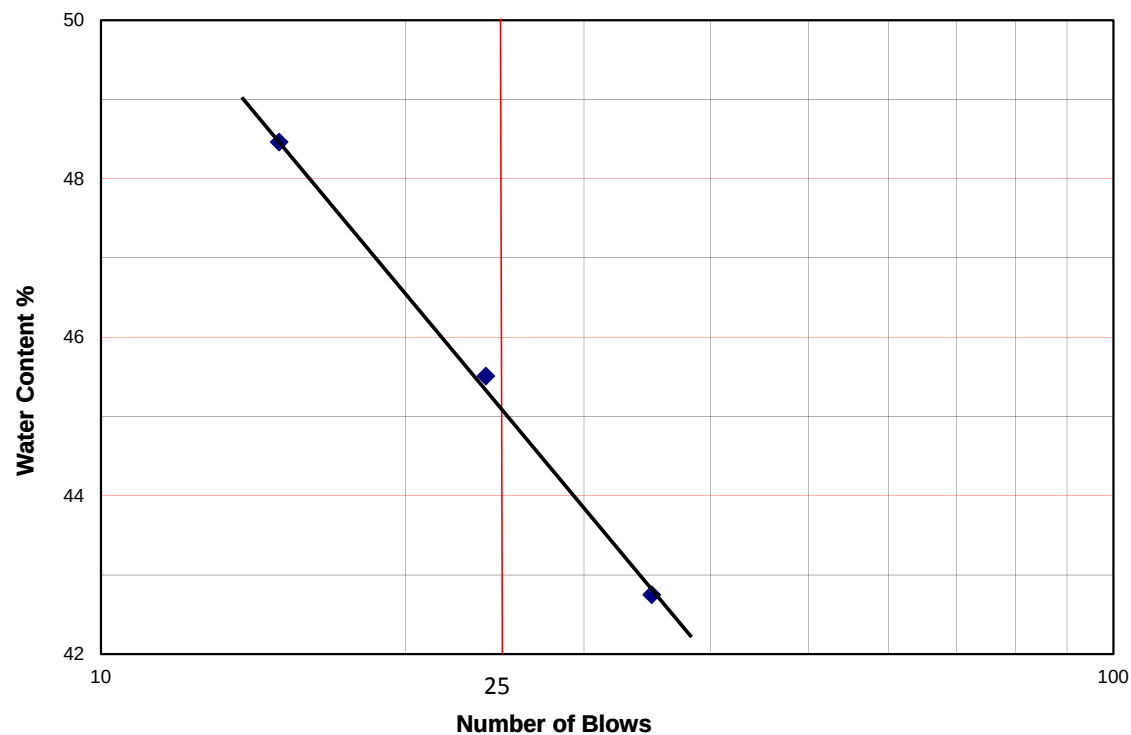
Sample Type: SPT-10

Borehole no.: MBH-15

Depth :13.50-13.60

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)	25.95	30.10	34.09		
Dry Weight + Can (g)	22.00	24.63	27.16		
Can Weight (g)	12.76	12.61	12.86		
Water Content, %	42.7	45.5	48.5		
Number of Blows	35	24	15		

Plastic Limit %

Wet Weight + Can (g)	17.75	16.83	15.22
Dry Weight + Can (g)	17.00	15.73	14.32
Can Weight (g)	12.93	9.47	9.52
Water Content, %	18.4	17.6	18.8

Liquid Limit % 45.0
Plastic Limit % 18.2
Plasticity Index % 26.8

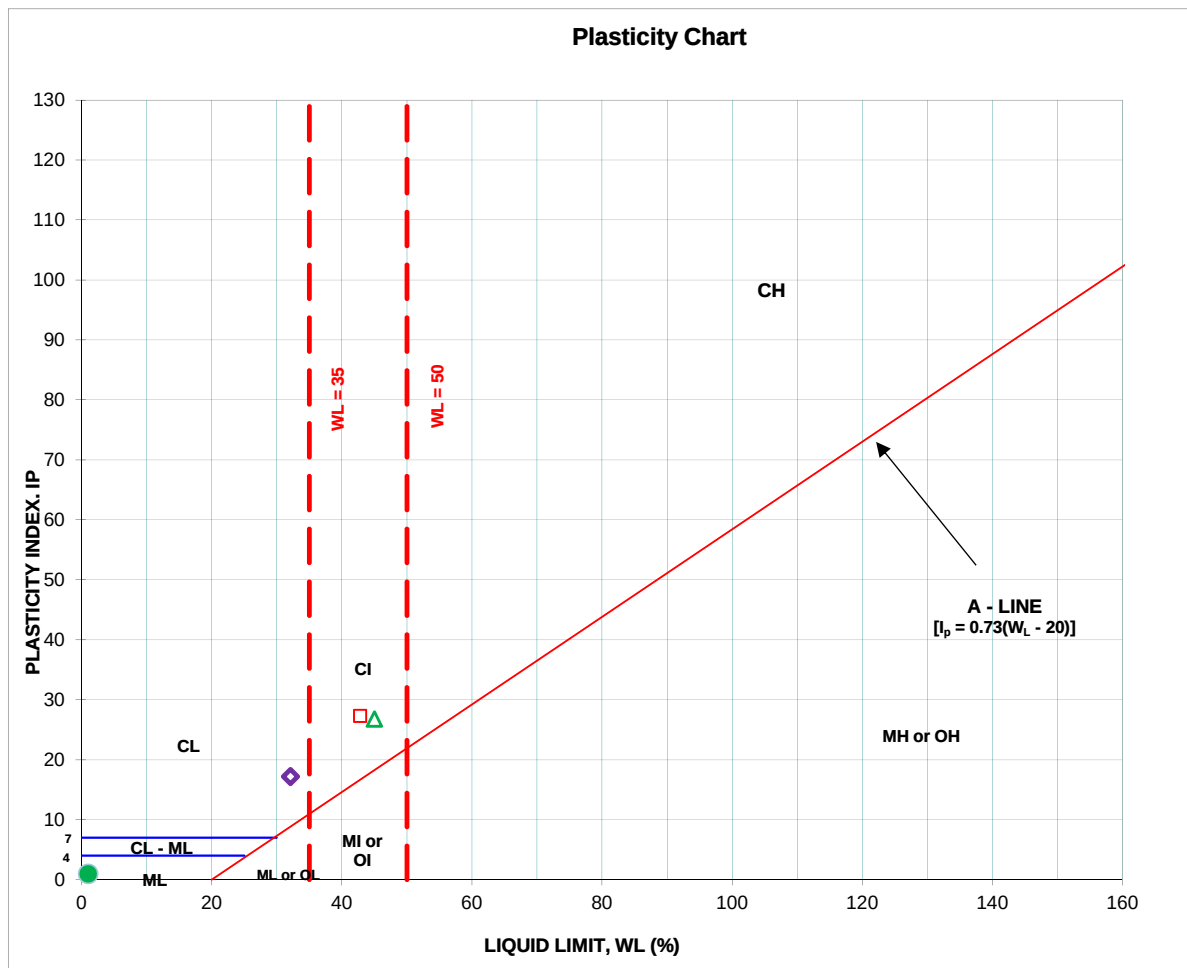
Preparation of Sample :
Dry State

Sample Type: SPT-17

Borehole no.: MBH-15

Depth :24.00-24.45

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-08	10.50-10.95	42.8	15.5	27.3	CI: Clays with Intermediate plasticity
◇	SPT-10	13.50-13.60	32.1	14.9	17.2	CL: Inorganic clays of low to medium plasticity.
△	SPT-15	24.00-24.45	45.0	18.2	26.8	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

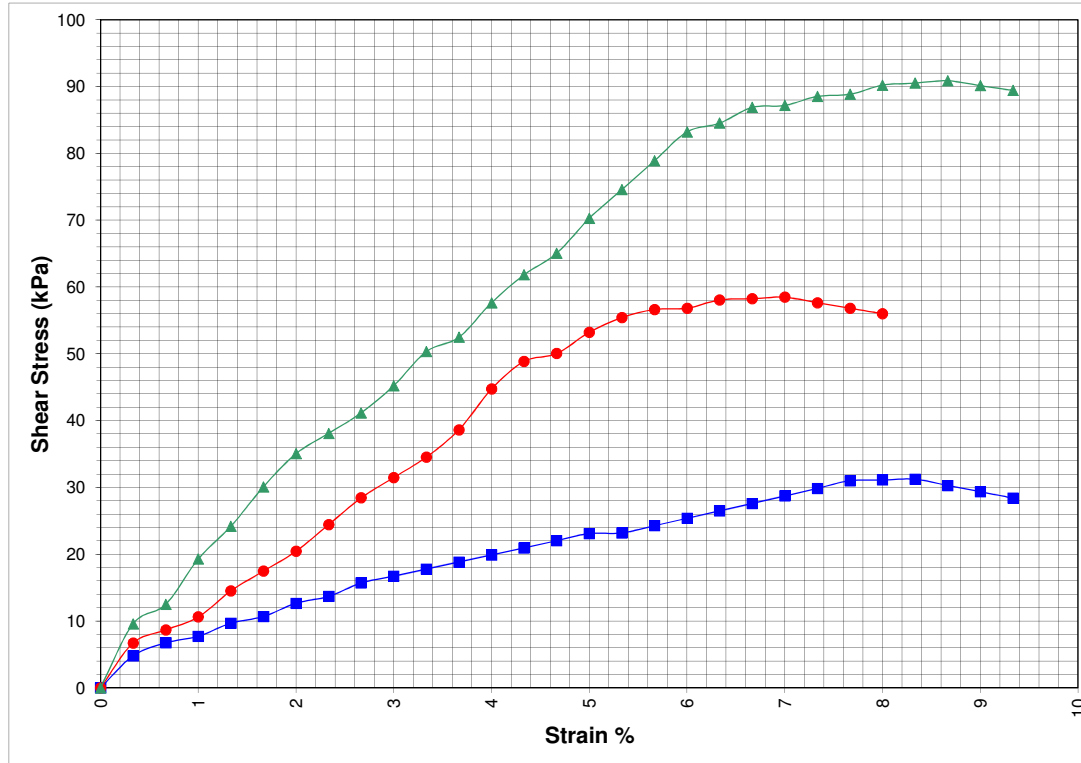
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-15

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

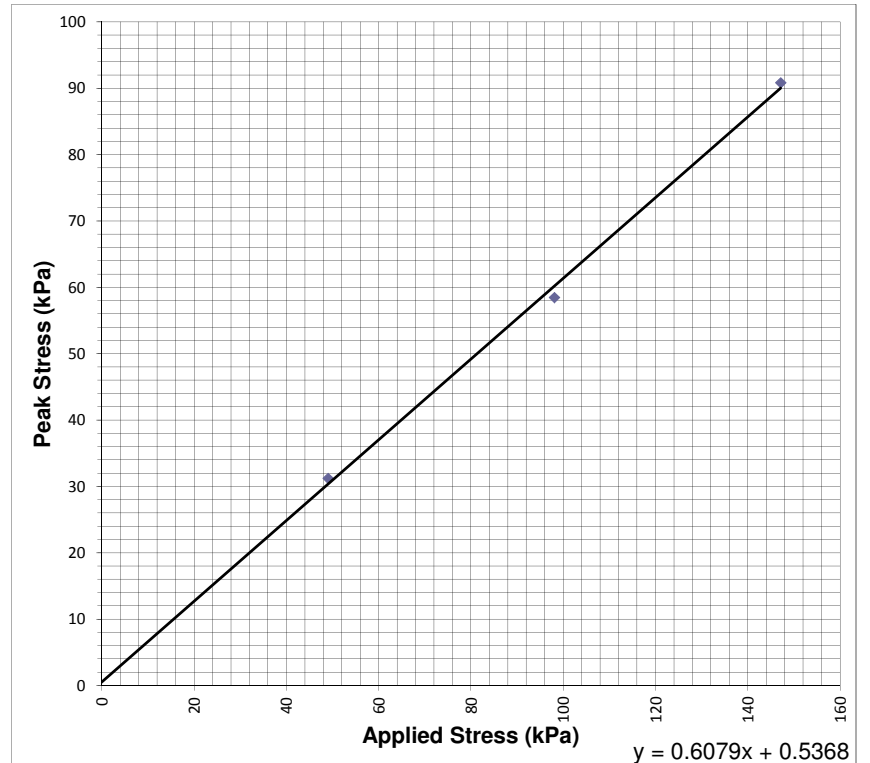
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	58
▲	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	31.3 °
Apparent Cohesion	0.54 kPa

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

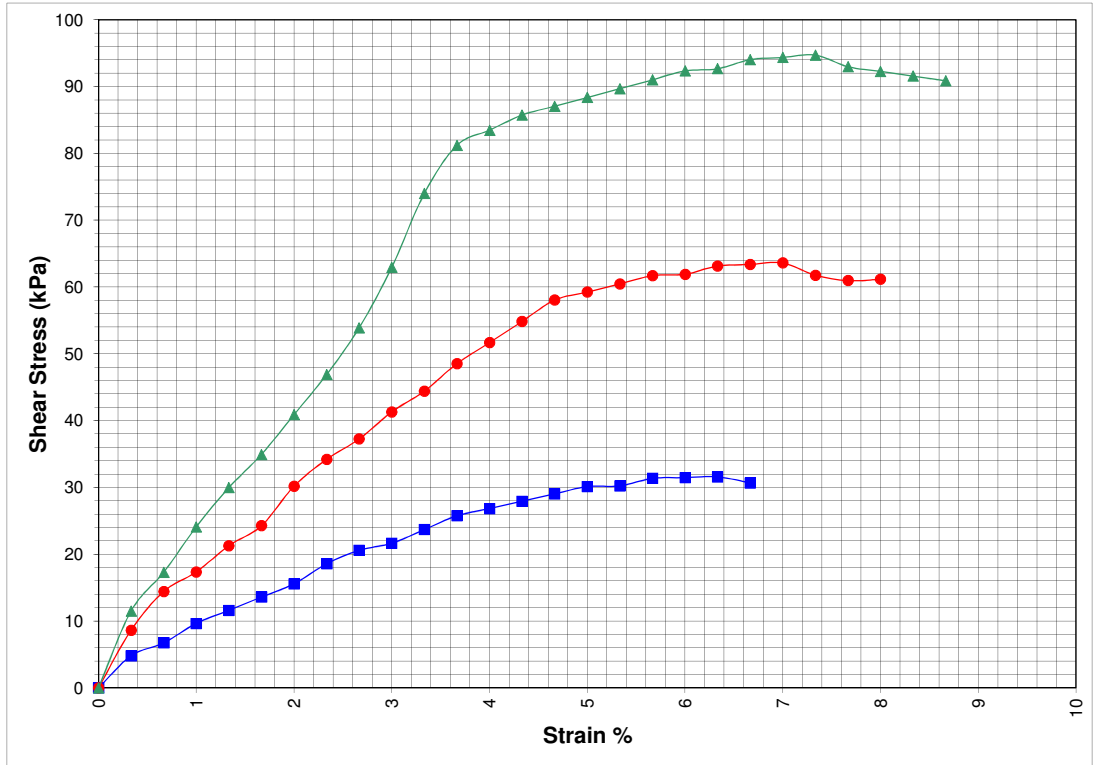
Borehole: MBH-15

Sample Type: SPT-02

Depth: 1.50-1.65 m

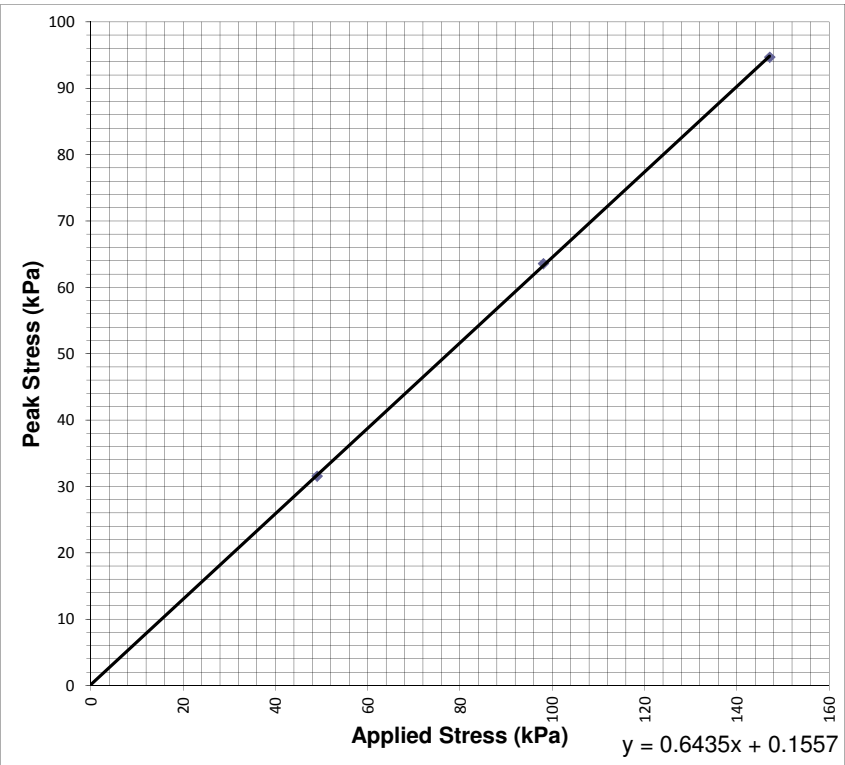
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	32
●	Stage 2	98	64
▲	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	32.8 °
Apparent Cohesion	0.16 kPa

Borehole: MBH-15

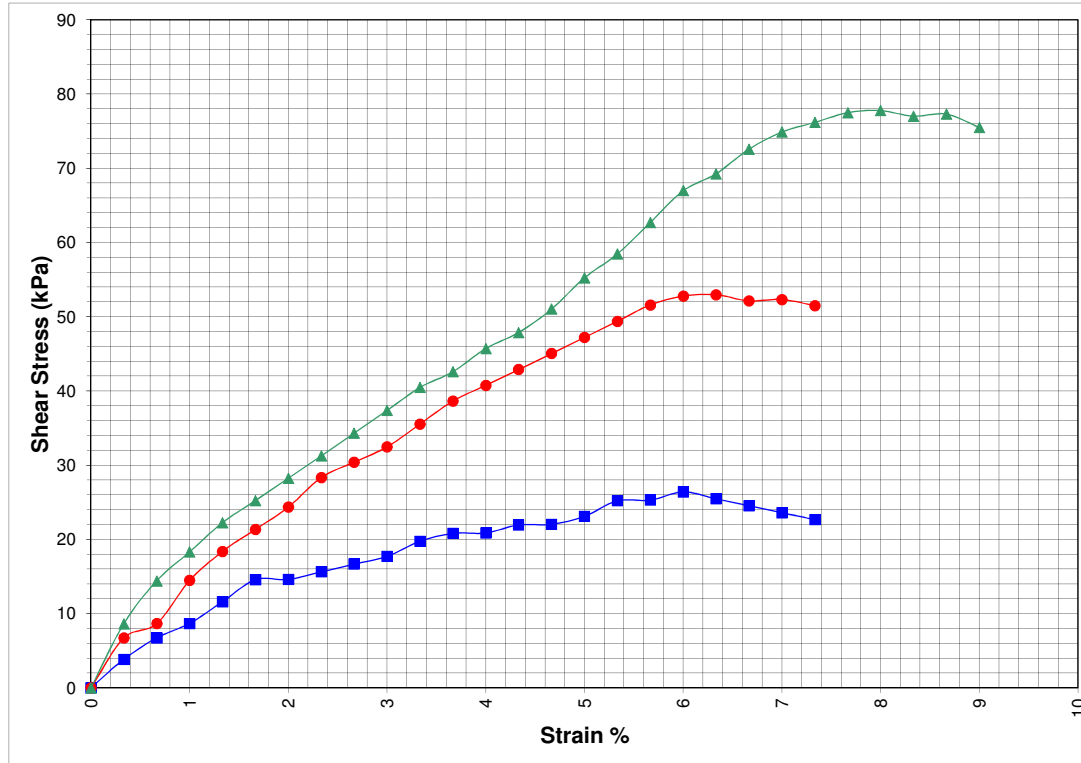
Sample Type: SPT-04

Depth: 4.50-4.68 m

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

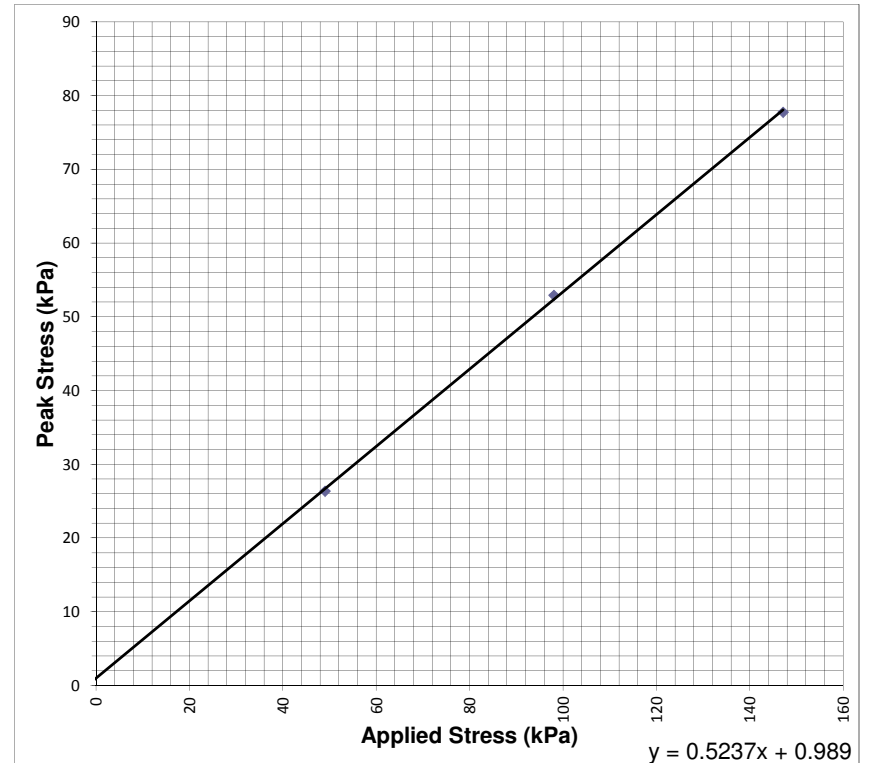
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	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	27.6 °
Apparent Cohesion	0.99 kPa

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

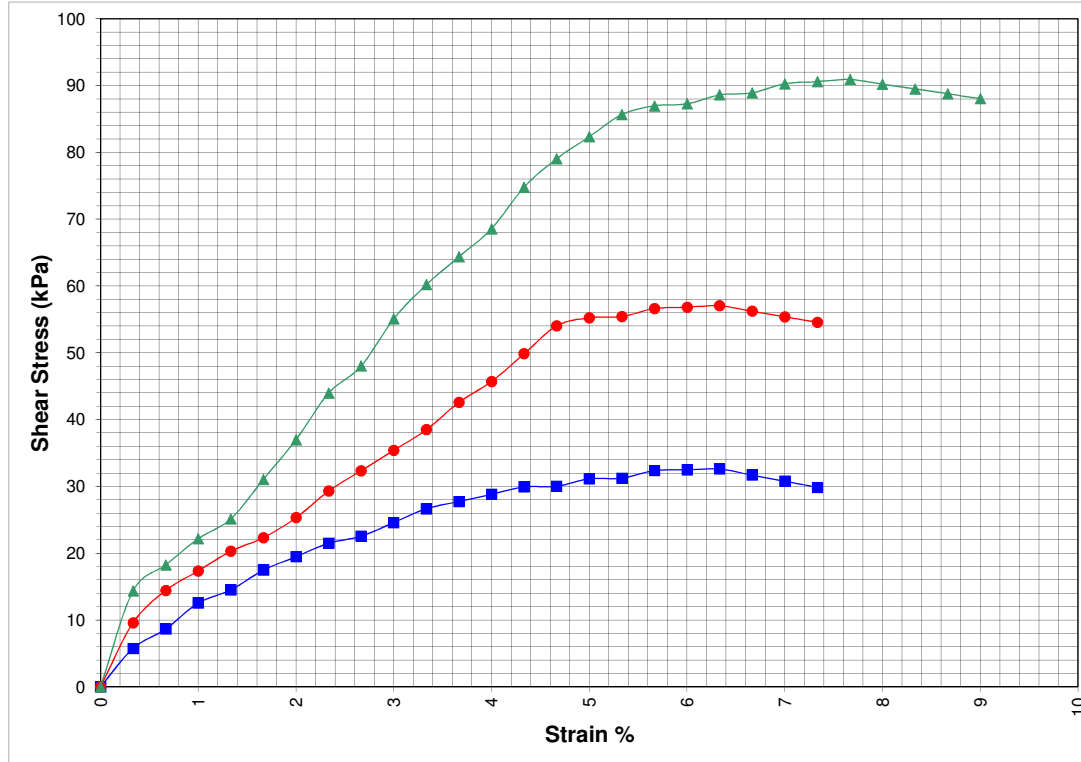
Borehole: MBH-15

Sample Type: SPT-11

Depth: 15.30-15.45 m

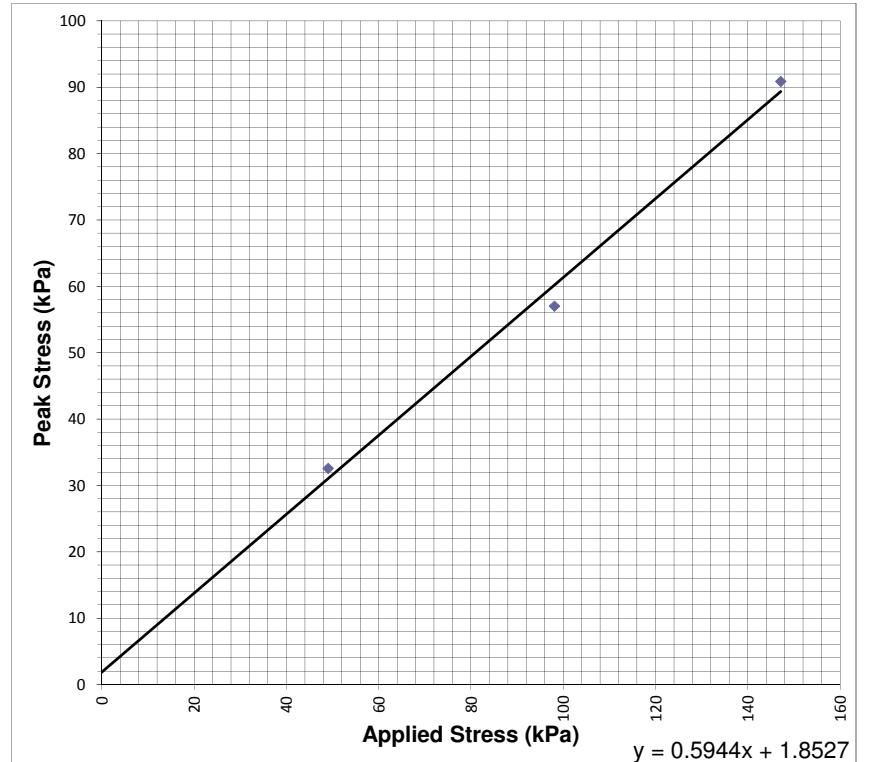
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	33
●	Stage 2	98	57
▲	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	30.7 °
Apparent Cohesion	1.85 kPa

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

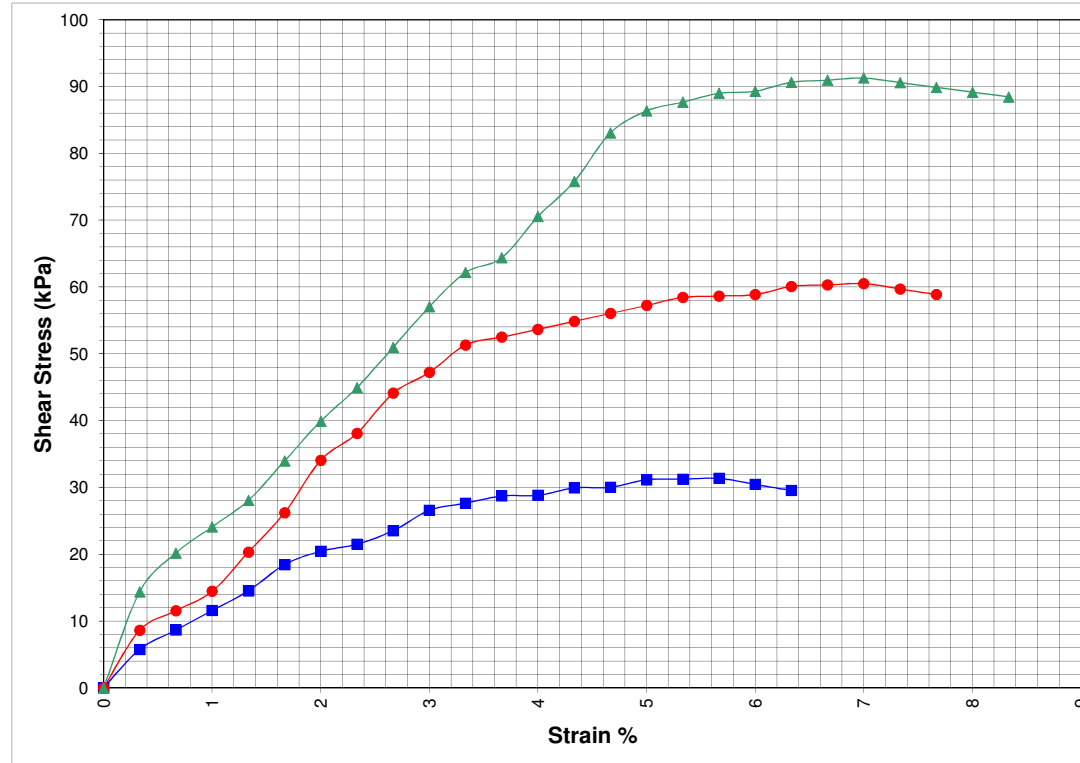
Borehole: MBH-15

Sample Type: SPT-12

Depth: 16.65-16.85 m

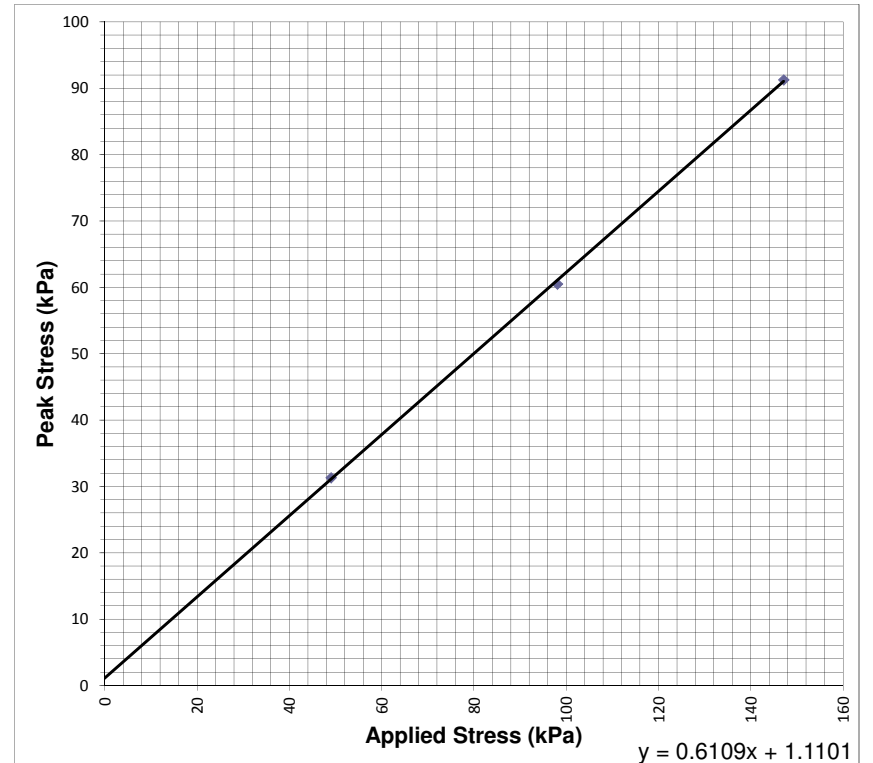
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	61
▲	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	1.11 kPa

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

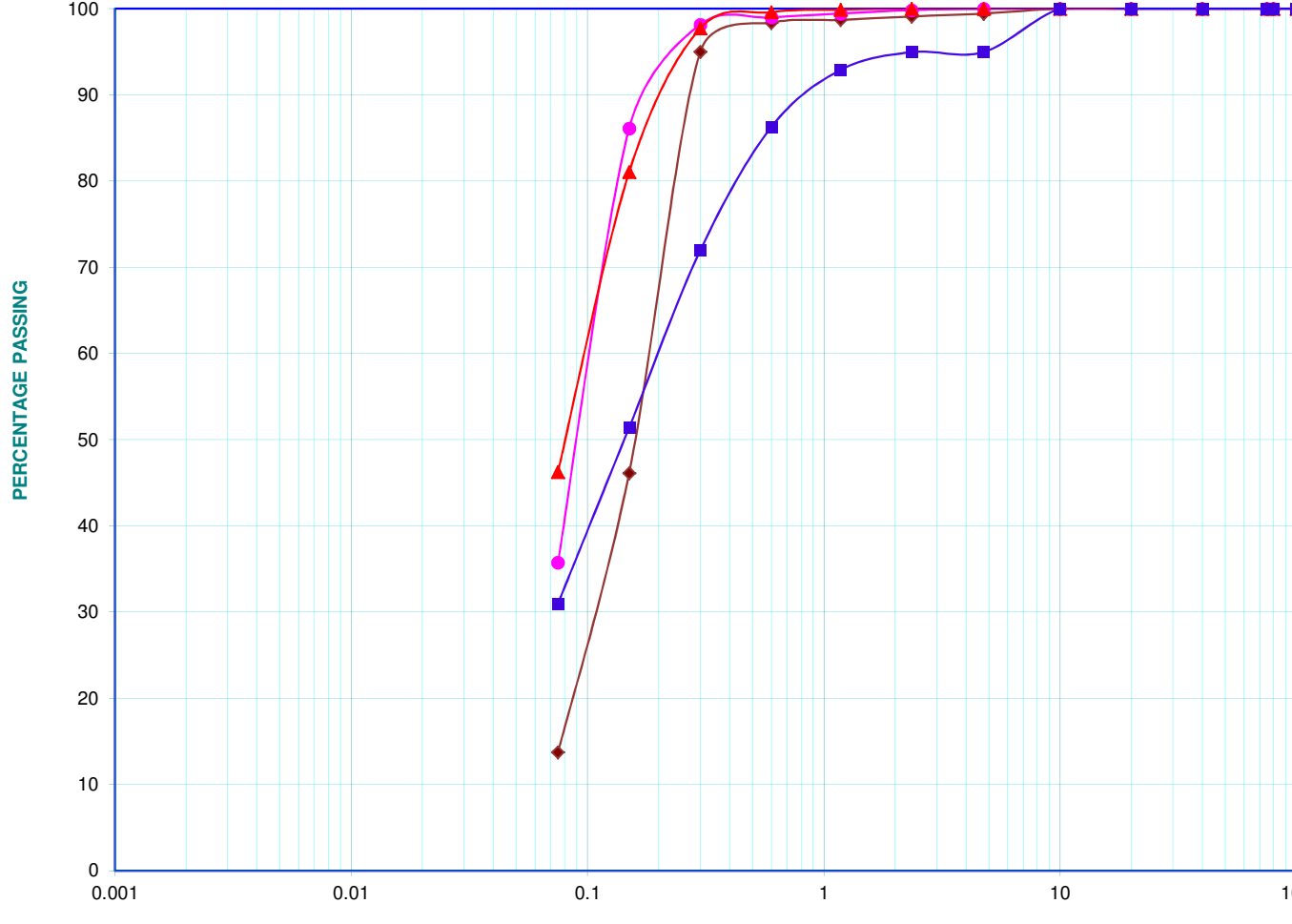
Borehole: MBH-15

Sample Type: SPT-14

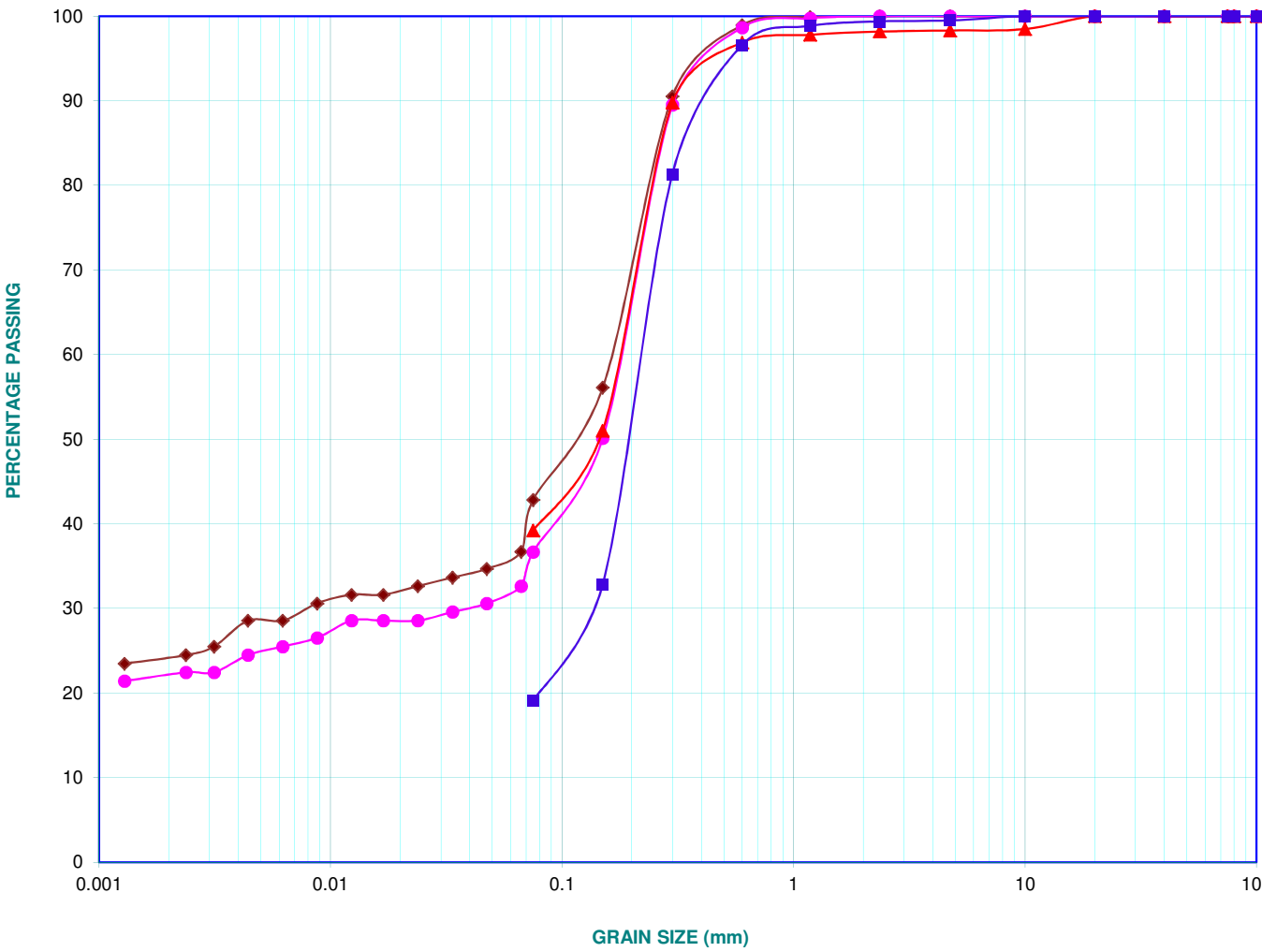
Depth: 19.65-19.95 m

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	0.00-0.45	SM \ SC				16.1	18.96	8.90	16.34	2.58																									
SPT-2	1.50-1.95					20.7	18.85	8.79	16.24		1	85	<-->	<-->	14																				
SPT-3	3.00-3.45					25.2	18.49	8.43	15.93		0	64	<-->	<-->	36																				
SPT-4	4.50-4.95					20.6	19.77	9.71	16.39		0	54	<-->	<-->	46	DST			3.18	29.6															
SPT-5	6.00-6.45					18.8	20.44	10.38	17.20		5	64	<-->	<-->	31																				
SPT-6	7.57-7.95	SC	30.6	13.3	17.3	18.2	20.52	10.46	17.36	2.56	0	57	19	24	43									77.8						8.33	2.59	1.00	1800	7080	
SPT-7	9.00-9.45		30.1	13.3	16.8	16.1	20.53	10.47	17.68	2.57	0	63	15	22	37																				
SPT-8	10.50-10.70	SM \ SC				20.3	20.34	10.28	16.91		2	59	<-->	<-->	39																				
SPT-8	10.70-10.95					17.3	19.03	8.97	16.23		1	80	<-->	<-->	19																				
SPT-9	12.20-12.45					15.0	19.95	9.89	17.36	2.60	0	81	<-->	<-->	19	DST			1.11	28.6															
SPT-10	13.65-13.95					19.7	19.97	9.91	16.69		0	64	<-->	<-->	36																				
SPT-11	15.20-15.45					22.3	19.95	9.89	16.32		0	58	<-->	<-->	42																				
SPT-12	16.75-16.95	SM \ SC				23.9	19.50	9.44	15.74	2.58	0	68	30	2	32																				
SPT-13	18.00-18.20					17.8	19.42	9.36	16.48		0	89	<-->	<-->	11																				
SPT-13	18.20-18.45					24.5	19.50	9.44	15.66		0	25	<-->	<-->	75																				
SPT-14	19.50-19.95	SM \ SC				16.2	20.26	10.20	17.44	2.57	0	54	34	12	46																				
SPT-15	21.00-21.45	SM \ SC				14.4	19.95	9.89	17.44	2.54	0	70	16	14	30																				
END OF BOREHOLE																																			
Notes :																																			
DS : Disturbed Sample						* : Insufficient sample						# : Decayed Wood						Failure Type						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											

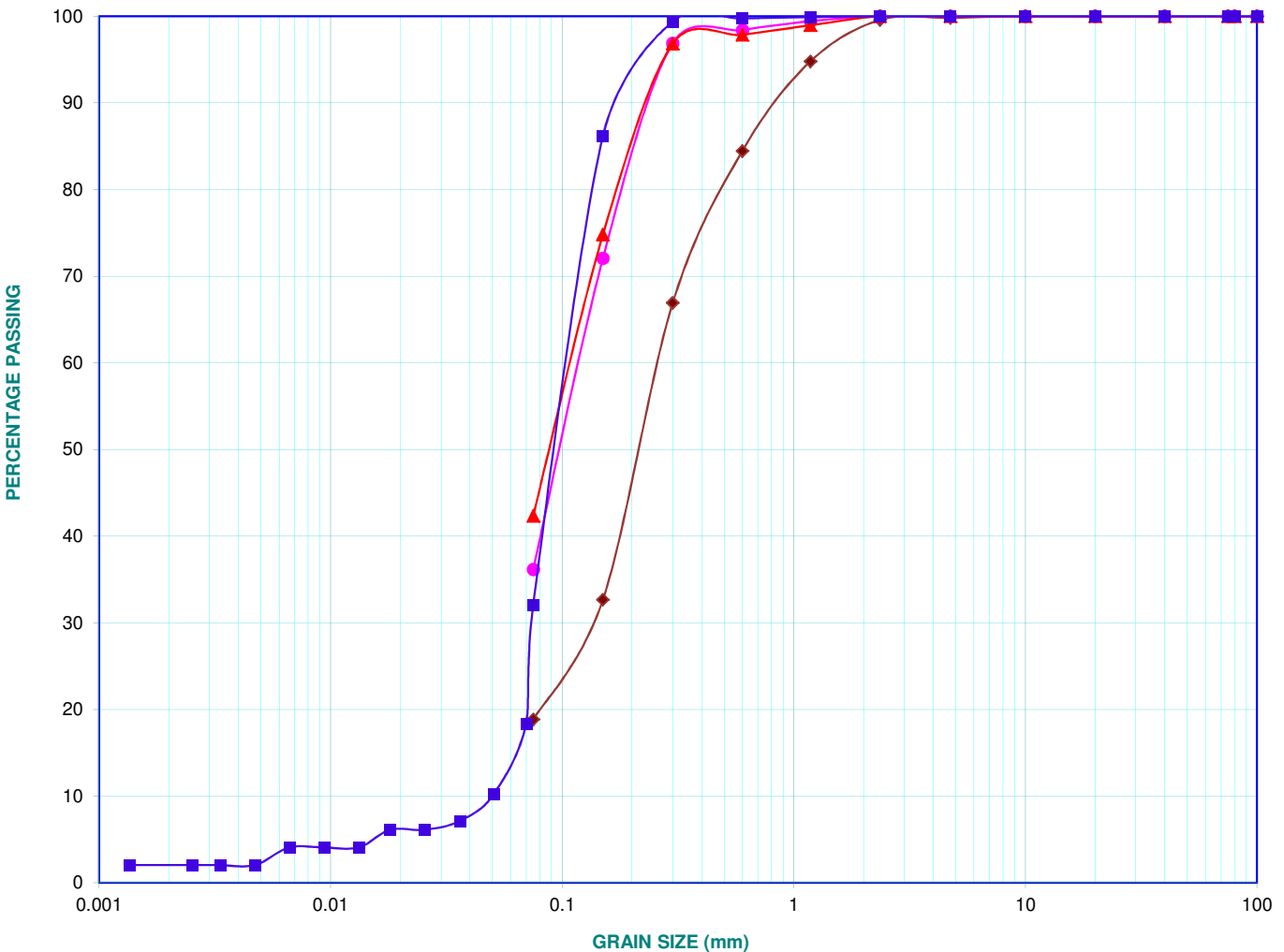
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-16					Date :		9-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-16	MBH-16	MBH-16	MBH-16										
Depth (m)	1.50-1.95	3.00-3.45	4.50-4.95	6.00-6.45										
Sample Type	SPT-2	SPT-3	SPT-4	SPT-5										
Classification	SM \ SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	1	0	0	5										
Sand %	85	64	54	64										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	14	36	46	31										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

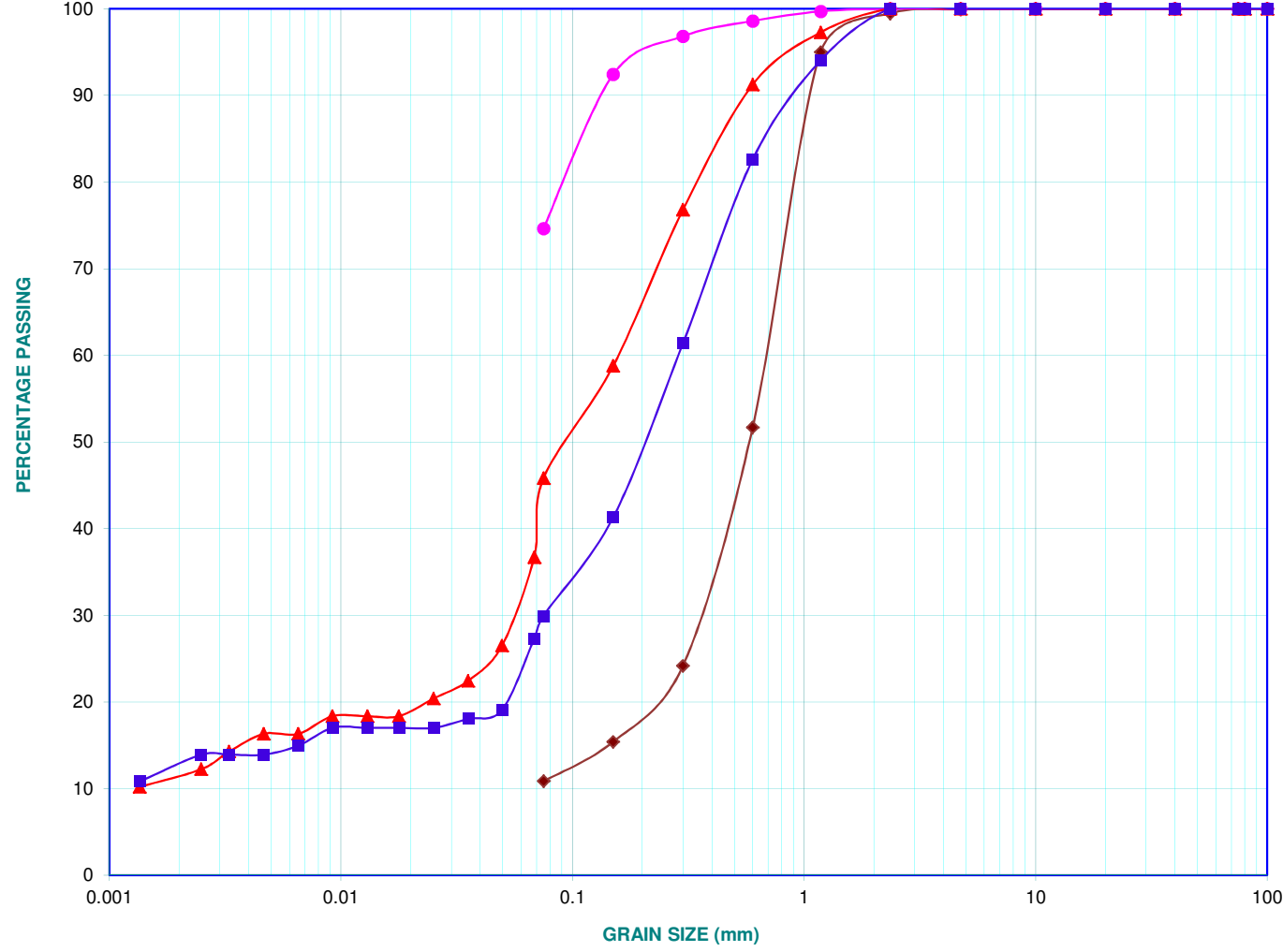
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-16					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-16	MBH-16	MBH-16	MBH-16										
Depth (m)	7.50-7.95	9.00-9.45	10.50-10.70	10.70-10.95										
Sample Type	SPT-6	SPT-7	SPT-8	SPT-8										
Classification	SC	SC	SC	SM \ SC										
Gravel %	0	0	2	1										
Sand %	57	63	59	80										
Silt %	19	15	<---->	<---->										
Clay %	24	22	<---->	<---->										
Fines % (Silt+Clay)	43	37	39	19										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	30.6	30.1	---	---										
Plastic Limit %	13.3	13.3	---	---										
Plasticity Index	17.3	16.8	---	---										
									Checked By :					

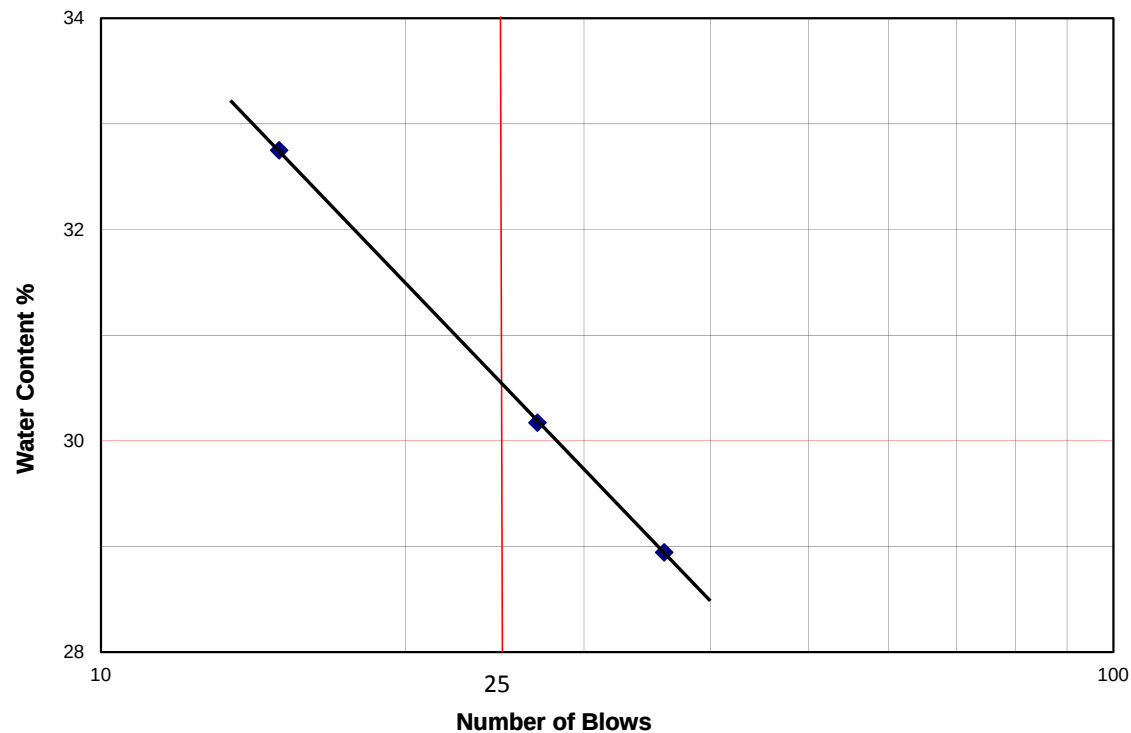
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-16					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-16	MBH-16	MBH-16	MBH-16										
Depth (m)	12.20-12.45	13.65-13.95	15.20-15.45	16.75-16.95										
Sample Type	SPT-9	SPT-10	SPT-11	SPT-12										
Classification	SM \ SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	81	64	58	68										
Silt %	<---->	<---->	<---->	30										
Clay %	<---->	<---->	<---->	2										
Fines % (Silt+Clay)	19	36	42	32										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-16					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-16	MBH-16	MBH-16	MBH-16										
Depth (m)	18.00-18.20	18.20-18.45	19.50-19.95	21.00-21.45										
Sample Type	SPT-13	SPT-13	SPT-14	SPT-15										
Classification	SM \ SC		SM \ SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	89	25	54	70										
Silt %	<---->	<---->	34	16										
Clay %	<---->	<---->	12	14										
Fines % (Silt+Clay)	11	75	46	30										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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)	32.12	33.14	31.21		
Dry Weight + Can (g)	27.81	28.37	25.79		
Can Weight (g)	12.92	12.56	9.24		
Water Content, %	28.9	30.2	32.7		
Number of Blows	36	27	15		

Plastic Limit %

Wet Weight + Can (g)	17.85	18.56	17.84
Dry Weight + Can (g)	17.19	17.46	16.94
Can Weight (g)	12.25	9.07	10.25
Water Content, %	13.4	13.1	13.5

Liquid Limit % 30.6
Plastic Limit % 13.3
Plasticity Index % 17.3

Preparation of Sample :
Dry State

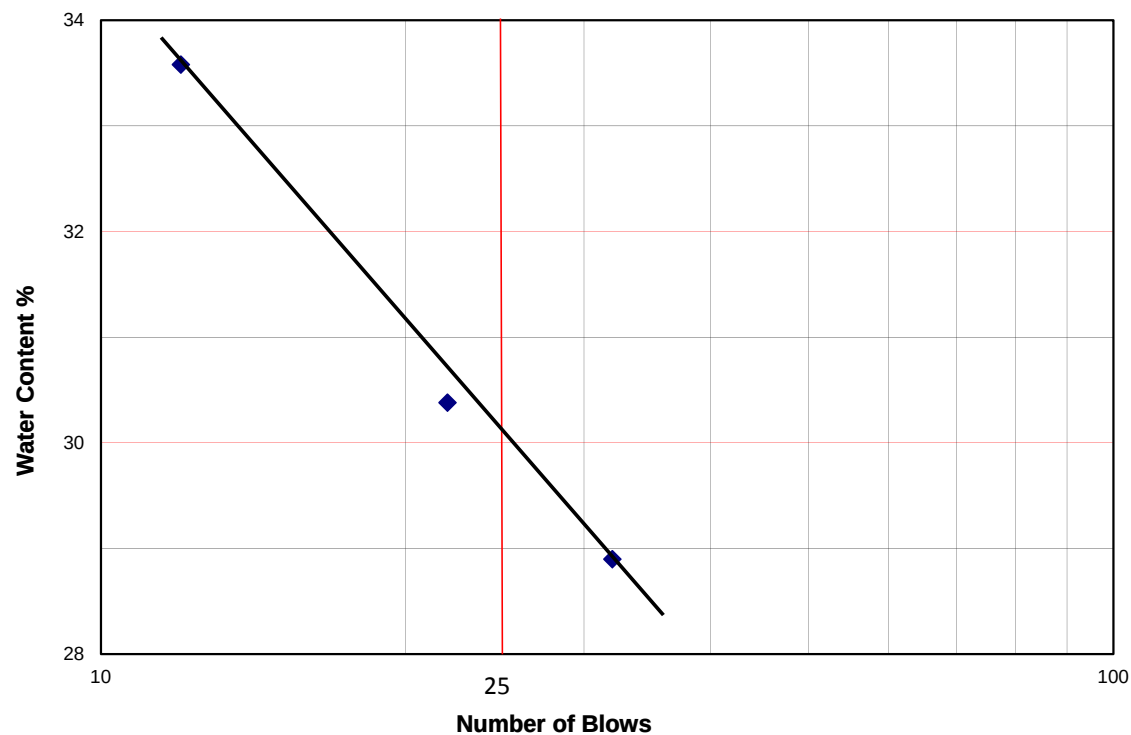
Sample Type: SPT-06

Borehole no.: MBH-16

Depth :7.50-7.95

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)	33.41	38.05	29.60		
Dry Weight + Can (g)	29.00	32.53	24.55		
Can Weight (g)	13.74	14.36	9.51		
Water Content, %	28.9	30.4	33.6		
Number of Blows	32	22	12		

Plastic Limit %

Wet Weight + Can (g)	18.54	16.89	18.78
Dry Weight + Can (g)	17.82	16.08	18.03
Can Weight (g)	12.45	9.87	12.45
Water Content, %	13.4	13.0	13.4

Liquid Limit % 30.1
Plastic Limit % 13.3
Plasticity Index % 16.8

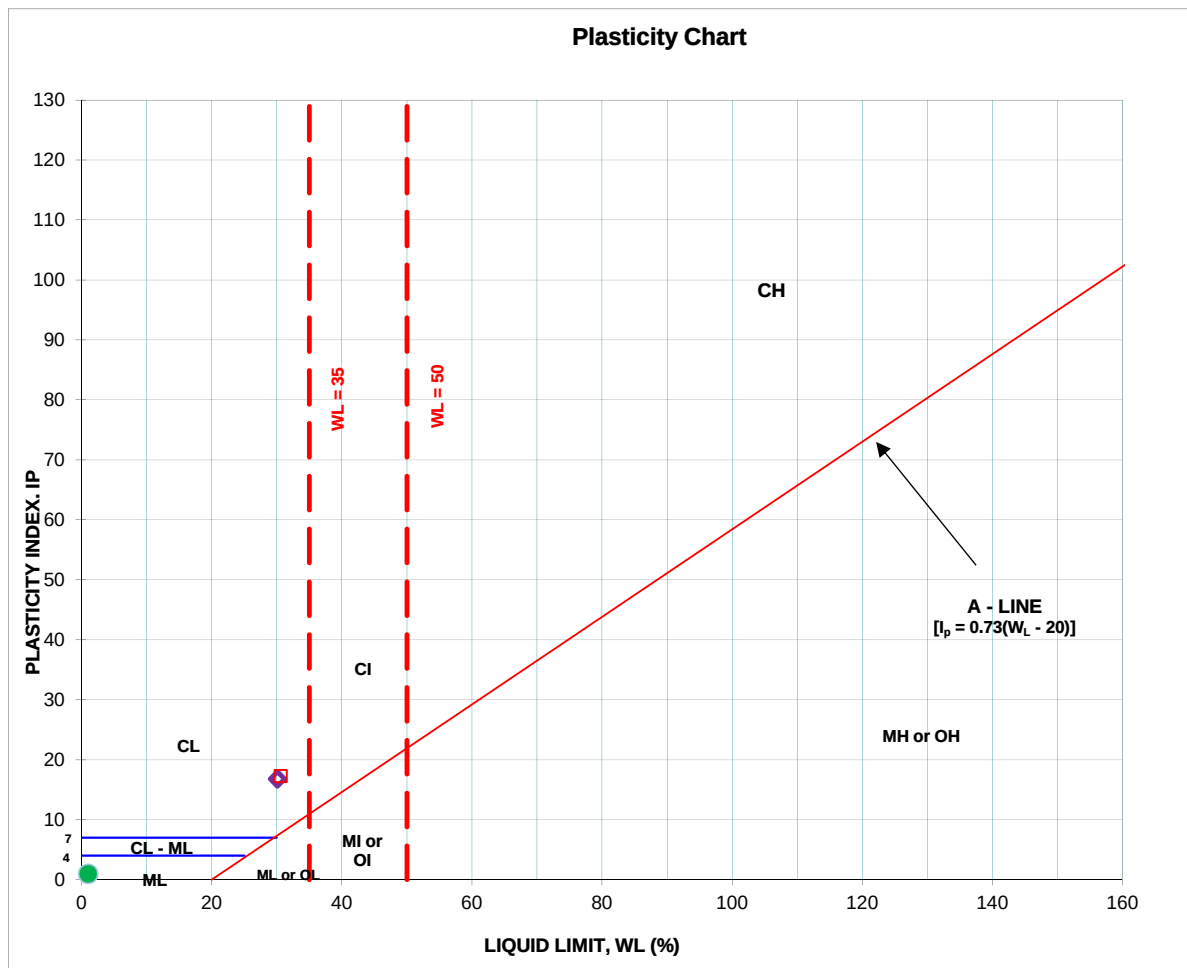
Preparation of Sample :
Dry State

Sample Type: SPT-07

Borehole no.: MBH-16

Depth :9.00-9.45

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-06	7.50-7.95	30.6	13.3	17.3	CL: Inorganic clays of low to medium plasticity.
◇	SPT-07	9.00-9.45	30.1	13.3	16.8	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

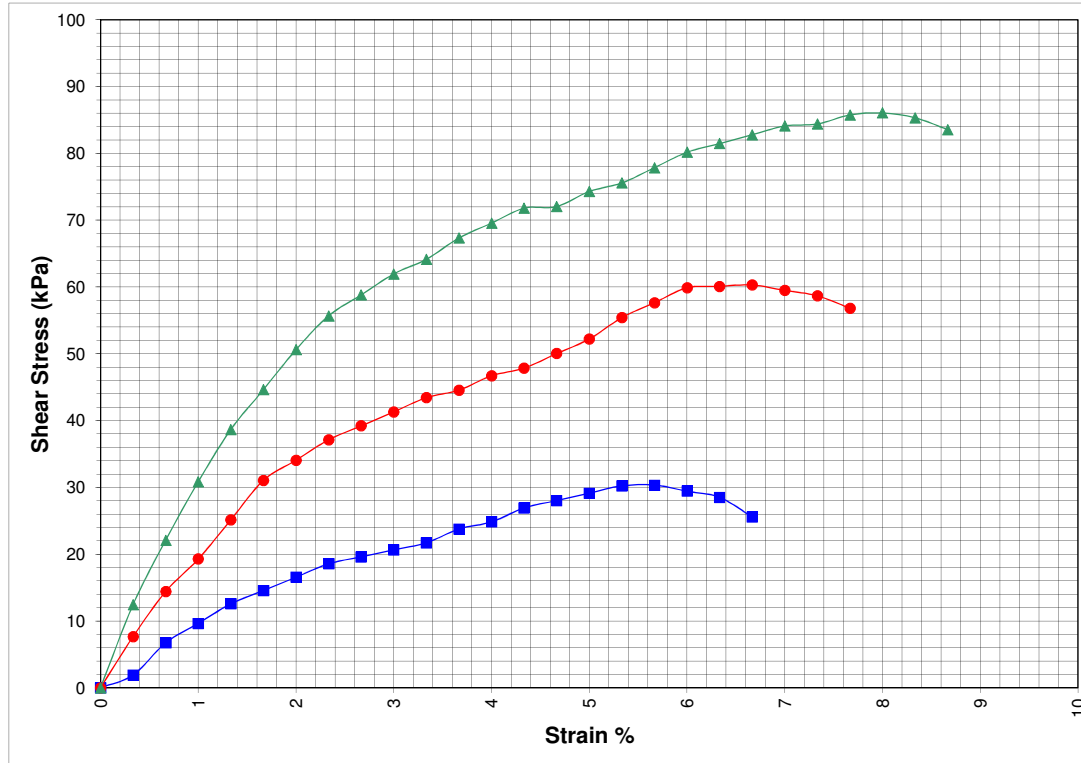
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-16

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

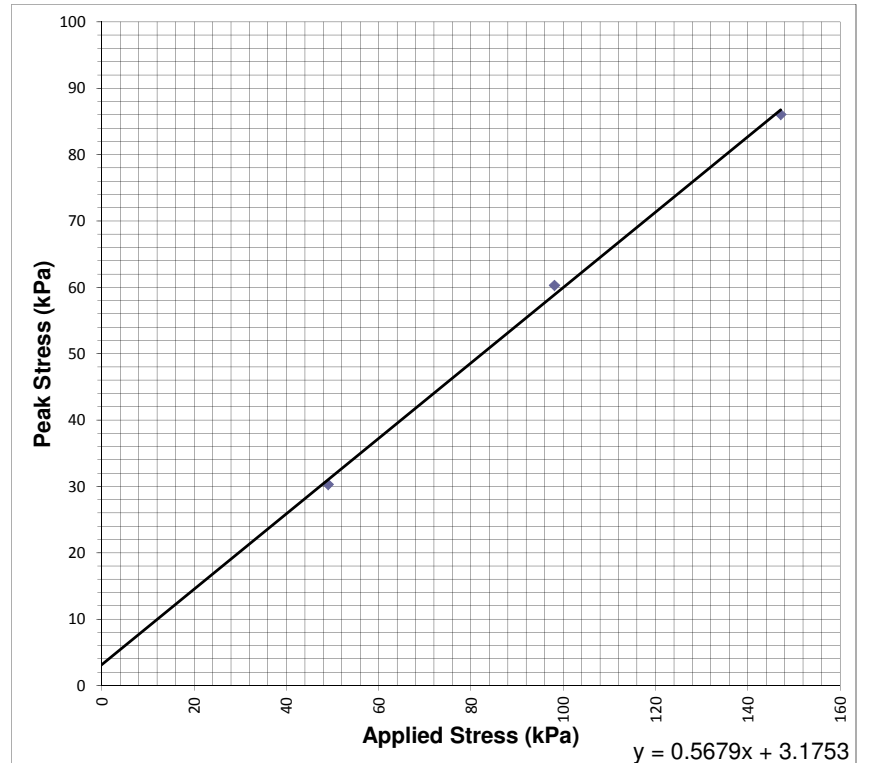
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	60
▲	Stage 3	147	86

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



Angle of Friction	29.6 °
Apparent Cohesion	3.18 kPa

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

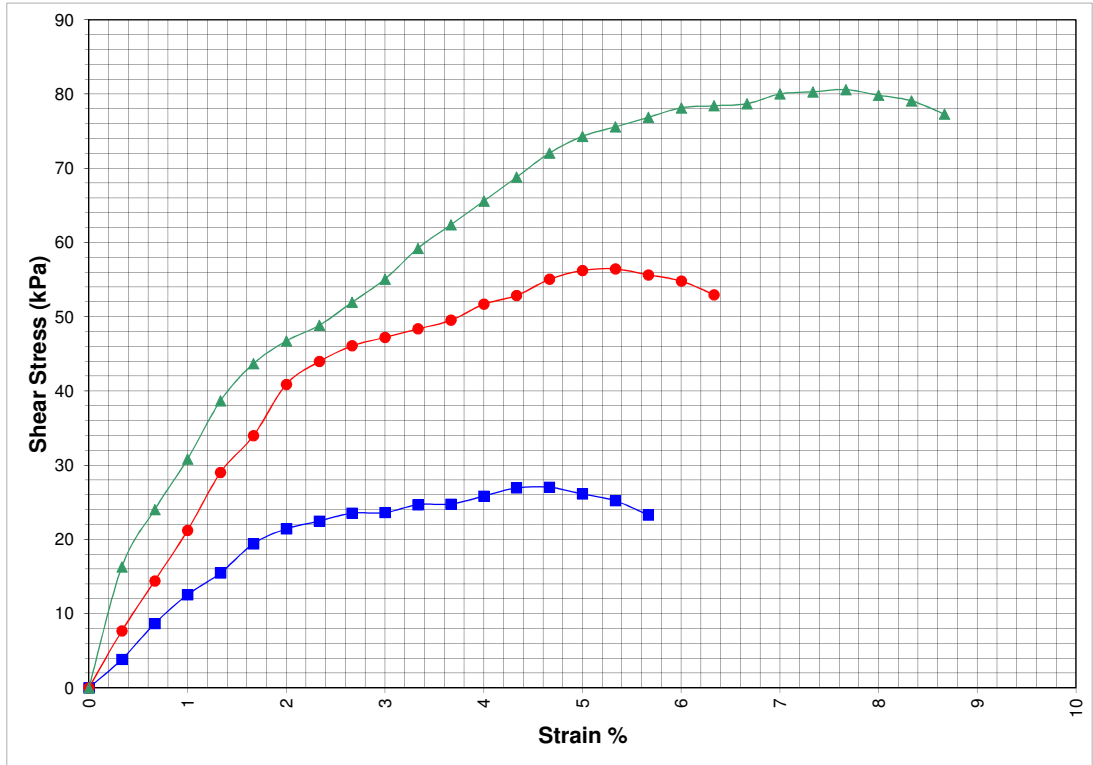
Borehole: MBH-16

Sample Type: SPT-4

Depth: 4.50-4.95 m

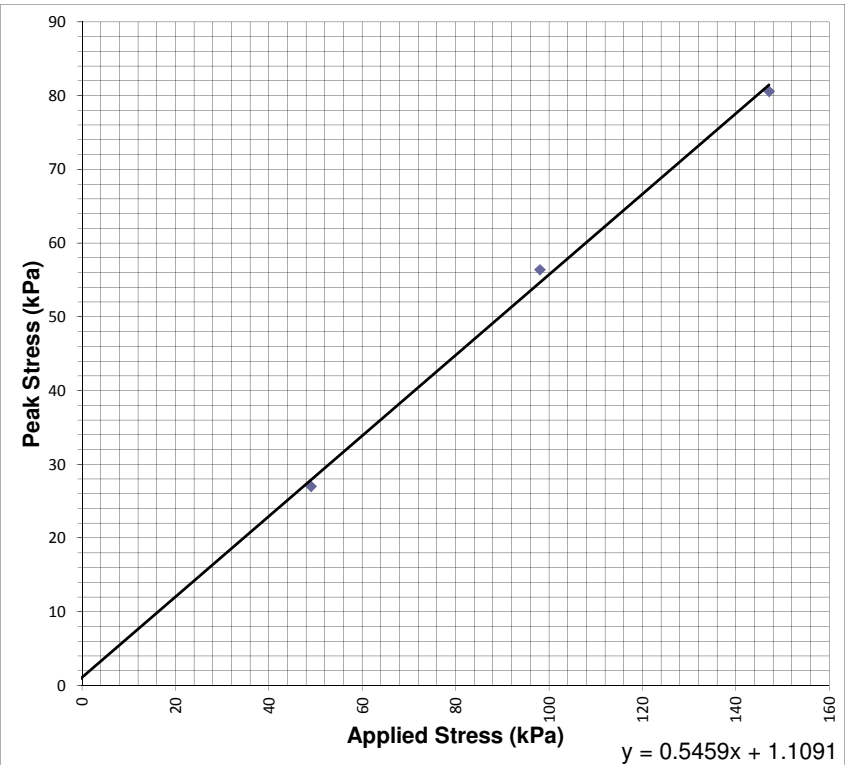
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	56
▲	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	28.6 °
Apparent Cohesion	1.11 kPa

Borehole: MBH-16

Sample Type: SPT-9

Depth: 12.20-12.45 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
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85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

[illegible]

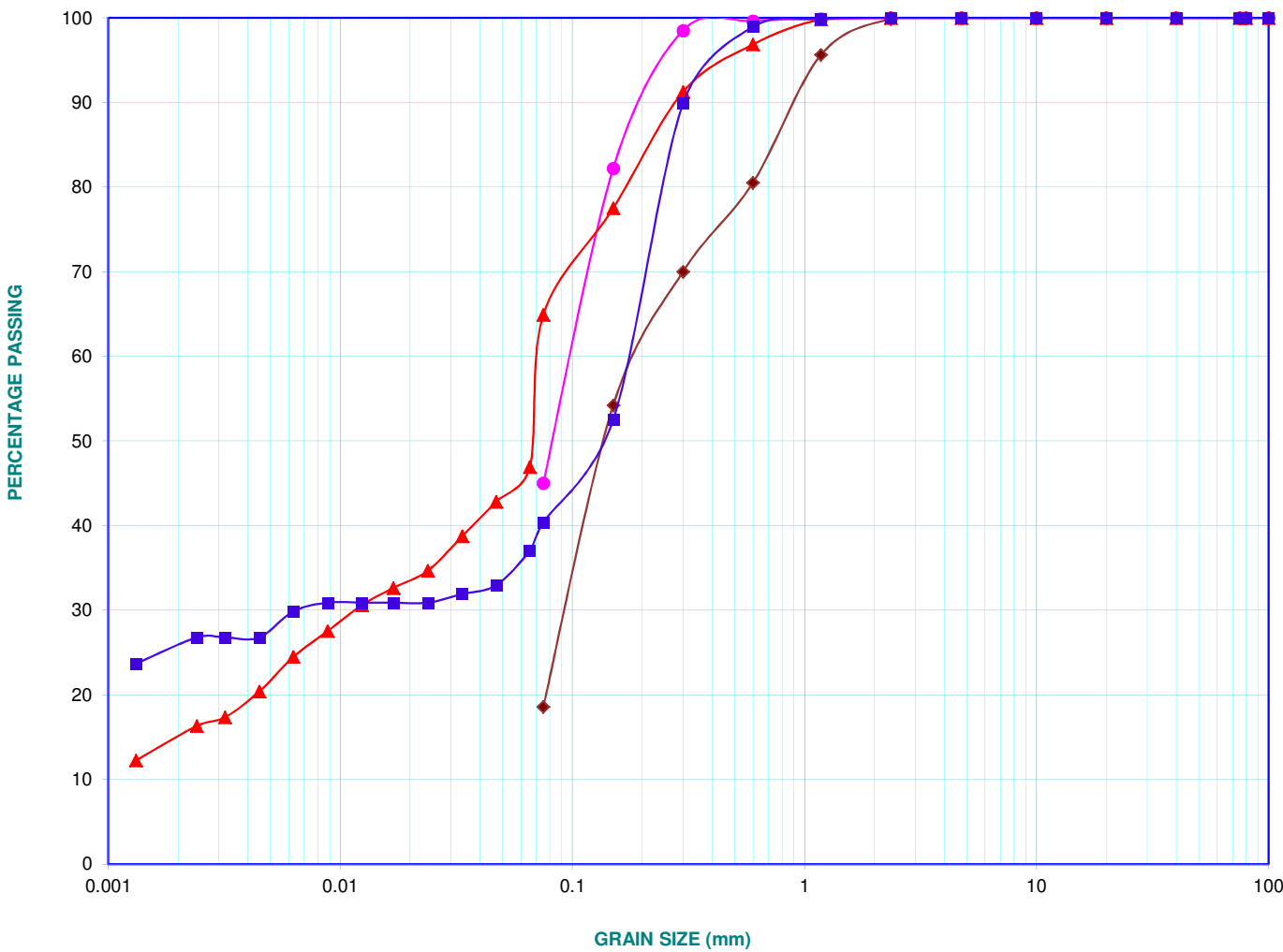
END OF BOREHOLE

[illegible]

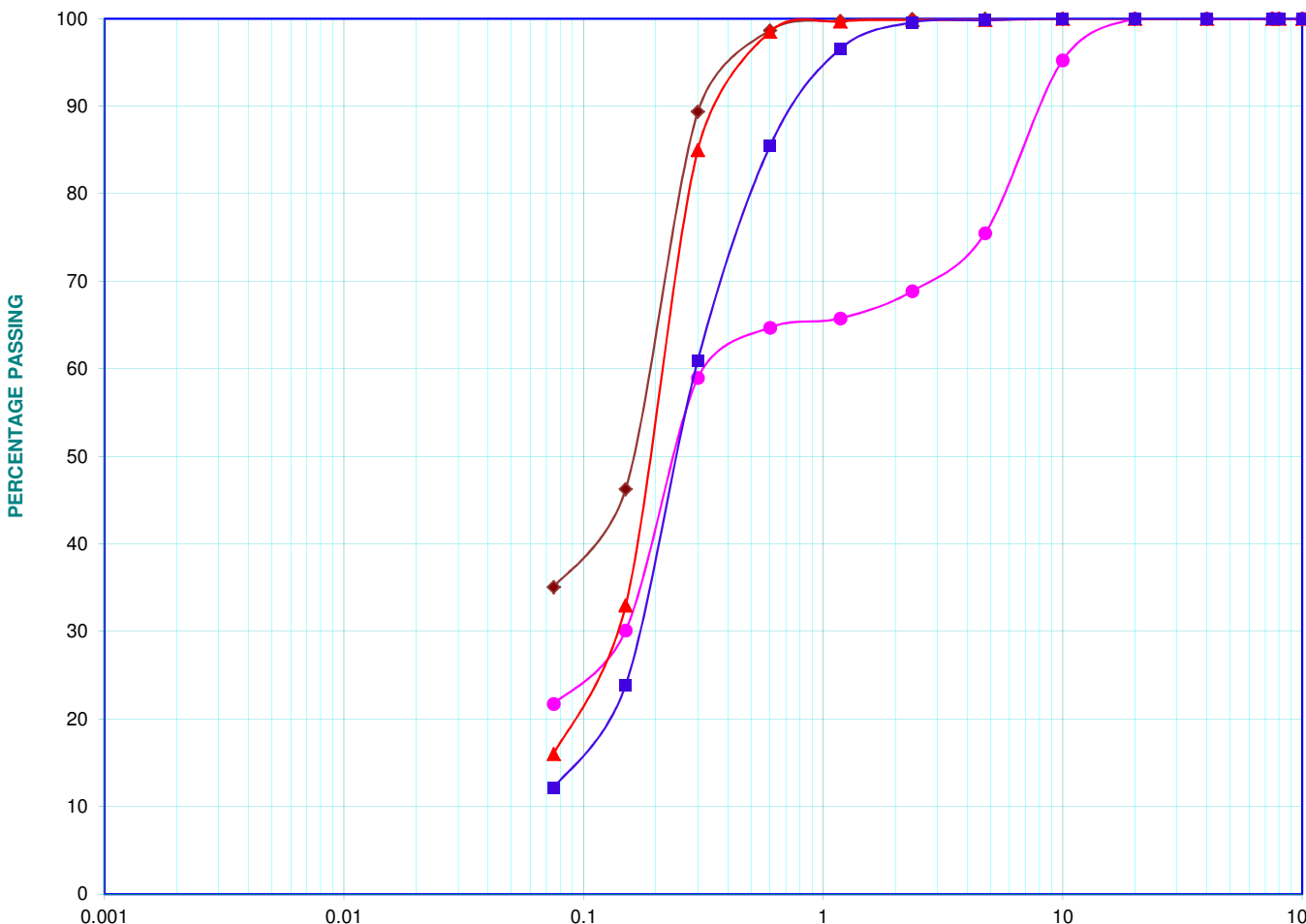
Notes :

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-17

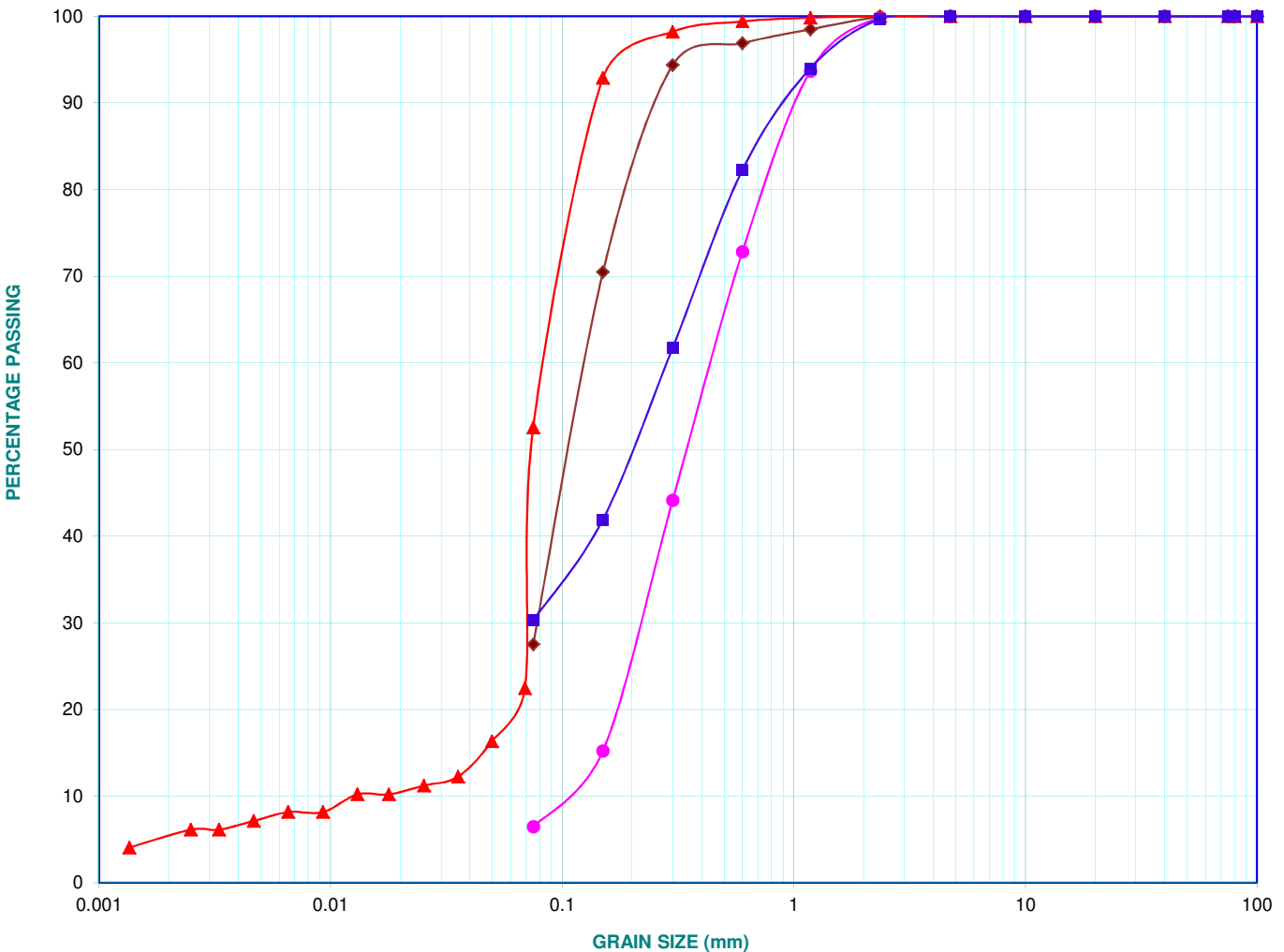
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03				Borehole No. : MBH-17					Date :		9-Apr-19		
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-17	MBH-17	MBH-17	MBH-17	PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	0.00-0.27	1.60-1.95	3.00-3.40	4.50-4.95										
Sample Type	SPT-1	SPT-2	SPT-3	SPT-4										
Classification	SM \ SC	SM \ SC		SC										
Gravel %	0	0	0	0										
Sand %	81	55	35	60										
Silt %	<---->	<---->	49	13										
Clay %	<---->	<---->	16	27										
Fines % (Silt+Clay)	19	45	65	40										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	30.9										
Plastic Limit %	---	---	---	16.0										
Plasticity Index	---	---	---	14.9										
									Checked By :					

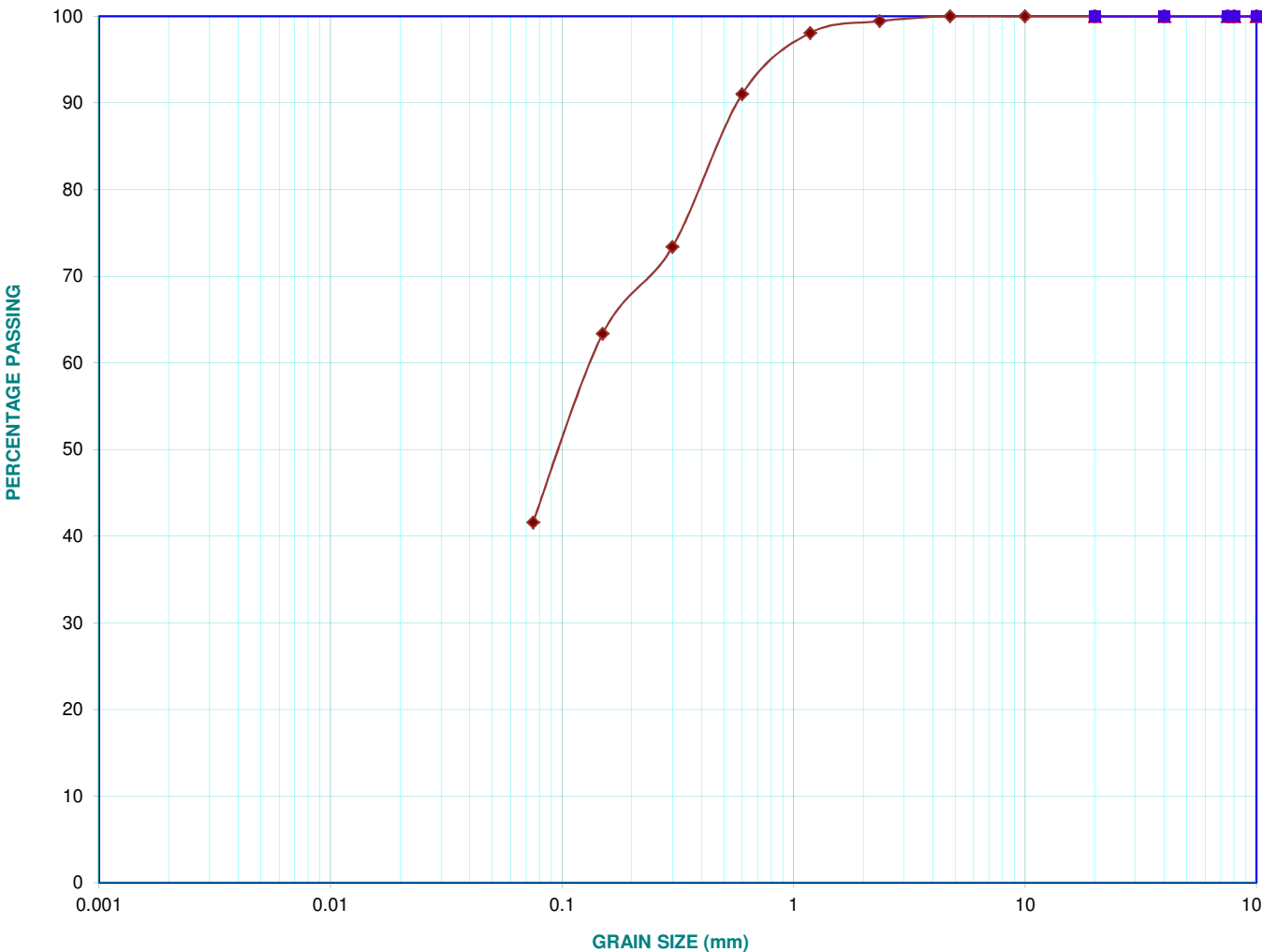
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03				Borehole No. : MBH-17				Date :		9-Apr-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-17	MBH-17	MBH-17	MBH-17										
Depth (m)	6.00-6.30	6.30-6.45	7.50-7.95	9.16-9.45										
Sample Type	SPT-5	SPT-5	SPT-6	SPT-7										
Classification	SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	0	24	0	0										
Sand %	65	54	84	88										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	35	22	16	12										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
								Checked By :						

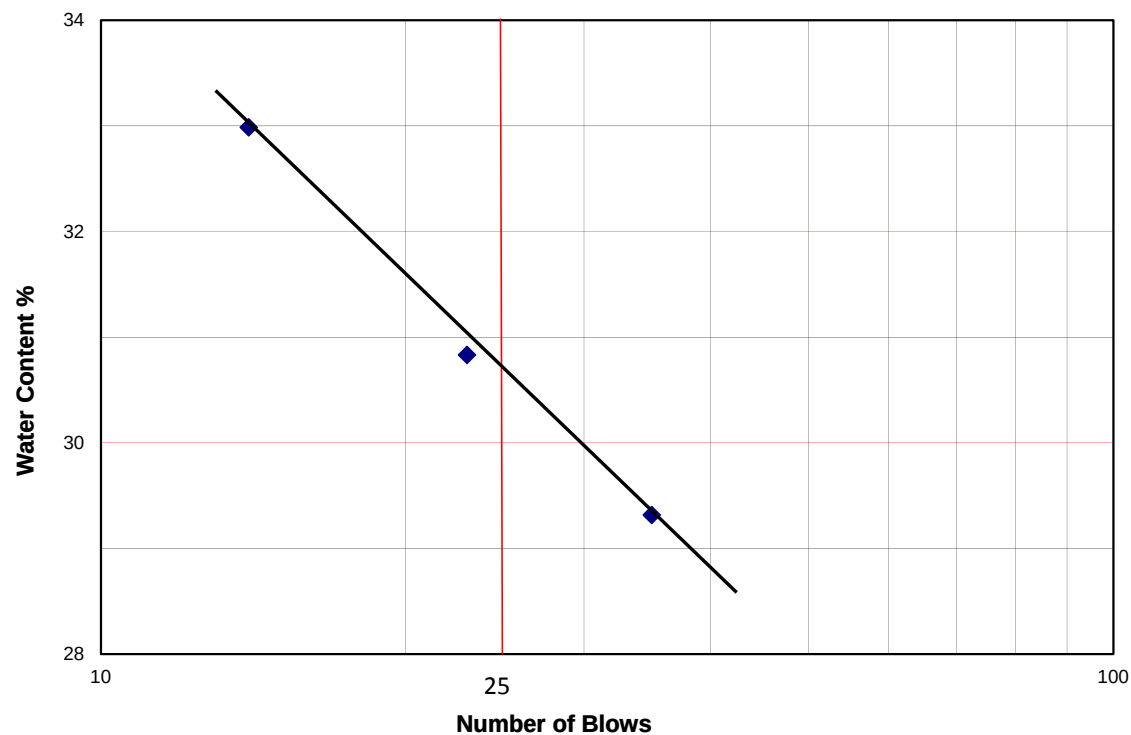
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-17					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-17	MBH-17	MBH-17	MBH-17										
Depth (m)	10.50-10.95	12.00-12.45	13.50-13.95	15.00-15.45										
Sample Type	SPT-8	SPT-9	SPT-10	SPT-11										
Classification	SM \ SC	SP-SM \ SP-SC		SM \ SC										
Gravel %	0	0	0	0										
Sand %	72	94	47	70										
Silt %	<---->	<---->	47	<---->										
Clay %	<---->	<---->	6	<---->										
Fines % (Silt+Clay)	28	6	53	30										
D60 mm		0.430												
D30 mm		0.220												
D10 mm		0.120												
Cu		3.58												
Cc		0.94												
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-17					Date :		9-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL	
									F	M	C	F	C
Bore Hole .	MBH-17												
Depth (m)	16.60-16.83												
Sample Type	SPT-12												
Classification	SM \ SC												
Gravel %	0												
Sand %	58												
Silt %	<---->												
Clay %	<---->												
Fines % (Silt+Clay)	42												
D60 mm													
D30 mm													
D10 mm													
Cu													
Cc													
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)	26.35	30.92	34.68		
Dry Weight + Can (g)	22.41	26.61	28.36		
Can Weight (g)	8.97	12.63	9.20		
Water Content, %	29.3	30.8	33.0		
Number of Blows	35	23	14		

Plastic Limit %

Wet Weight + Can (g)	16.45	17.87	17.77
Dry Weight + Can (g)	15.49	17.15	16.48
Can Weight (g)	9.54	12.56	8.54
Water Content, %	16.1	15.7	16.2

Liquid Limit % 30.9
Plastic Limit % 16.0
Plasticity Index % 14.9

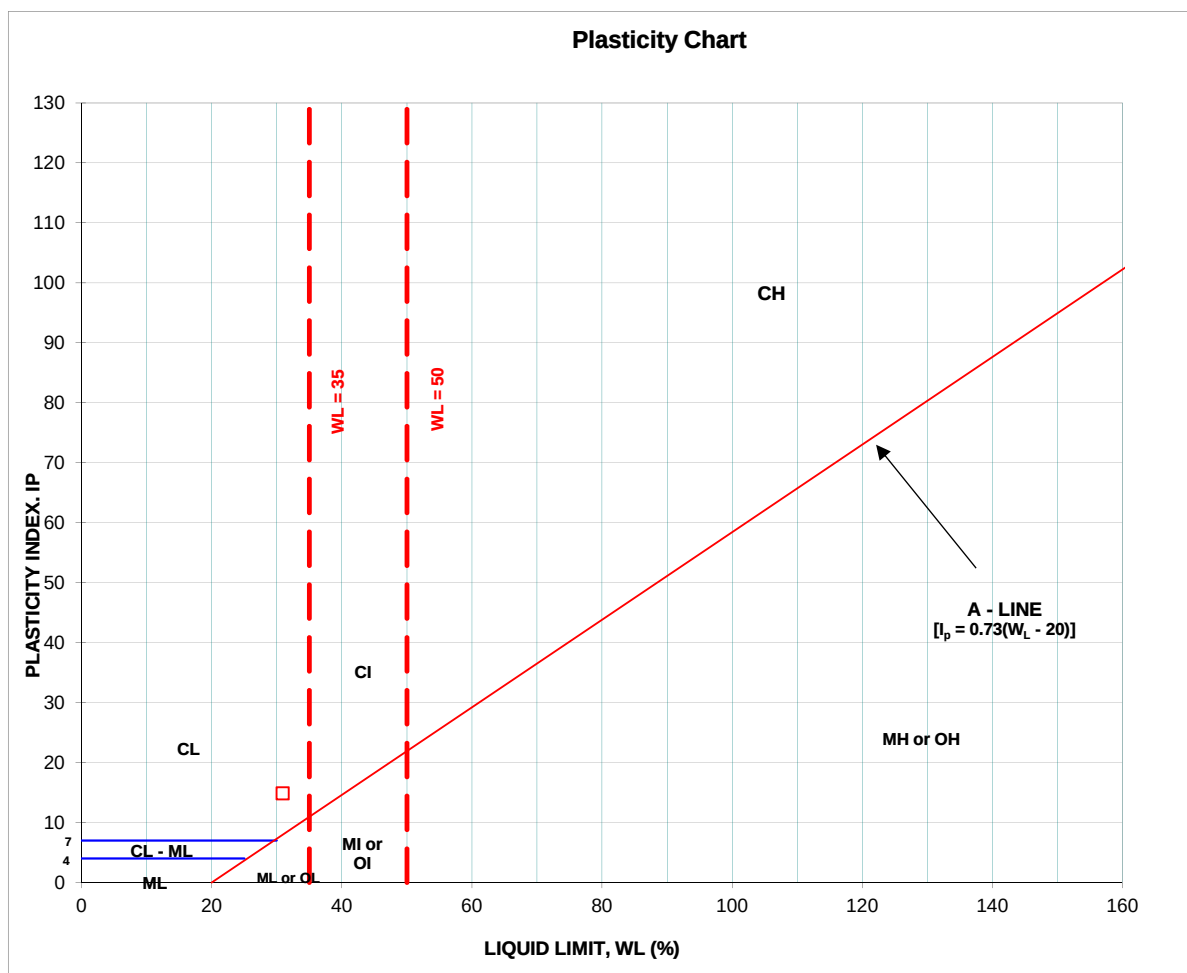
Preparation of Sample :
Dry State

Sample Type: SPT-04

Borehole no.: MBH-17

Depth :4.50-4.95

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-04	4.50-4.95	30.9	16.0	14.9	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

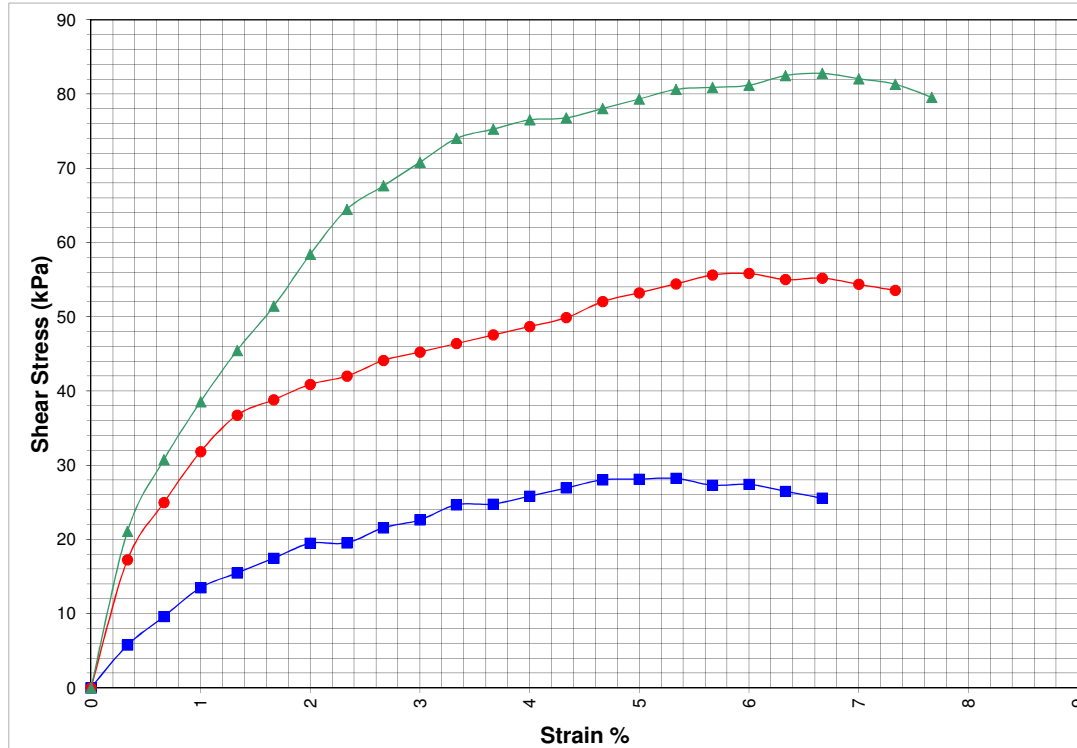
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-17

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

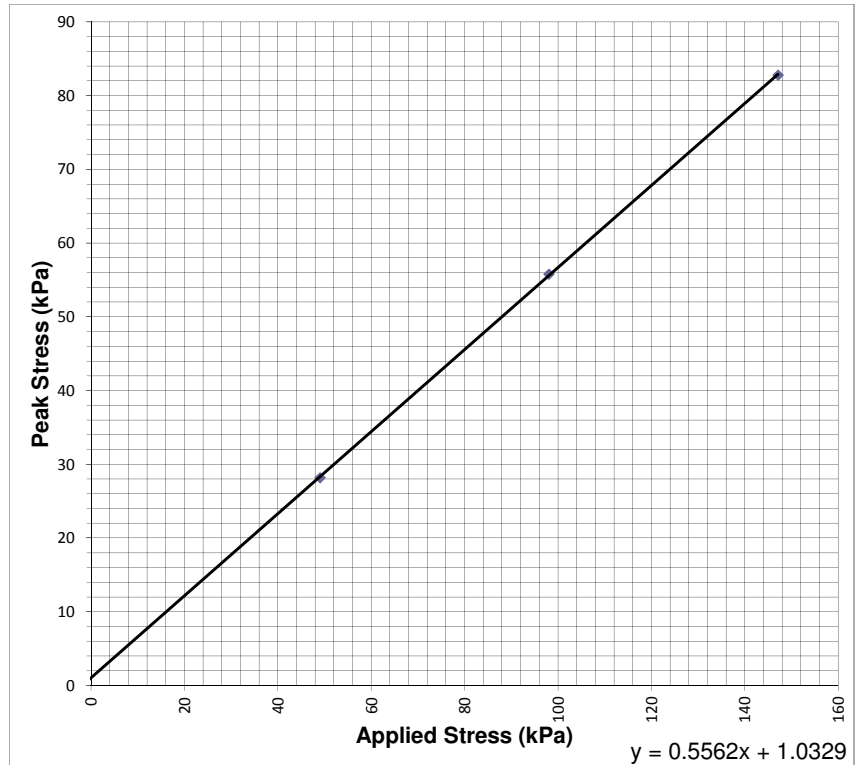
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	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	29.1 °
Apparent Cohesion	1.03 kPa

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

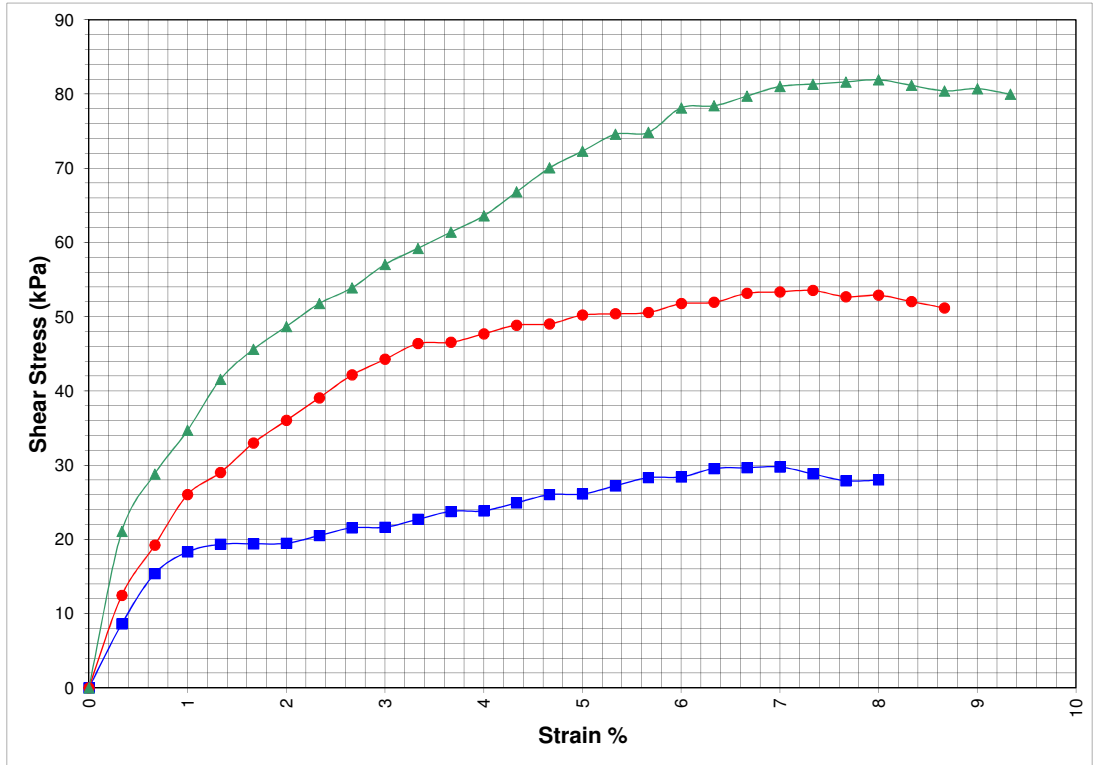
Borehole: MBH-17

Sample Type: SPT-02

Depth: 1.60-1.95 m

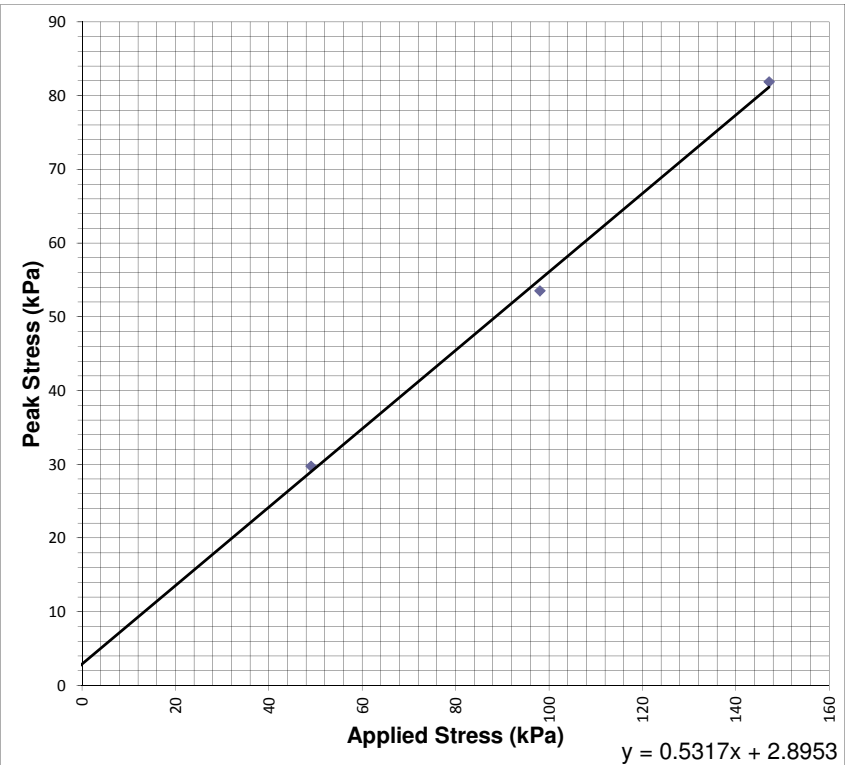
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	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	28.0 °
Apparent Cohesion	2.90 kPa

Borehole: MBH-17

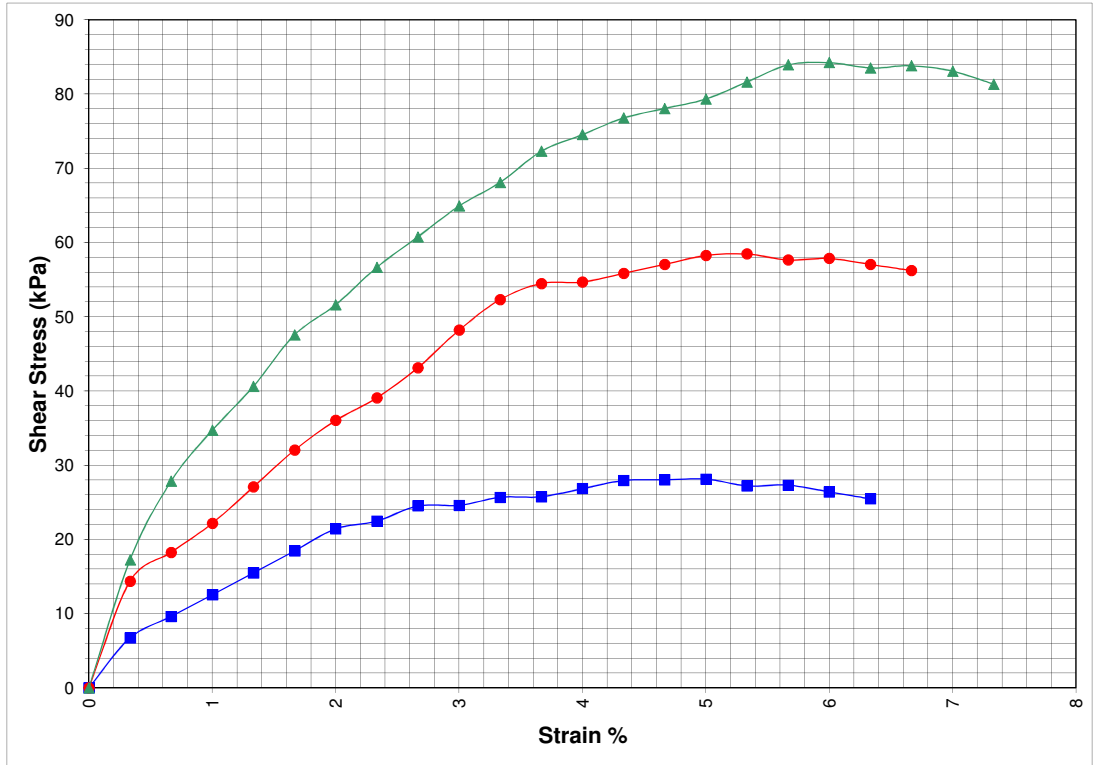
Sample Type: SPT-5

Depth: 6.30-6.45 m

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

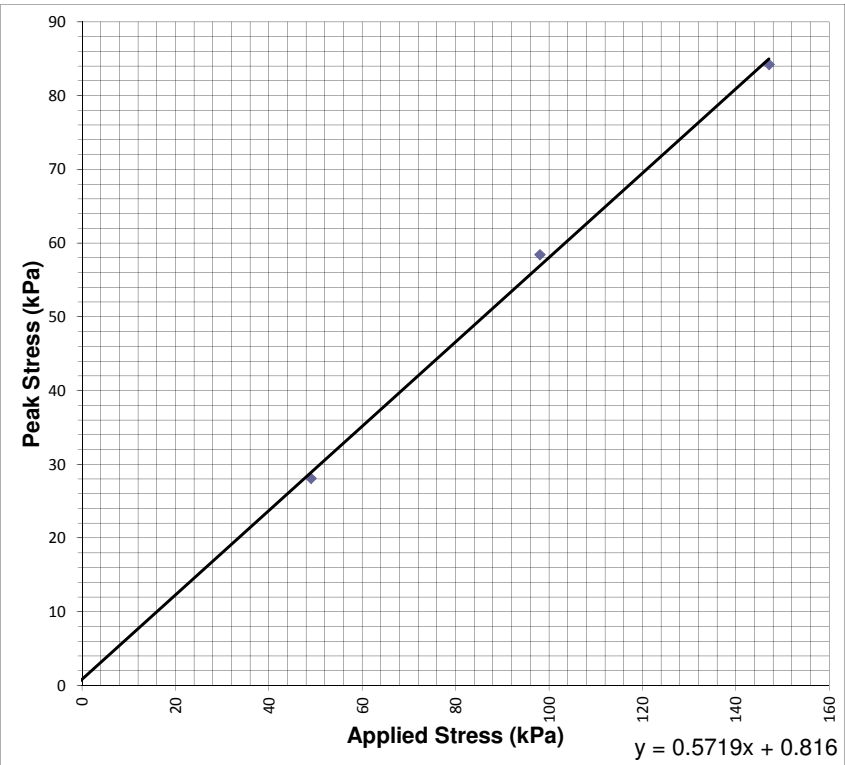
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	58
▲	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	29.8 °
Apparent Cohesion	0.82 kPa

Borehole: MBH-17

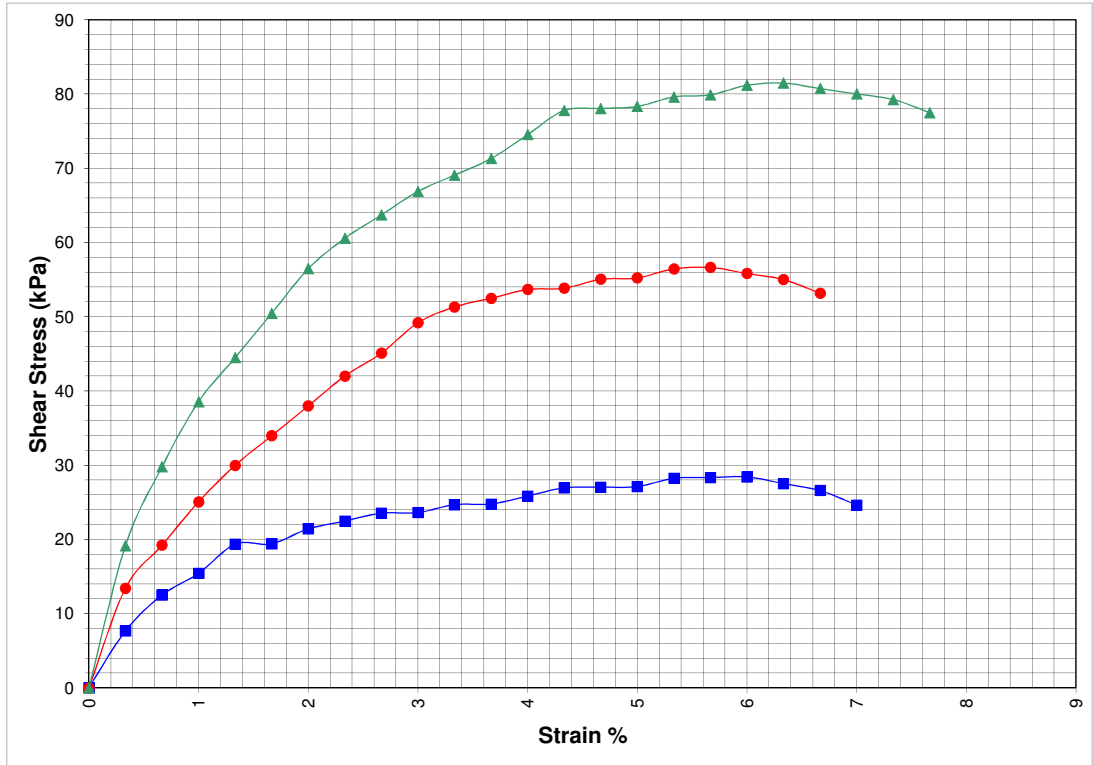
Sample Type: SPT-7

Depth: 9.16-9.45 m

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

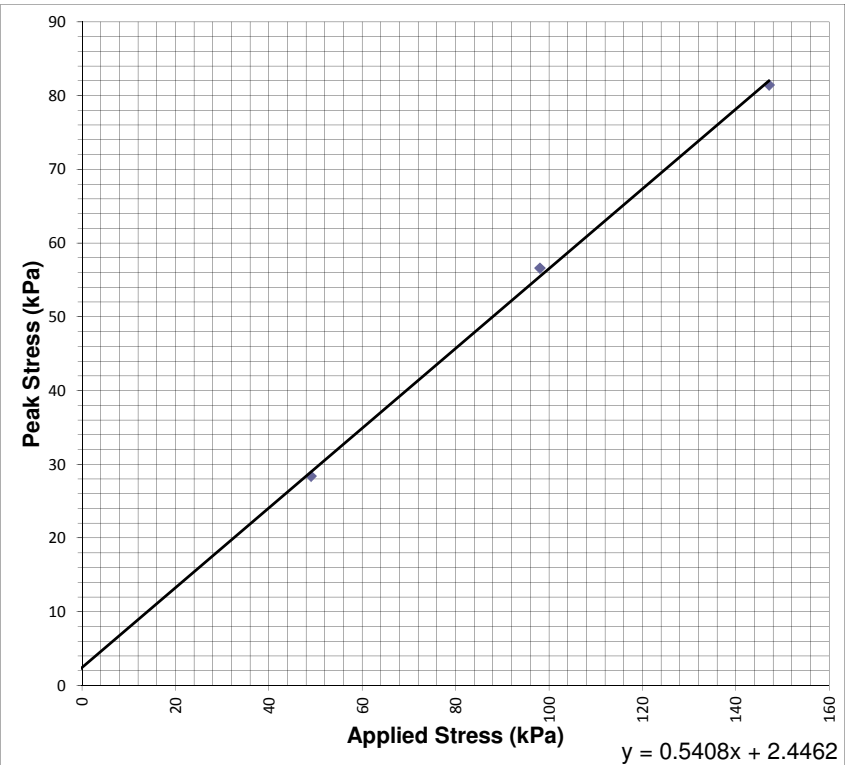
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	57
▲	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	28.4 °
Apparent Cohesion	2.45 kPa

Borehole: MBH-17

Sample Type: SPT-12

Depth: 16.60-16.83 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
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85	86
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89	90
91	92
93	94
95	96
97	98
99	100

[illegible]

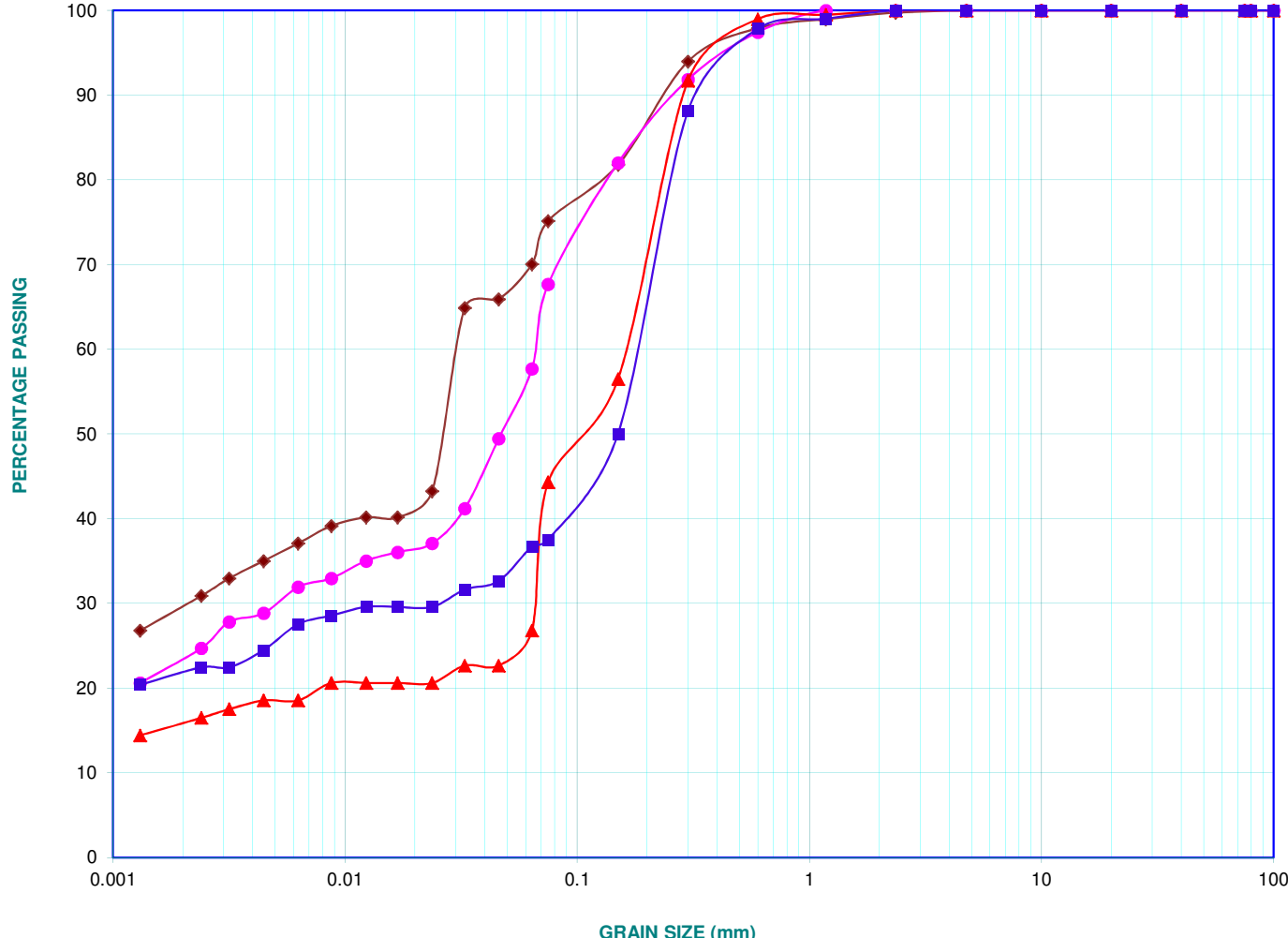
END OF BOREHOLE

[illegible]

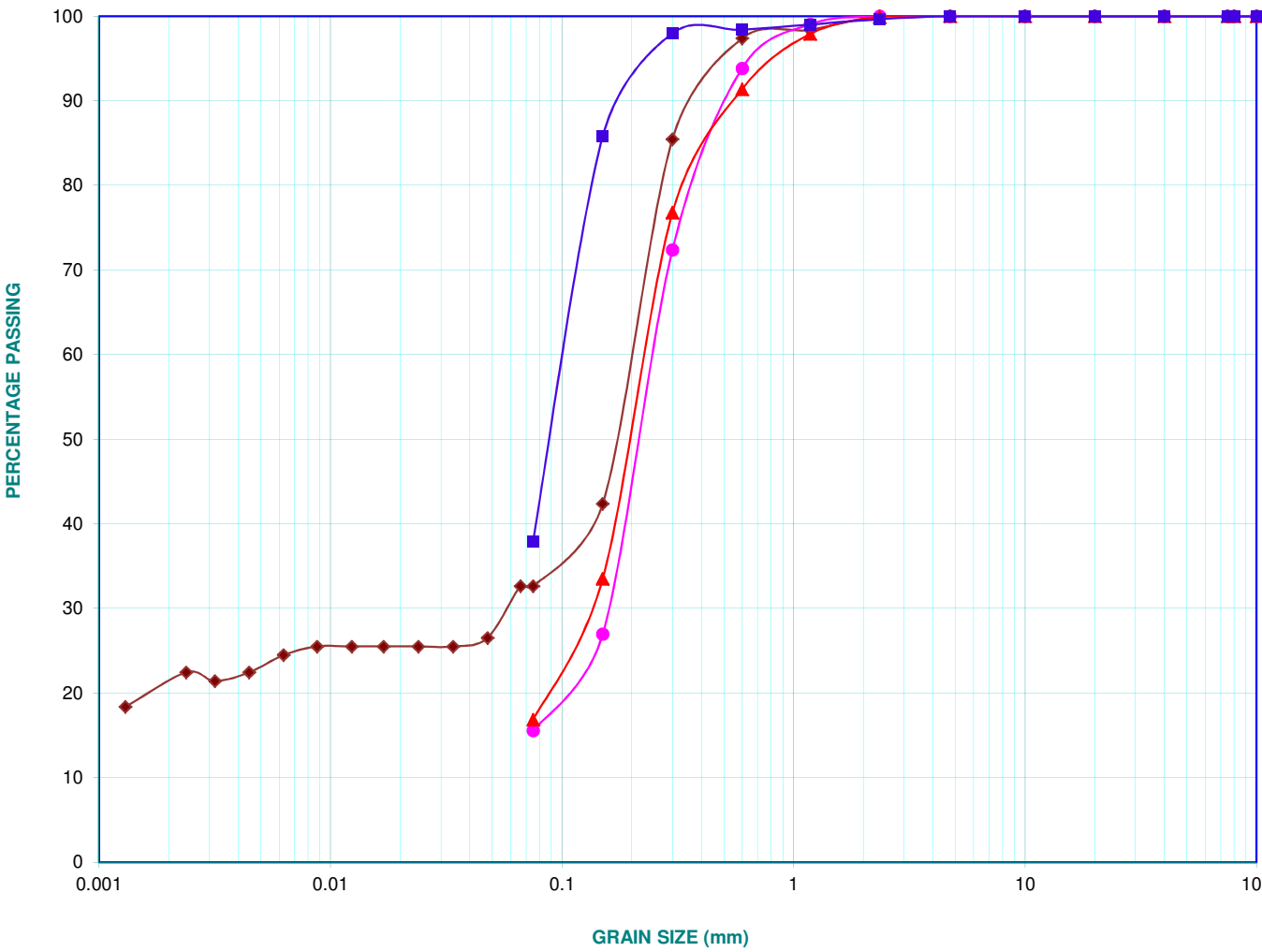
Notes :

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	: $^{\circ}$ (deg) Angle of internal friction	NS	: Not Suitable			D : Vertical Shear	Borehole No.	: MBH-18

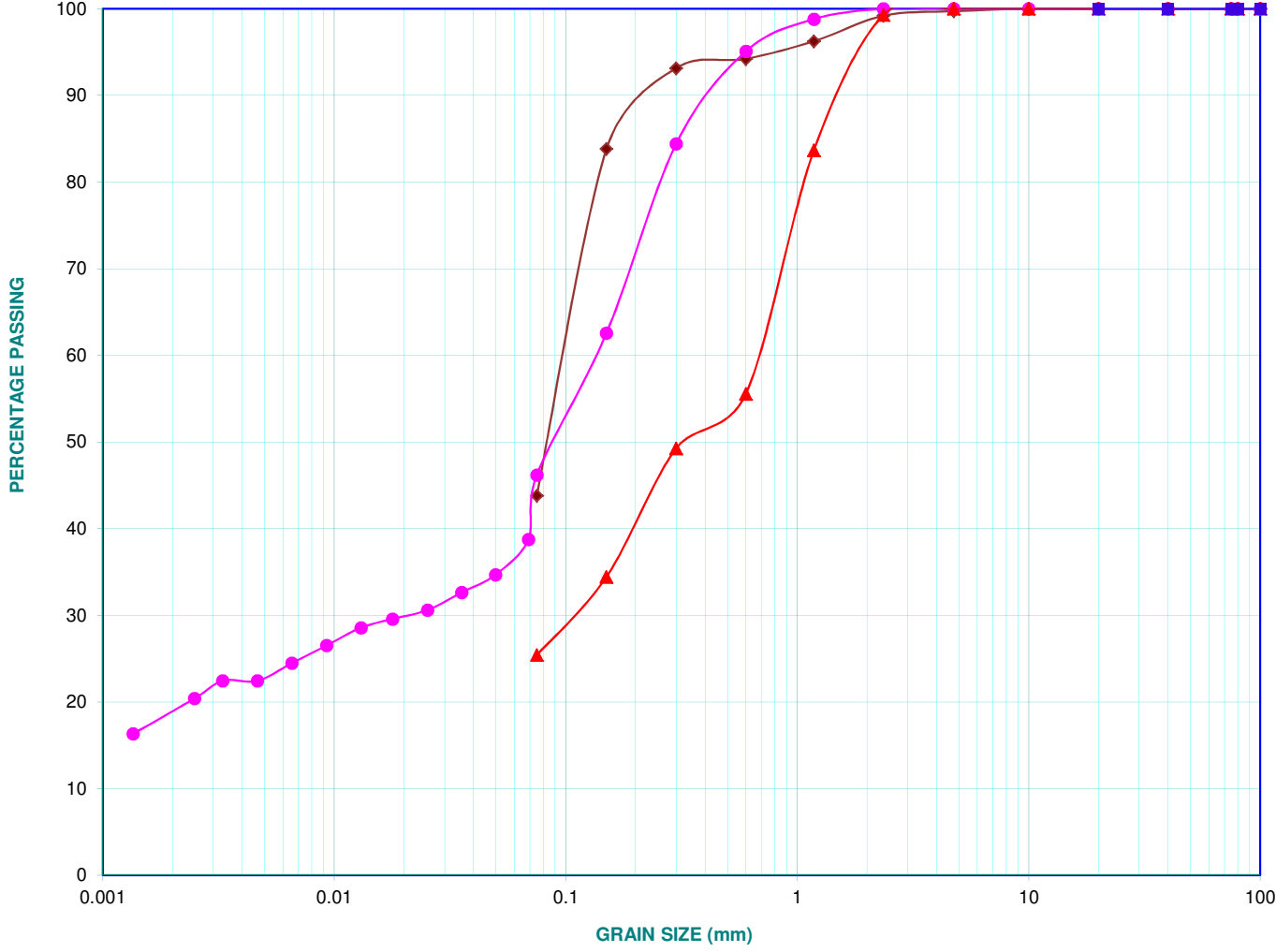
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-18					Date :		9-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-18	MBH-18	MBH-18	MBH-18	PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	0.80-1.00	1.00-1.45	2.66-2.85	3.00-3.45										
Sample Type	UDS-1	SPT-1	UDS-2	SPT-2										
Classification	CL	CL	SM \ SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	25	32	56	62										
Silt %	44	43	28	16										
Clay %	31	25	16	22										
Fines % (Silt+Clay)	75	68	44	38										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	34.8	32.7	---	---										
Plastic Limit %	15.1	17.2	---	---										
Plasticity Index	19.7	15.5	---	---										
									Checked By :					

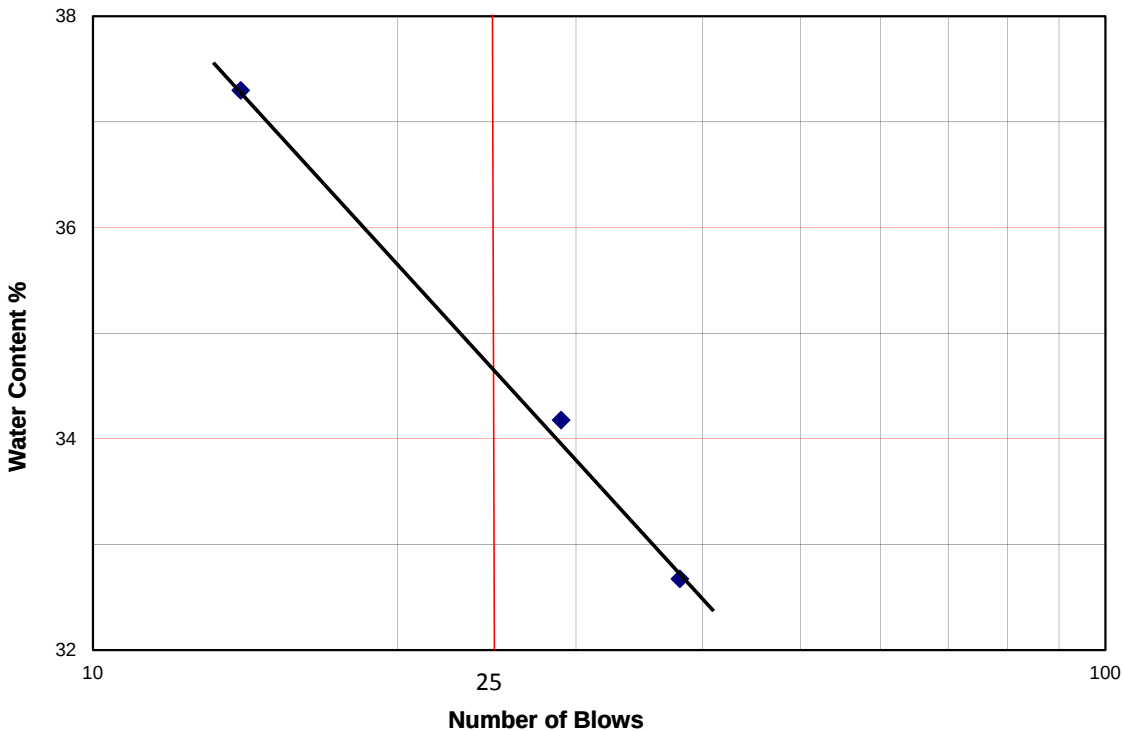
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-18					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-18	MBH-18	MBH-18	MBH-18										
Depth (m)	4.50-4.95	9.00-9.45	10.60-10.90	12.00-12.45										
Sample Type	SPT-3	SPT-6	SPT-7	SPT-8										
Classification	SM \ SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	67	84	83	62										
Silt %	11	<---->	<---->	<---->										
Clay %	22	<---->	<---->	<---->										
Fines % (Silt+Clay)	33	16	17	38										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-18					Date :			9-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-18	MBH-18	MBH-18											
Depth (m)	13.65-13.95	15.00-15.45	16.50-16.95											
Sample Type	SPT-9	SPT-10	SPT-11											
Classification	SC	SC	SM \ SC											
Gravel %	0	0	0											
Sand %	56	54	75											
Silt %	<---->	26	<---->											
Clay %	<---->	20	<---->											
Fines % (Silt+Clay)	44	46	25											
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	30.0	---											
Plastic Limit %	---	16.5	---											
Plasticity Index	---	13.5	---											
									Checked By :					

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



Liquid Limit %

Wet Weight + Can (g)	30.59	31.71	25.61		
Dry Weight + Can (g)	26.45	26.98	21.00		
Can Weight (g)	13.78	13.14	8.64		
Water Content, %	32.7	34.2	37.3		
Number of Blows	38	29	14		

Plastic Limit %

Wet Weight + Can (g)	17.22	18.67	20.25
Dry Weight + Can (g)	16.77	18.01	18.79
Can Weight (g)	13.80	13.63	9.20
Water Content, %	15.2	15.1	15.2

Liquid Limit % 34.8
Plastic Limit % 15.1
Plasticity Index % 19.7

Preparation of Sample :
Dry State

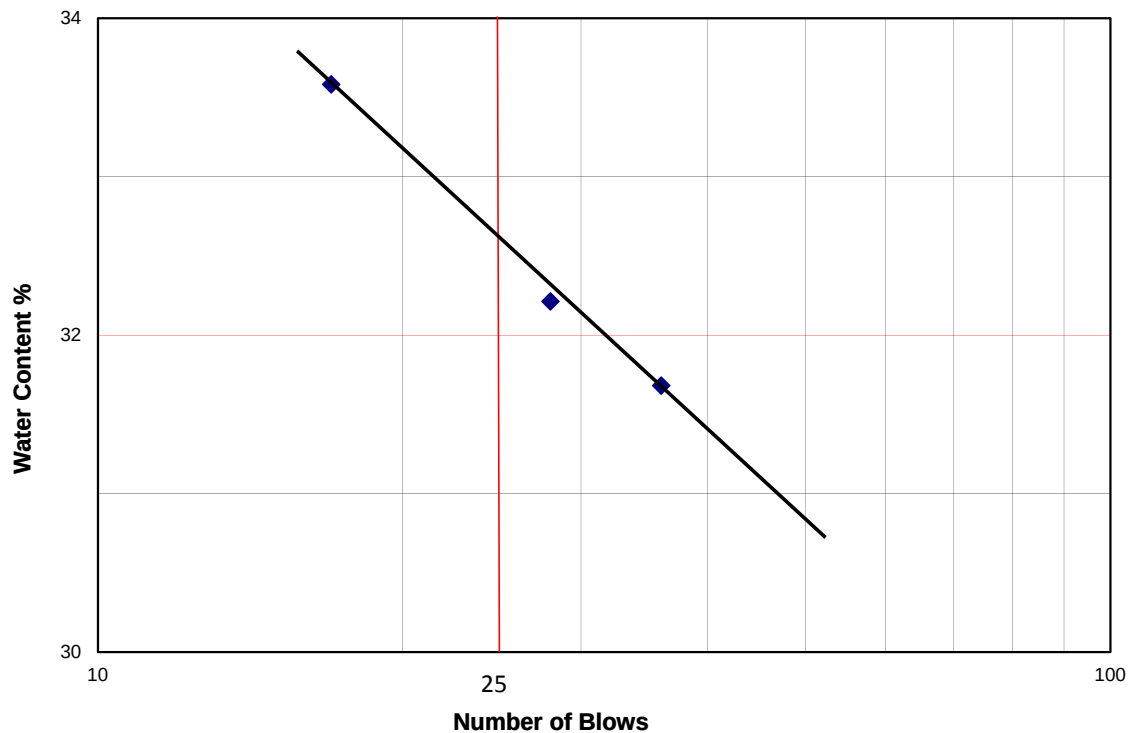
Sample Type: UDS-01

Borehole no.: MBH-18

Depth :0.80-1.00

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)	32.58	30.89	28.97		
Dry Weight + Can (g)	26.89	26.48	24.00		
Can Weight (g)	8.93	12.79	9.20		
Water Content, %	31.7	32.2	33.6		
Number of Blows	36	28	17		

Plastic Limit %

Wet Weight + Can (g)	20.58	19.57	20.29
Dry Weight + Can (g)	19.49	18.56	19.21
Can Weight (g)	13.09	12.72	12.93
Water Content, %	17.0	17.3	17.2

Liquid Limit % 32.7
Plastic Limit % 17.2
Plasticity Index % 15.5

Preparation of Sample :
Dry State

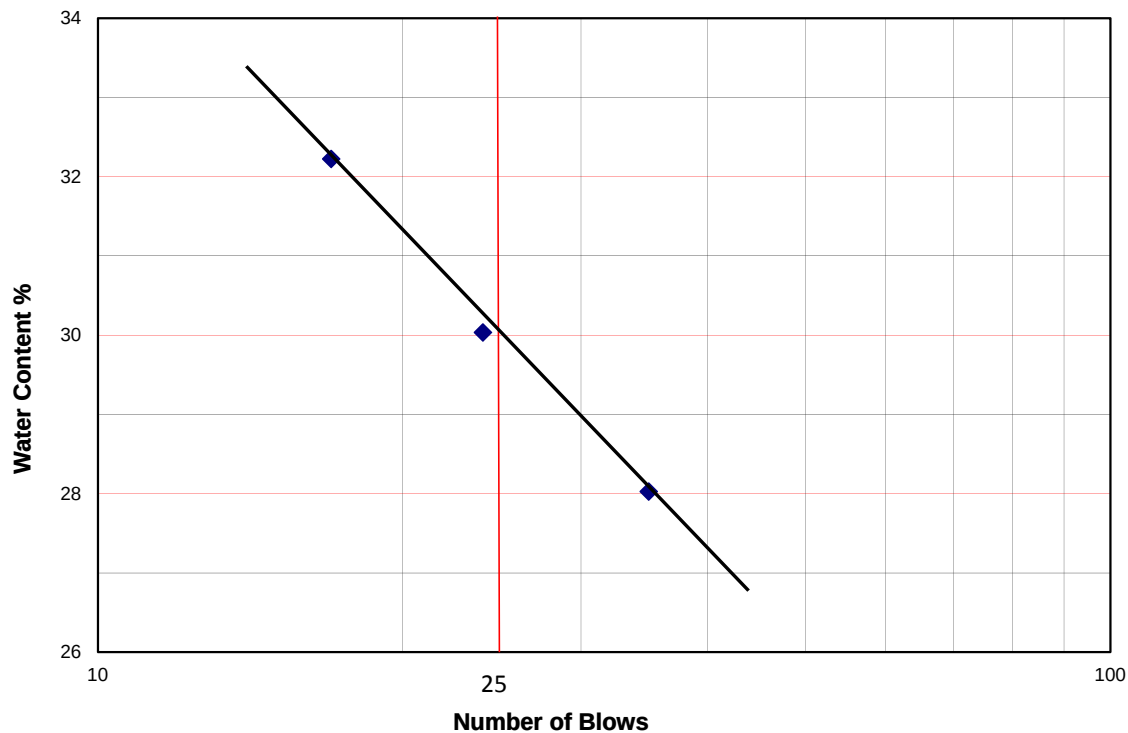
Sample Type: SPT-01

Borehole no.: MBH-18

Depth :1.00-1.45

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)	31.58	28.32	29.59		
Dry Weight + Can (g)	27.55	24.68	25.44		
Can Weight (g)	13.17	12.56	12.56		
Water Content, %	28.0	30.0	32.2		
Number of Blows	35	24	17		

Plastic Limit %

Wet Weight + Can (g)	17.26	16.99	17.78
Dry Weight + Can (g)	16.14	16.39	16.58
Can Weight (g)	9.52	12.76	9.14
Water Content, %	16.9	16.5	16.1

Liquid Limit % 30.0
Plastic Limit % 16.5
Plasticity Index % 13.5

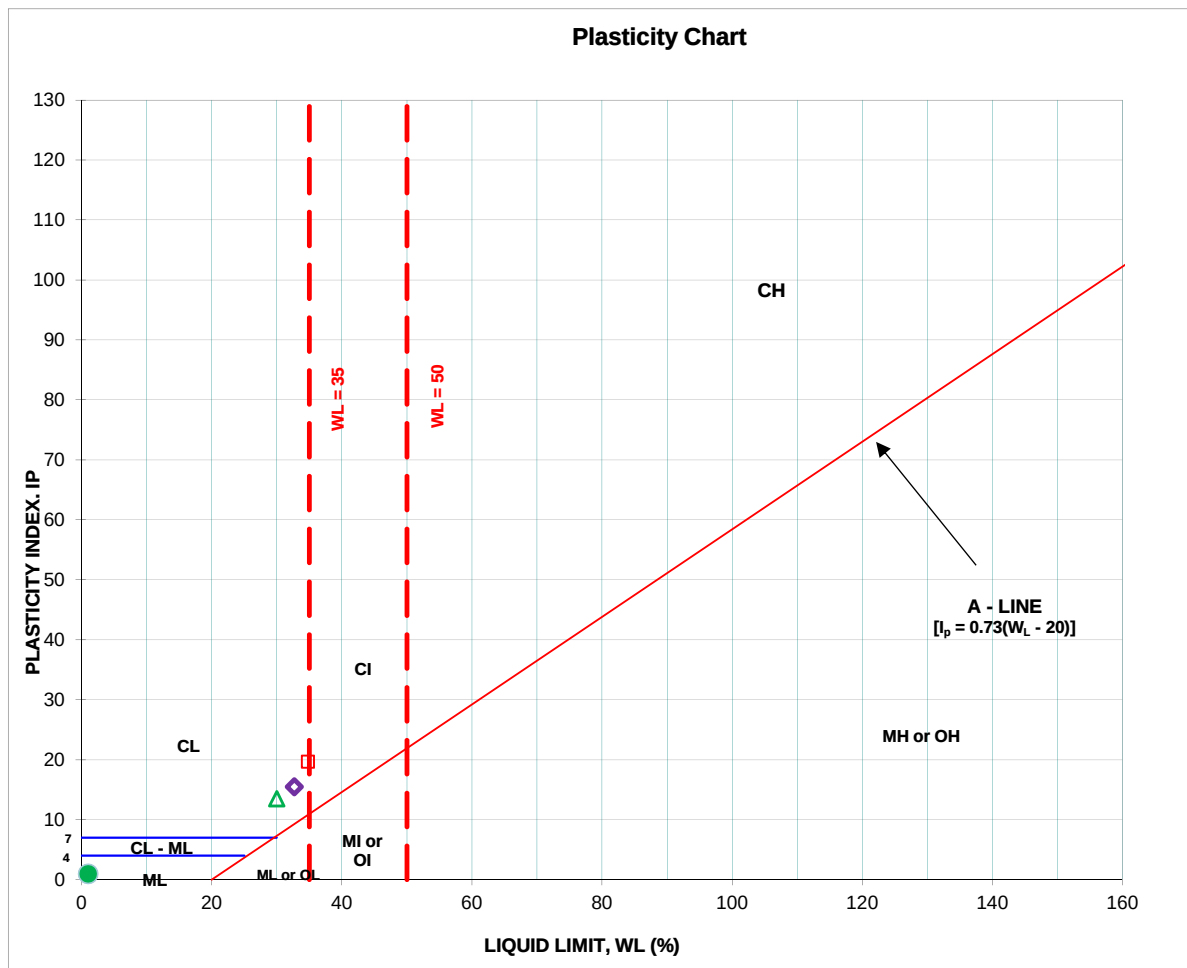
Preparation of Sample :
Dry State

Sample Type: SPT-10

Borehole no.: MBH-18

Depth :15.00-15.45

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



	Sample Type	Depth (m)	W _L	W _p	I _p	Remarks
□	UDS-01	0.80-1.00	34.8	15.1	19.7	CL : Inorganic clays of low to medium plasticity.
◇	SPT-01	1.00-1.45	32.7	17.2	15.5	CL : Inorganic clays of low to medium plasticity.
△	SPT-10	15.00-15.45	30.0	16.5	13.5	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

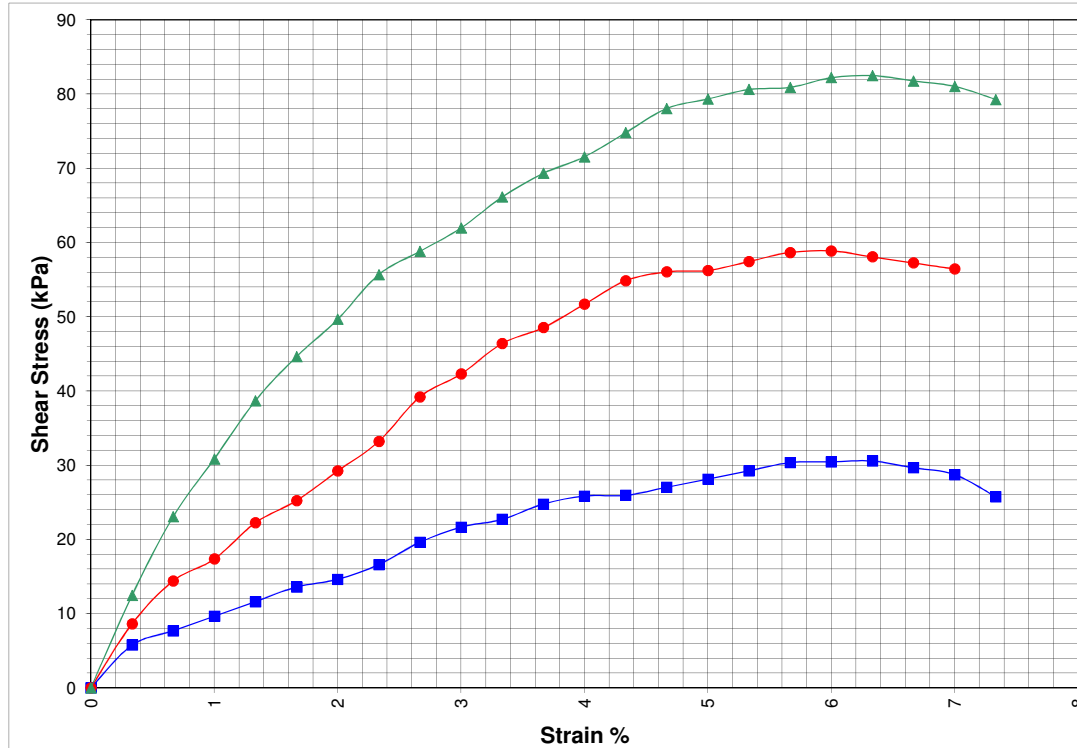
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-18

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

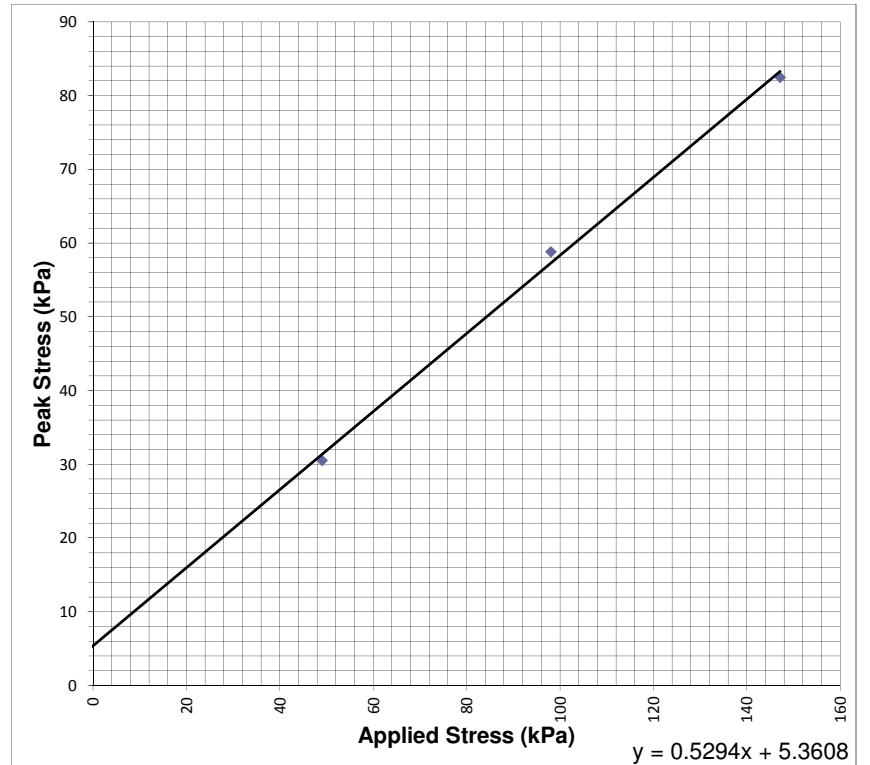
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	59
▲	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	27.9 °
Apparent Cohesion	5.36 kPa

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

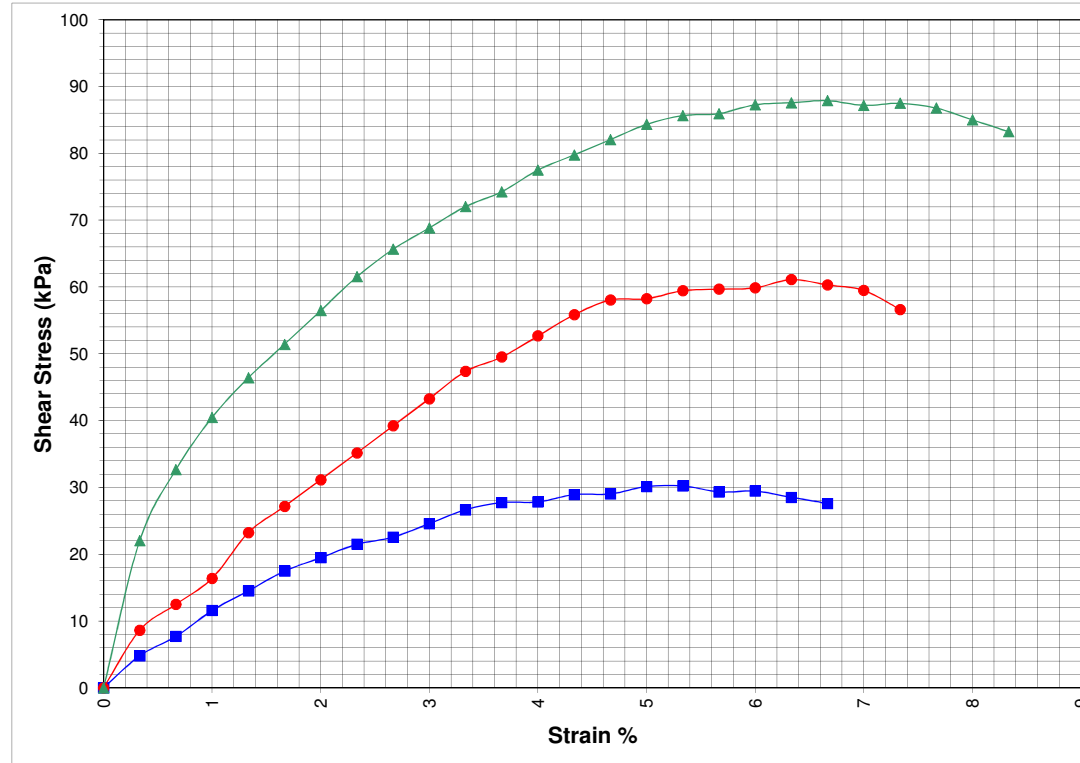
Borehole: MBH-18

Sample Type: SPT-05

Depth: 7.65-7.95 m

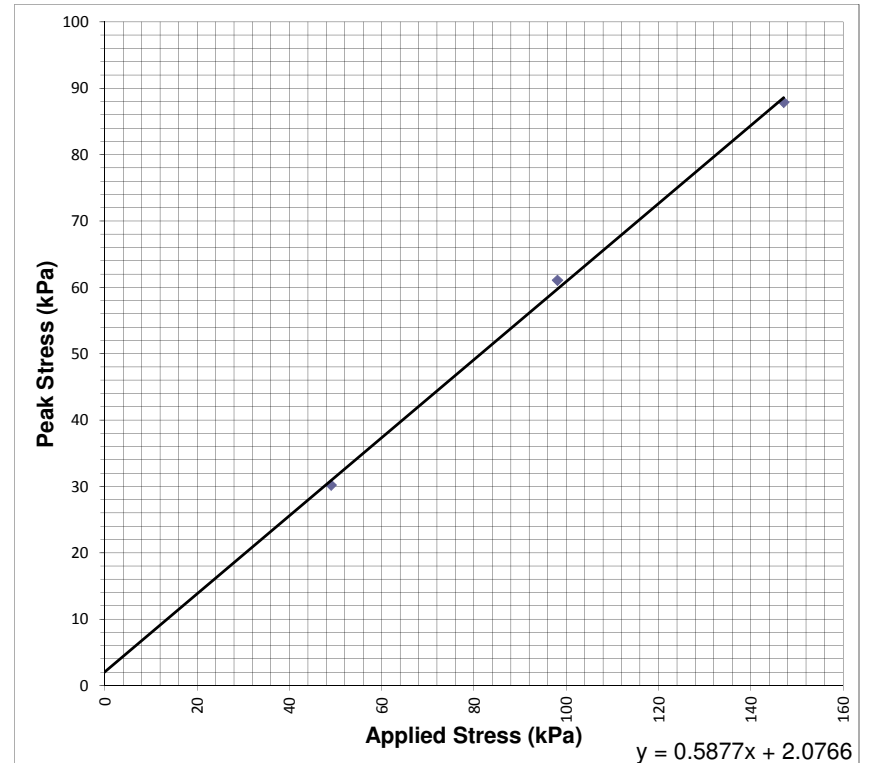
Direct Shear Test Results

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	30.4 °
Apparent Cohesion	2.08 kPa

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

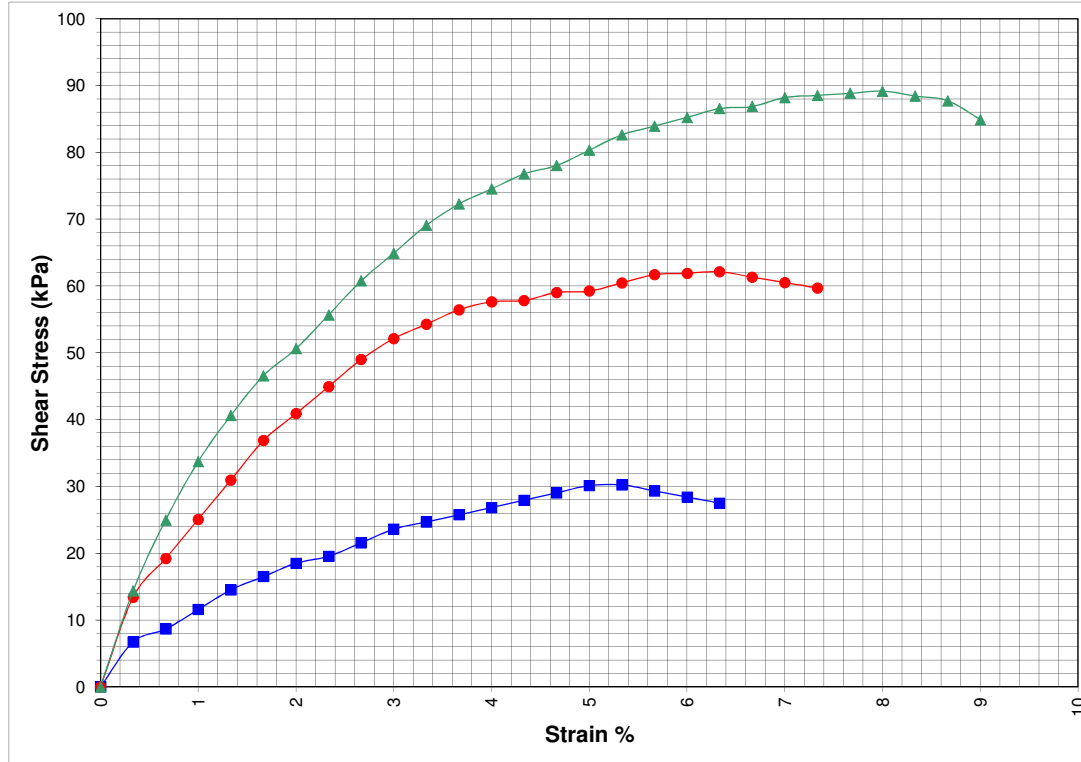
Borehole: MBH-18

Sample Type: SPT-09

Depth: 13.65-13.95 m

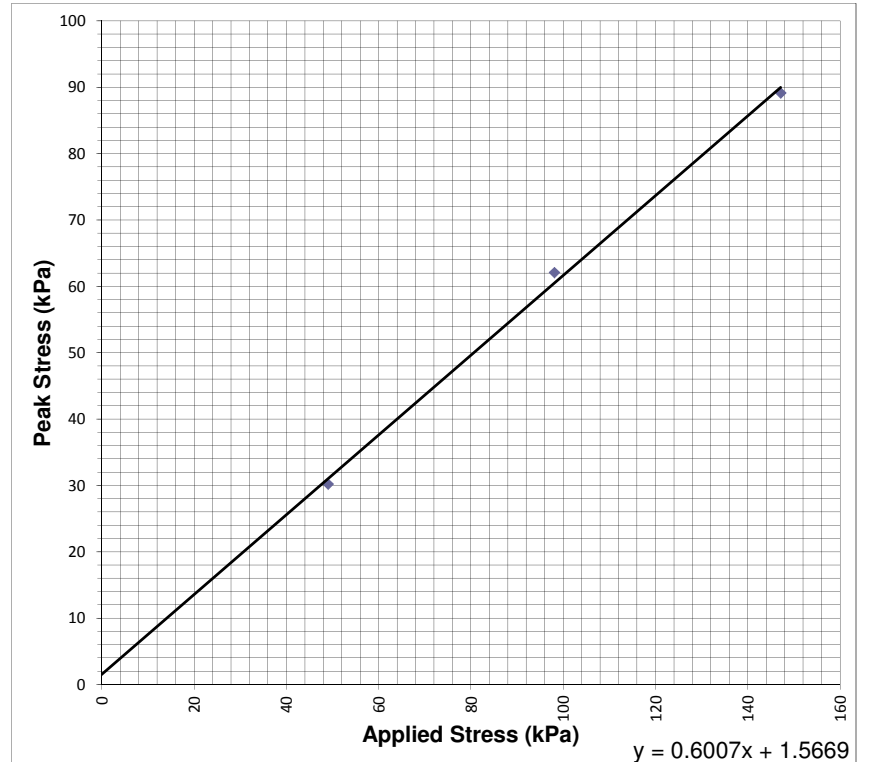
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	62
▲	Stage 3	147	89

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



Angle of Friction	31.0 °
Apparent Cohesion	1.57 kPa

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

Borehole: MBH-18

Sample Type: SPT-11

Depth: 16.50-16.95 m

SUMMARY OF TEST RESULTS

[illegible]

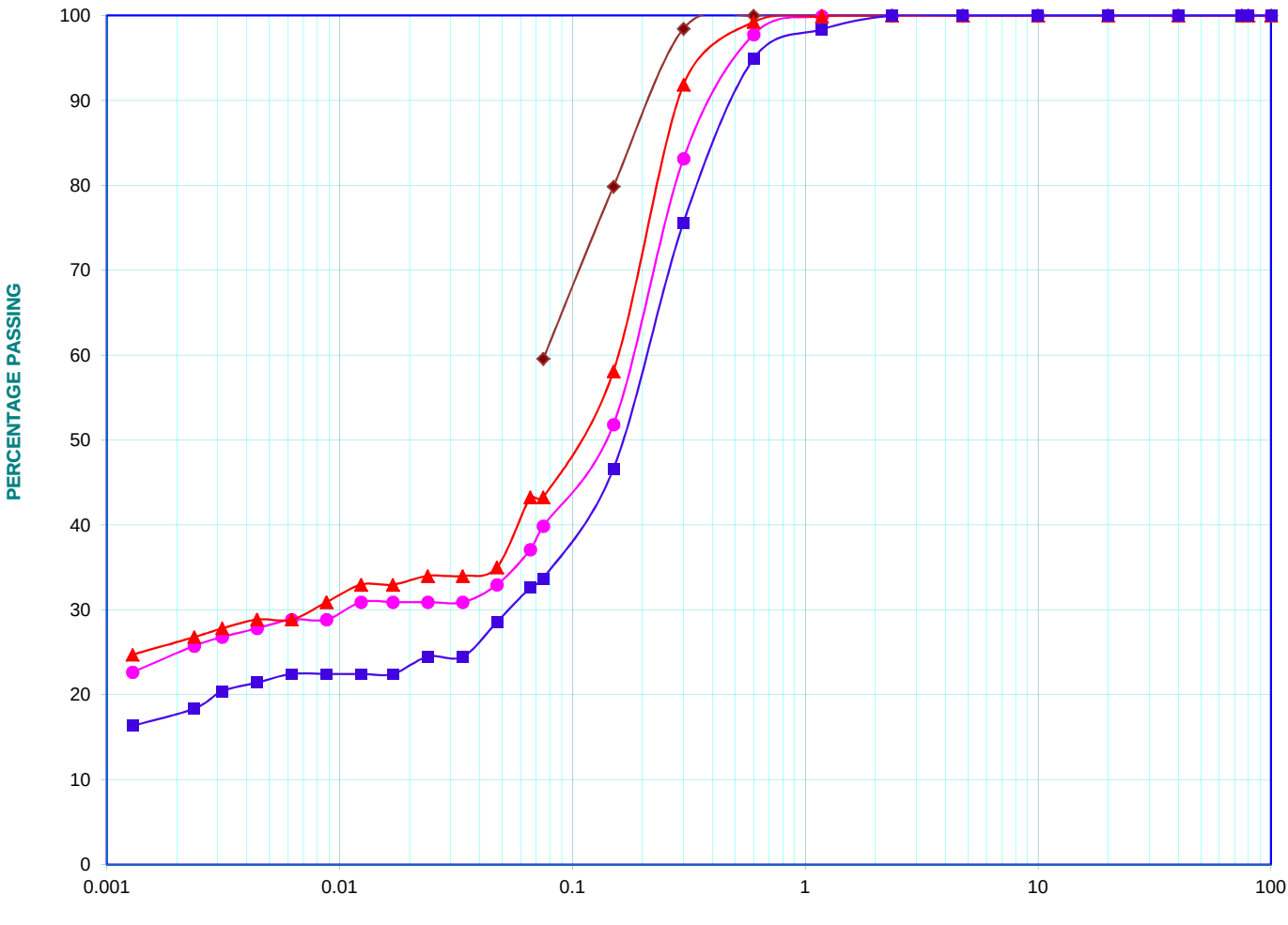
END OF BOREHOLE

[illegible]

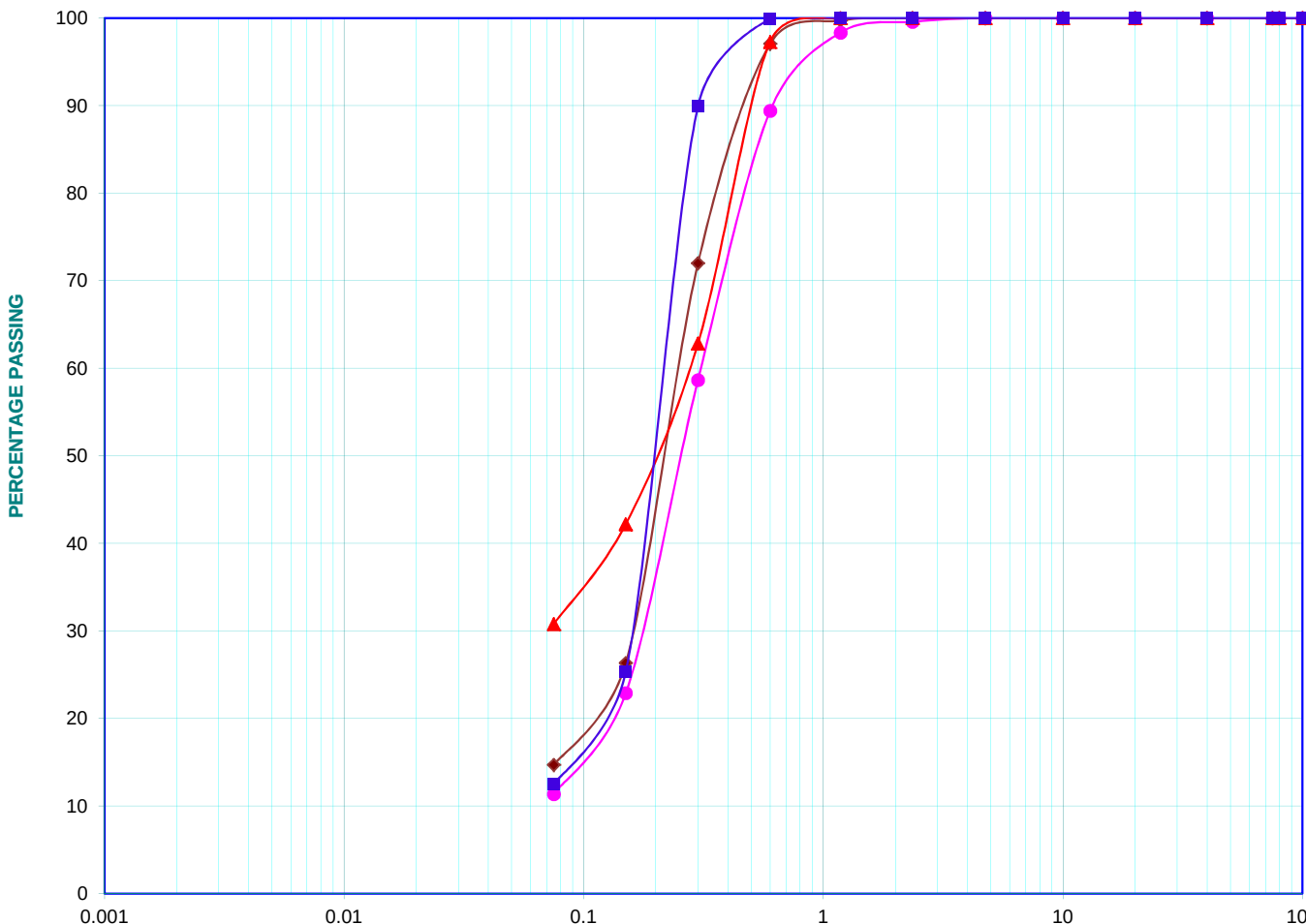
Notes : PS : Disturbed Sample * : Insufficient sample # : Decayed Wood Failure Type Geotechnical Investigation For Senior Jettys at

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

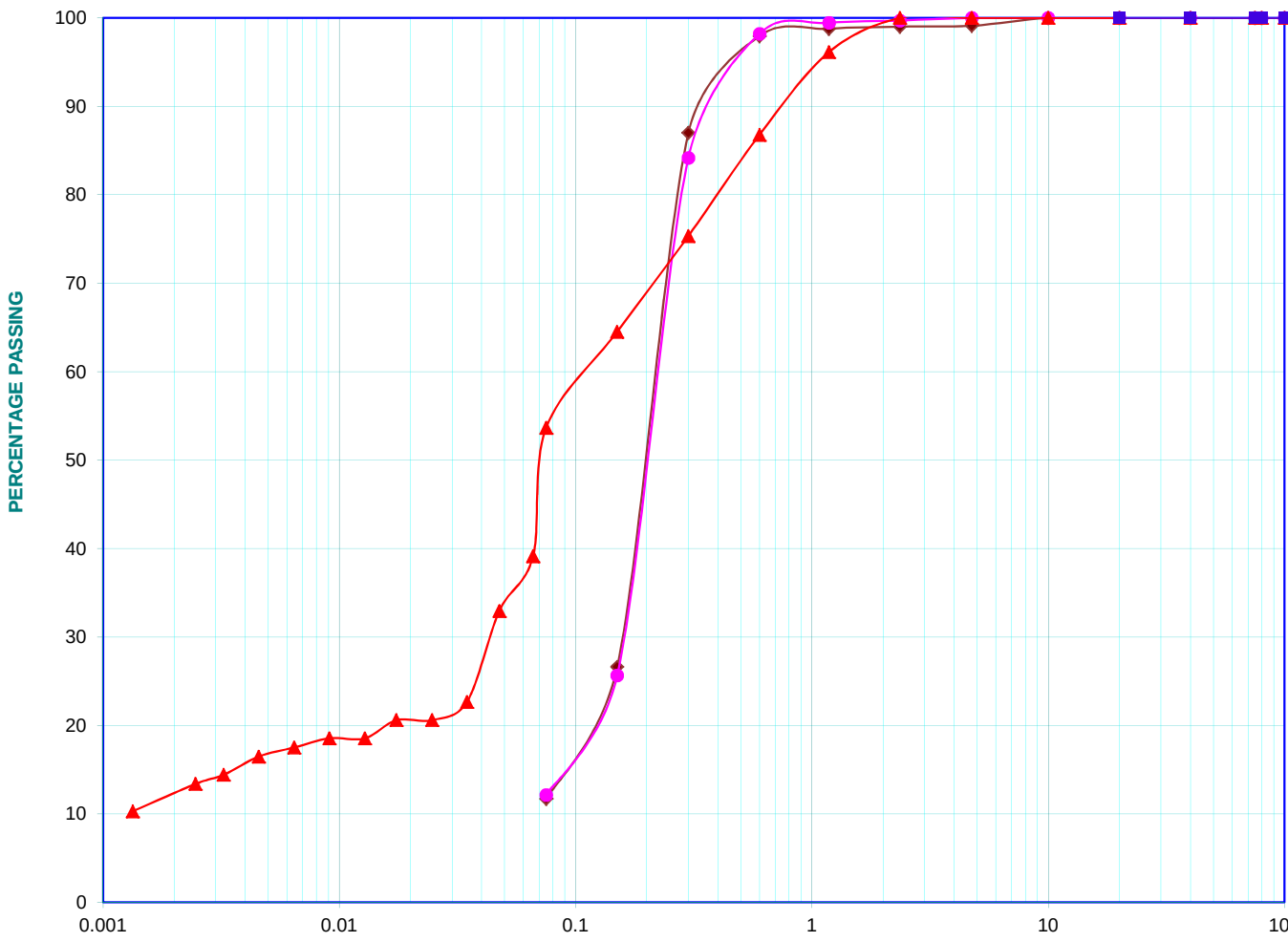
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-19					Date :			10-Apr-19		
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-19	MBH-19	MBH-19	MBH-19										
Depth (m)	0.00-0.30	1.50-1.95	3.00-3.45	4.50-4.95										
Sample Type	UDS-1	SPT-1	SPT-2	SPT-3										
Classification		SC	SC	SC										
Gravel %	0	0	0	0										
Sand %	40	60	57	66										
Silt %	<---->	14	16	16										
Clay %	<---->	26	27	18										
Fines % (Silt+Clay)	60	40	43	34										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	31.2	27.2	25.8										
Plastic Limit %	---	14.6	16.6	17.3										
Plasticity Index	---	16.6	10.6	8.5										
										Checked By :				

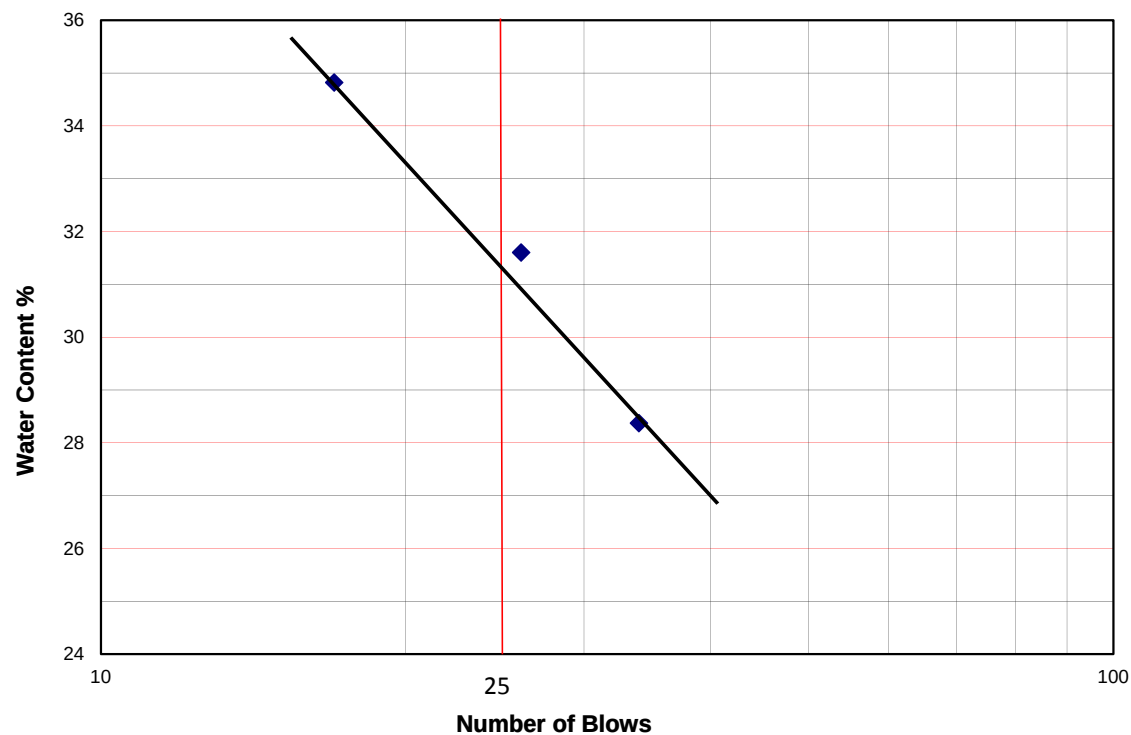
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-19					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-19	MBH-19	MBH-19	MBH-19										
Depth (m)	6.00-6.45	7.50-7.95	9.00-9.45	10.50-10.95										
Sample Type	SPT-4	SPT-5	SPT-6	SPT-7										
Classification	SM \ SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	85	89	69	87										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	15	11	31	13										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-19					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-19	MBH-19	MBH-19											
Depth (m)	12.15-12.45	13.50-13.95	15.35-15.80											
Sample Type	SPT-8	SPT-9	SPT-10											
Classification	SM \ SC	SM \ SC	CL											
Gravel %	1	0	0											
Sand %	87	88	46											
Silt %	<---->	<---->	41											
Clay %	<---->	<---->	13											
Fines % (Silt+Clay)	12	12	54											
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	30.7											
Plastic Limit %	---	---	16.4											
Plasticity Index	---	---	14.3											
									Checked By :					

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



Liquid Limit %

Wet Weight + Can (g)	26.11	27.83	33.62		
Dry Weight + Can (g)	22.45	23.27	28.38		
Can Weight (g)	9.55	8.84	13.33		
Water Content, %	28.4	31.6	34.8		
Number of Blows	34	26	17		

Plastic Limit %

Wet Weight + Can (g)	17.03	16.59	19.83
Dry Weight + Can (g)	16.04	16.08	19.07
Can Weight (g)	9.39	12.59	13.74
Water Content, %	14.9	14.6	14.3

Liquid Limit % 31.2
Plastic Limit % 14.6
Plasticity Index % 16.6

Preparation of Sample :
Dry State

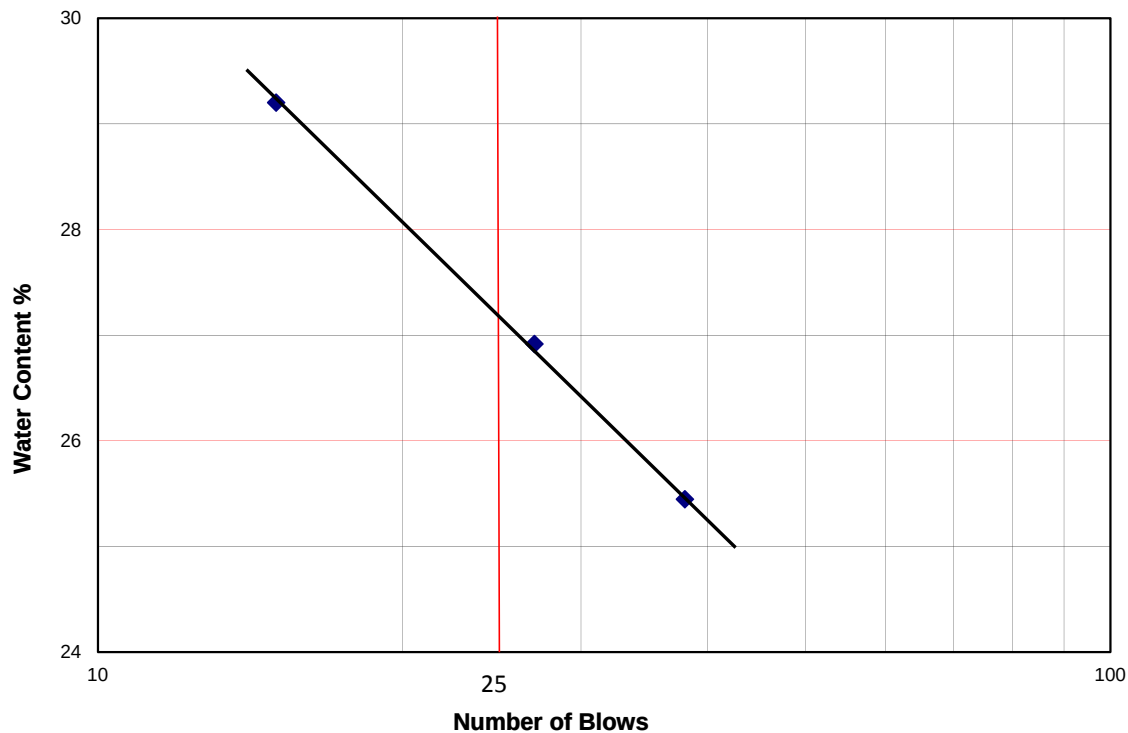
Sample Type: SPT-01

Borehole no.: MBH-19

Depth :1.50-1.95

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)	30.56	29.47	32.59		
Dry Weight + Can (g)	26.29	25.96	27.20		
Can Weight (g)	9.51	12.92	8.74		
Water Content, %	25.4	26.9	29.2		
Number of Blows	38	27	15		

Plastic Limit %

Wet Weight + Can (g)	17.33	17.88	17.63
Dry Weight + Can (g)	16.68	16.64	16.35
Can Weight (g)	12.76	9.25	8.52
Water Content, %	16.6	16.8	16.3

Liquid Limit % 27.2
Plastic Limit % 16.6
Plasticity Index % 10.6

Preparation of Sample :
Dry State

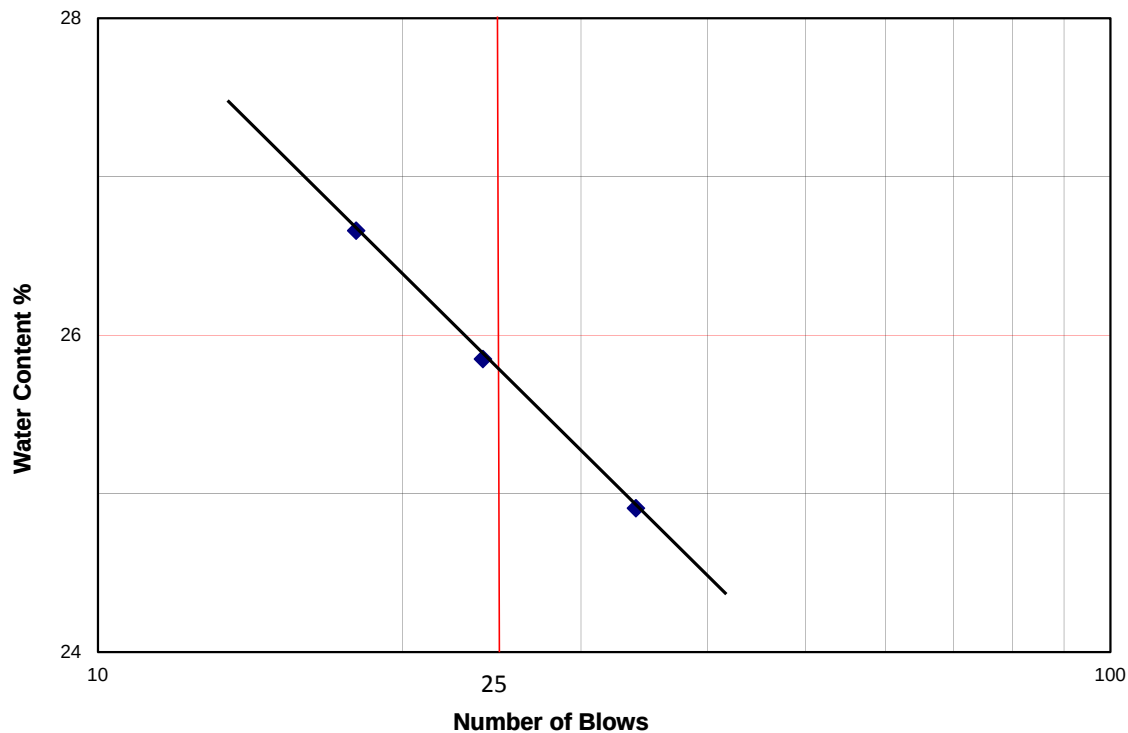
Sample Type: SPT-02

Borehole no.: MBH-19

Depth :3.00-3.45

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)	34.82	30.87	26.63		
Dry Weight + Can (g)	30.75	26.99	22.61		
Can Weight (g)	14.41	11.98	7.53		
Water Content, %	24.9	25.8	26.7		
Number of Blows	34	24	18		

Plastic Limit %

Wet Weight + Can (g)	19.67	18.84	17.57
Dry Weight + Can (g)	18.70	17.35	16.41
Can Weight (g)	13.06	8.65	9.83
Water Content, %	17.2	17.1	17.6

Liquid Limit % 25.8
Plastic Limit % 17.3
Plasticity Index % 8.5

Preparation of Sample :
Dry State

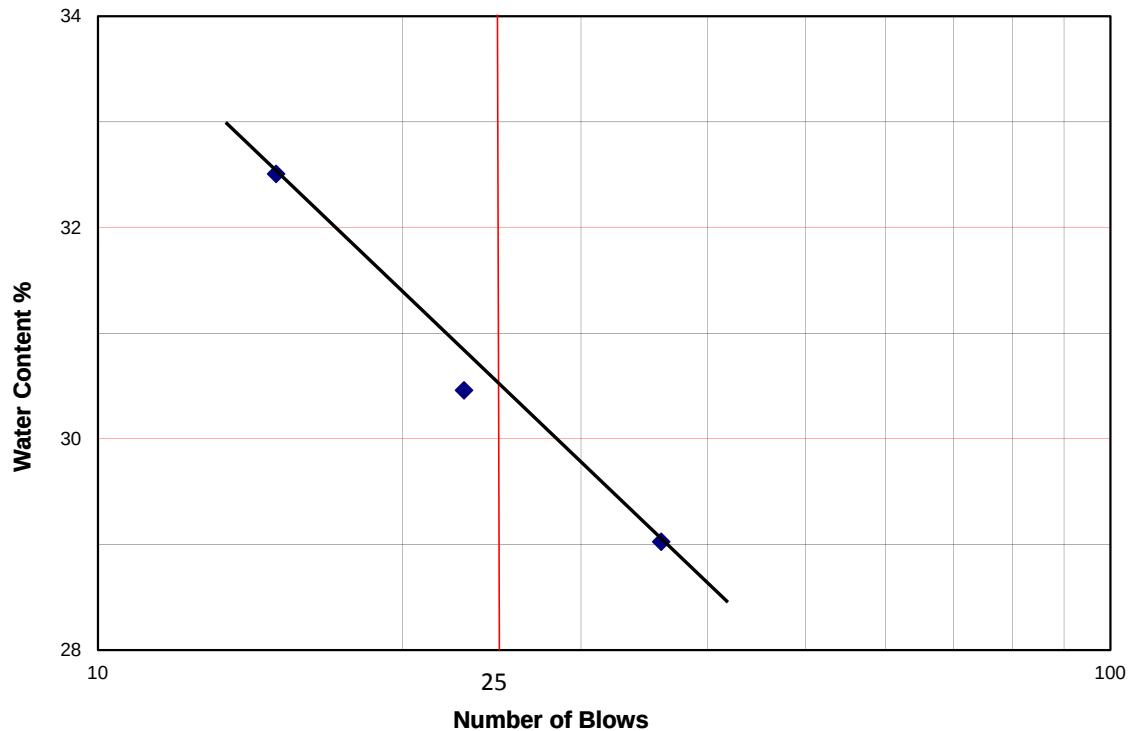
Sample Type: SPT-03

Borehole no.: MBH-19

Depth :4.50-4.95

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)	26.95	35.35	30.36		
Dry Weight + Can (g)	23.04	30.09	25.26		
Can Weight (g)	9.57	12.82	9.57		
Water Content, %	29.0	30.5	32.5		
Number of Blows	36	23	15		

Plastic Limit %

Wet Weight + Can (g)	16.56	17.39	18.73
Dry Weight + Can (g)	15.47	16.86	17.42
Can Weight (g)	8.75	13.74	9.27
Water Content, %	16.2	17.0	16.1

Liquid Limit % 30.7
Plastic Limit % 16.4
Plasticity Index % 14.3

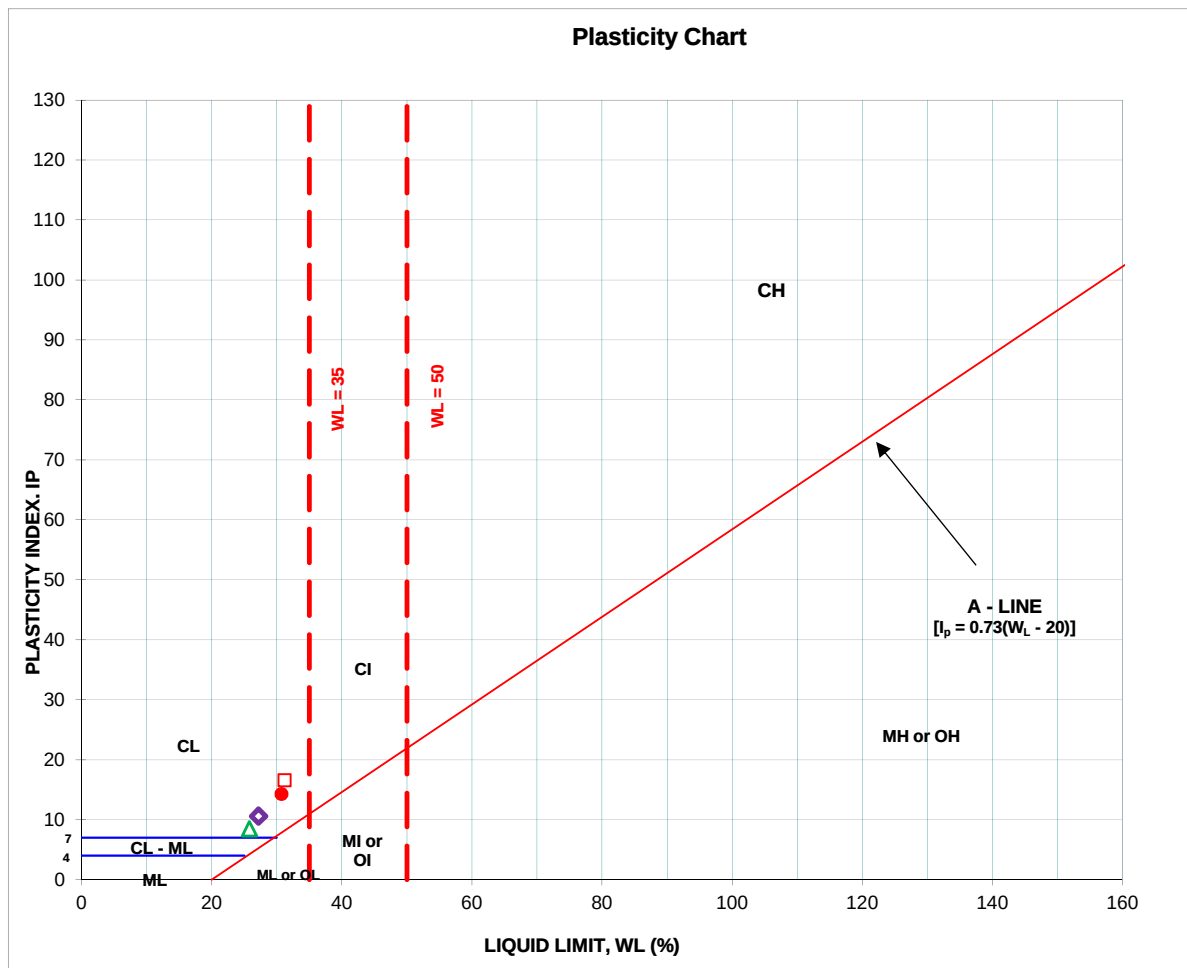
Preparation of Sample :
Dry State

Sample Type: SPT-10

Borehole no.: MBH-19

Depth :15.35-15.80

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-01	1.50-1.95	31.2	14.6	16.6	CL: Inorganic clays of low to medium plasticity.
◇	SPT-02	3.00-3.45	27.2	16.6	10.6	CL: Inorganic clays of low to medium plasticity.
△	SPT-03	4.50-4.95	25.8	17.3	8.5	CL: Inorganic clays of low to medium plasticity.
●	SPT-10	15.35-15.80	30.7	16.4	14.3	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

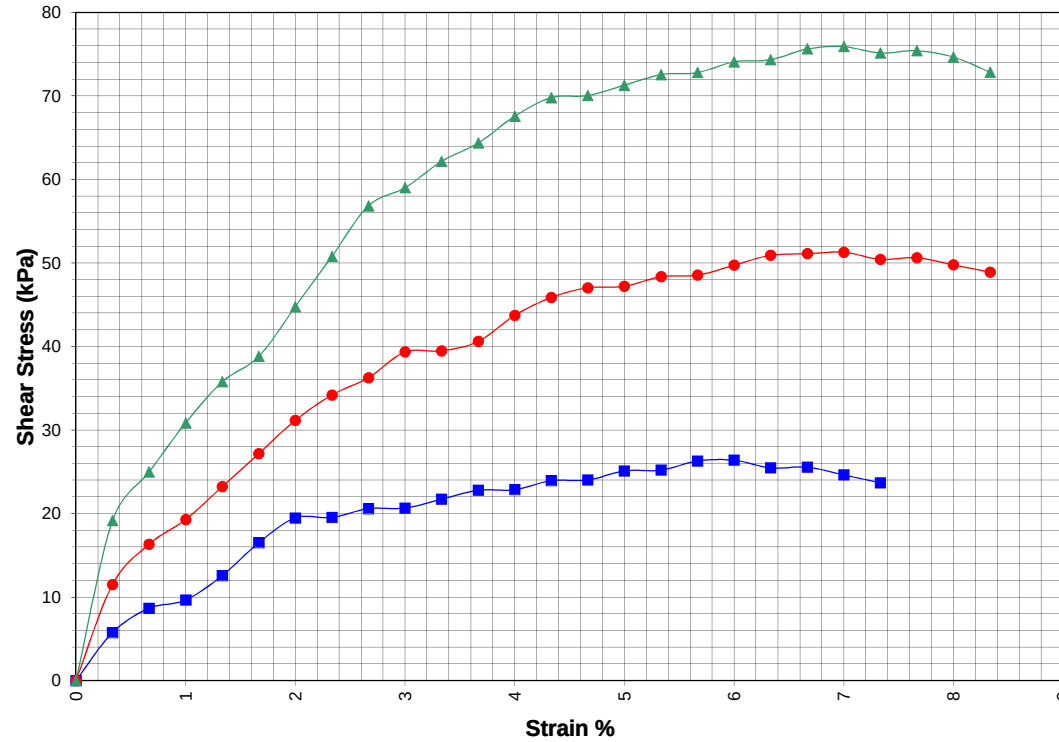
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-19

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

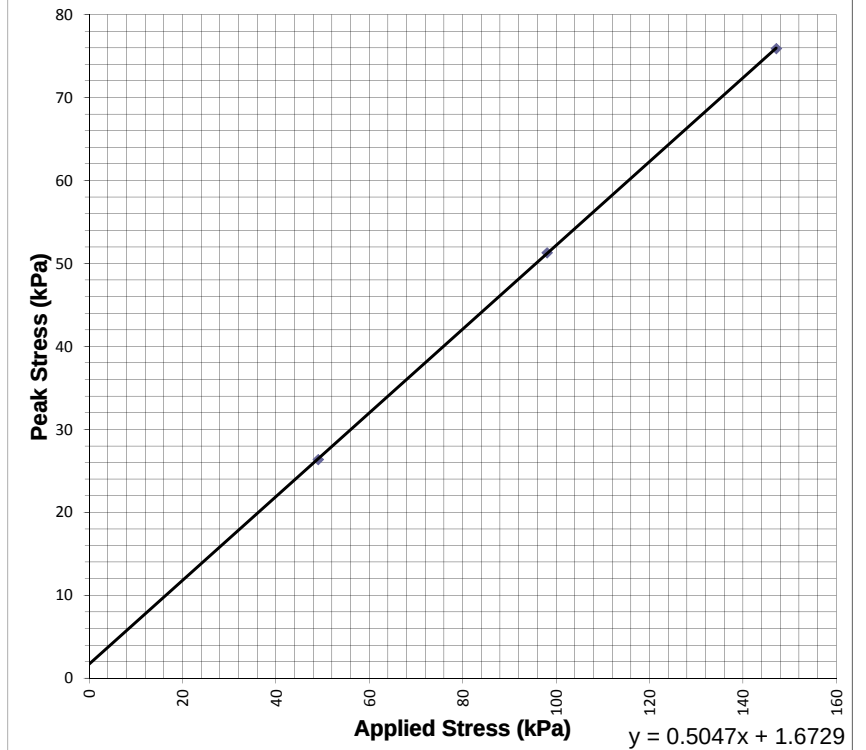
Direct Shear Test Results

Stress - Strain Curves



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

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



Angle of Friction	26.78 °
Apparent Cohesion	1.67 kPa

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

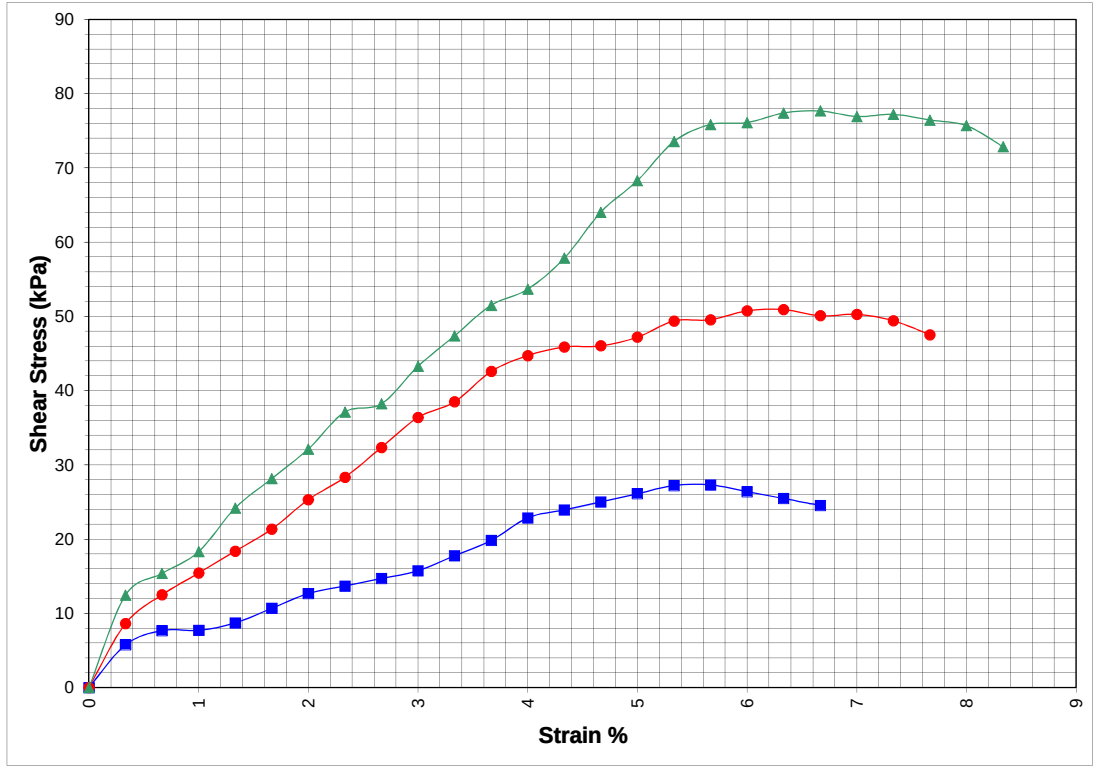
Borehole: MBH-19

Sample Type: UDS-01

Depth: 0.00-0.30 m

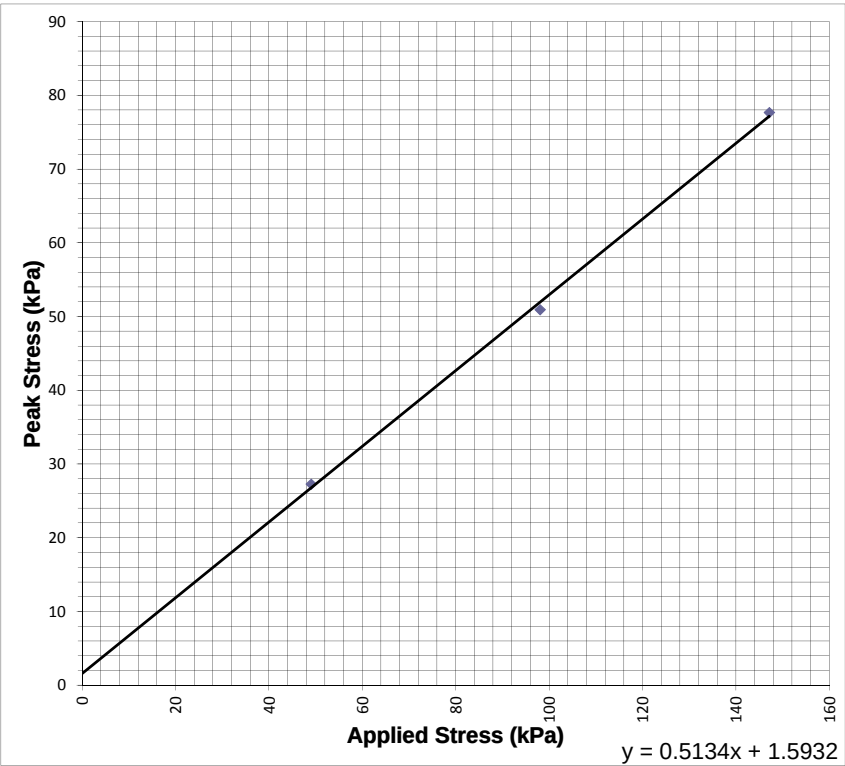
Direct Shear Test Results

Stress - Strain Curves



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

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



Angle of Friction	27.18 °
Apparent Cohesion	1.59 kPa

Borehole: MBH-19

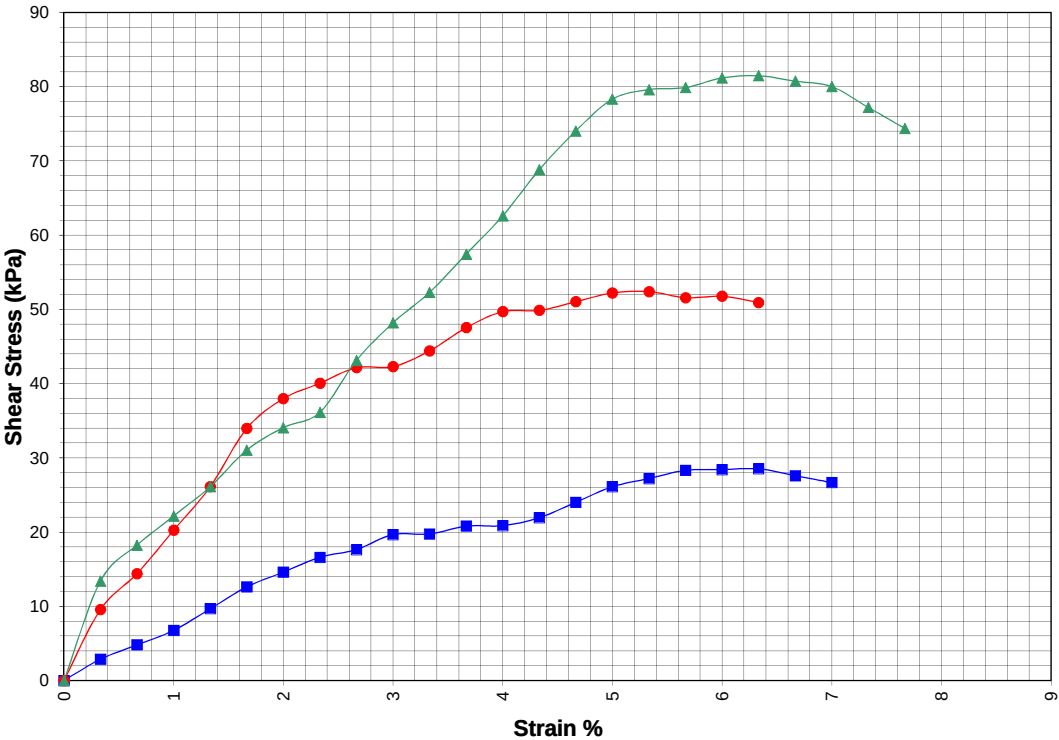
Sample Type: SPT-04

Depth: 6.00-6.45 m

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

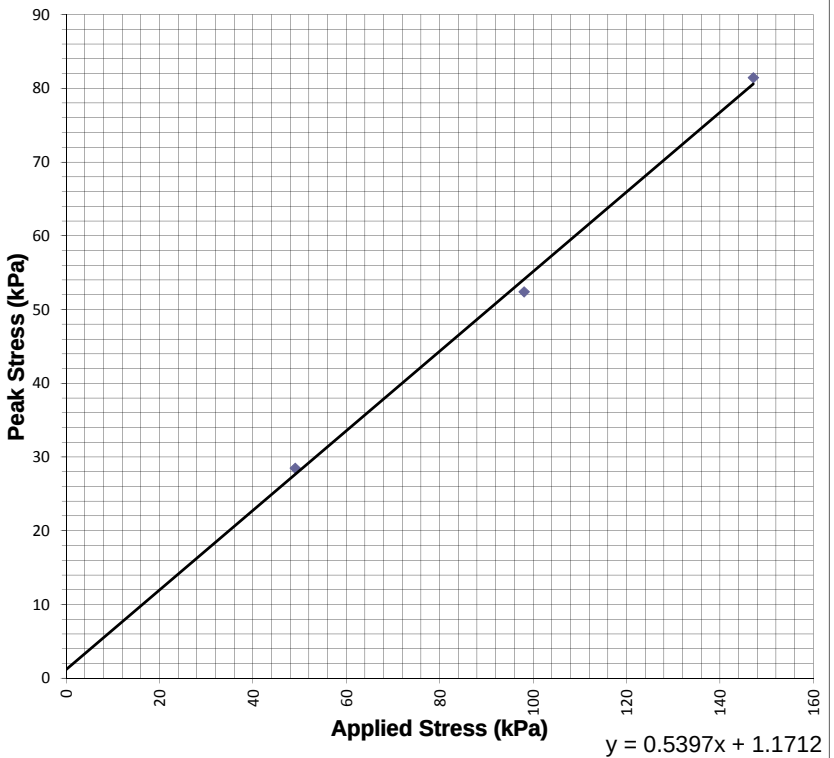
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	52
▲	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	28.36 °
Apparent Cohesion	1.17 kPa

Borehole: MBH-19

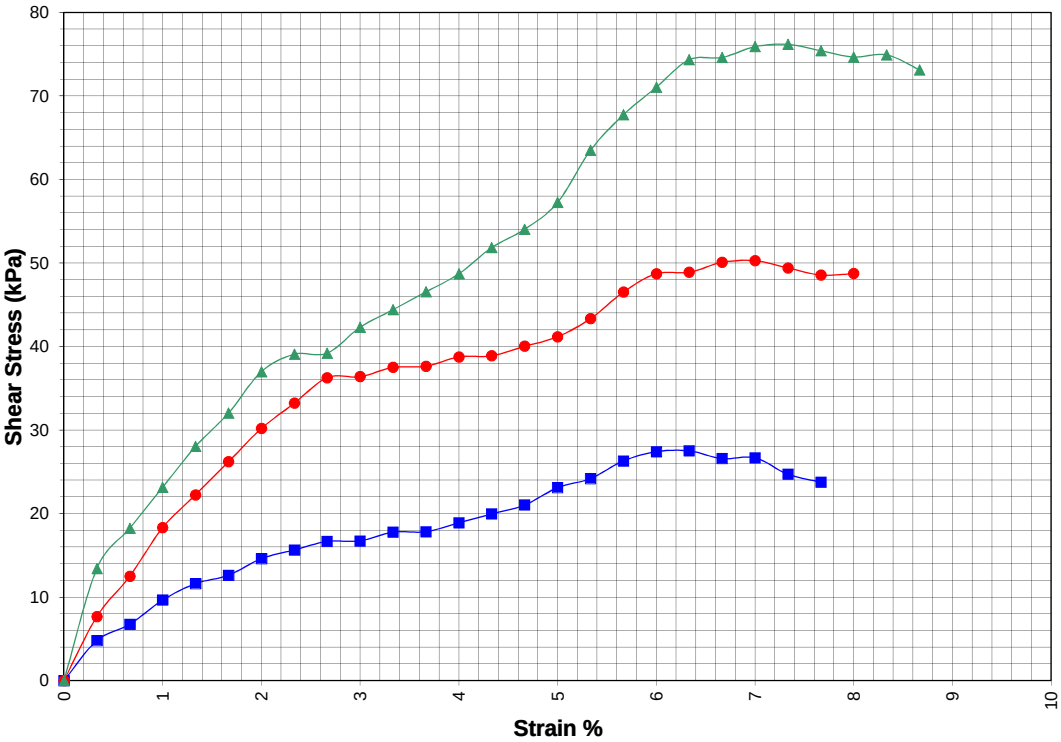
Sample Type: SPT-06

Depth: 9.00-9.45 m

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

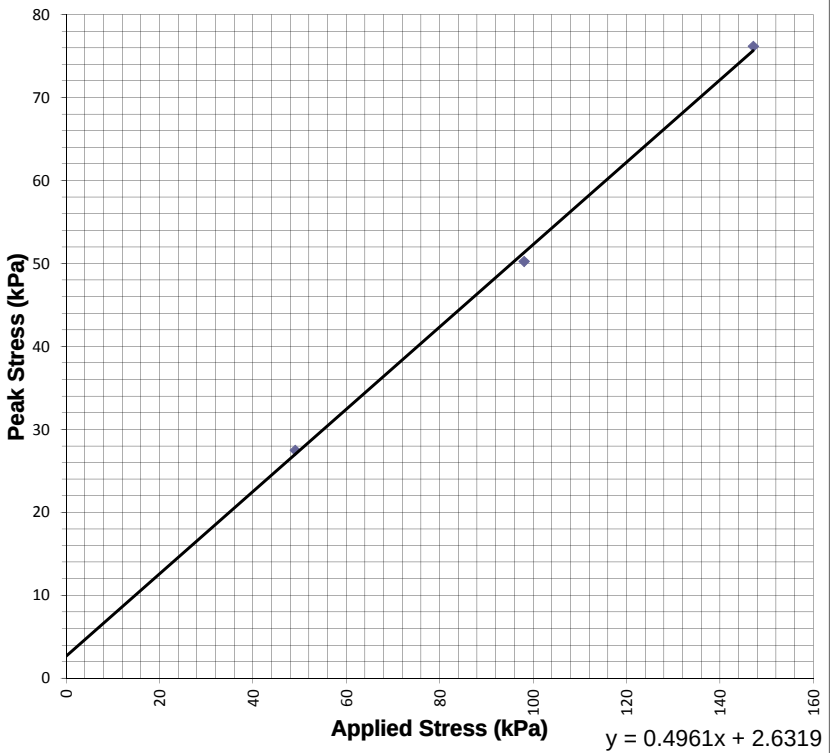
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	50
▲	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	26.4 °
Apparent Cohesion	2.63 kPa

Borehole: MBH-19

Sample Type: SPT-09

Depth: 13.50-13.95 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
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83	84
85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

[illegible]

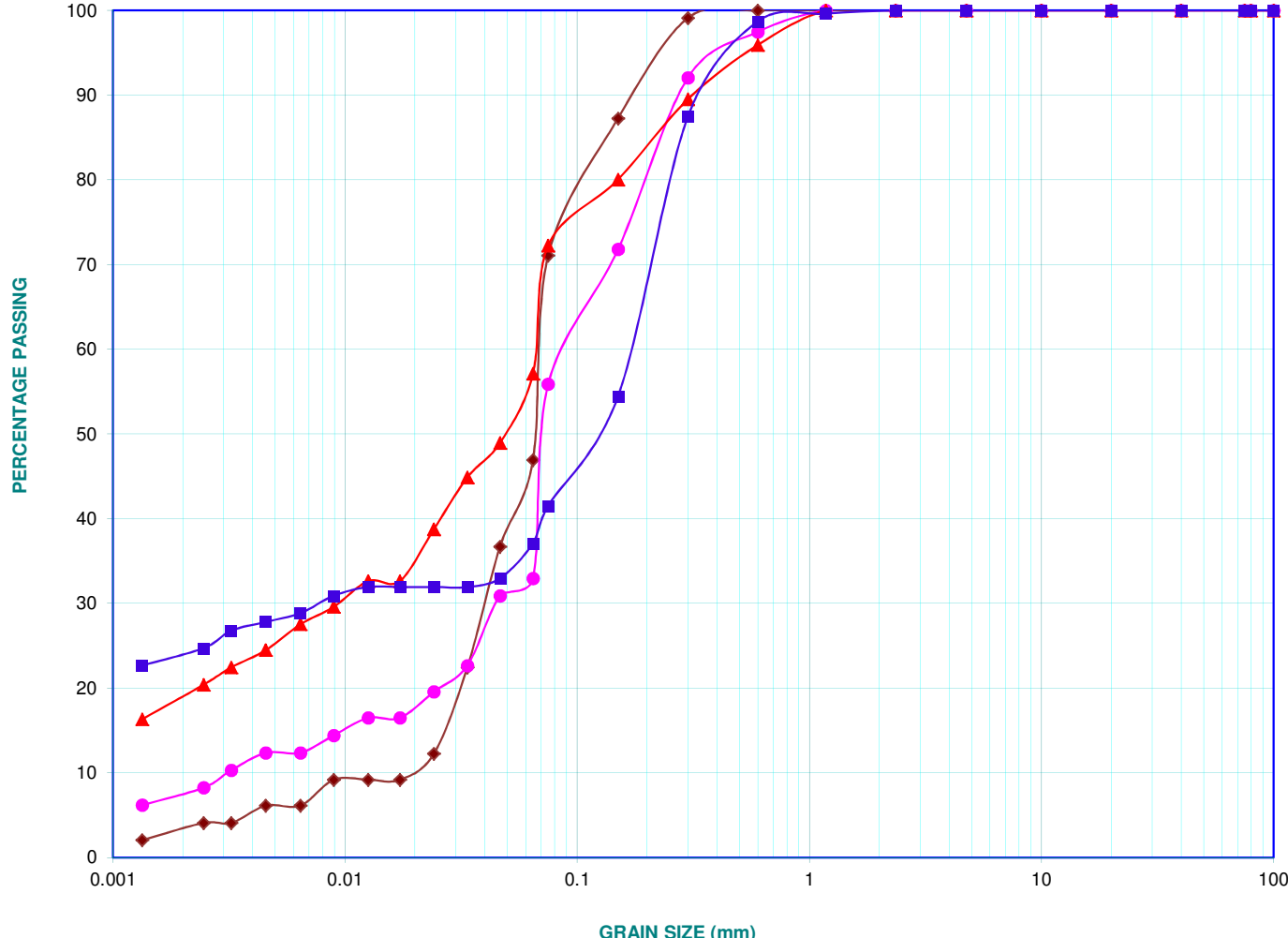
END OF BOREHOLE

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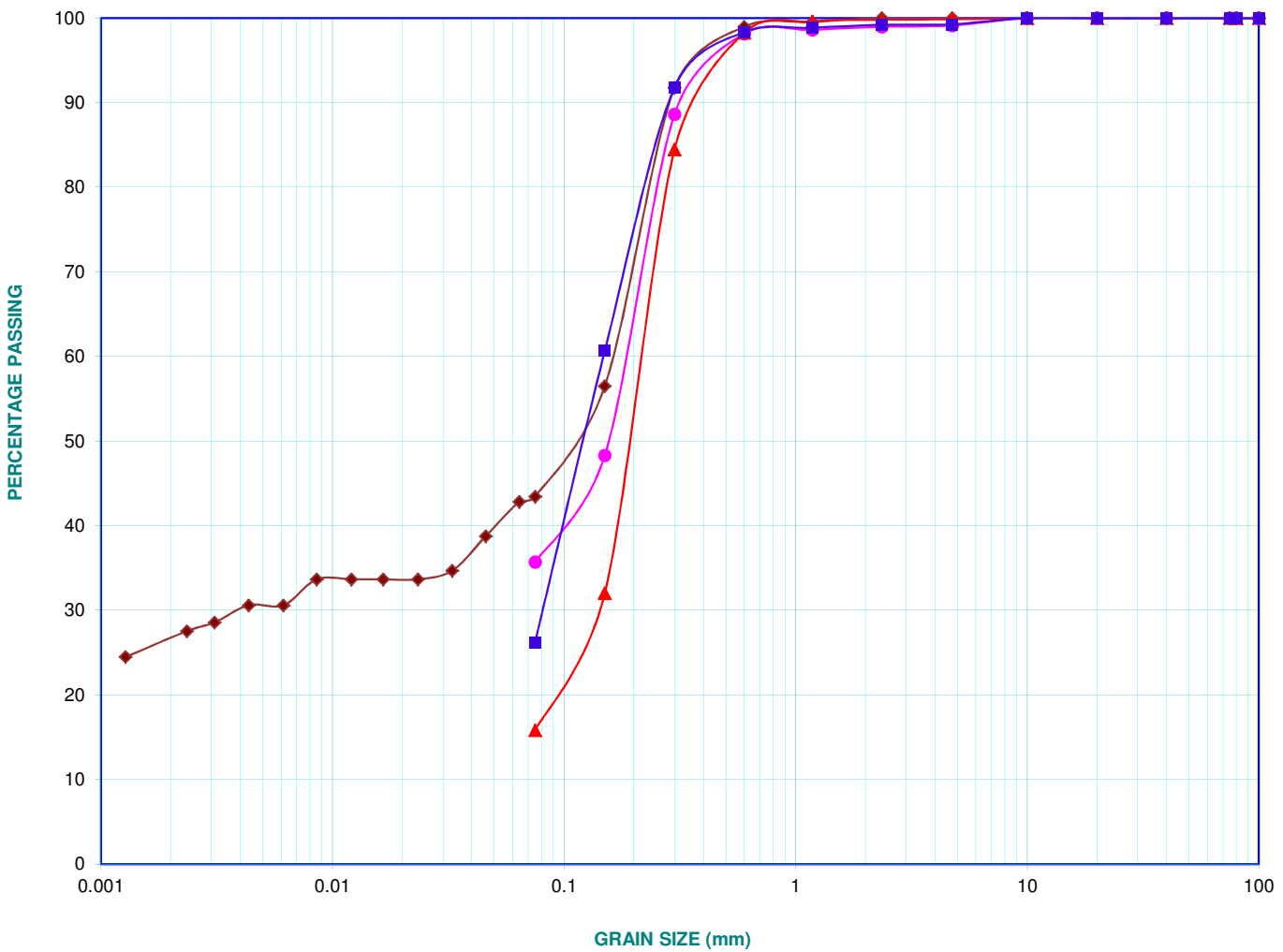
Notes :

DS	: Disturbed Sample	*	: Insufficient sample	#	: Decayed Wood	Failure Type	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-20

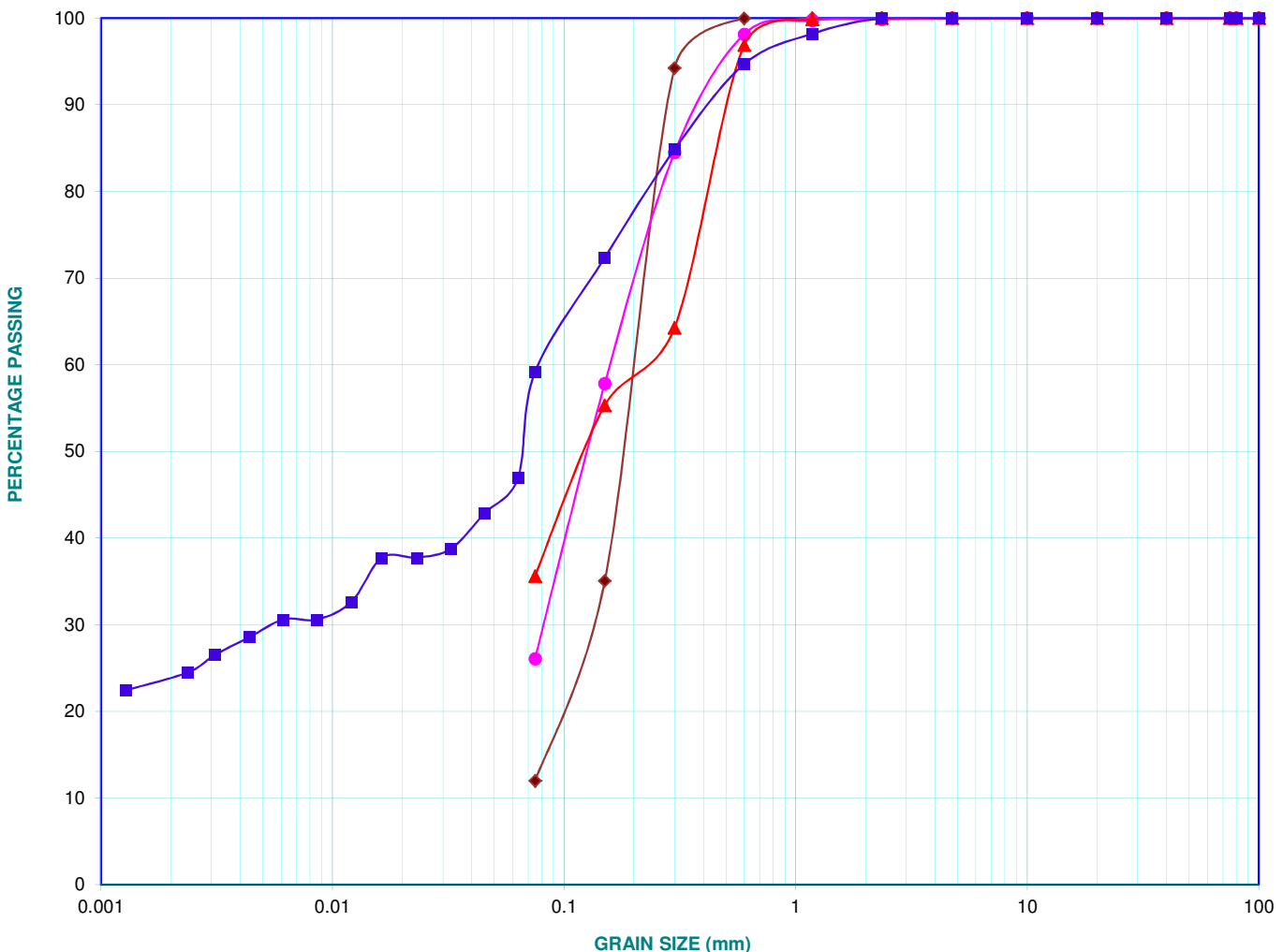
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-20					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-20	MBH-20	MBH-20	MBH-20	PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	0.00-0.30	1.00-1.10	1.10-1.45	4.00-4.45										
Sample Type	UDS-1	SPT-1	SPT-1	SPT-2										
Classification	CL	CL	CL	SC										
Gravel %	0	0	0	0										
Sand %	29	44	28	58										
Silt %	67	48	52	17										
Clay %	4	8	20	25										
Fines % (Silt+Clay)	71	56	72	42										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	29.3	38.9										
Plastic Limit %	---	---	17.5	17.3										
Plasticity Index	---	---	11.8	21.6										
									Checked By :					

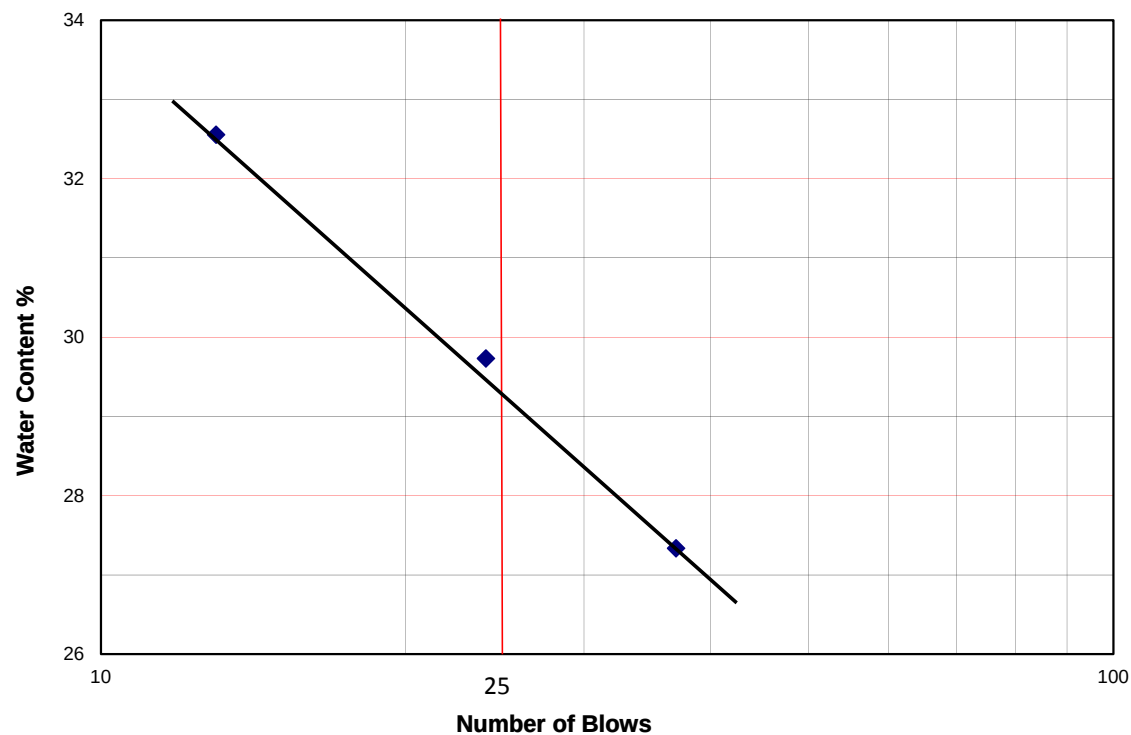
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-20					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-20	MBH-20	MBH-20	MBH-20										
Depth (m)	5.50-5.65	5.65-5.95	7.00-7.45	8.50-8.95										
Sample Type	SPT-3	SPT-3	SPT-4	SPT-5										
Classification	SC	SC	SC	SC										
Gravel %	0	1	0	1										
Sand %	57	63	84	73										
Silt %	15	<---->	<---->	<---->										
Clay %	28	<---->	<---->	<---->										
Fines % (Silt+Clay)	43	36	16	26										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-20					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-20	MBH-20	MBH-20	MBH-20										
Depth (m)	10.00-10.45	11.50-11.95	13.00-13.45	14.50-14.95										
Sample Type	SPT-6	SPT-7	SPT-8	SPT-9										
Classification	SC	SC	SC											
Gravel %	0	0	0	0										
Sand %	88	74	64	41										
Silt %	<---->	<---->	<---->	35										
Clay %	<---->	<---->	<---->	24										
Fines % (Silt+Clay)	12	26	36	59										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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)	28.78	24.47	31.82		
Dry Weight + Can (g)	24.48	21.06	27.24		
Can Weight (g)	8.75	9.59	13.17		
Water Content, %	27.3	29.7	32.6		
Number of Blows	37	24	13		

Plastic Limit %

Wet Weight + Can (g)	21.99	20.52	19.44
Dry Weight + Can (g)	20.80	18.80	18.59
Can Weight (g)	14.02	8.87	13.73
Water Content, %	17.6	17.3	17.5

Liquid Limit % 29.3
Plastic Limit % 17.5
Plasticity Index % 11.8

Preparation of Sample :
Dry State

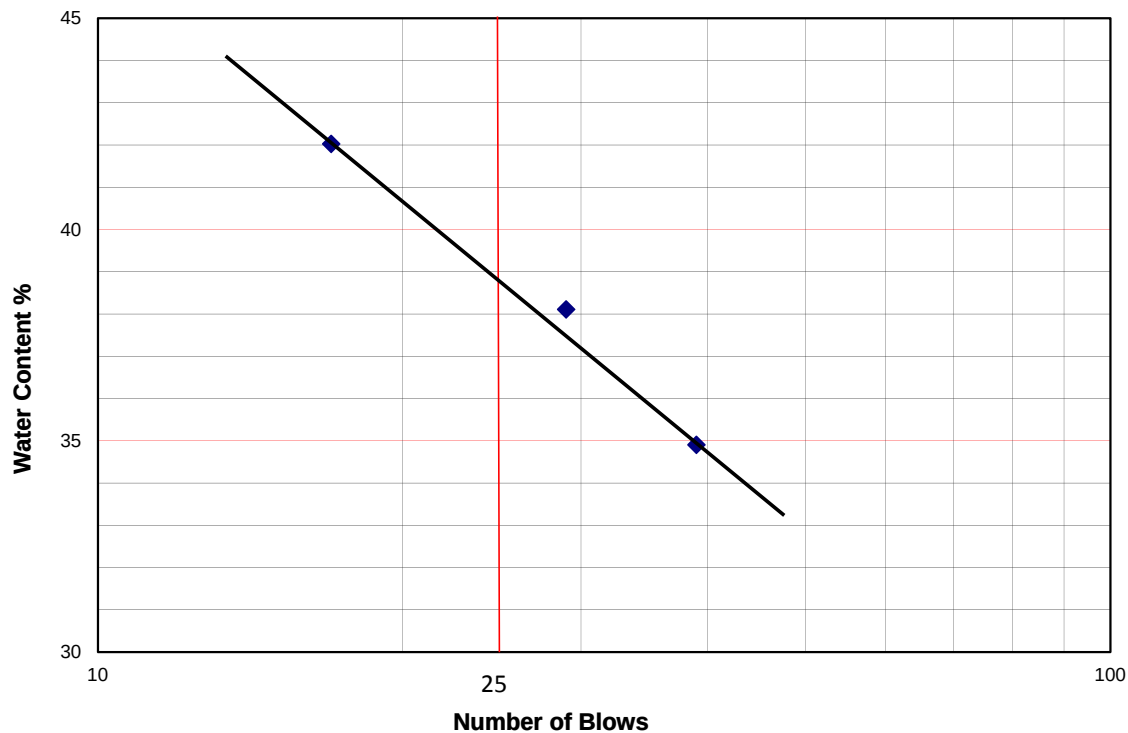
Sample Type: SPT-01

Borehole no.: MBH-20

Depth :1.10-1.45

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)	27.01	31.55	35.37		
Dry Weight + Can (g)	22.41	26.04	27.73		
Can Weight (g)	9.23	11.58	9.55		
Water Content, %	34.9	38.1	42.0		
Number of Blows	39	29	17		

Plastic Limit %

Wet Weight + Can (g)	19.25	17.93	14.97
Dry Weight + Can (g)	18.29	16.55	14.16
Can Weight (g)	12.76	8.51	9.52
Water Content, %	17.4	17.2	17.5

Liquid Limit % 38.9
Plastic Limit % 17.3
Plasticity Index % 21.6

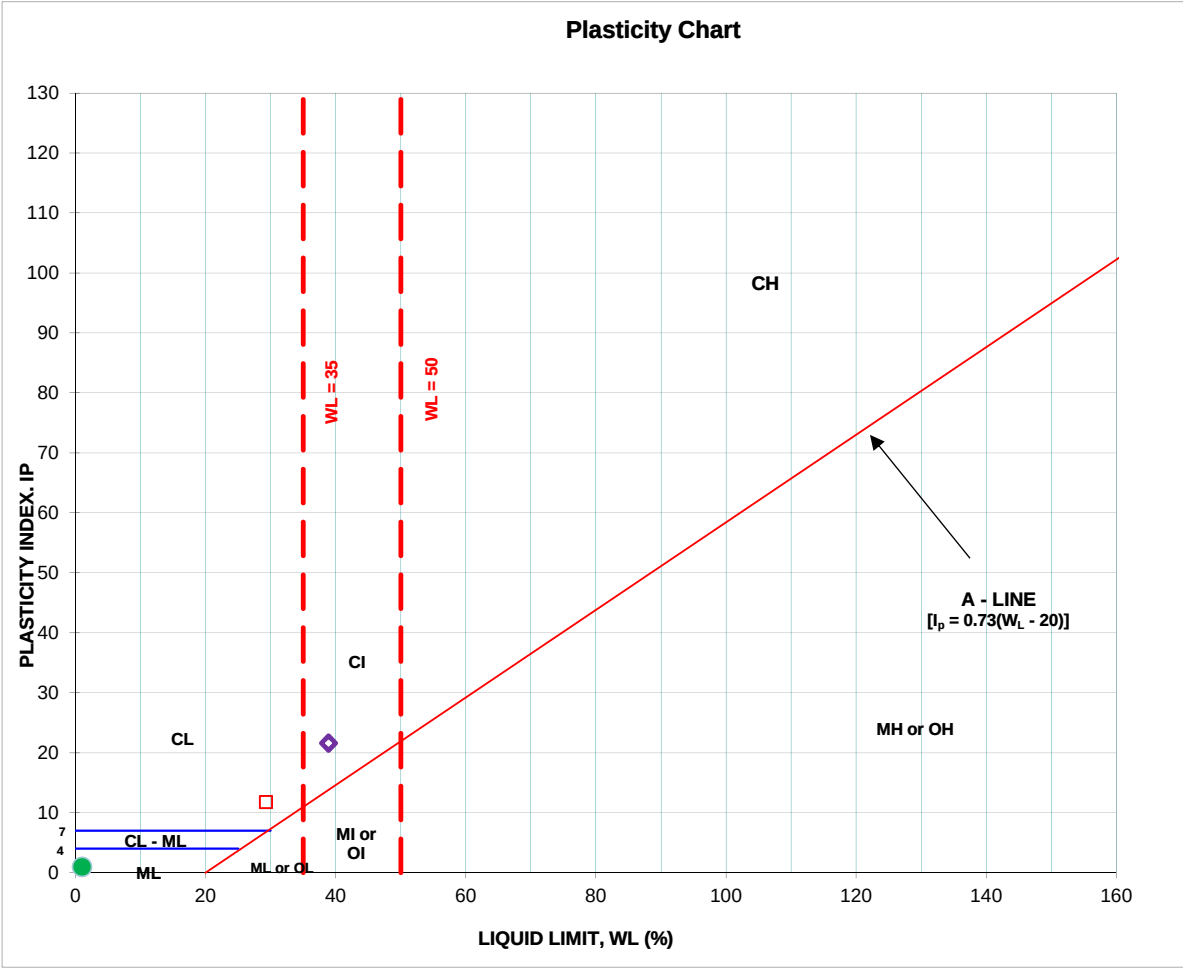
Preparation of Sample :
Dry State

Sample Type: SPT-02

Borehole no.: MBH-20

Depth :4.00-4.45

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-01	1.10-1.45	29.3	17.5	11.8	CL : Inorganic clays of low to medium plasticity.
◇	SPT-02	4.00-4.45	38.9	17.3	21.6	CI : Clays with Intermediate plasticity
△						
●						
+						
■						

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

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

OL Organic silts and organic silty clays of low plasticity

CI Clays with Intermediate plasticity

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

CH Inorganic clays of high plasticity, fat clays

OH Organic silts and organic clays of medium to high plasticity

MI Silt with intermediate plasticity

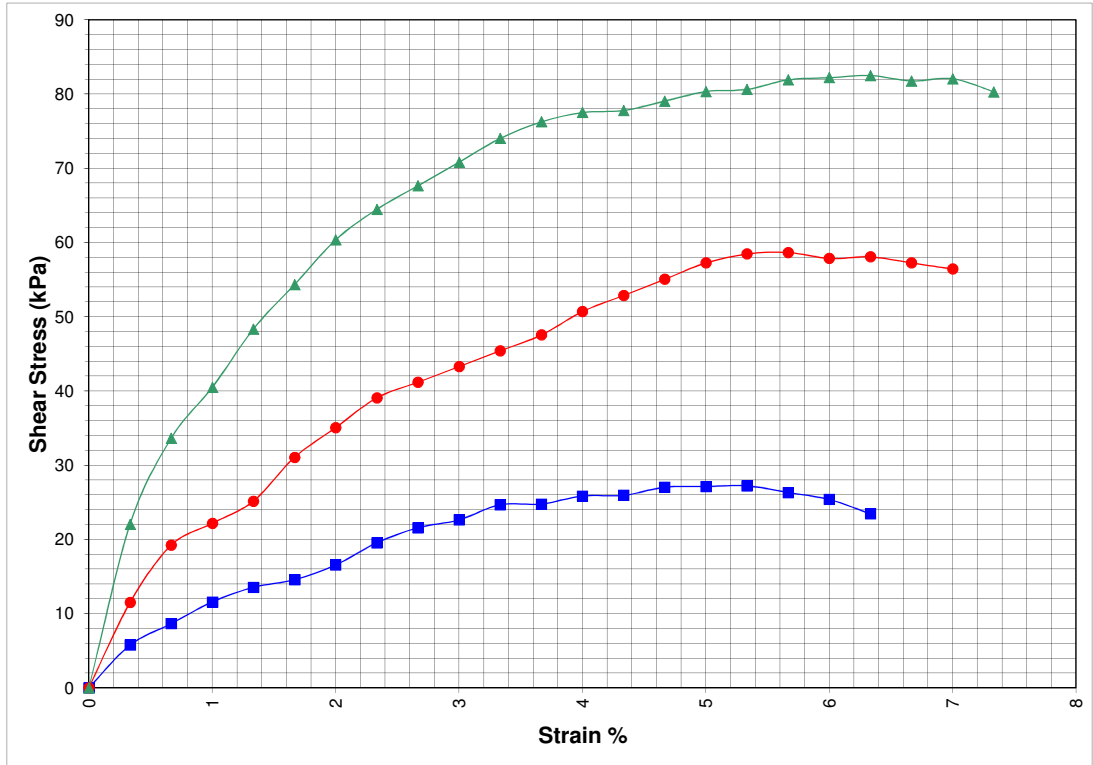
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-20

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

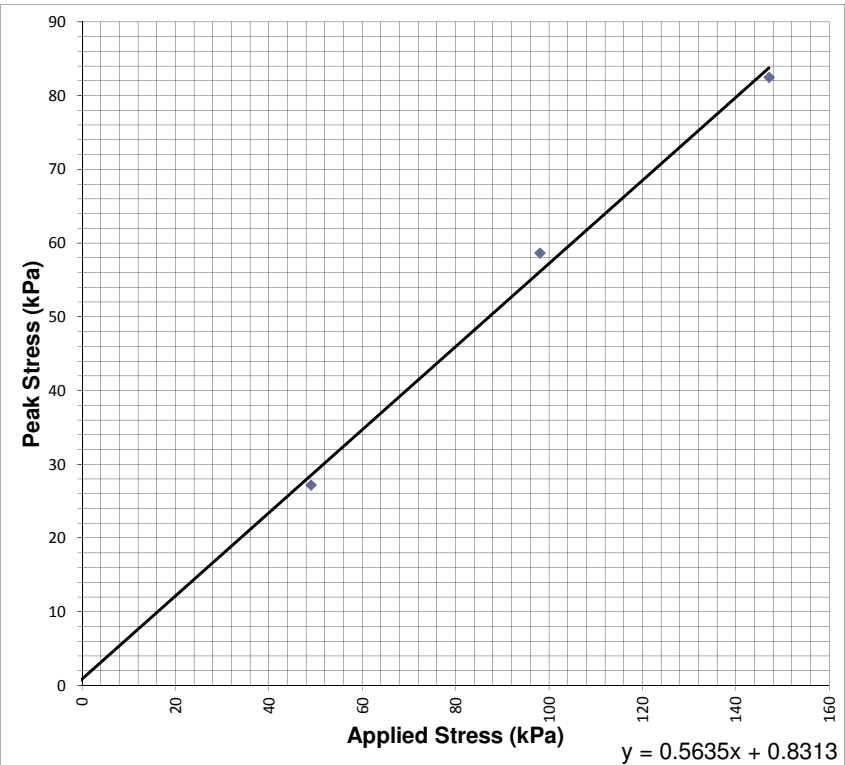
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	59
▲	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	29.4 °
Apparent Cohesion	0.83 kPa

Borehole: MBH-20

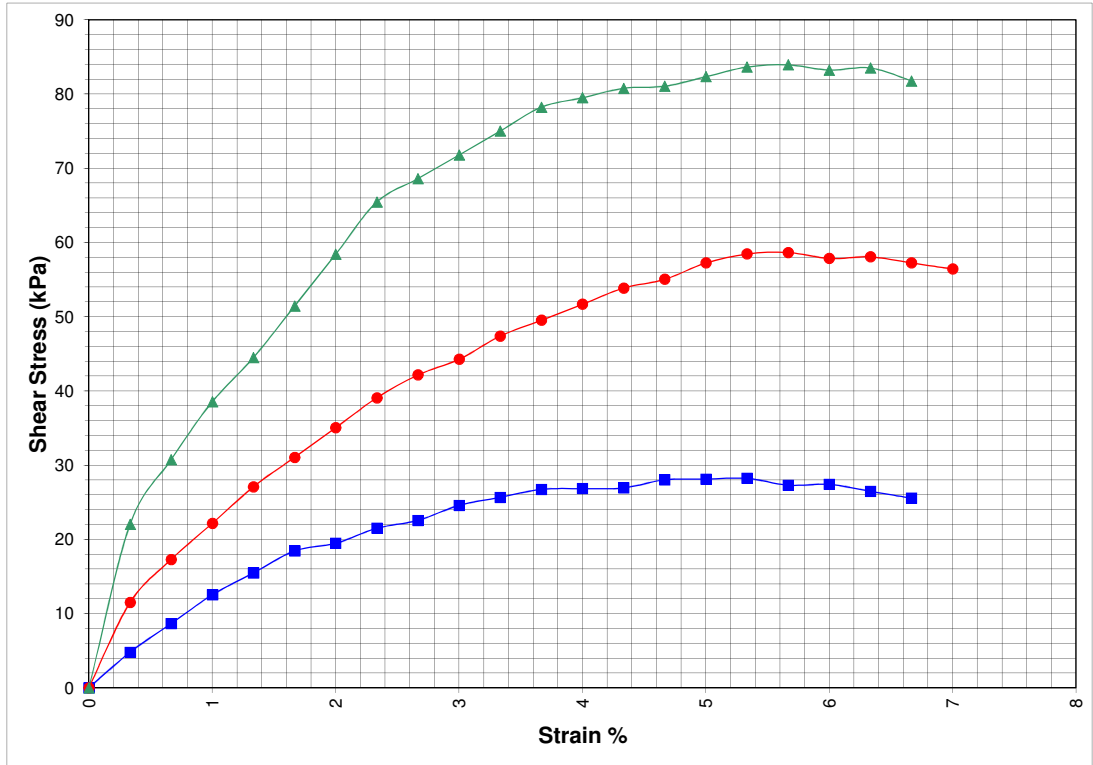
Sample Type: SPT-01

Depth: 1.00-1.10 m

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

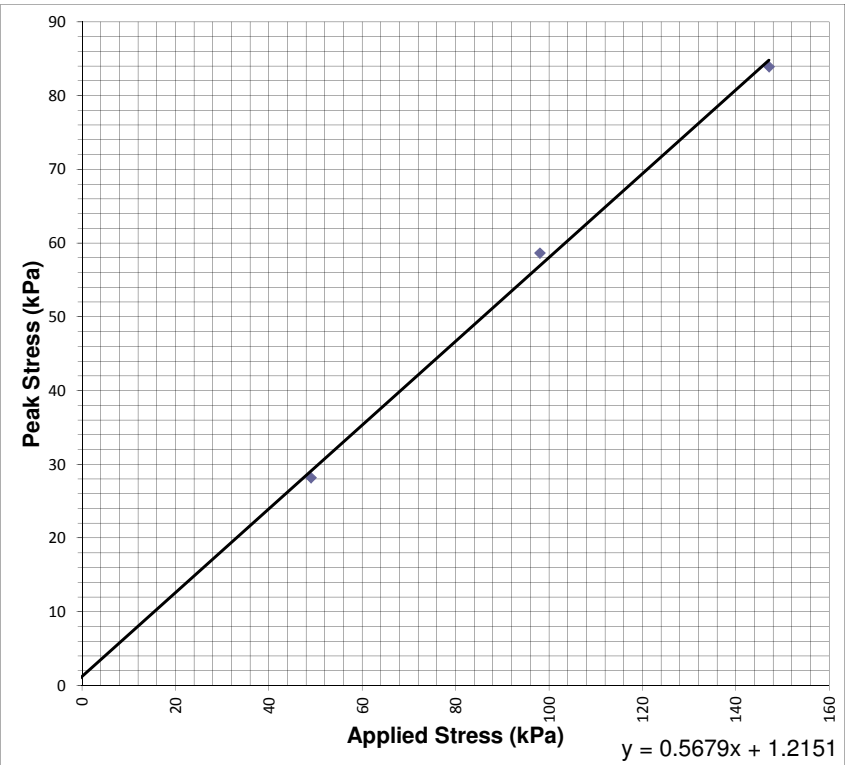
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	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	29.6 °
Apparent Cohesion	1.22 kPa

Borehole: MBH-20

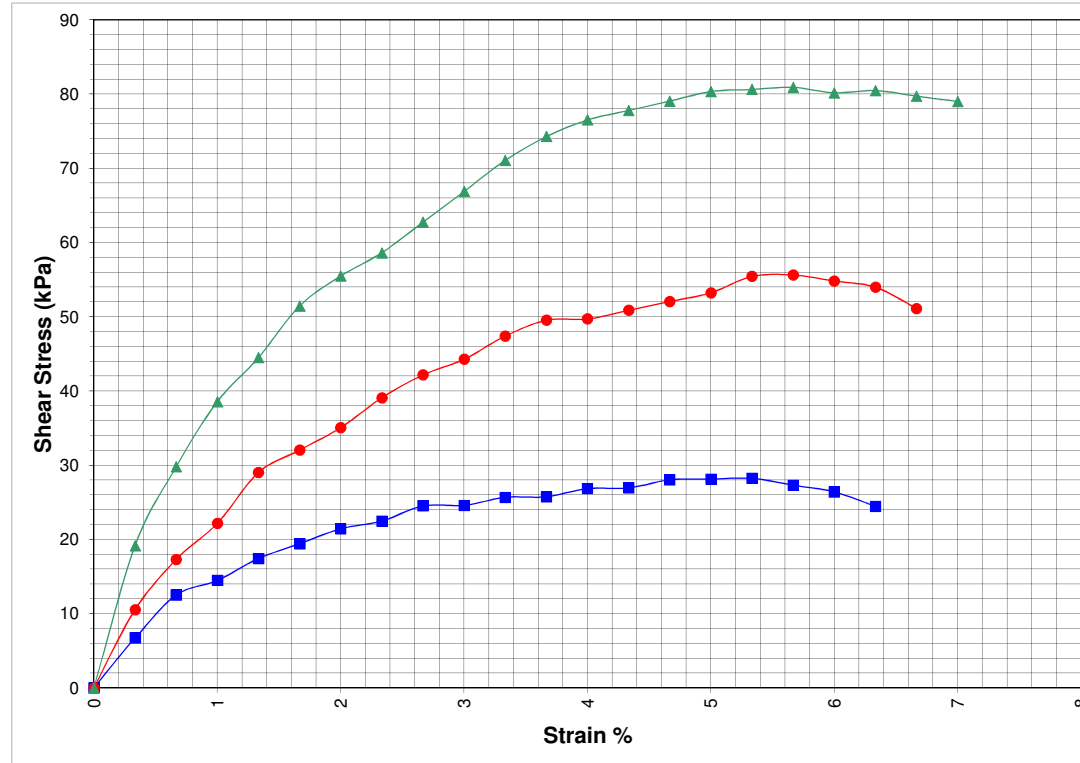
Sample Type: SPT-03

Depth: 5.65-5.95 m

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

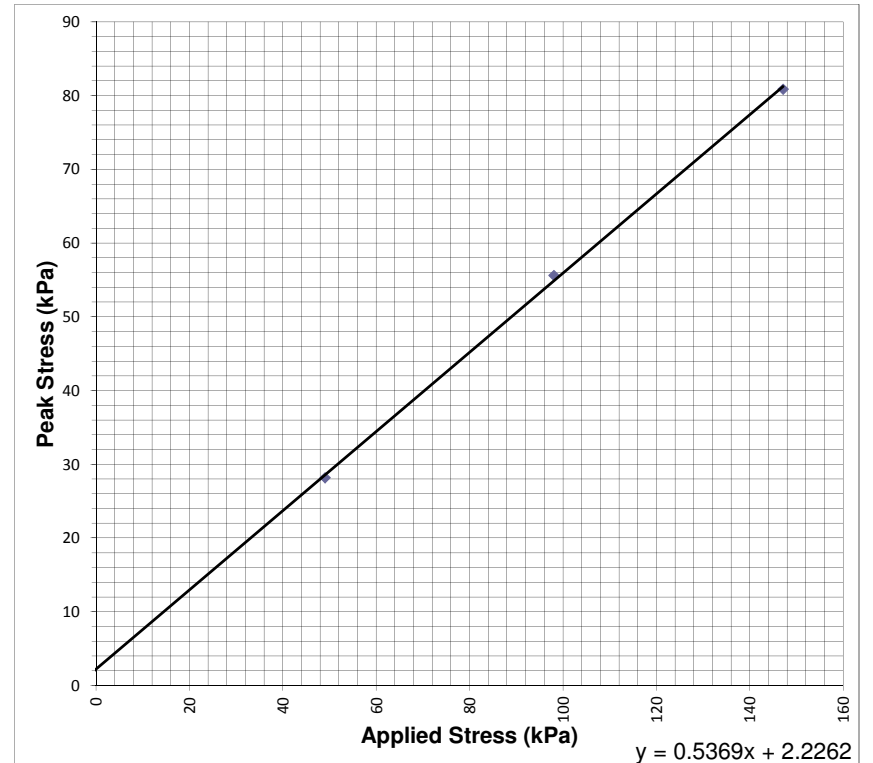
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	56
▲	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	28.2 °
Apparent Cohesion	2.23 kPa

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

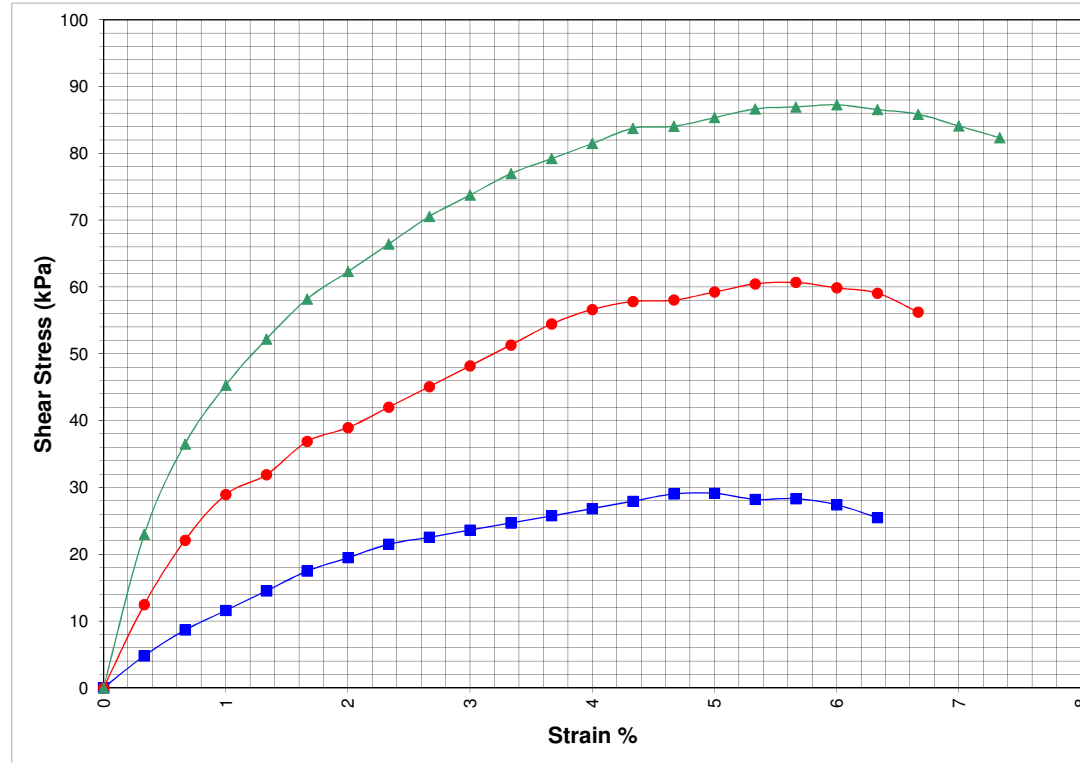
Borehole: MBH-20

Sample Type: SPT-04

Depth: 7.00-7.45 m

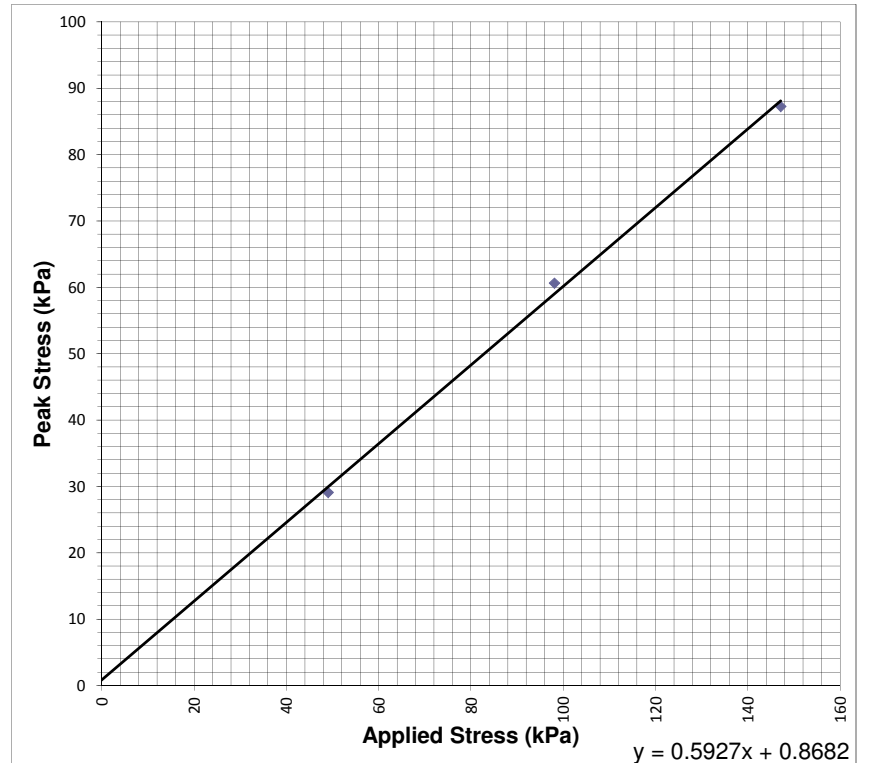
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	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	30.6 °
Apparent Cohesion	0.87 kPa

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

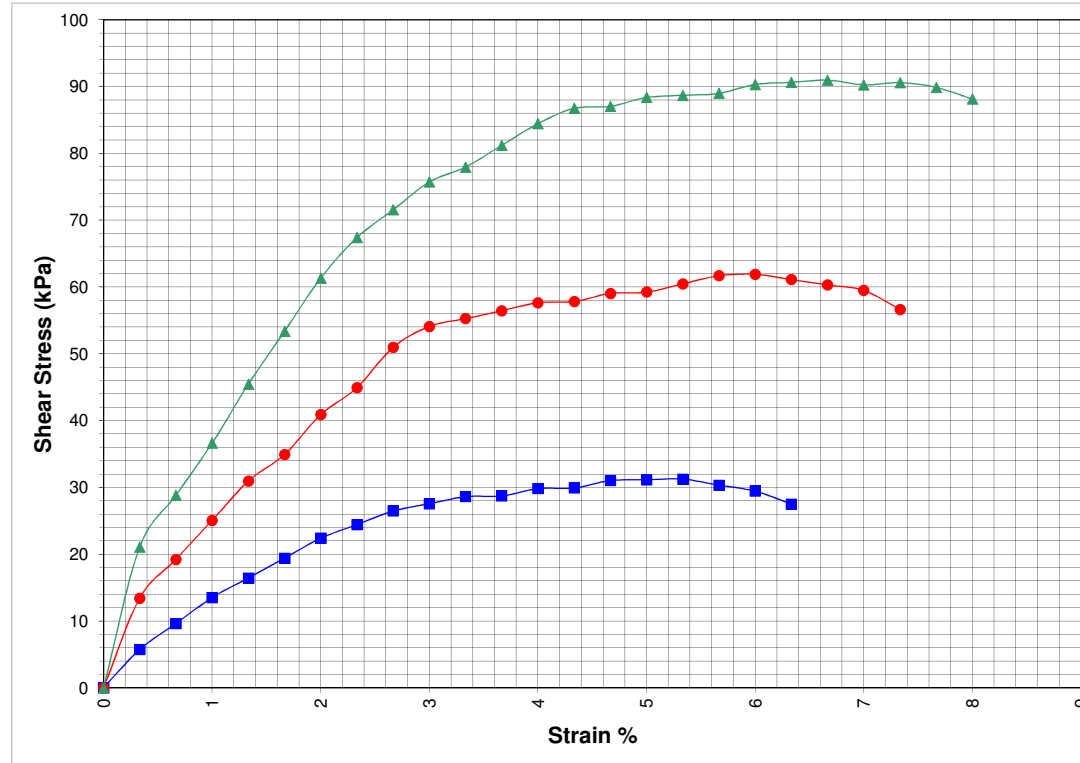
Borehole: MBH-20

Sample Type: SPT-07

Depth: 11.50-11.95 m

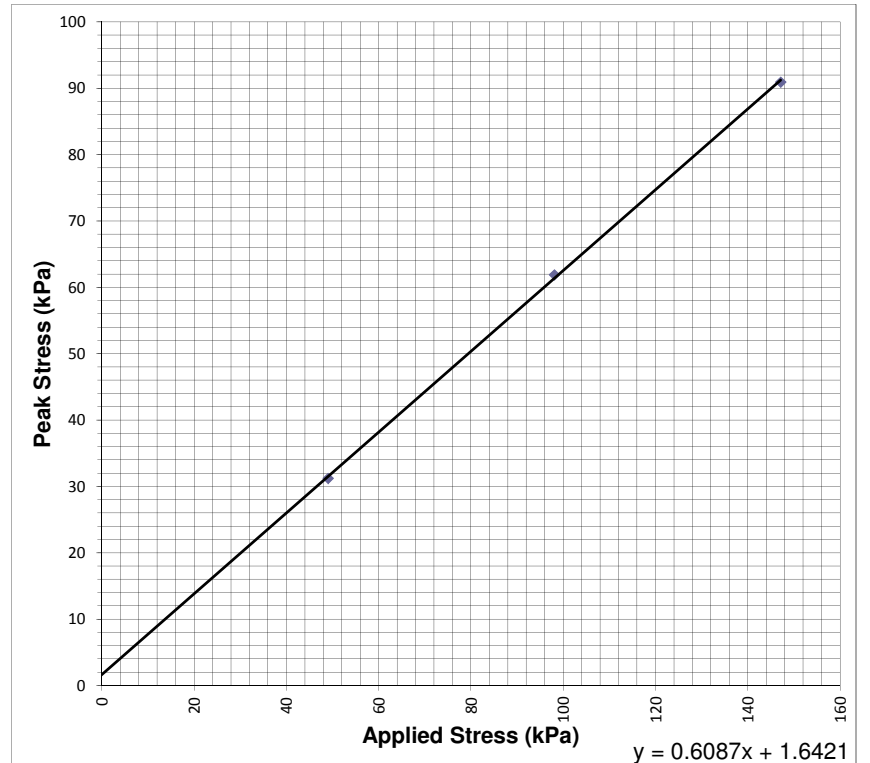
Direct Shear Test Results

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	31.3 °
Apparent Cohesion	1.64 kPa

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

Borehole: MBH-20

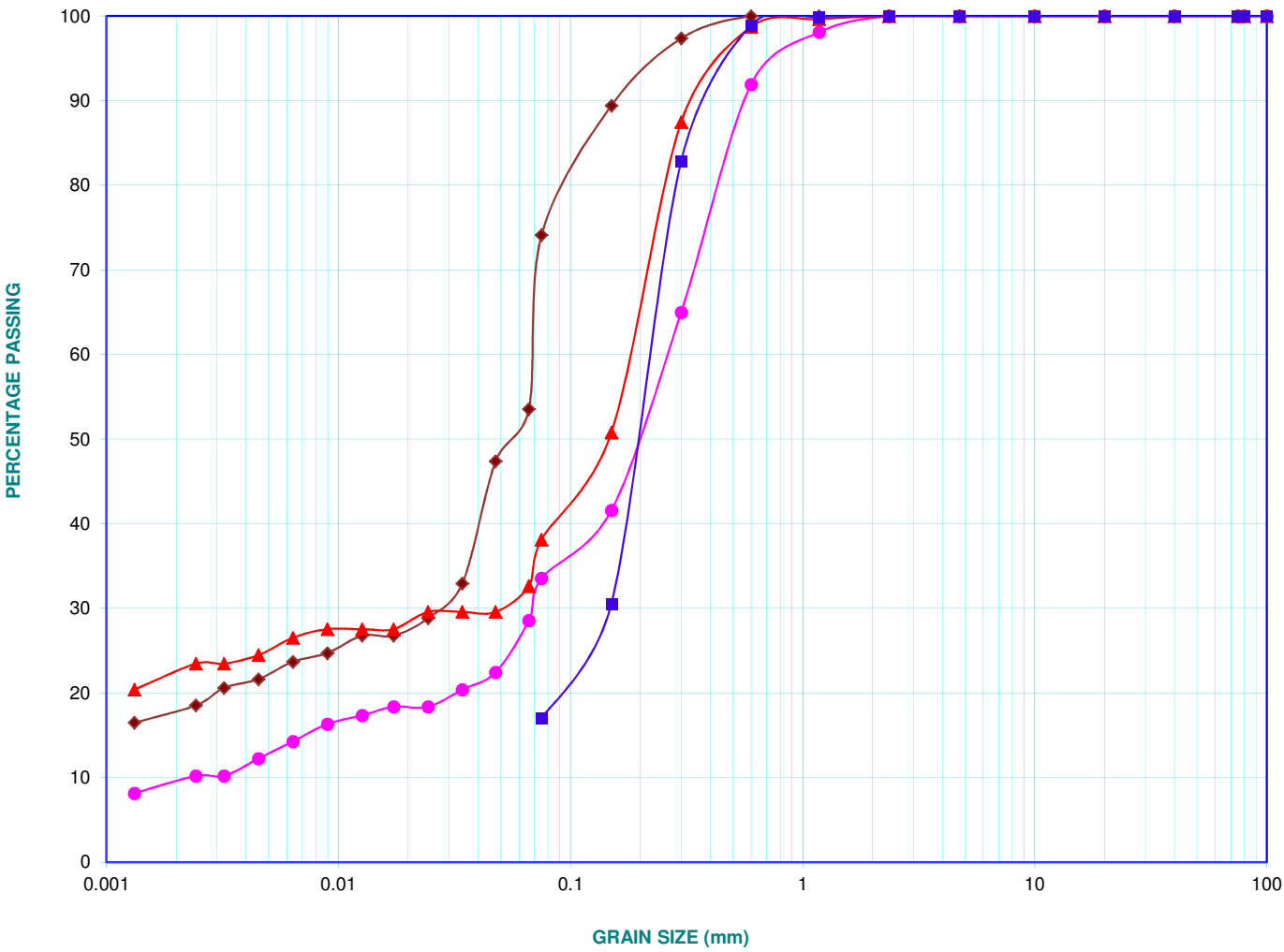
Sample Type: SPT-08

Depth: 13.00-13.45 m

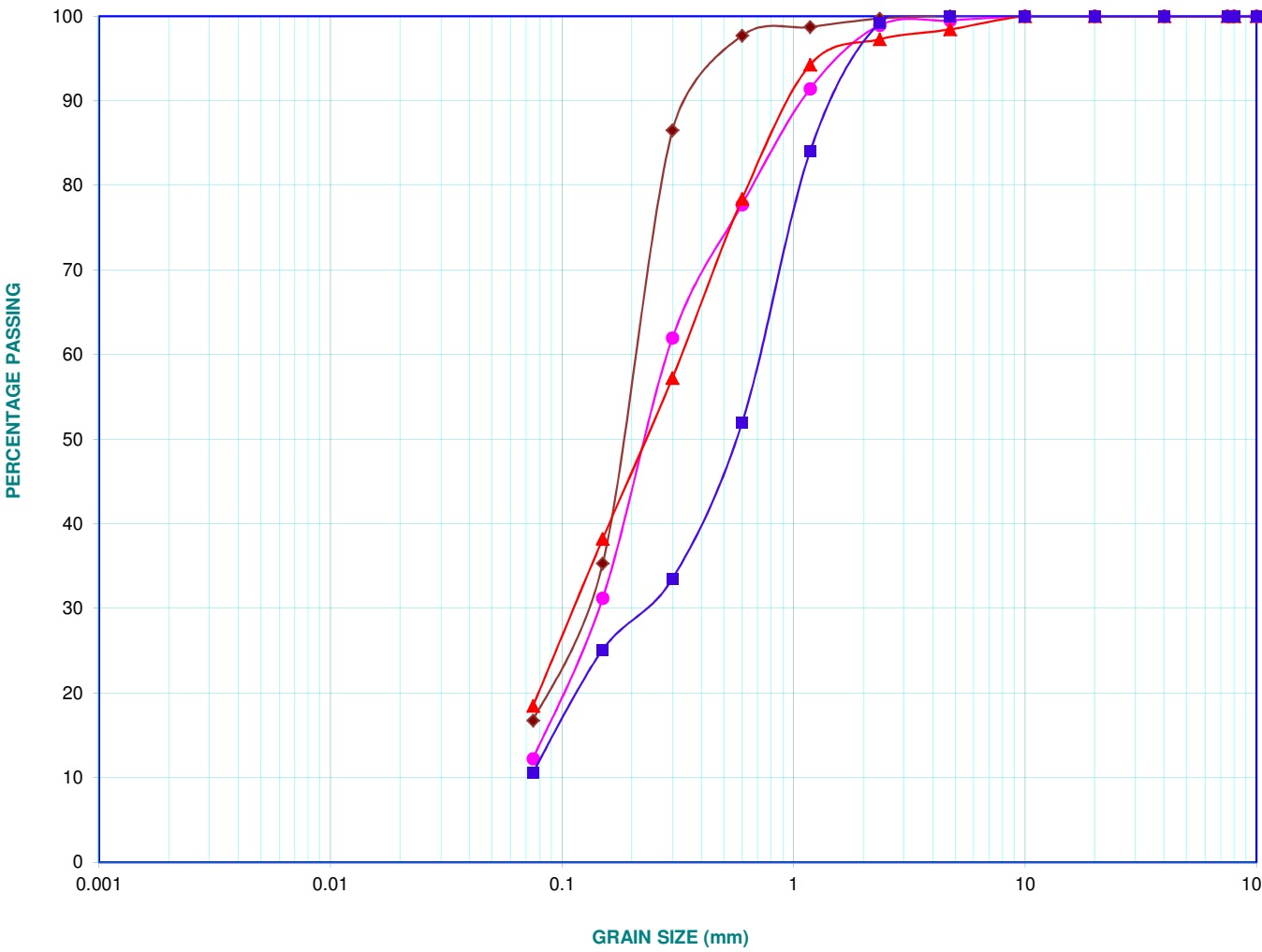
SUMMARY OF TEST RESULTS	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50
51	52
53	54
55	56
57	58
59	60
61	62
63	64
65	66
67	68
69	70
71	72
73	74
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91	92
93	94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

[illegible]

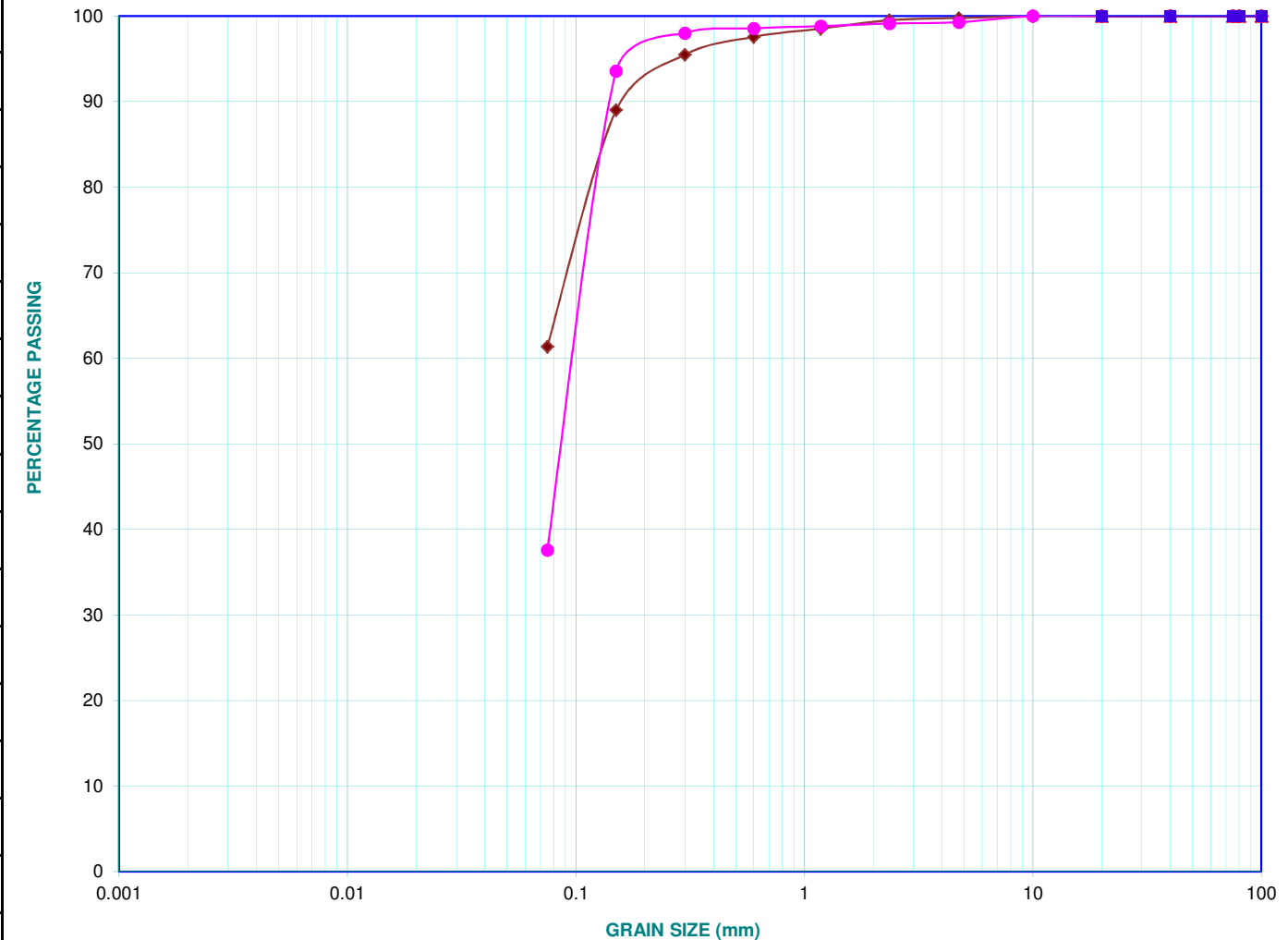
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-21					Date :			10-Apr-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-21	MBH-21	MBH-21	MBH-21										
Depth (m)	0.00-1.00	1.50-1.95	3.00-3.45	4.50-4.95										
Sample Type	UDS-1	SPT-1	SPT-2	SPT-3										
Classification	CL	SC	SC	SM \ SC										
Gravel %	0	0	0	0										
Sand %	26	66	62	83										
Silt %	55	24	15	<---->										
Clay %	19	10	23	<---->										
Fines % (Silt+Clay)	74	34	38	17										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	29.1	---	30.7	---										
Plastic Limit %	14.4	---	13.8	---										
Plasticity Index	14.7	---	16.9	---										
									Checked By :					

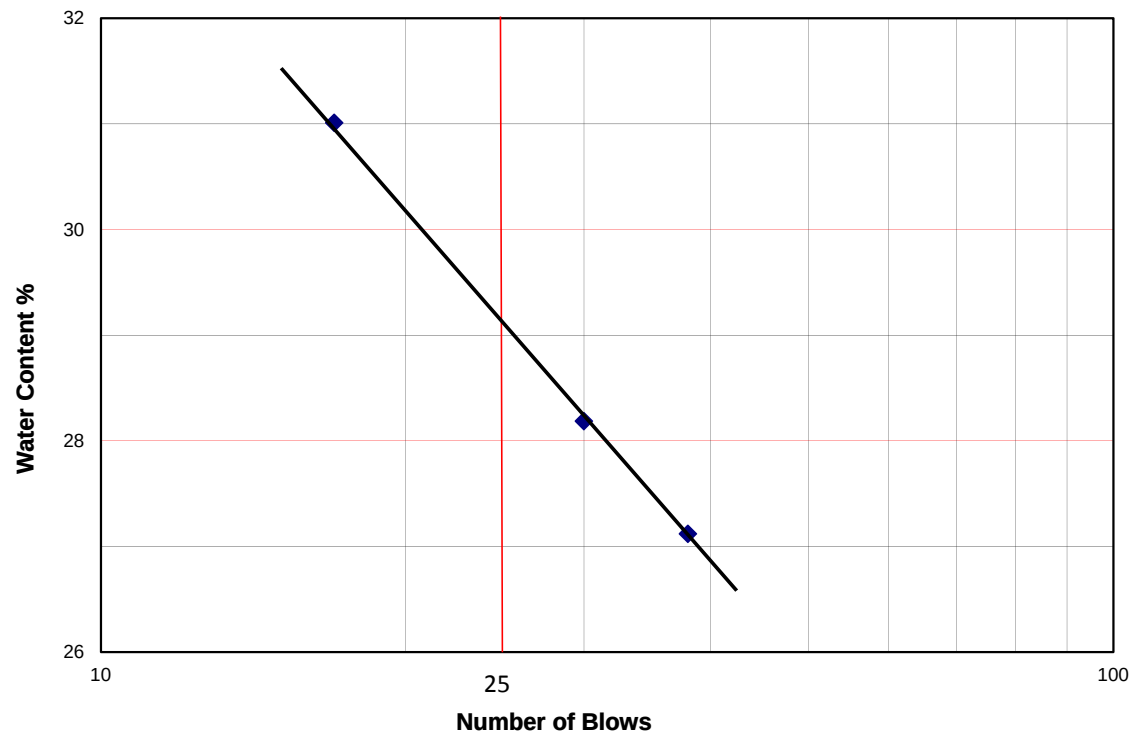
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation For Capive Jetty at Jatadharmuhan, Near Paradip, Dist Jagatsinghpur, Odisha													
Job No.	: CM 19 01 03			Borehole No. : MBH-21					Date :			10-Apr-19		
Symbol					Particle size mm	CLAY	SILT			SAND			GRAVEL	
										F	M	C	F	C
Bore Hole .	MBH-21	MBH-21	MBH-21	MBH-21										
Depth (m)	6.00-6.45	7.50-7.95	9.00-9.45	10.50-10.95										
Sample Type	SPT-4	SPT-5	SPT-6	SPT-7										
Classification	SM \ SC	SM \ SC	SM \ SC	SM \ SC										
Gravel %	0	1	2	0										
Sand %	83	87	80	89										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	17	12	18	11										
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
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-21					Date :		10-Apr-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL	
									F	M	C	F	C
Bore Hole .	MBH-21	MBH-21											
Depth (m)	12.00-12.45	13.70-14.15											
Sample Type	SPT-8	SPT-9											
Classification		SM \ SC											
Gravel %	0	1											
Sand %	39	61											
Silt %	<---->	<---->											
Clay %	<---->	<---->											
Fines % (Silt+Clay)	61	38											
D60 mm													
D30 mm													
D10 mm													
Cu													
Cc													
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)	28.98	27.83	35.07		
Dry Weight + Can (g)	25.59	23.74	29.78		
Can Weight (g)	13.09	9.23	12.72		
Water Content, %	27.1	28.2	31.0		
Number of Blows	38	30	17		

Plastic Limit %

Wet Weight + Can (g)	16.03	18.45	18.58
Dry Weight + Can (g)	15.21	17.64	17.87
Can Weight (g)	9.52	11.99	12.93
Water Content, %	14.4	14.3	14.4

Liquid Limit % 29.1
Plastic Limit % 14.4
Plasticity Index % 14.7

Preparation of Sample :
Dry State

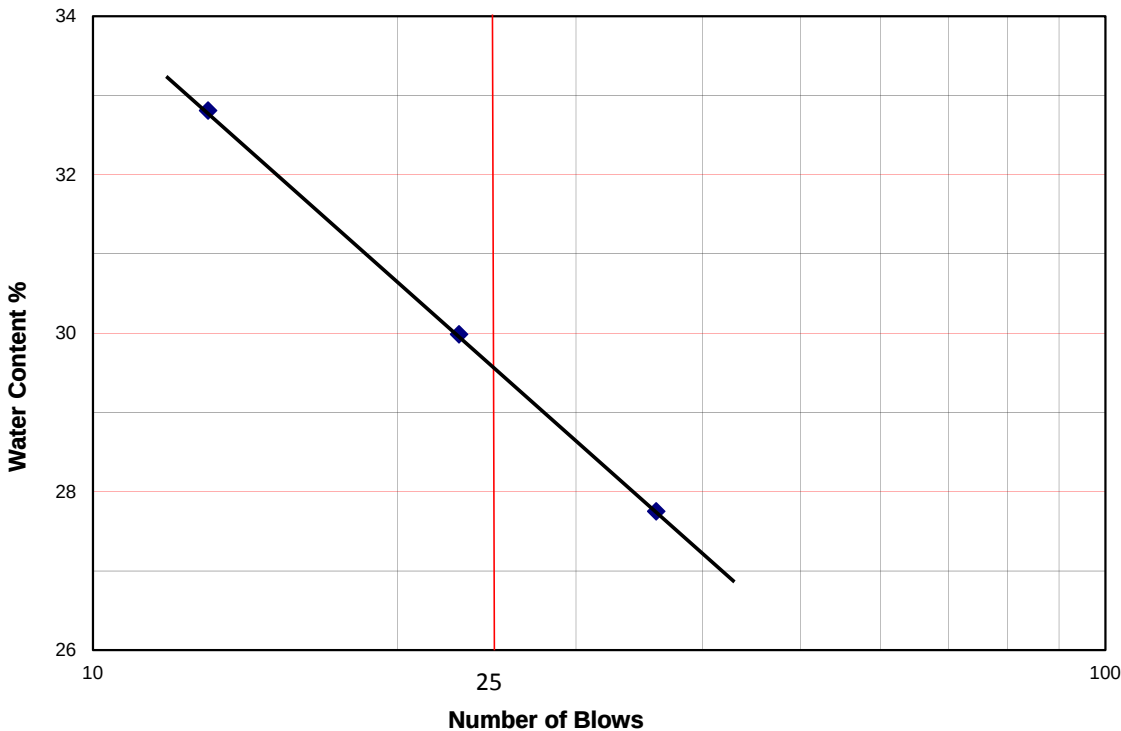
Sample Type: UDS-01

Borehole no.: MBH-21

Depth :0.00-0.10

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)	29.46	25.24	32.99		
Dry Weight + Can (g)	25.00	21.54	28.00		
Can Weight (g)	8.93	9.20	12.79		
Water Content, %	27.8	30.0	32.8		
Number of Blows	36	23	13		

Plastic Limit %

Wet Weight + Can (g)	17.75	18.42	18.58
Dry Weight + Can (g)	17.15	17.85	18.00
Can Weight (g)	12.82	13.63	13.85
Water Content, %	13.9	13.5	14.0

Liquid Limit % 30.7
Plastic Limit % 13.8
Plasticity Index % 16.9

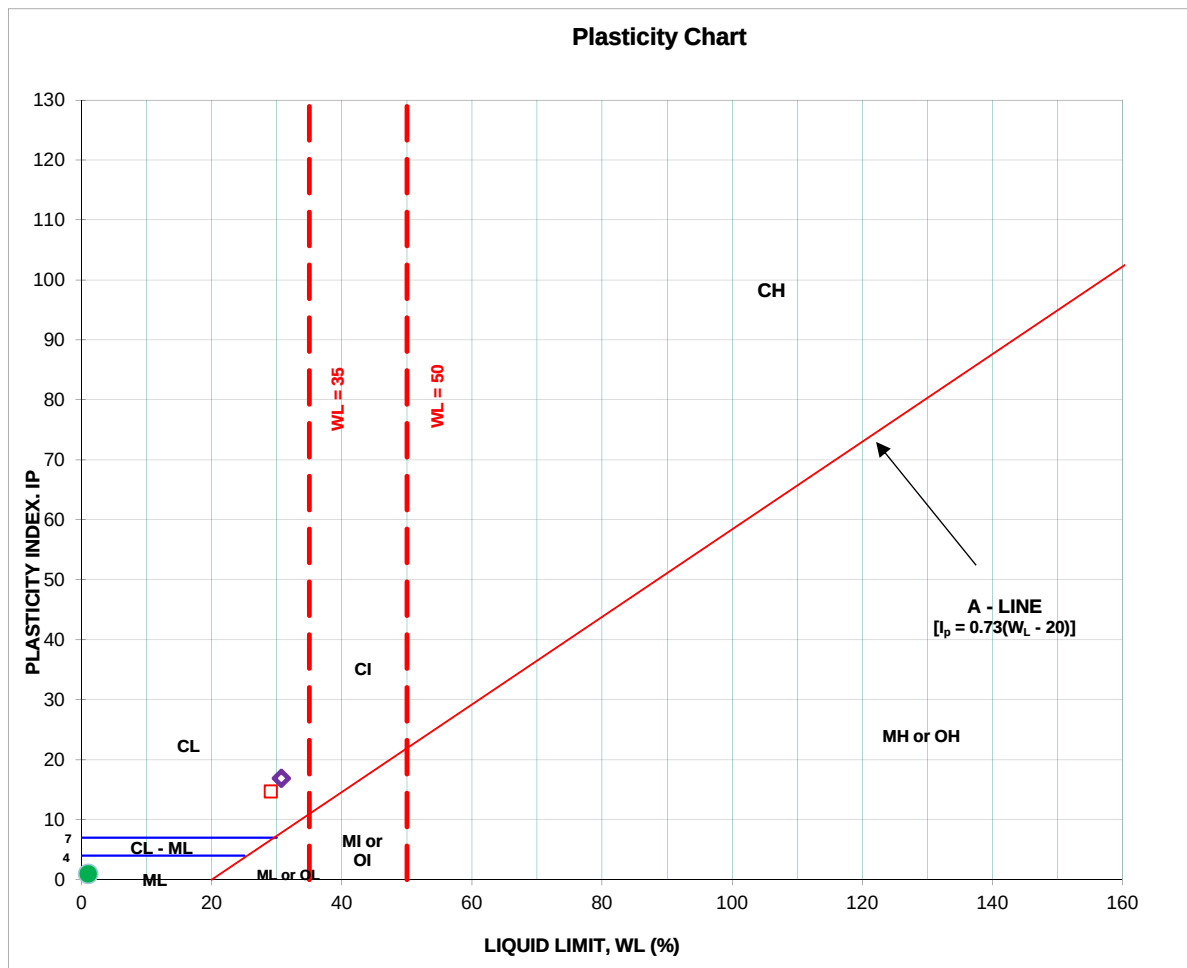
Preparation of Sample :
Dry State

Sample Type: SPT-02

Borehole no.: MBH-21

Depth :3.00-3.45

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



	Sample Type	Depth (m)	W_L	W_p	I_p	Remarks
□	UDS-01	0.00-1.00	29.1	14.4	14.7	CL: Inorganic clays of low to medium plasticity.
◇	SPT-02	3.00-3.45	30.7	13.8	16.9	CL: Inorganic clays of low to medium plasticity.
△					p	
●						
+						
■						

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

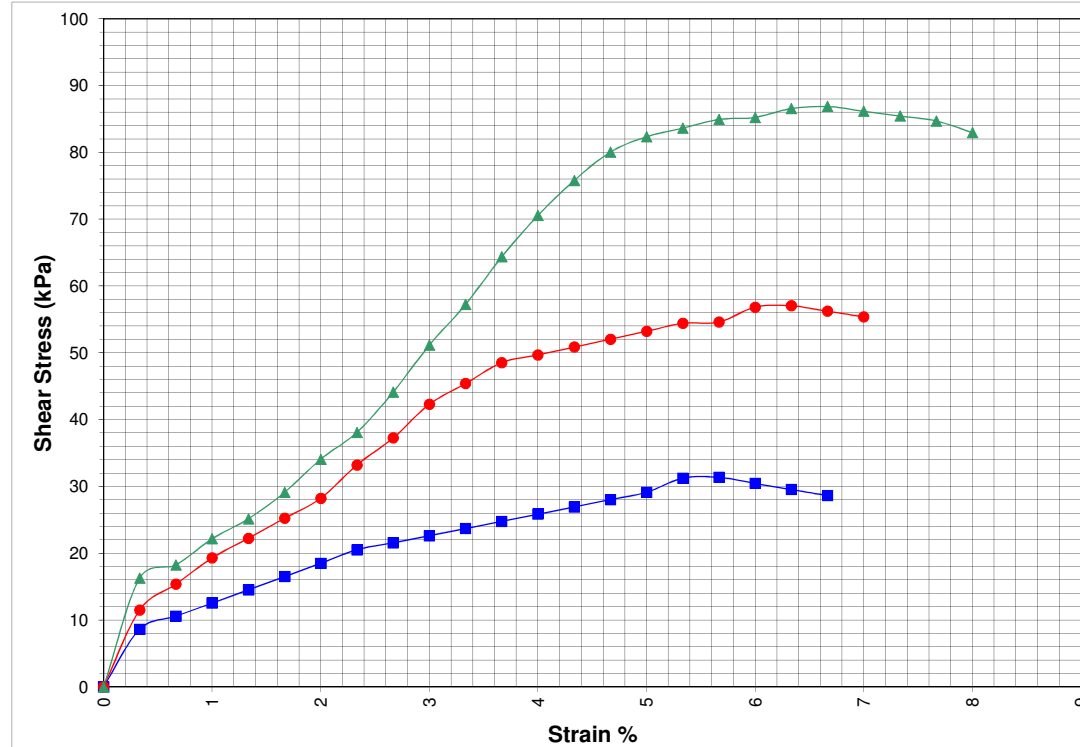
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-21

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

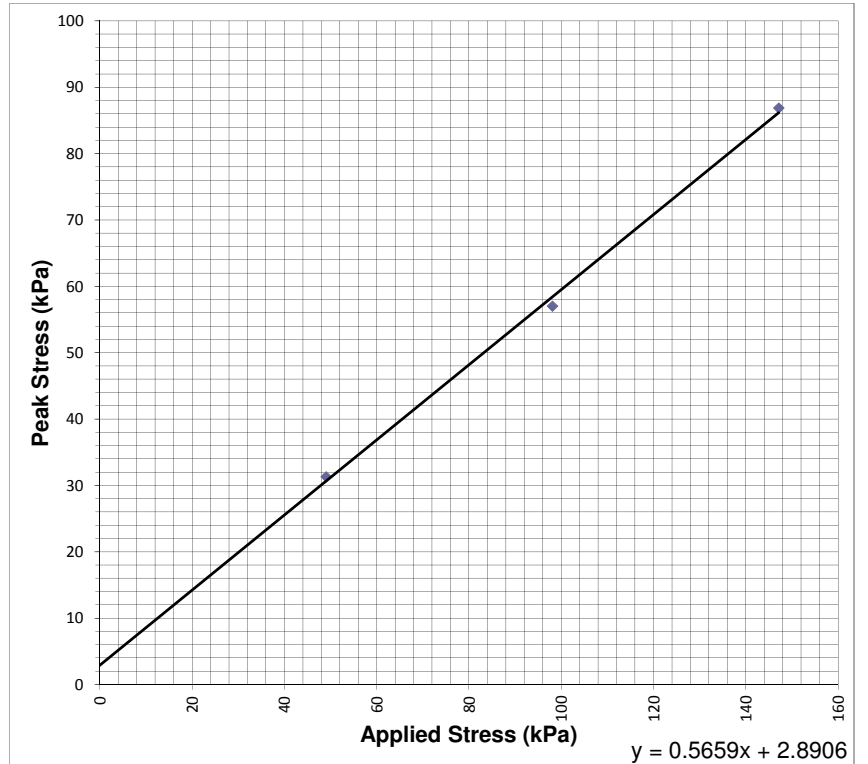
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	31
●	Stage 2	98	57
▲	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	29.5 °
Apparent Cohesion	2.89 kPa

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

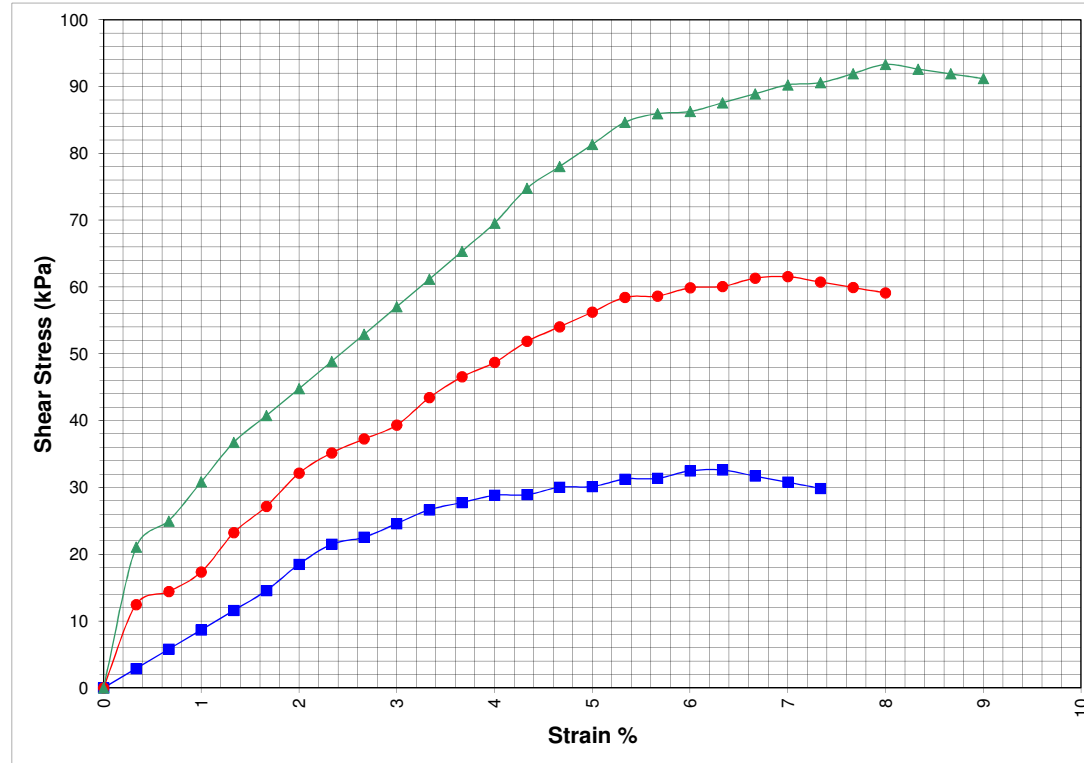
Borehole: MBH-21

Sample Type: SPT-3

Depth: 4.50-4.95 m

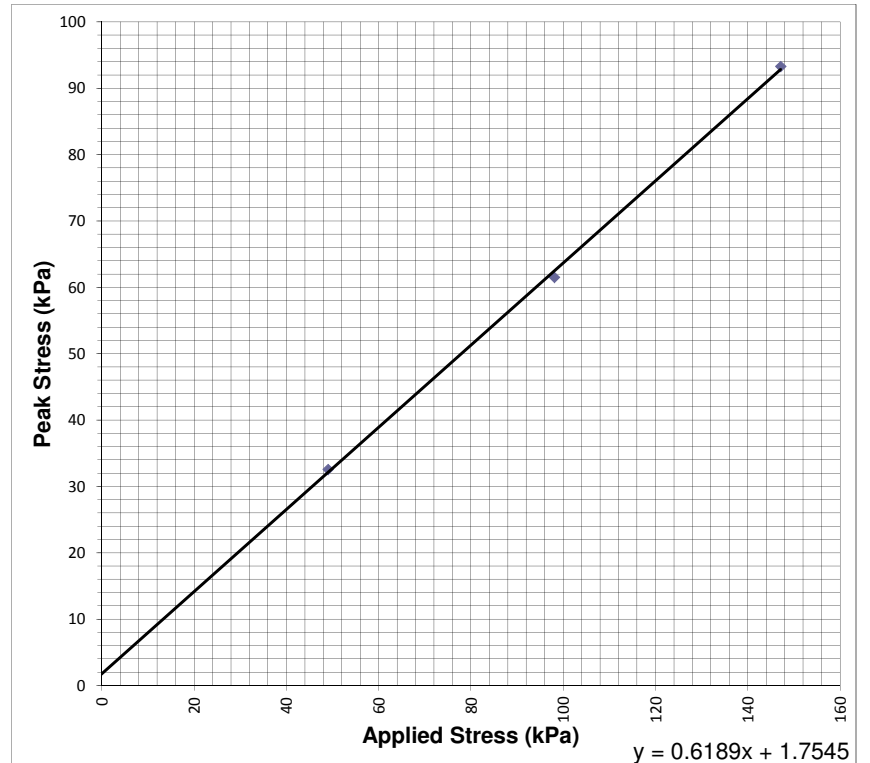
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	33
●	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	31.8 °
Apparent Cohesion	1.75 kPa

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

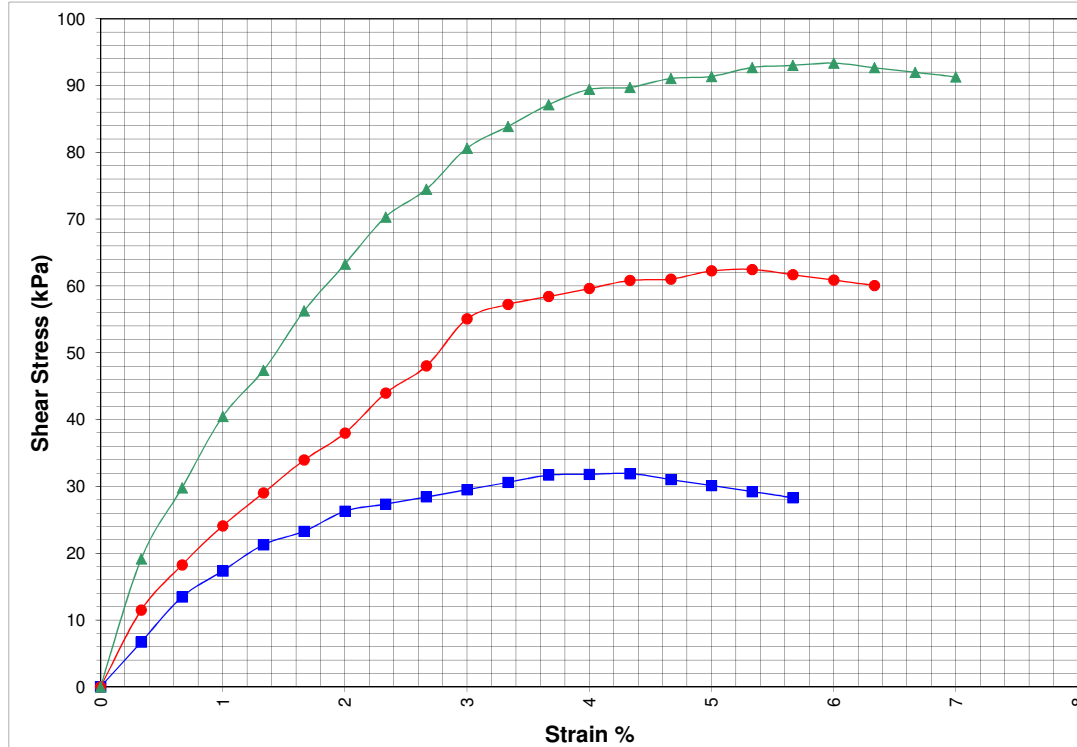
Borehole: MBH-21

Sample Type: SPT-7

Depth: 10.50-10.95 m

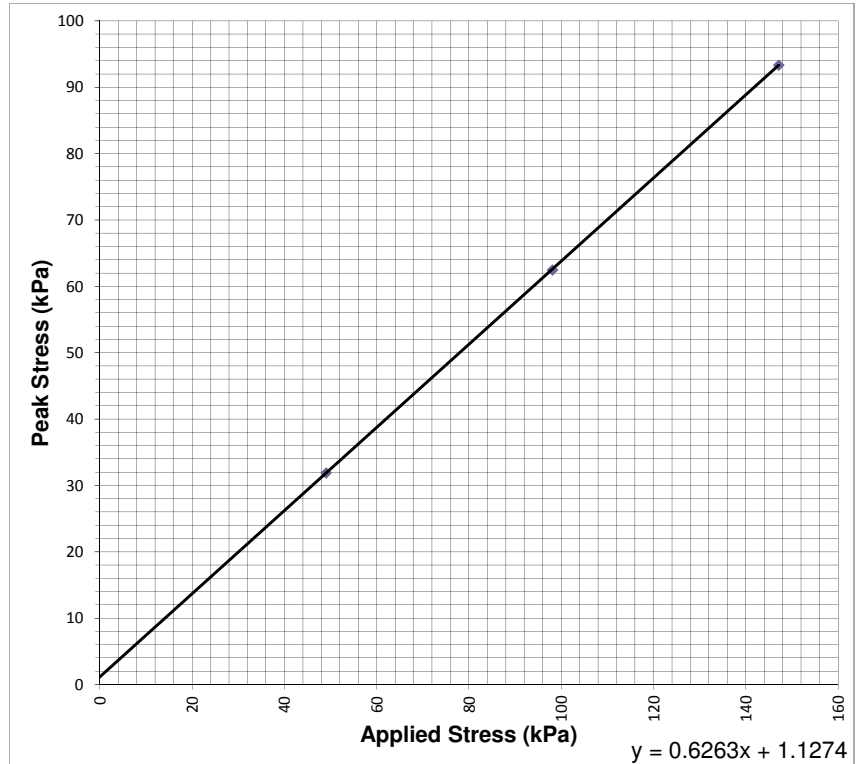
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	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	32.1 °
Apparent Cohesion	1.13 kPa

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

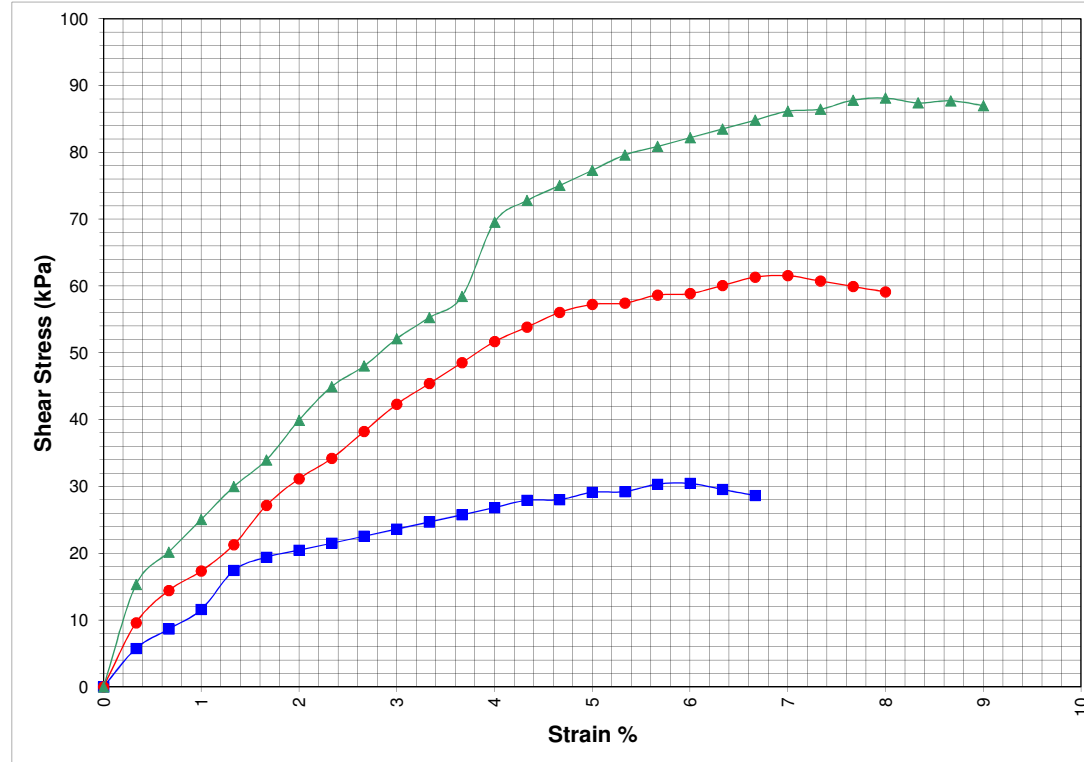
Borehole: MBH-21

Sample Type: SPT-6

Depth: 9.00-9.45 m

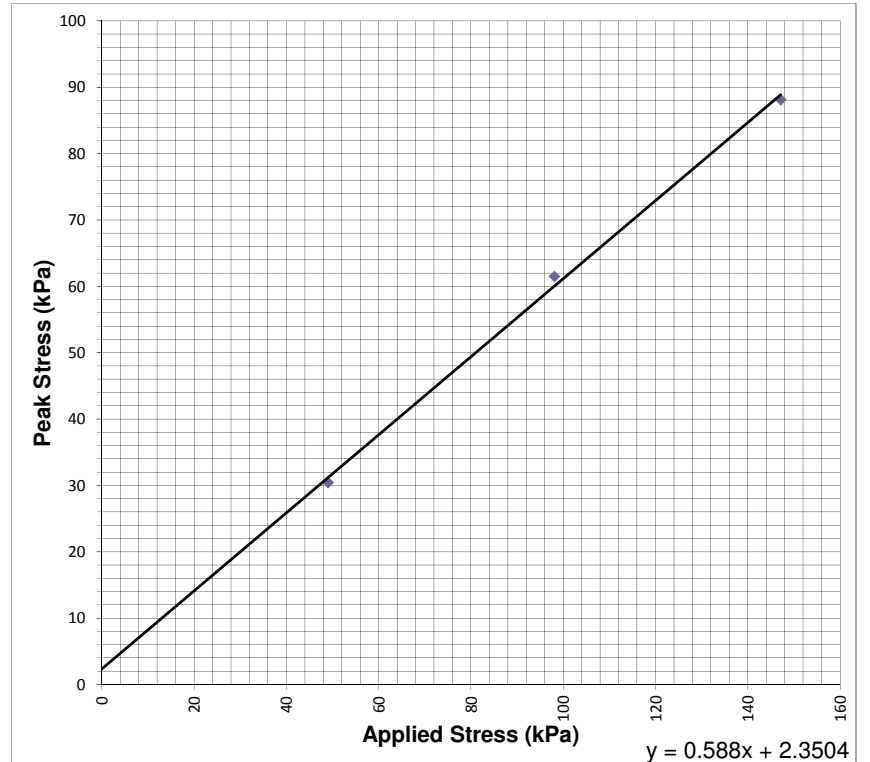
Direct Shear Test Results

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	30.5 °
Apparent Cohesion	2.35 kPa

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

Borehole: MBH-21

Sample Type: SPT-9

Depth: 13.70-14.15 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)											
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																						
Sample Type	Depth, m																																										
SPT-1	0.00-0.45	SP-SM				17.4	19.99	9.93	17.03		0	90	<->	<->	10	DST			2.03	29.4																							
SPT-2	1.50-1.80					17.8	18.47	8.41	15.68	2.62																																	
SPT-3	3.00-3.10					21.2	18.54	8.48	15.30																																		
SPT-4	4.50-4.65					21.1	19.29	9.23	15.93	2.61																																	
SPT-5	6.00-6.20					18.6	18.76	8.70	15.82	2.60																																	
SPT-6	7.50-7.80					19.7	18.21	8.15	15.22							DST		1.65	28.7																								
SPT-7	9.00-9.30	SM / SC				17.7	19.35	9.29	16.43		0	67	<->	<->	33																												
SPT-8	10.50-10.80	SM / SC				20.0	18.22	8.16	15.19	2.59	0	84	<->	<->	16																												
SPT-9	12.00-12.25					13.5	20.30	10.24	17.89							DST		2.15	29.7																								
SPT-10	13.50-13.80	SM / SC				15.2	19.58	9.52	17.00		0	79	<->	<->	21																												
SPT-11	15.00-15.20					16.0	18.70	8.64	16.13	2.63																																	
SPT-12	16.50-16.70					21.9	19.92	9.86	16.33																																		
SPT-13	18.00-18.25					18.2	17.48	7.42	14.79							DST		1.59	25.2																								
SPT-14	19.50-19.75	SP-SM				15.2	18.90	8.84	16.40		1	93	<->	<->	6																												
SPT-15	21.00-21.20	SP-SM				19.7	18.81	8.75	15.71	2.64	0	95	<->	<->	5																												
SPT-16	22.50-22.70					17.5	18.85	8.79	16.04							DST		0.90	26.4																								
SPT-17	24.00-24.25					19.7	18.70	8.64	15.62	2.62																																	
SPT-18	25.50-25.70	SM / SC				18.8	18.15	8.09	15.28		0	85	<->	<->	15																												
SPT-19	27.00-27.15					21.0	18.10	8.04	14.96							DST		2.10	27.0																								
SPT-20	28.50-28.70	SM / SC				17.3	17.32	7.26	14.77	2.60	0	78	<->	<->	22																												

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-22

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	: ° (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

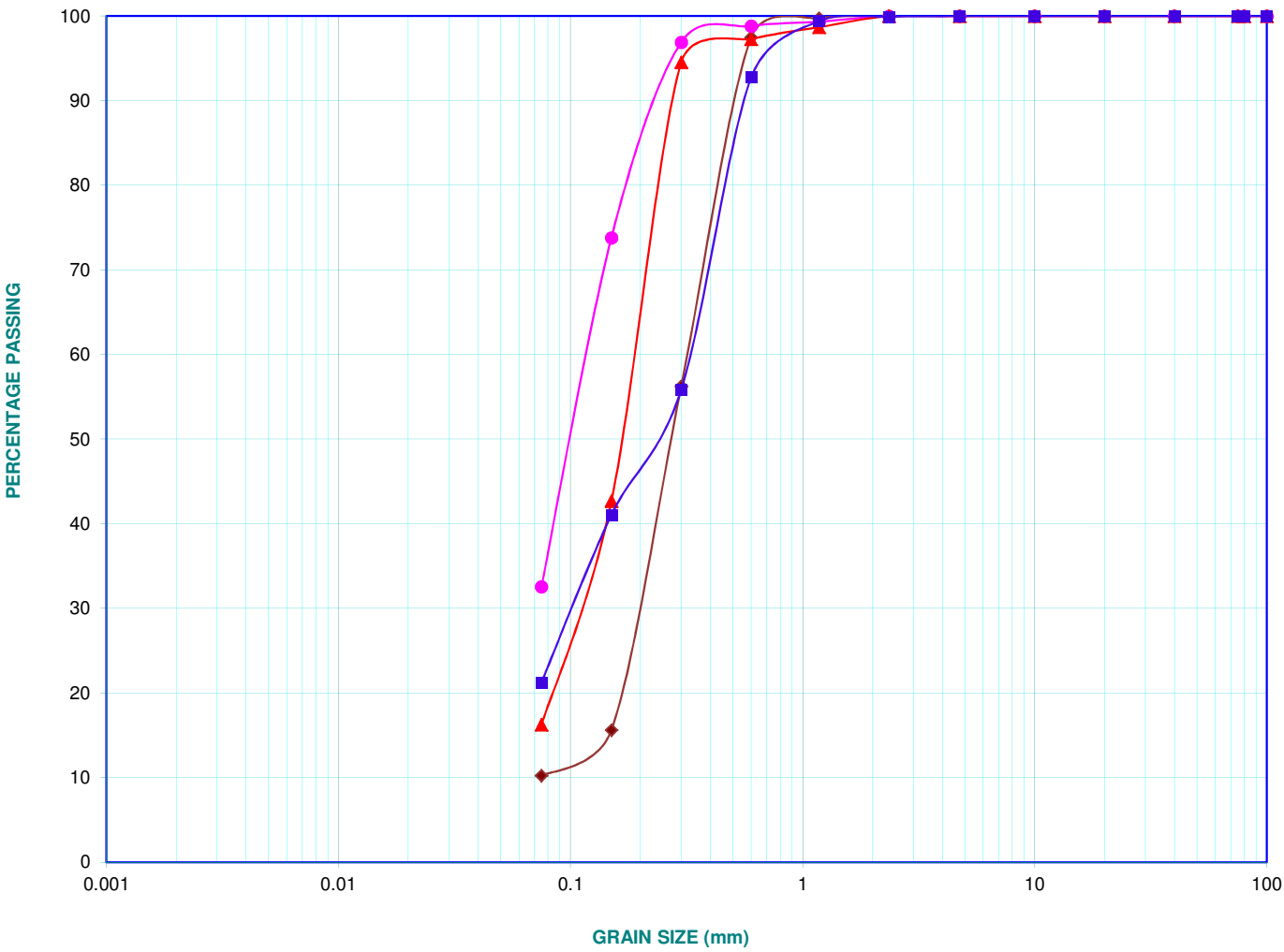
Project

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

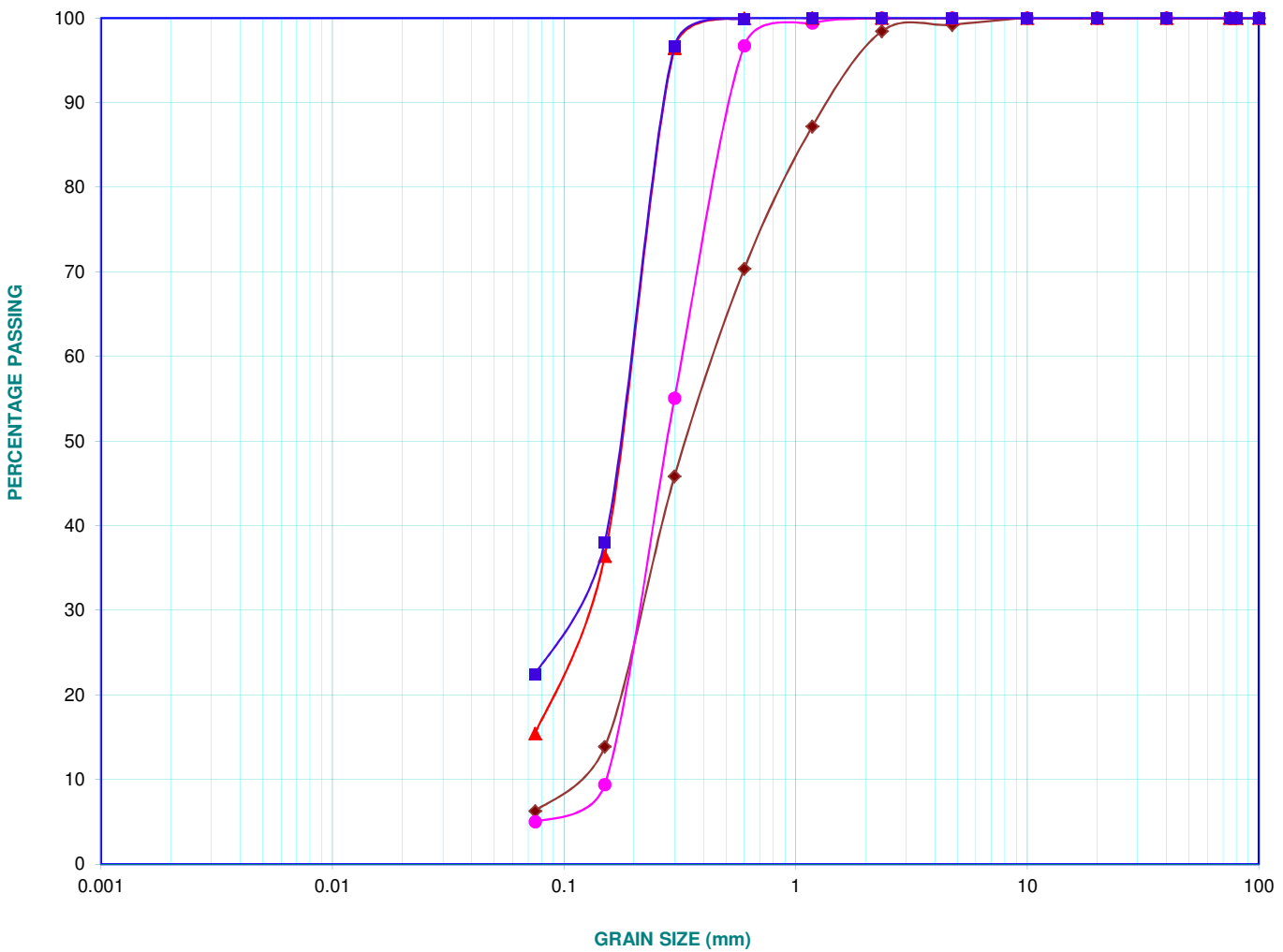
Project Code : CM 19 01 03

Borehole No. : MBH-22

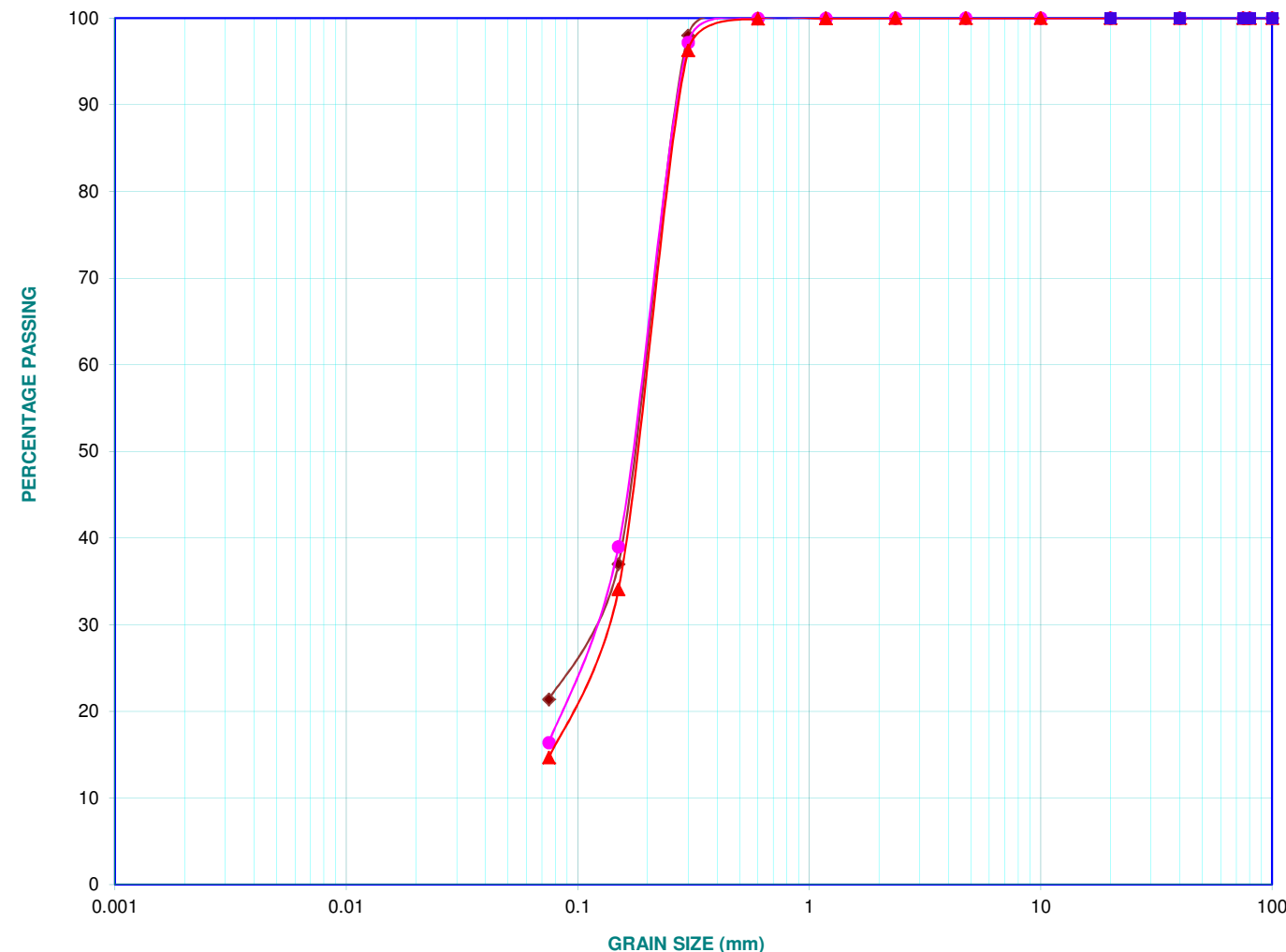
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-22					Date :			9-Jun-19		
Symbol					Particle size mm	CLAY		SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-22	MBH-22	MBH-22	MBH-22										
Depth (m)	0.00-0.45	9.00-9.30	10.50-10.80	13.50-13.80										
Sample Type	SPT-01	SPT-07	SPT-08	SPT-10										
Classification	SP-SM	SM / SC	SM / SC	SM / SC										
Gravel %	0	0	0	0										
Sand %	90	67	84	79										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	10	33	16	21										
D60 mm	0.310													
D30 mm	0.200													
D10 mm	0.075													
Cu	4.13													
Cc	1.72													
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

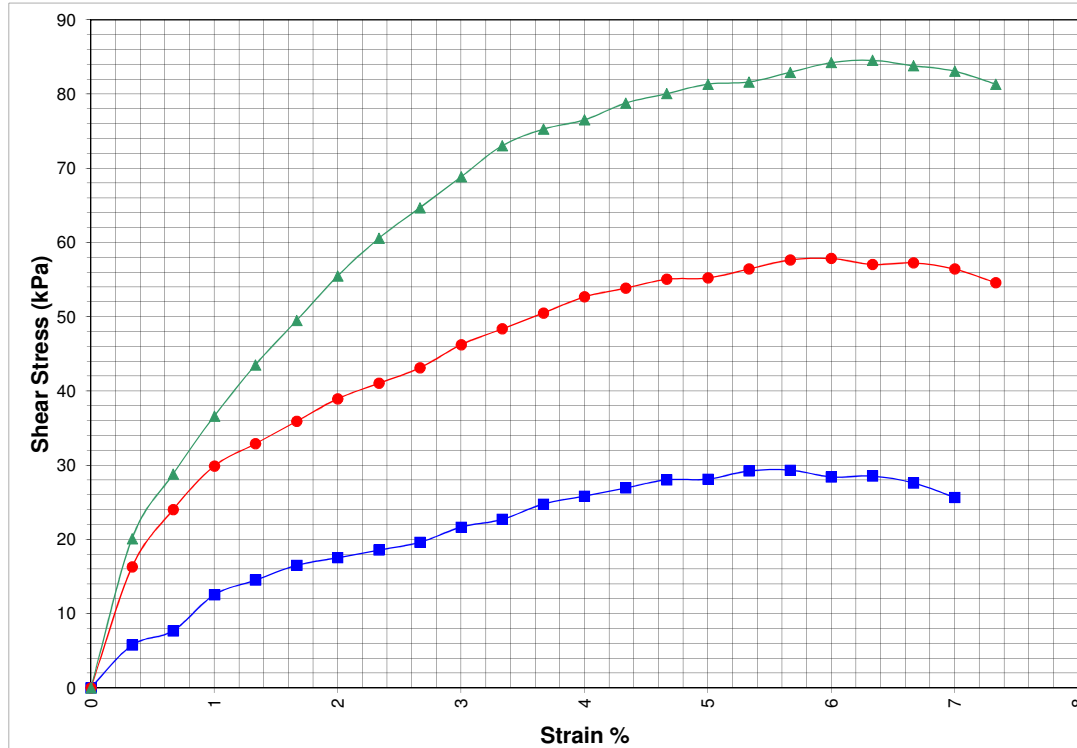
Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-22					Date :		9-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-22	MBH-22	MBH-22	MBH-22										
Depth (m)	19.50-19.75	21.00-21.20	25.50-25.70	28.50-28.70										
Sample Type	SPT-14	SPT-15	SPT-18	SPT-20										
Classification	SP-SM	SP-SM	SM / SC	SM / SC										
Gravel %	1	0	0	0										
Sand %	93	95	85	78										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	6	5	15	22										
D60 mm	0.450	0.310												
D30 mm	0.210	0.210												
D10 mm	0.120	0.150												
Cu	3.75	2.07												
Cc	0.82	0.95												
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-22					Date :		9-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-22	MBH-22	MBH-22											
Depth (m)	37.50-37.65	42.00-42.10	43.50-43.65											
Sample Type	SPT-26	SPT-29	SPT-30											
Classification	SM / SC	SM / SC	SM / SC											
Gravel %	0	0	0											
Sand %	79	84	85											
Silt %	<---->	<---->	<---->											
Clay %	<---->	<---->	<---->											
Fines % (Silt+Clay)	21	16	15											
D60 mm														
D30 mm														
D10 mm														
Cu														
Cc														
Liquid Limit %	---	---	---											
Plastic Limit %	---	---	---											
Plasticity Index	---	---	---											
									Checked By :					

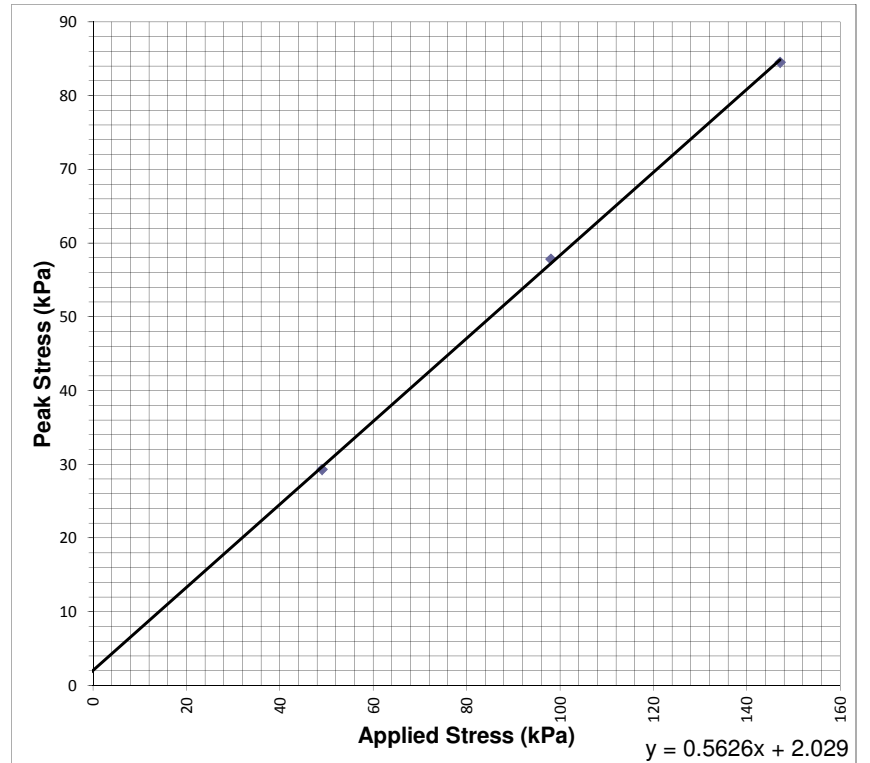
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	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	29.36 °
Apparent Cohesion	2.03 kPa

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

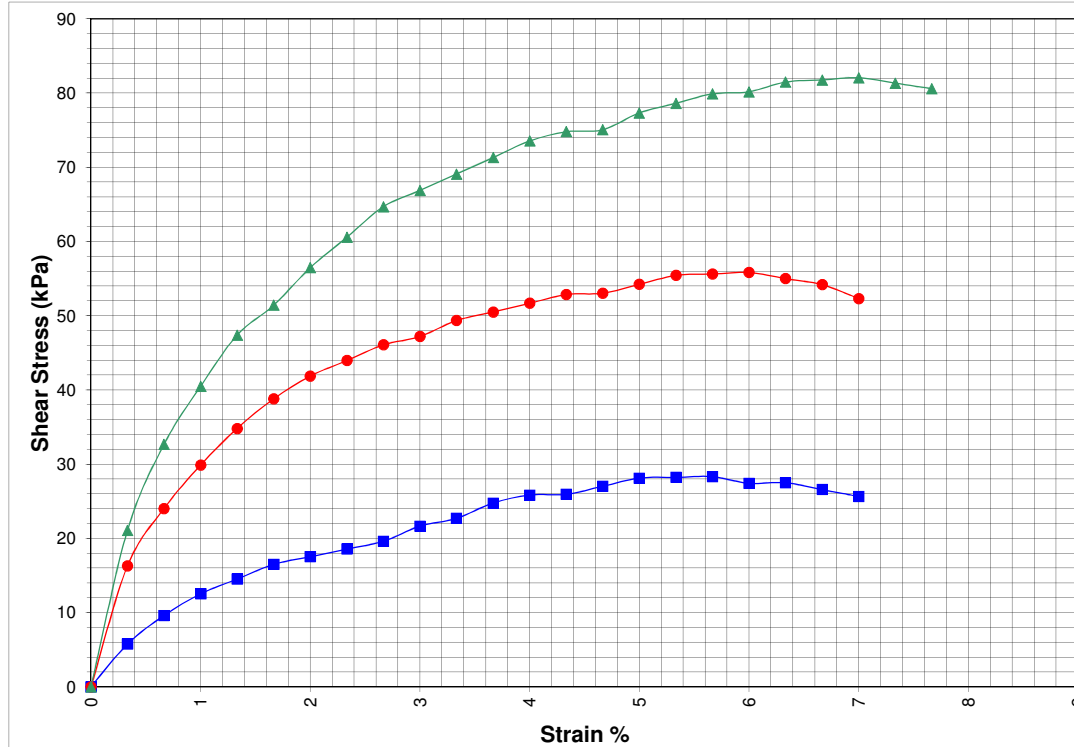
Borehole: MBH-22

Sample Type: SPT-01

Depth: 0.00-0.45 m

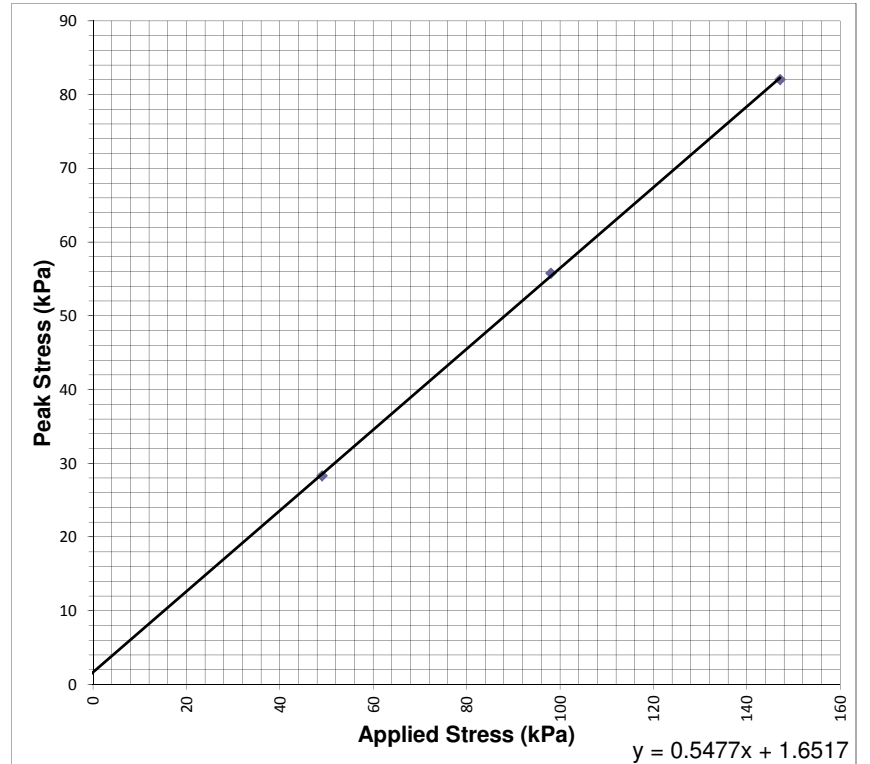
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	Stage 2	98	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	28.7 °
Apparent Cohesion	1.65 kPa

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

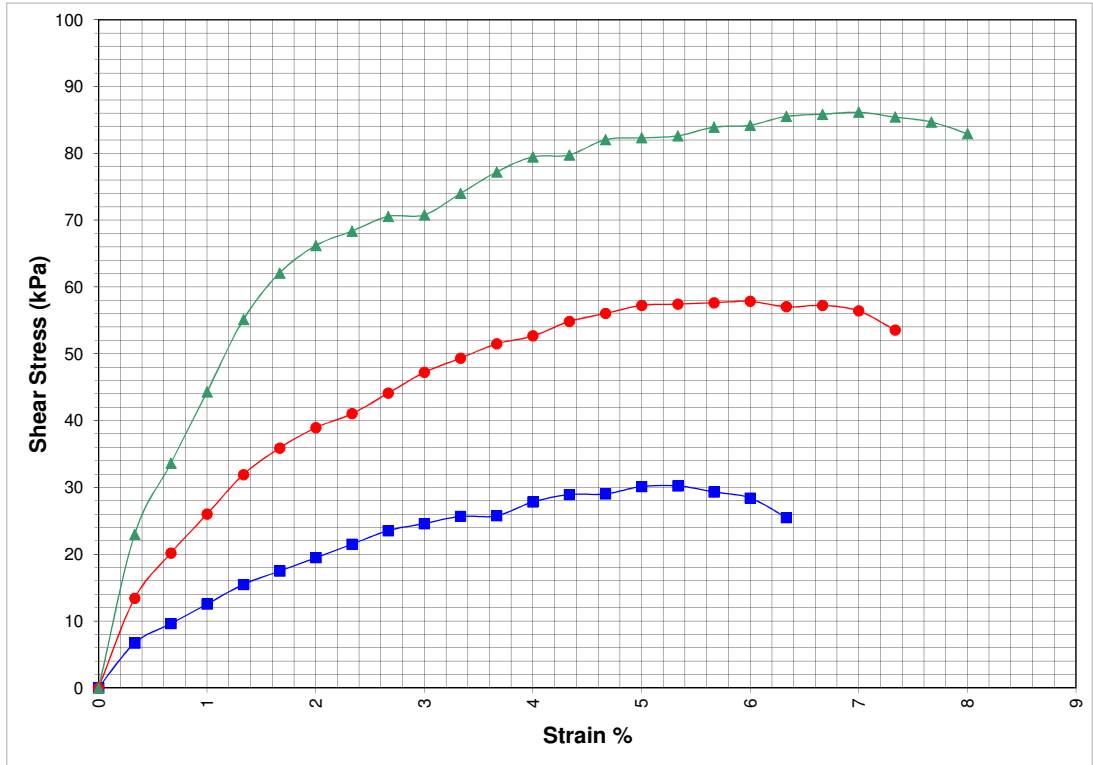
Borehole: MBH-22

Sample Type: SPT-06

Depth: 7.50-7.80 m

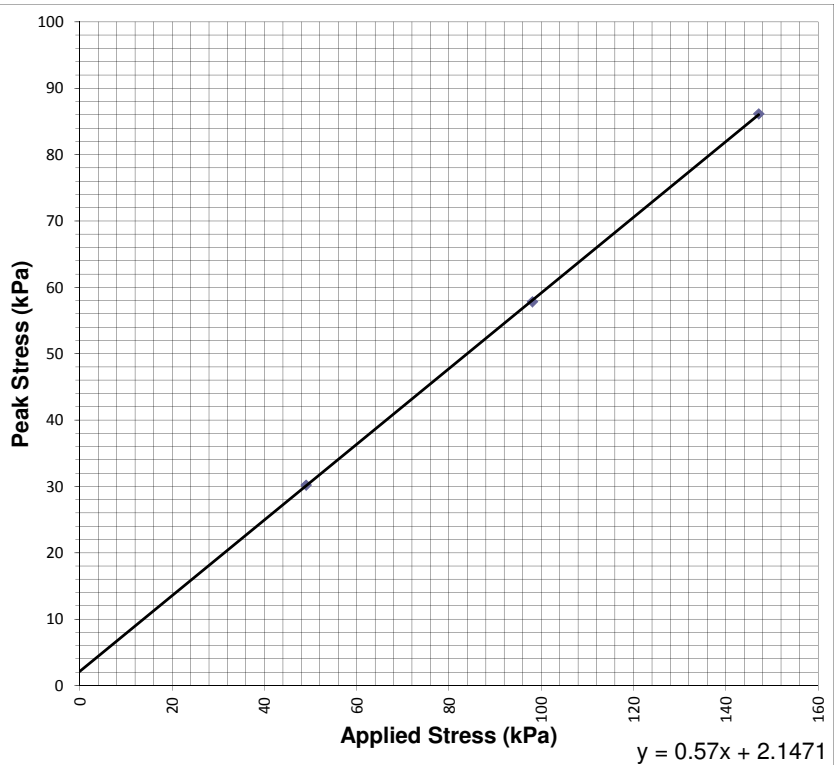
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	30
●	Stage 2	98	58
▲	Stage 3	147	86

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



Angle of Friction	29.7 °
Apparent Cohesion	2.15 kPa

Borehole: MBH-22

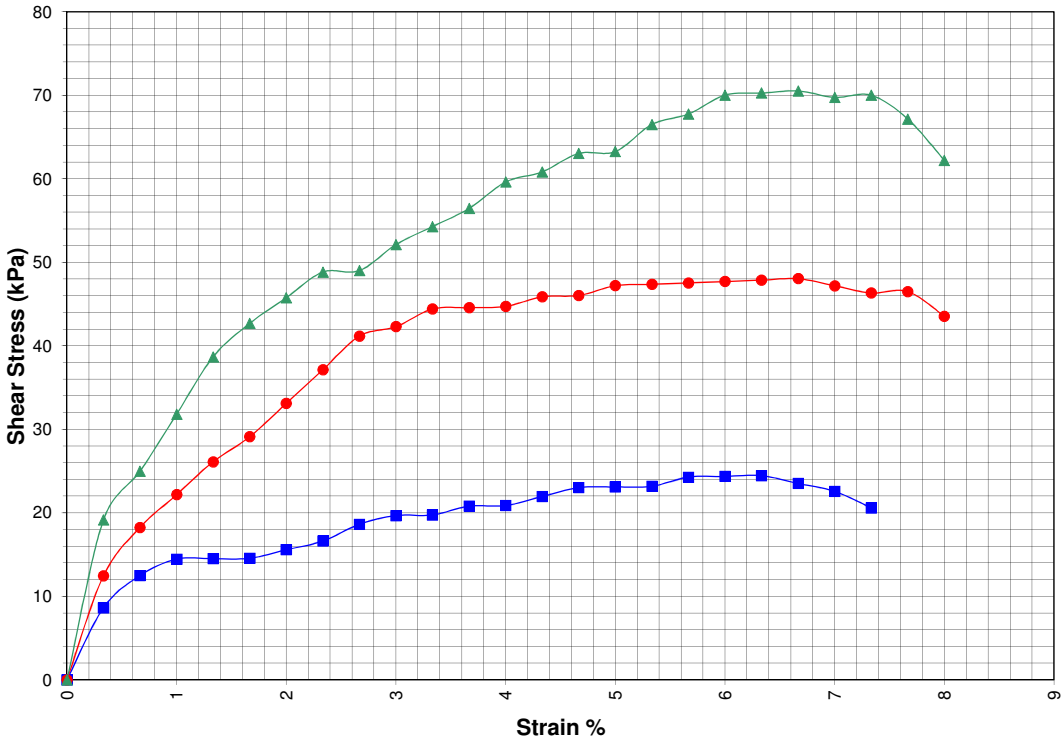
Sample Type: SPT-09

Depth: 12.00-12.25 m

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

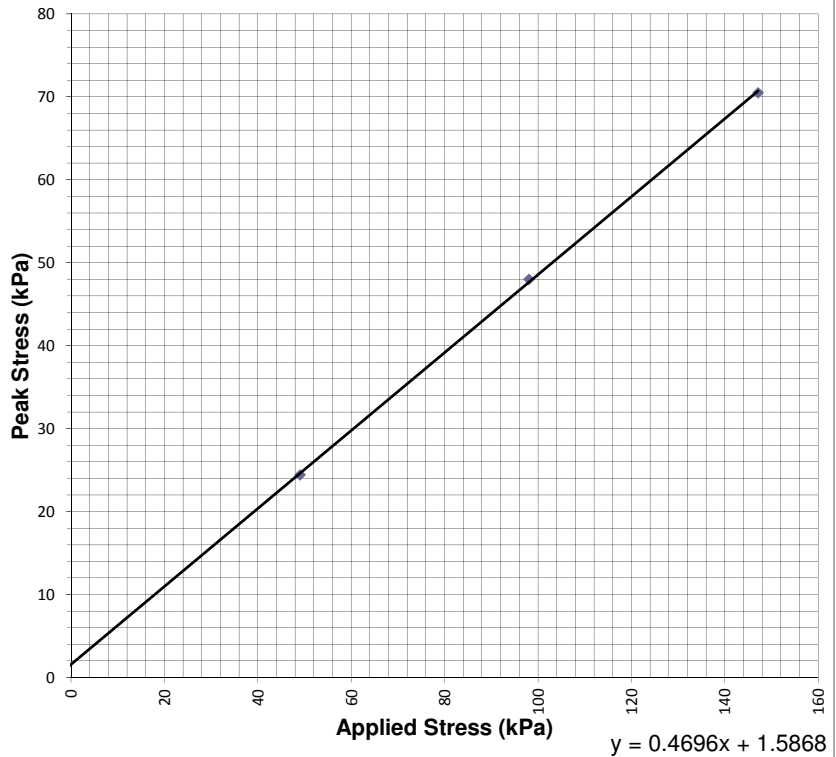
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	24
●	Stage 2	98	48
▲	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	25.2 °
Apparent Cohesion	1.59 kPa

Borehole: MBH-22

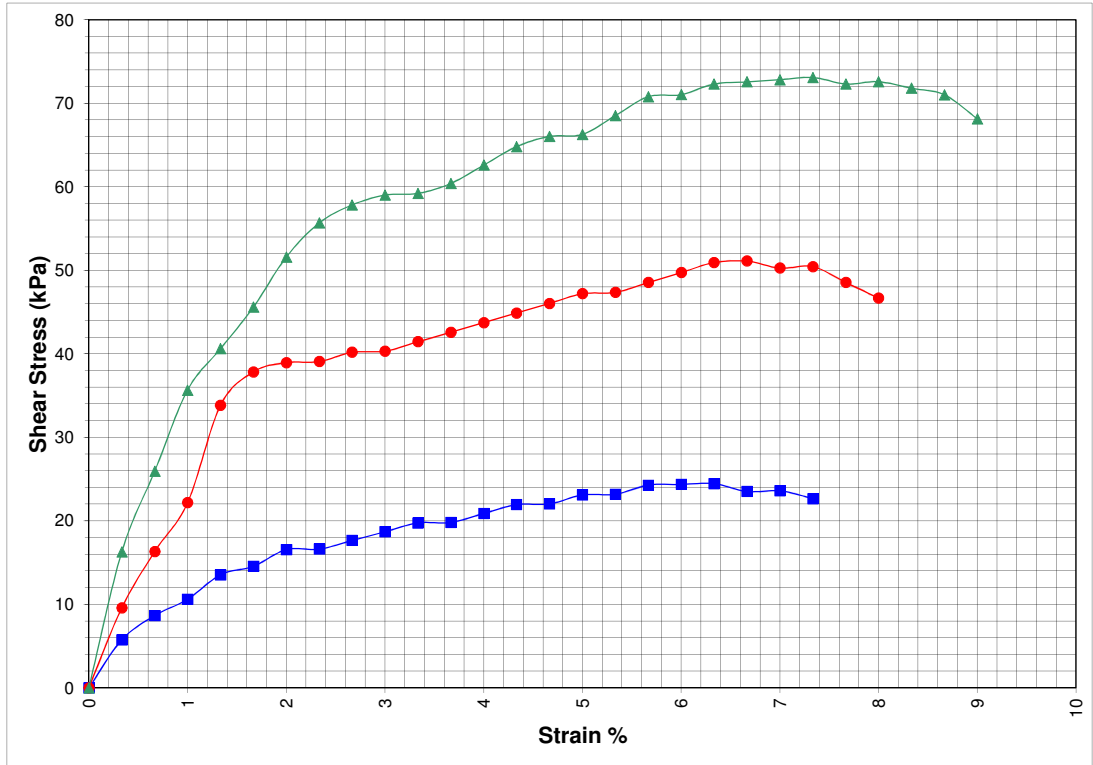
Sample Type: SPT-13

Depth: 18.00-18.25 m

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

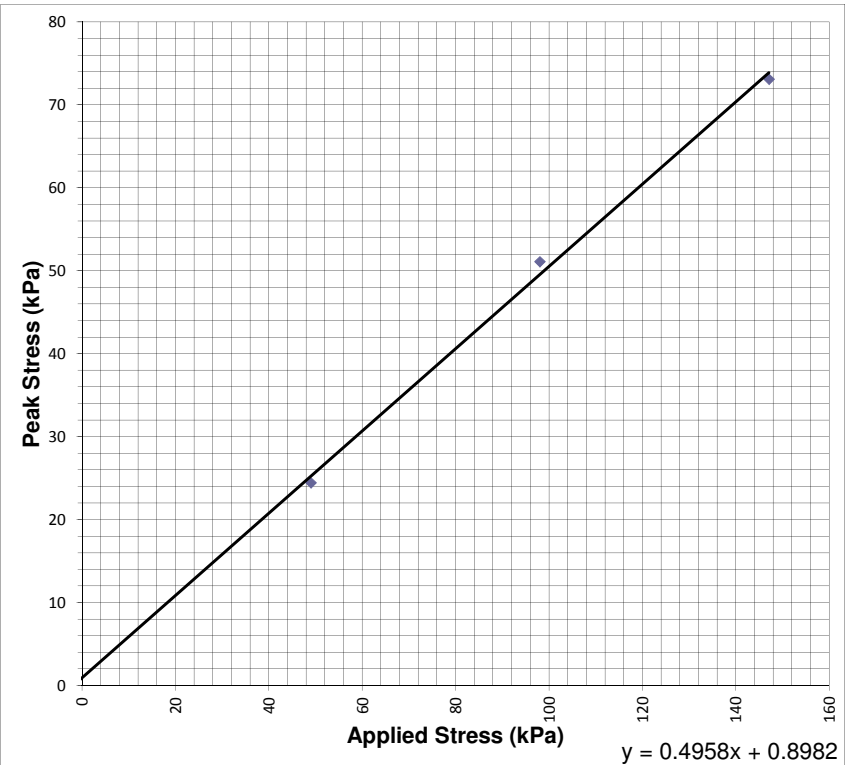
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	24
●	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	26.4 °
Apparent Cohesion	0.90 kPa

Borehole: MBH-22

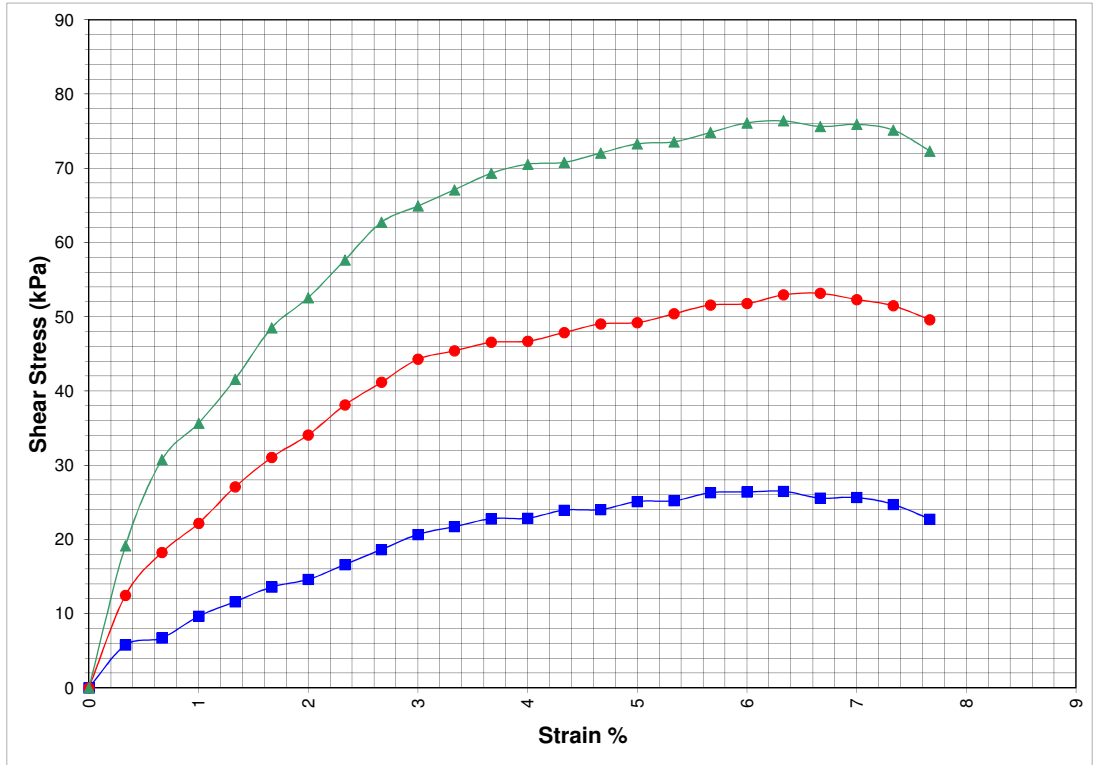
Sample Type: SPT-16

Depth: 22.50-22.70 m

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

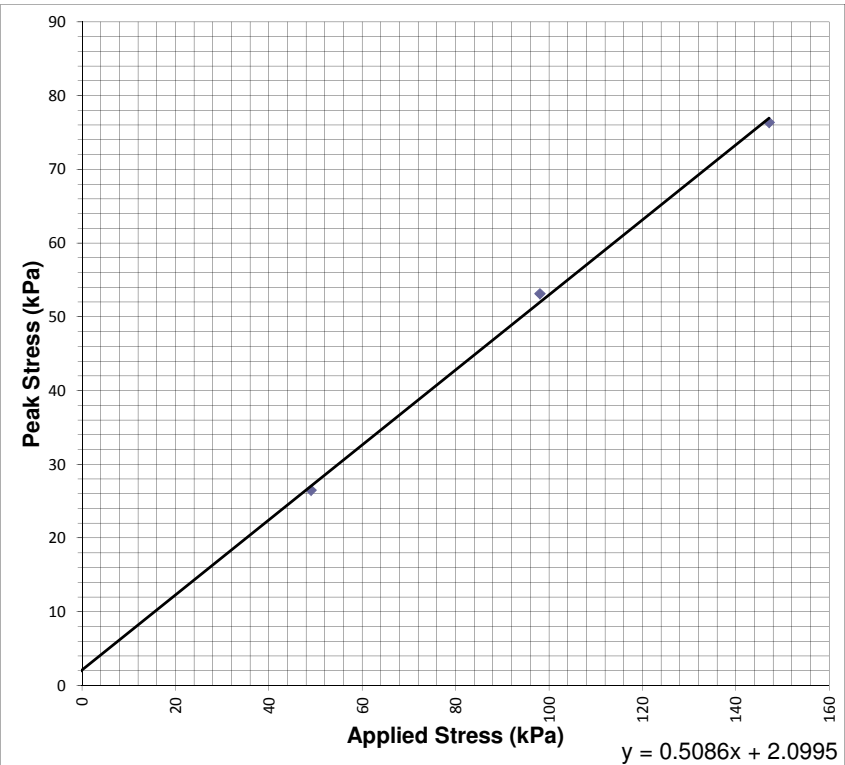
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	53
▲	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	27.0 °
Apparent Cohesion	2.10 kPa

Borehole: MBH-22

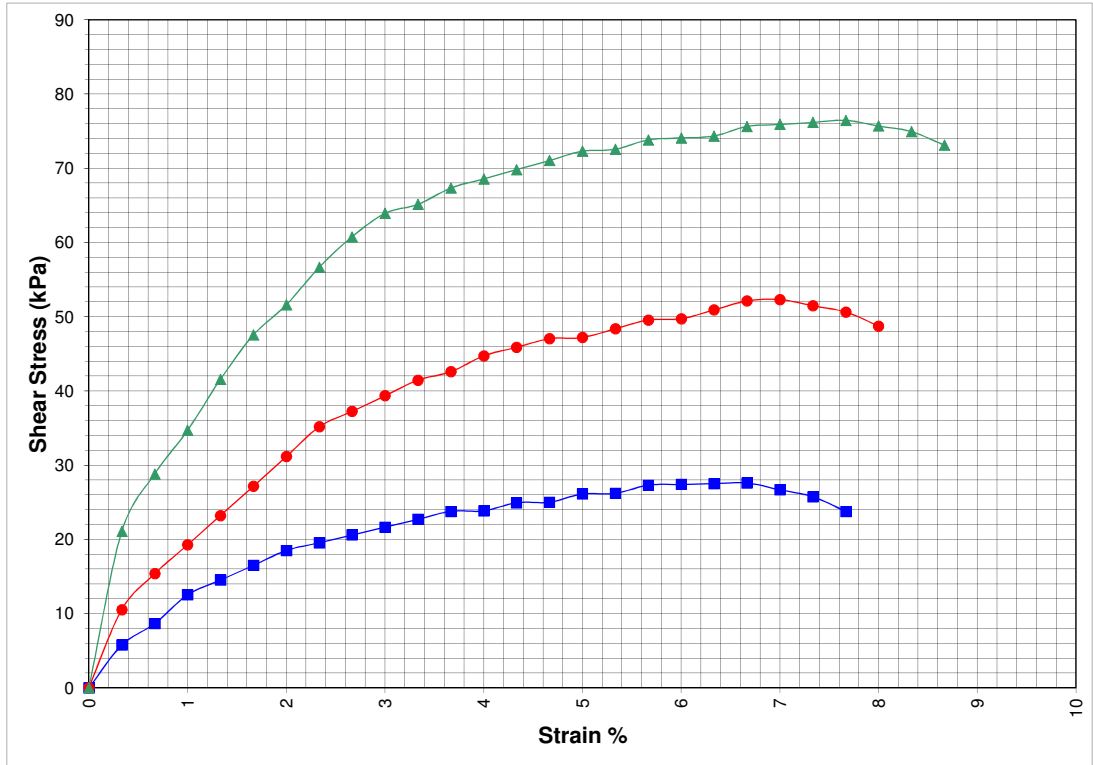
Sample Type: SPT-19

Depth: 27.00-27.15 m

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

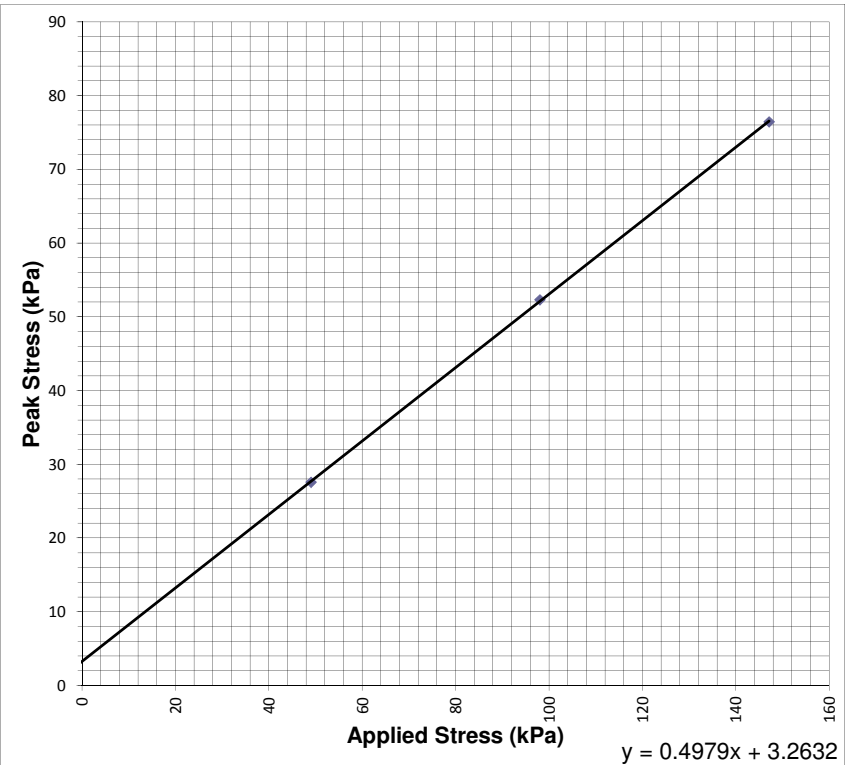
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	28
●	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	26.5 °
Apparent Cohesion	3.26 kPa

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

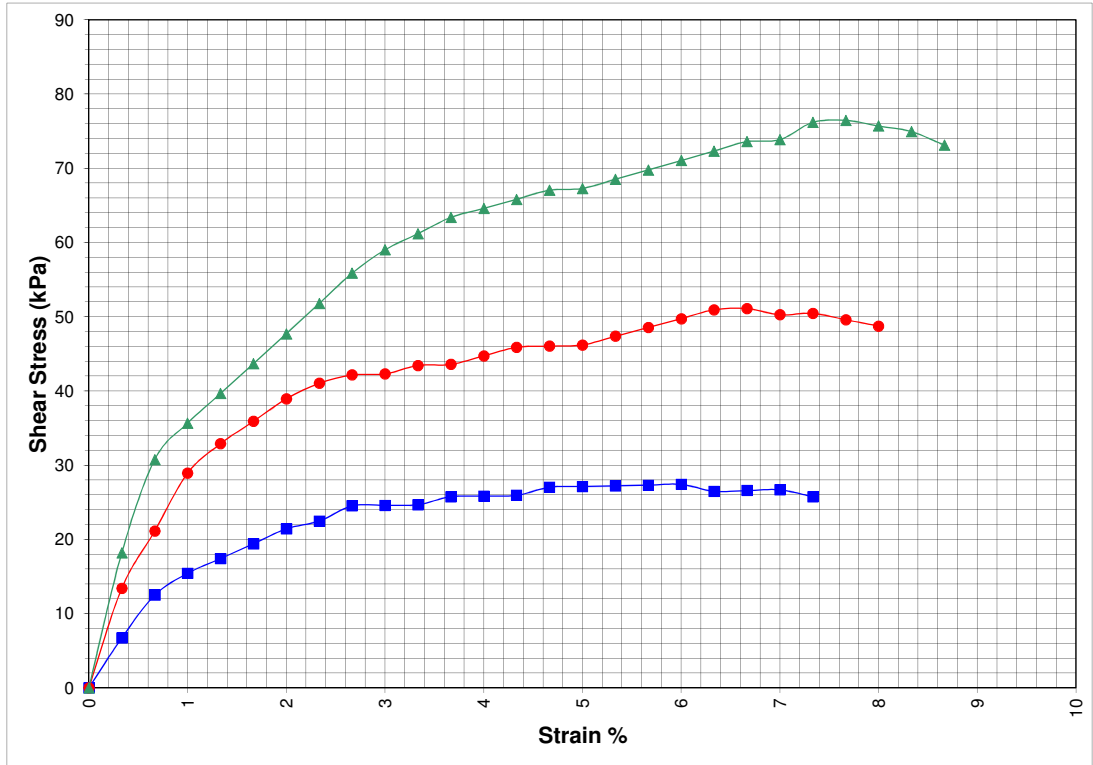
Borehole: MBH-22

Sample Type: SPT-25

Depth: 36.00-36.30 m

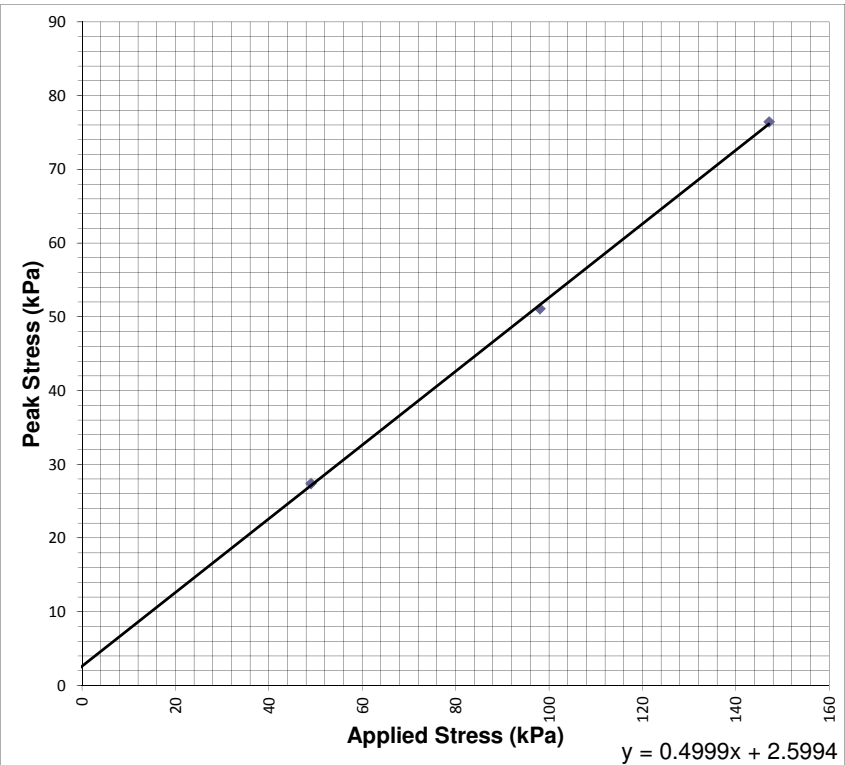
Direct Shear Test Results

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	26.6 °
Apparent Cohesion	2.60 kPa

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

Borehole: MBH-22

Sample Type: SPT-27

Depth: 39.00-39.20 m

SUMMARY OF TEST RESULTS

[illegible]

Notes :

[illegible]

SUMMARY OF TEST RESULTS

[illegible]

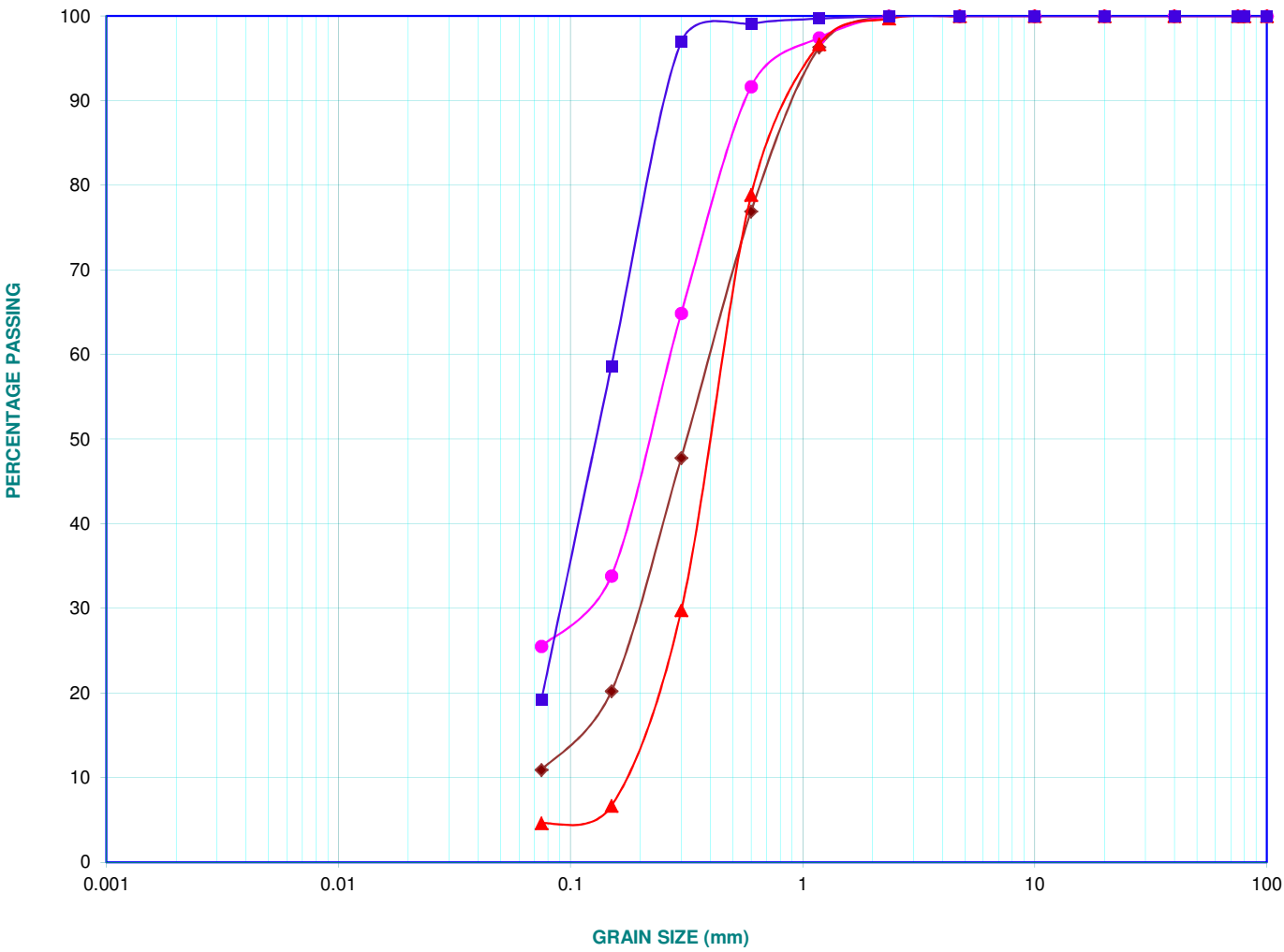
END OF BOREHOLE

[illegible]

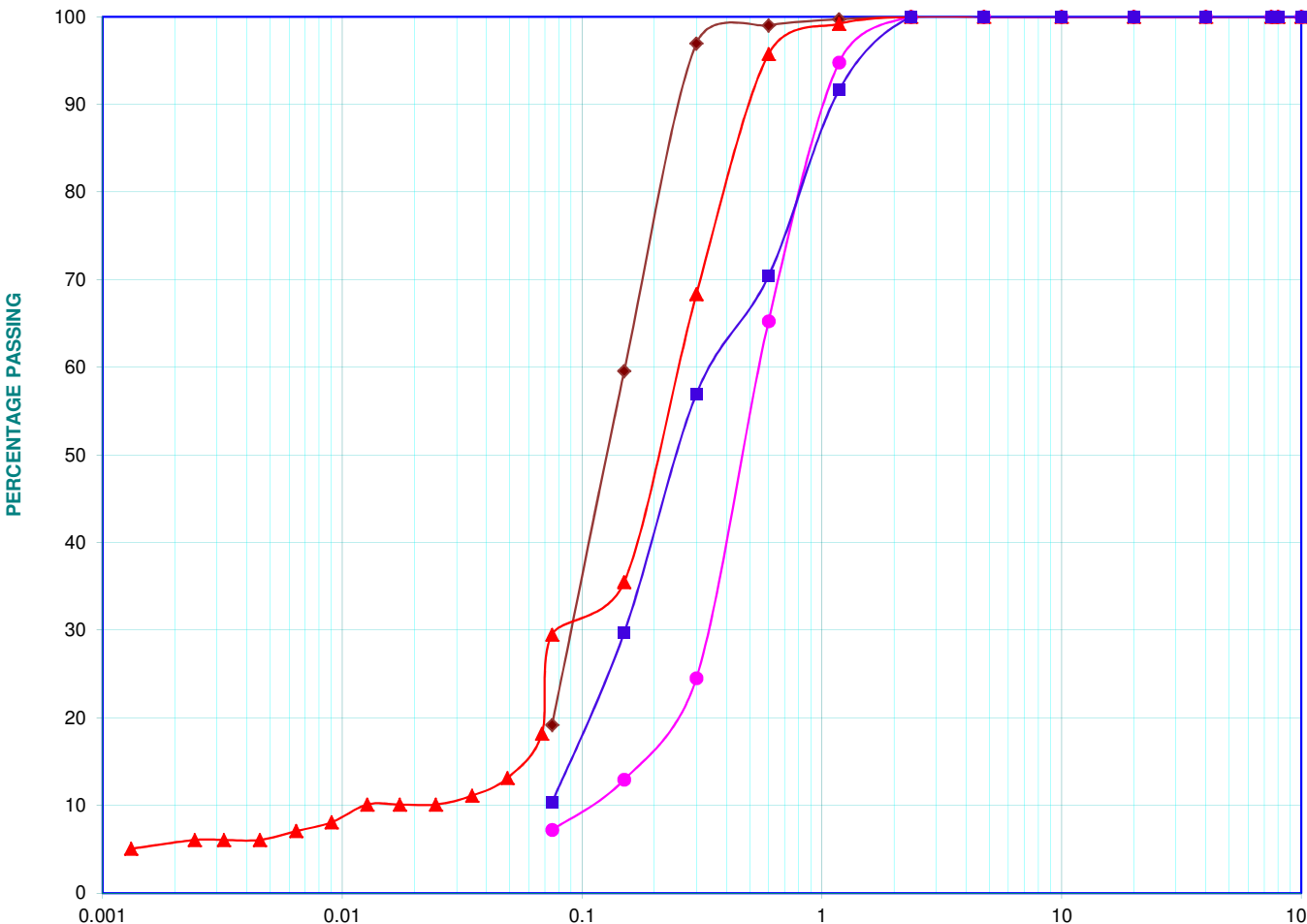
Notes :

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-23

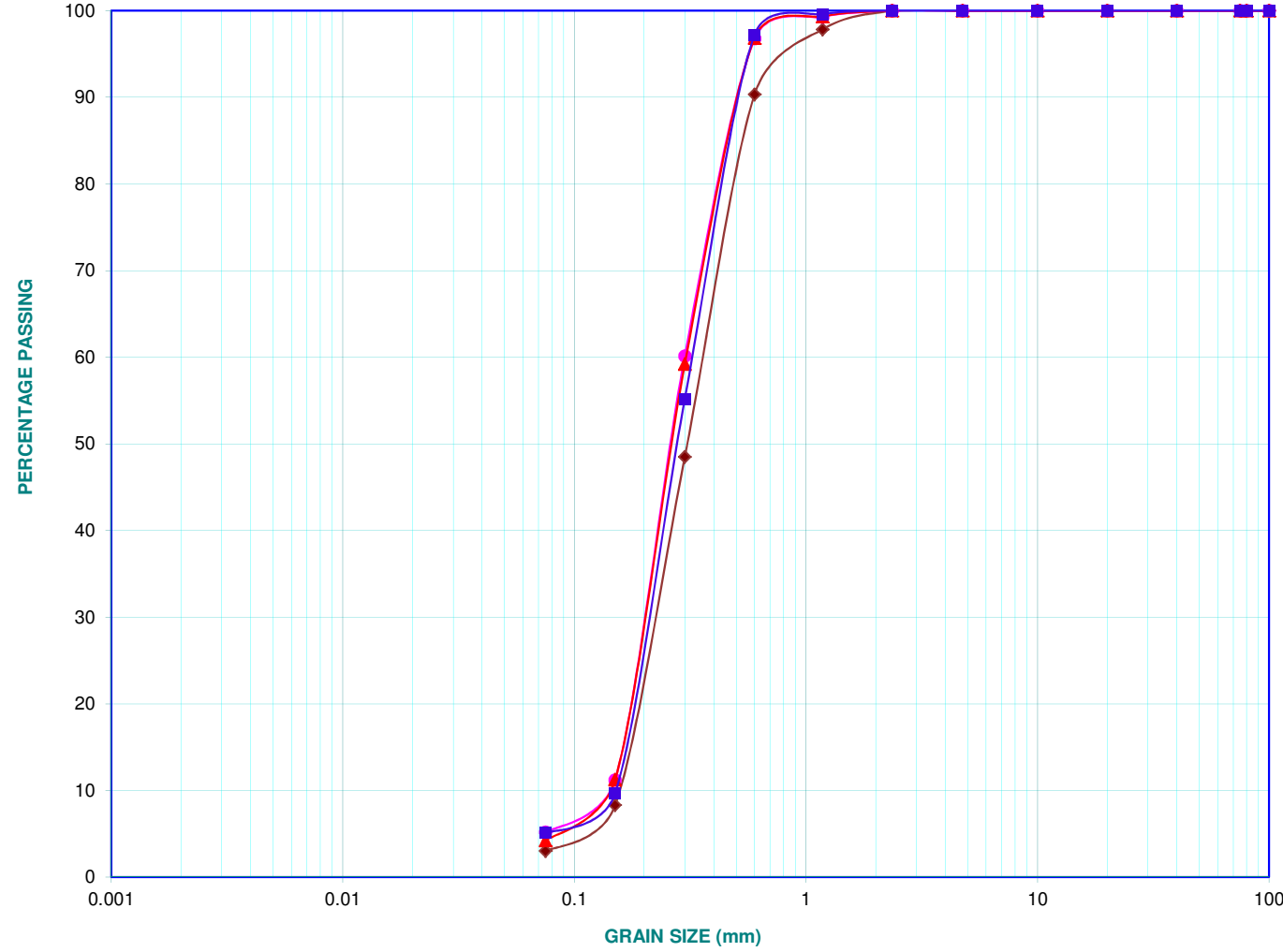
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-23					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY			SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-23	MBH-23	MBH-23	MBH-23										
Depth (m)	0.00-0.25	1.50-1.85	4.50-4.85	7.50-7.75										
Sample Type	SPT-01	SPT-02	SPT-04	SPT-06										
Classification	SP-SM	SM / SC	SP-SM	SM / SC										
Gravel %	0	0	0	0										
Sand %	89	74	95	81										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	11	26	5	19										
D60 mm	0.400		0.460											
D30 mm	0.200		0.300											
D10 mm	0.075		0.180											
Cu	5.33		2.56											
Cc	1.33		1.09											
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
										Checked By :				

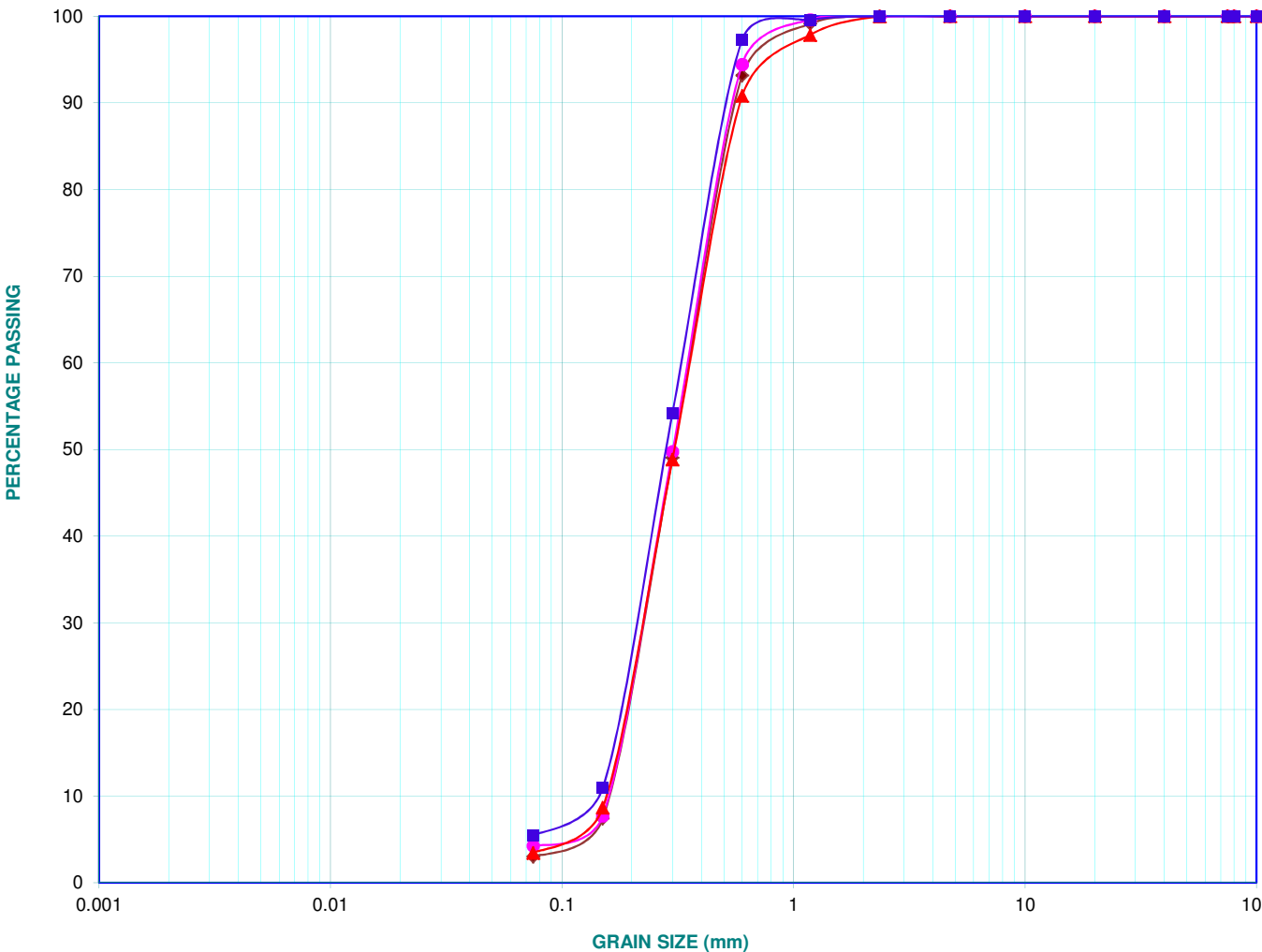
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-23					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-23	MBH-23	MBH-23	MBH-23										
Depth (m)	10.50-10.70	12.00-12.30	13.50-13.80	15.00-15.25										
Sample Type	SPT-08	SPT-09	SPT-10	SPT-11										
Classification	SM / SC	SP-SM	SM / SC	SP-SM										
Gravel %	0	0	0	0										
Sand %	81	93	71	90										
Silt %	<---->	<---->	23	<---->										
Clay %	<---->	<---->	6	<---->										
Fines % (Silt+Clay)	19	7	29	10										
D60 mm		0.550	0.260	0.340										
D30 mm		0.340	0.075	0.150										
D10 mm		0.110	0.025	0.075										
Cu		5.00	10.40	4.53										
Cc		1.91	0.87	0.88										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

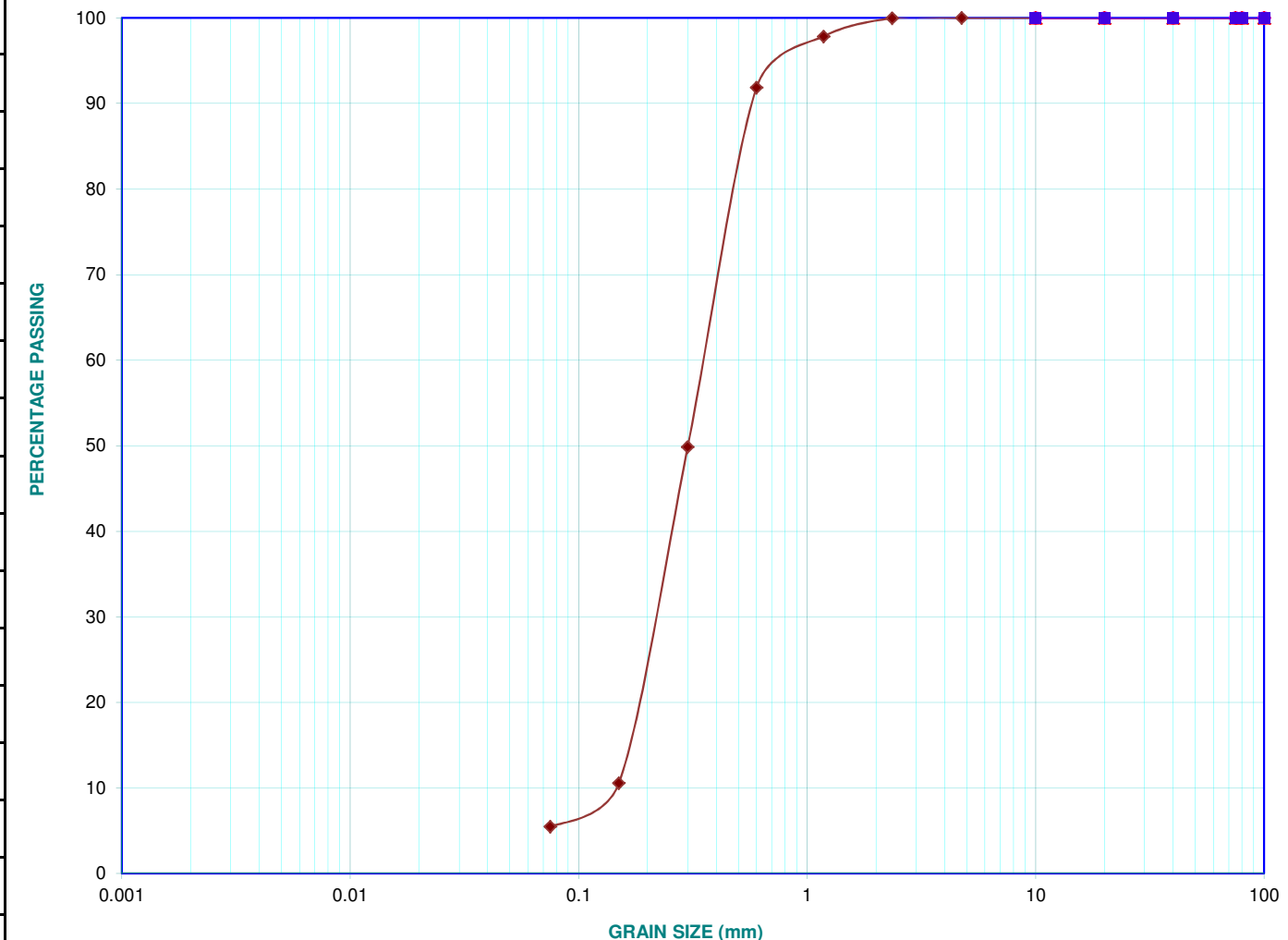
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-23					Date :		7-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-23	MBH-23	MBH-23	MBH-23	PERCENTAGE PASSING  GRAIN SIZE (mm)									
Depth (m)	18.00-18.30	19.50-19.75	24.00-24.25	27.00-27.20										
Sample Type	SPT-13	SPT-14	SPT-17	SPT-19										
Classification	SP	SP-SM	SP	SP-SM										
Gravel %	0	0	0	0										
Sand %	97	95	96	95										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	3	5	4	5										
D60 mm	0.370	0.300	0.300	0.310										
D30 mm	0.220	0.200	0.200	0.210										
D10 mm	0.160	0.150	0.150	0.150										
Cu	2.31	2.00	2.00	2.067										
Cc	0.82	0.89	0.89	0.948										
Liquid Limit %	---	---	---	---										
Plastic Limit %	---	---	---	---										
Plasticity Index	---	---	---	---										
									Checked By :					

GRAIN SIZE ANALYSIS

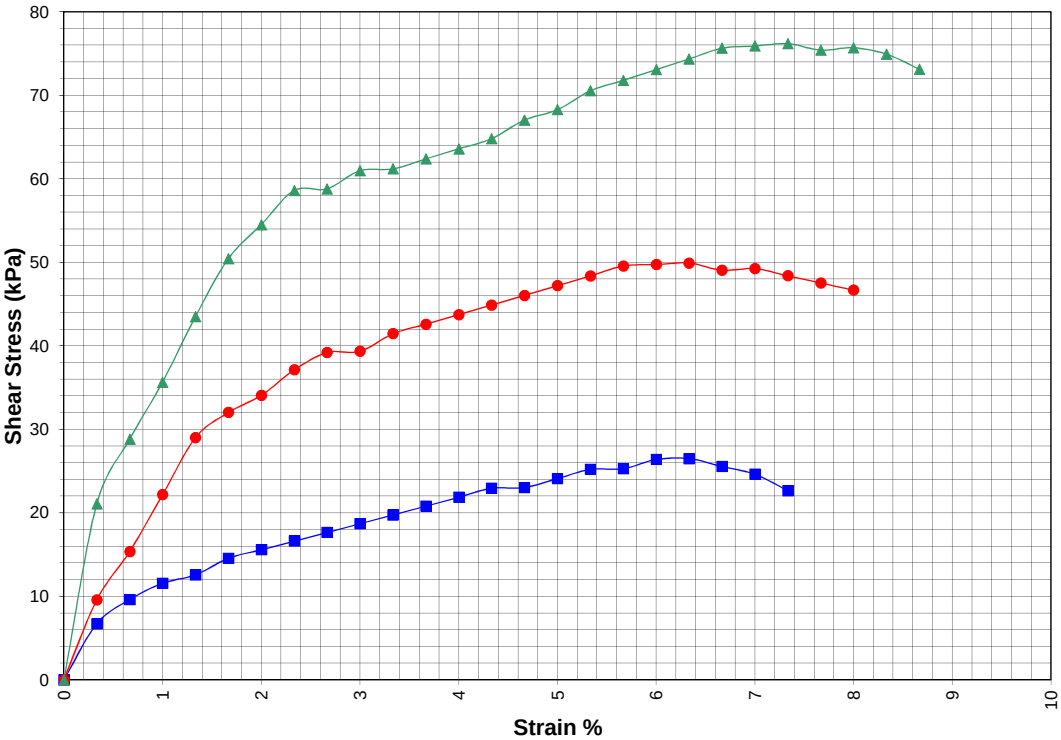
Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-23					Date :			7-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-23	MBH-23	MBH-23	MBH-23										
Depth (m)	28.50-28.65	30.00-30.15	34.50-34.65	37.50-37.65										
Sample Type	SPT-20	SPT-21	SPT-24	SPT-26										
Classification	SP	SP	SP	SP-SM										
Gravel %	0	0	0	0										
Sand %	97	96	97	95										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	3	4	3	5										
D60 mm	0.360	0.360	0.360	0.340										
D30 mm	0.220	0.220	0.220	0.210										
D10 mm	0.160	0.160	0.160	0.150										
Cu	2.25	2.25	2.25	2.27										
Cc	0.84	0.84	0.84	0.86										
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-23					Date :		7-Jun-19			
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL		
								F	M	C	F	C	
Bore Hole .	MBH-23				PERCENTAGE PASSING  GRAIN SIZE (mm)								
Depth (m)	43.50-43.65												
Sample Type	SPT-30												
Classification	SP-SM												
Gravel %	0												
Sand %	95												
Silt %	<---->												
Clay %	<---->												
Fines % (Silt+Clay)	5												
D60 mm	0.350												
D30 mm	0.220												
D10 mm	0.150												
Cu	2.33												
Cc	0.92												
Liquid Limit %	---												
Plastic Limit %	---												
Plasticity Index	---												
								Checked By :					

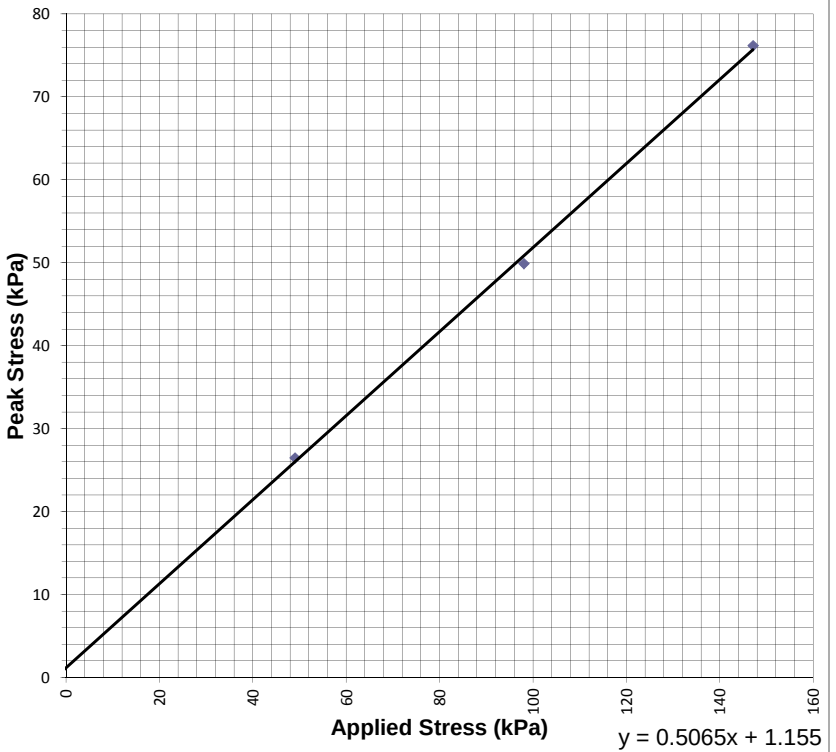
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	26
●	Stage 2	98	50
▲	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	26.86 °
Apparent Cohesion	1.16 kPa

Borehole: MBH-23

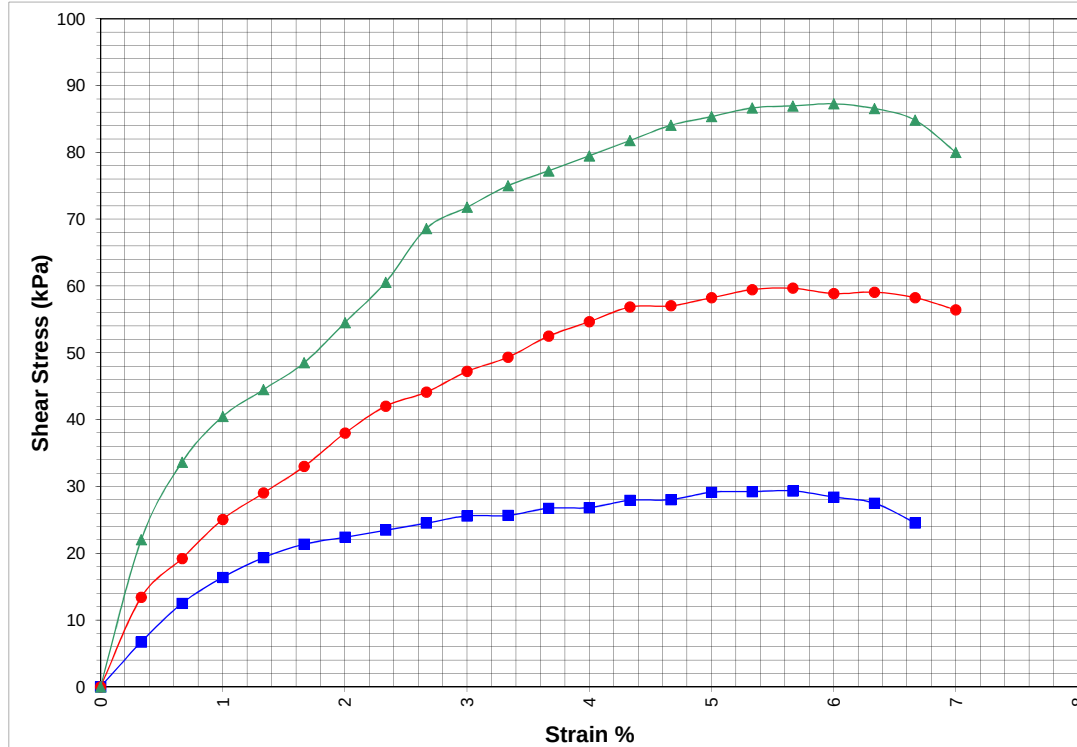
Sample Type: SPT-01

Depth: 0.00-0.25 m

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

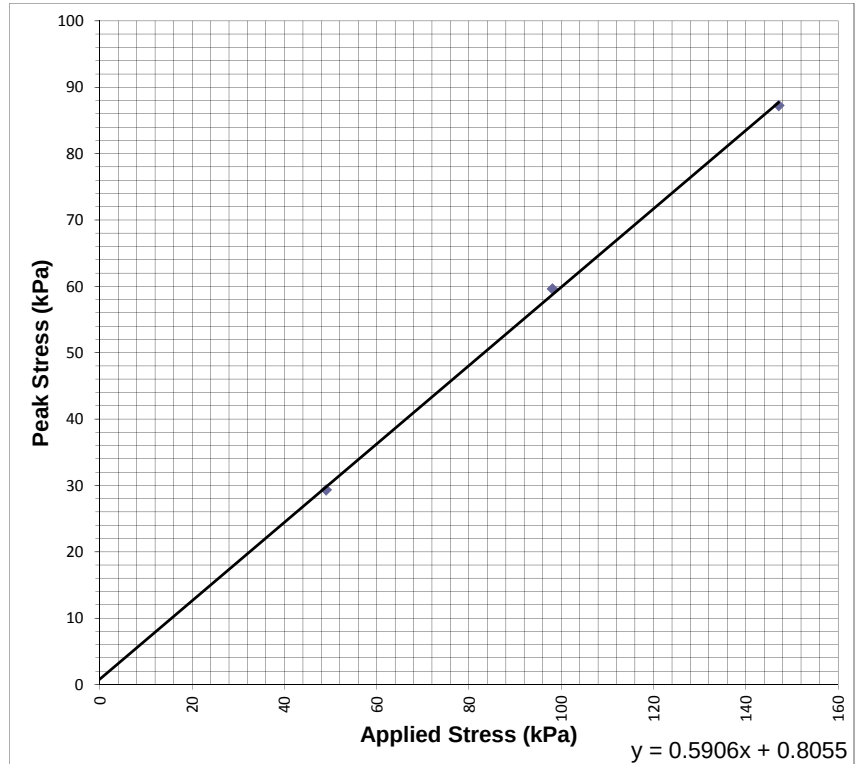
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	29
●	Stage 2	98	60
▲	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	0.81 kPa

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

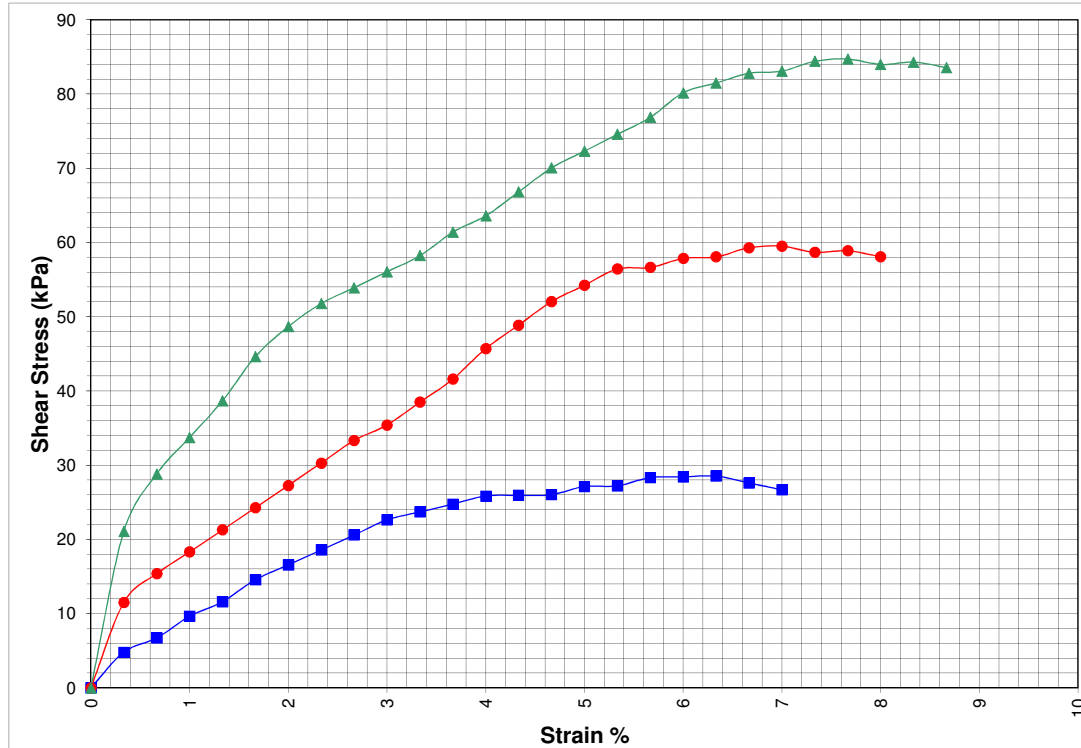
Borehole: MBH-23

Sample Type: SPT-03

Depth: 3.00-3.20 m

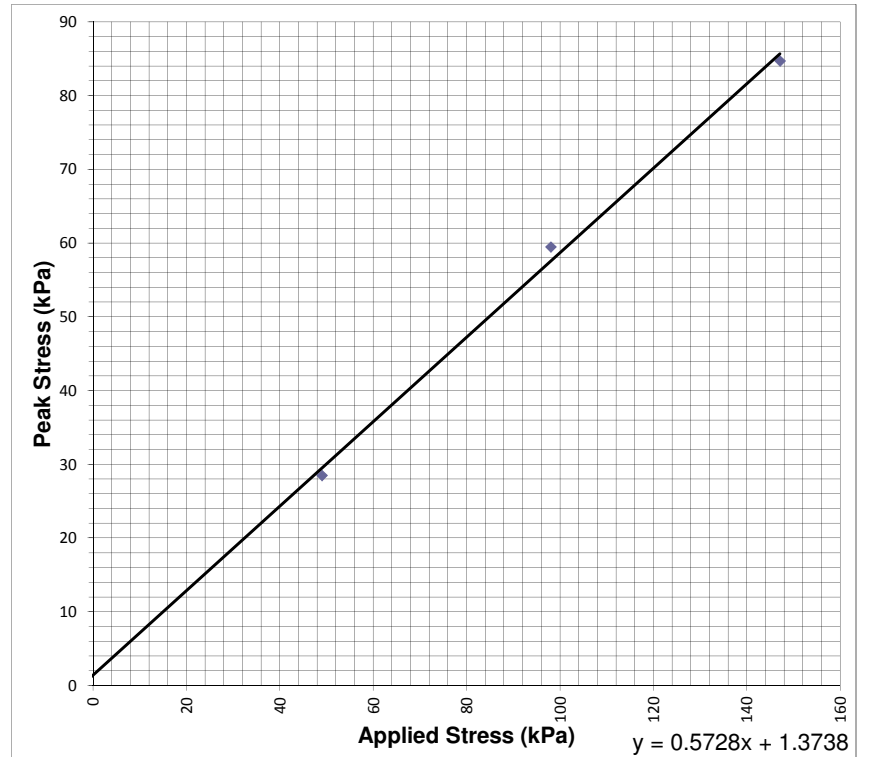
Direct Shear Test Results

Stress - Strain Curves



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

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



Angle of Friction	29.8 °
Apparent Cohesion	1.37 kPa

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

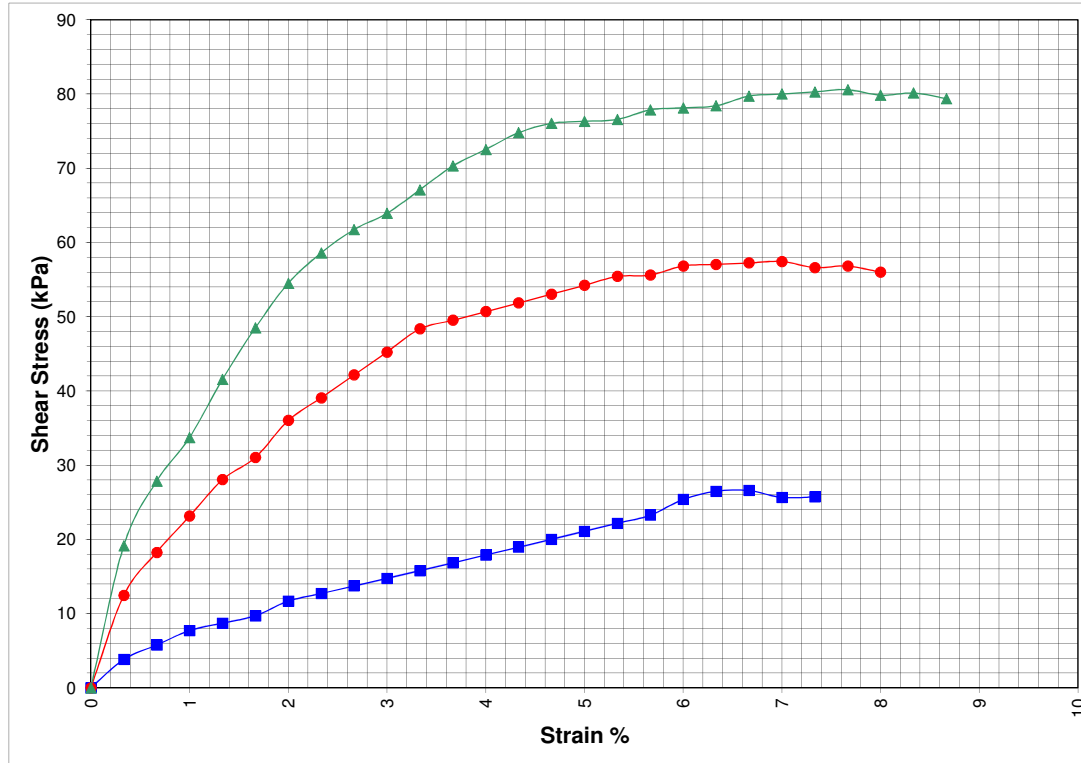
Borehole: MBH-23

Sample Type: SPT-05

Depth: 6.00-6.30 m

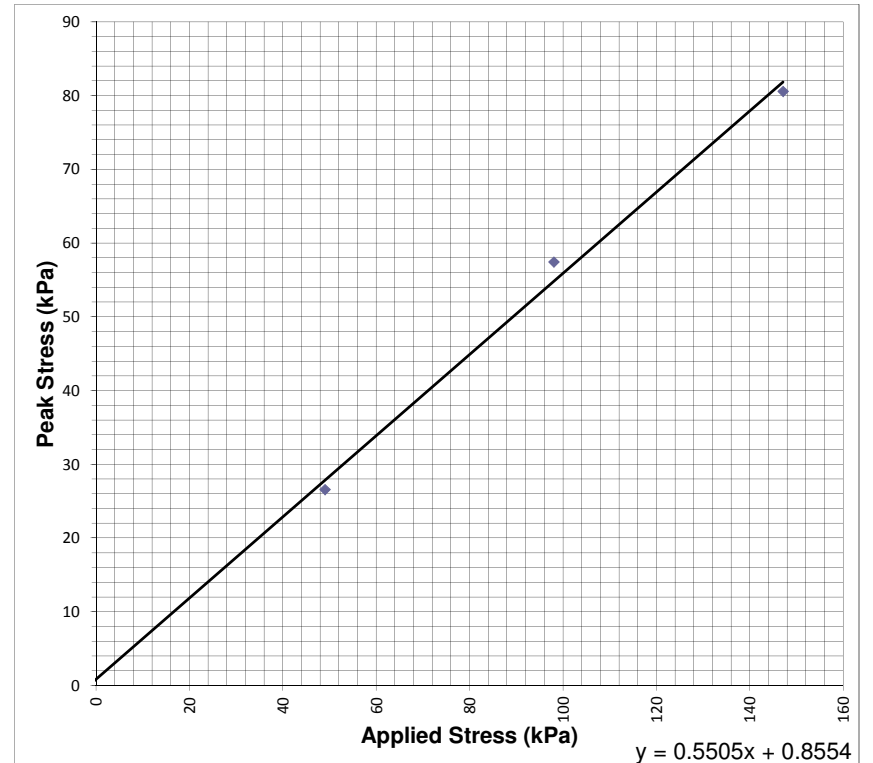
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	27
●	Stage 2	98	57
▲	Stage 3	147	81

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



Angle of Friction	28.8 °
Apparent Cohesion	0.86 kPa

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

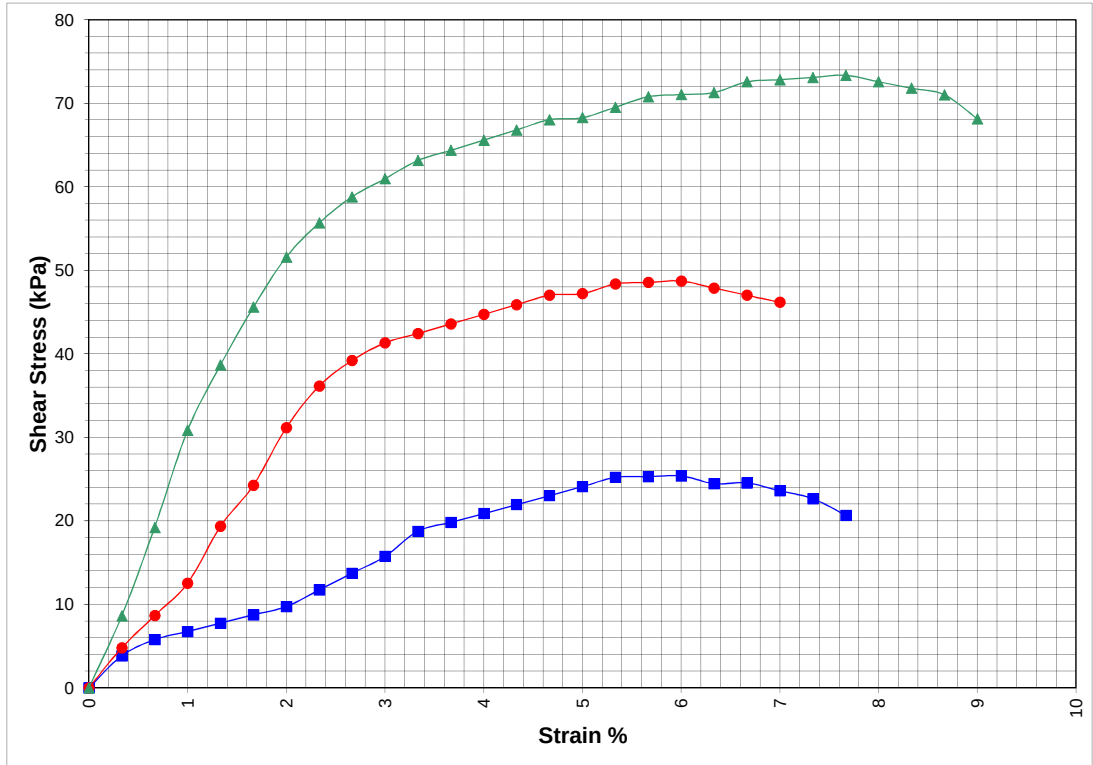
Borehole: MBH-23

Sample Type: SPT-07

Depth: 9.00-9.25 m

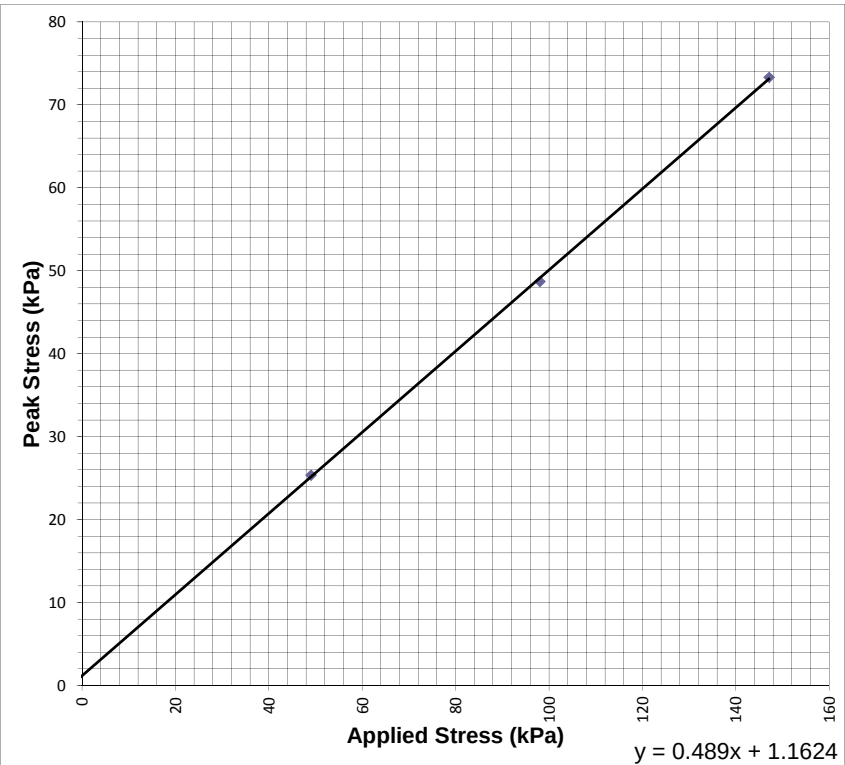
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	49
▲	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	26.06 °
Apparent Cohesion	1.16 kPa

Borehole: MBH-23

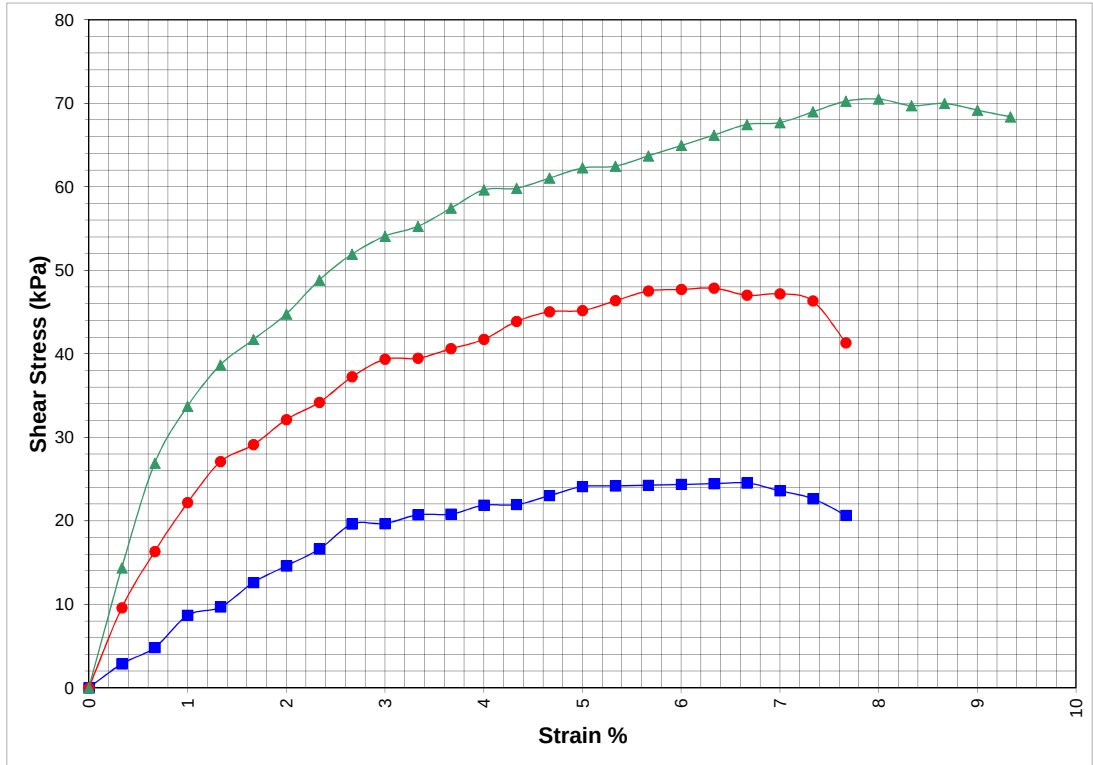
Sample Type: SPT-12

Depth: 16.50-16.80 m

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

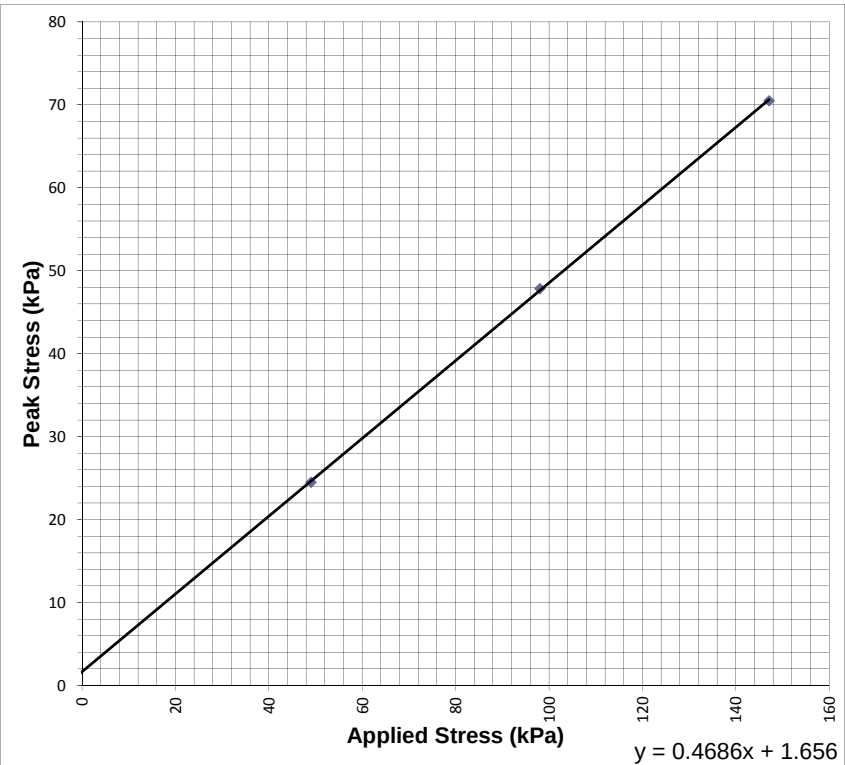
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	48
▲	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	25.11 °
Apparent Cohesion	1.66 kPa

Borehole: MBH-23

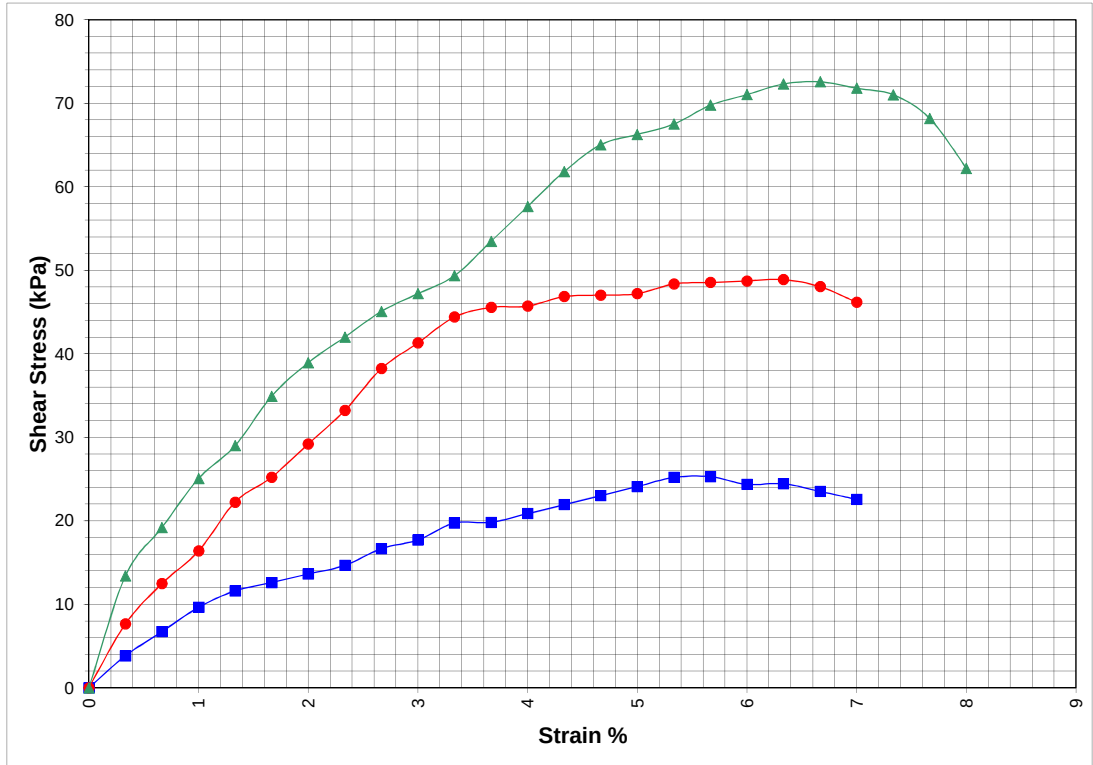
Sample Type: SPT-16

Depth: 22.50-22.70 m

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

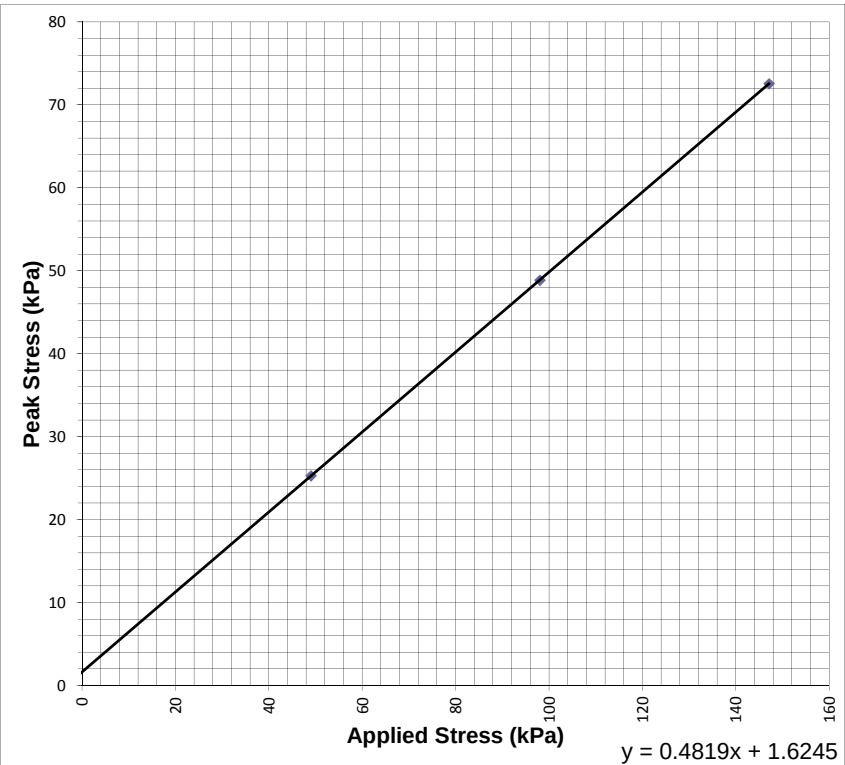
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	49
▲	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	25.73 °
Apparent Cohesion	1.62 kPa

Borehole: MBH-23

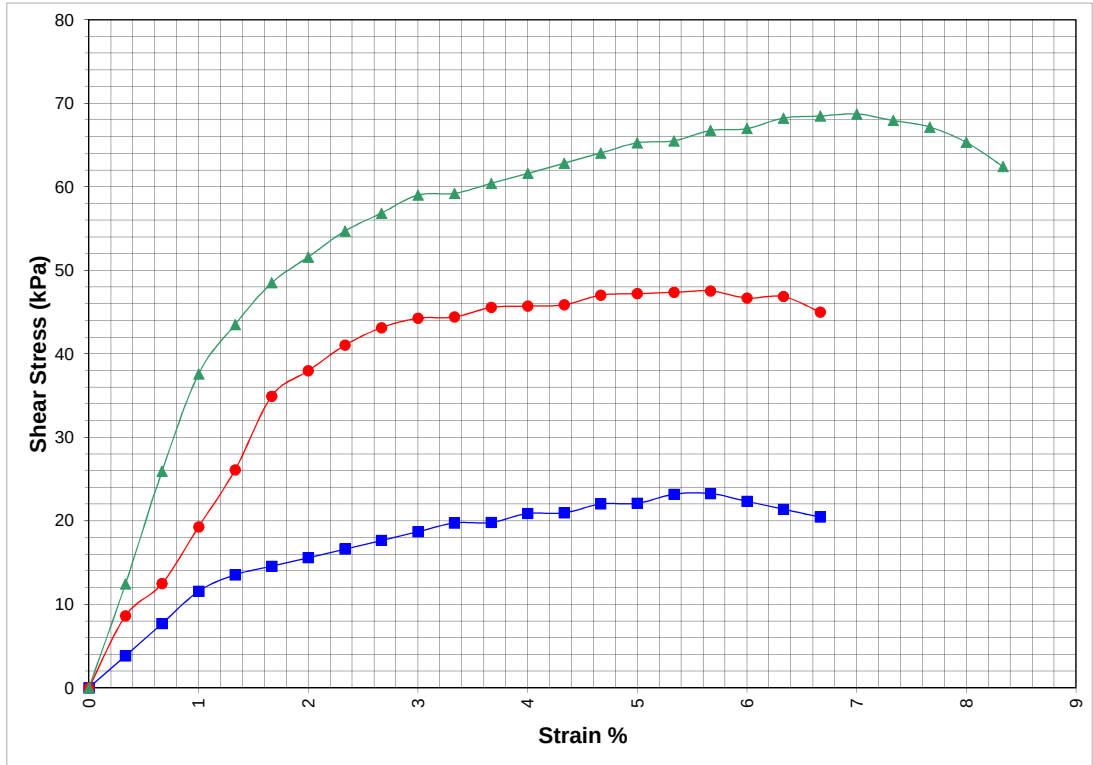
Sample Type: SPT-18

Depth: 25.50-25.70 m

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

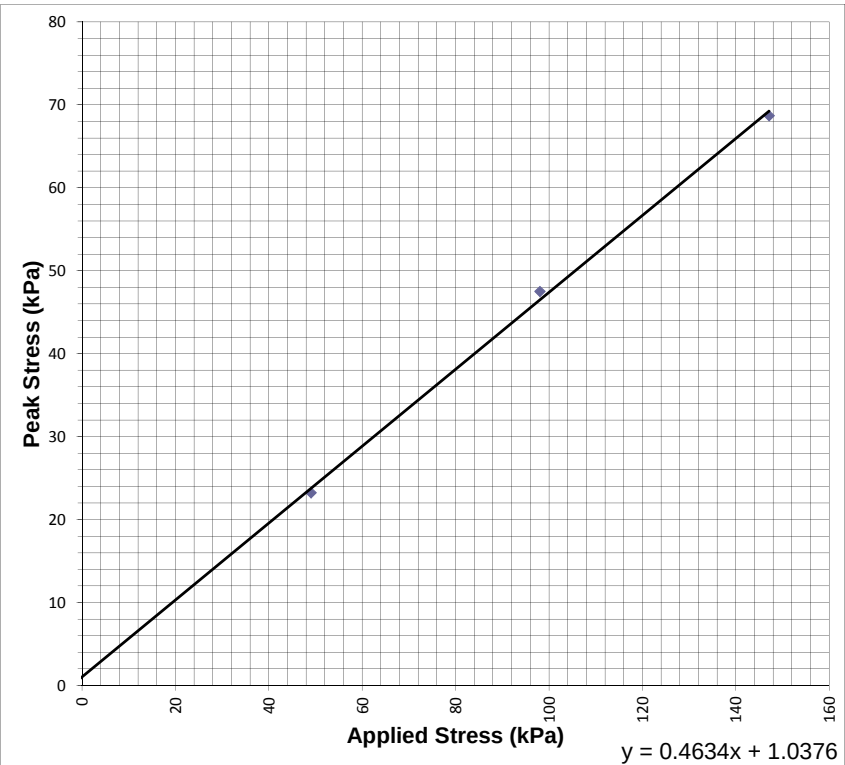
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	23
●	Stage 2	98	48
▲	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	24.86 °
Apparent Cohesion	1.04 kPa

Borehole: MBH-23

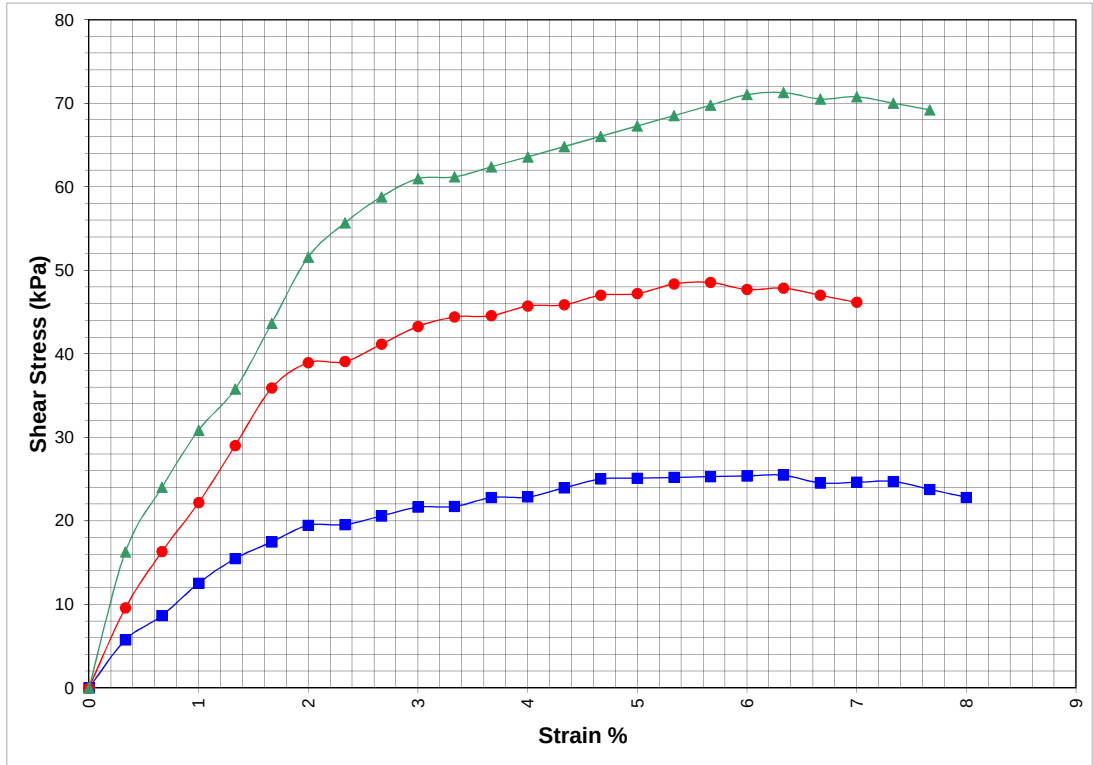
Sample Type: SPT-23

Depth: 33.00-33.25 m

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

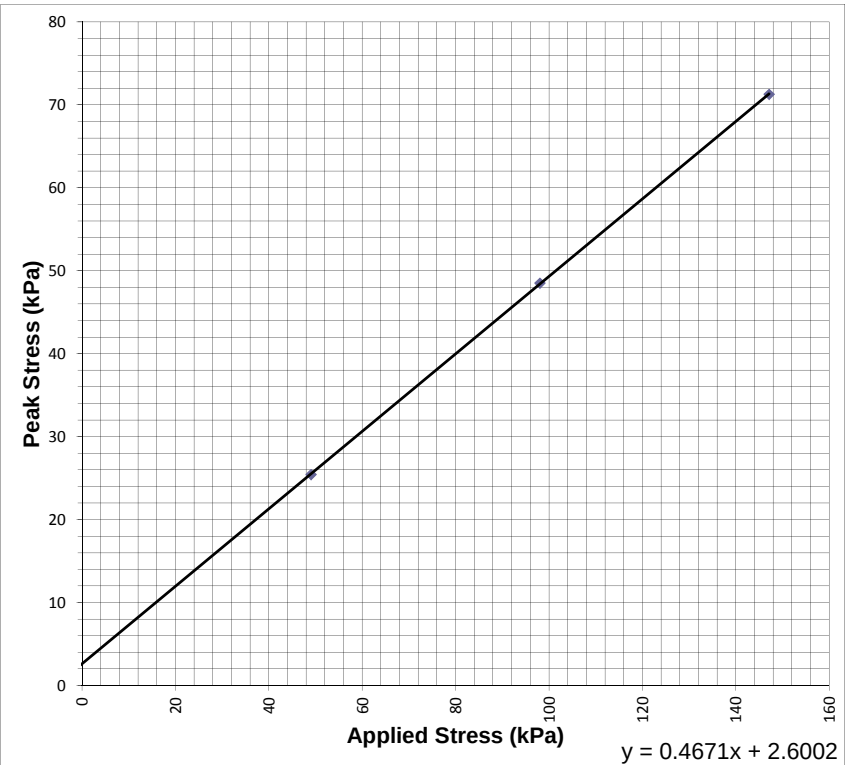
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	25
●	Stage 2	98	49
▲	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	25.04 °
Apparent Cohesion	2.60 kPa

Borehole: MBH-23

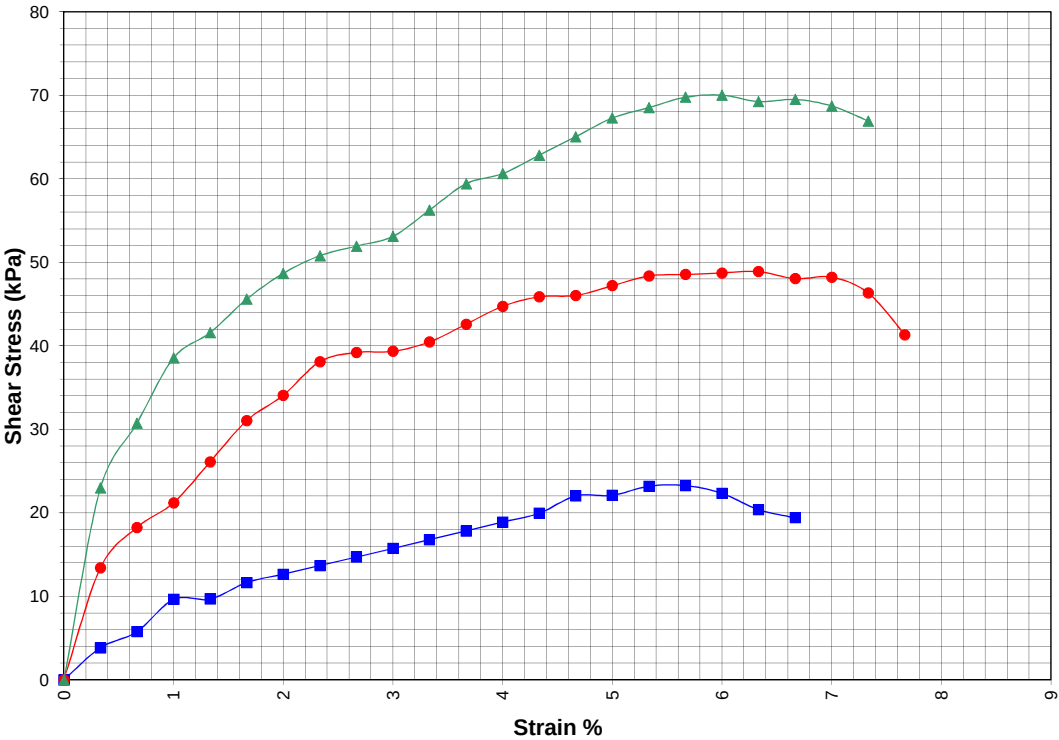
Sample Type: SPT-25

Depth: 36.00-36.20 m

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

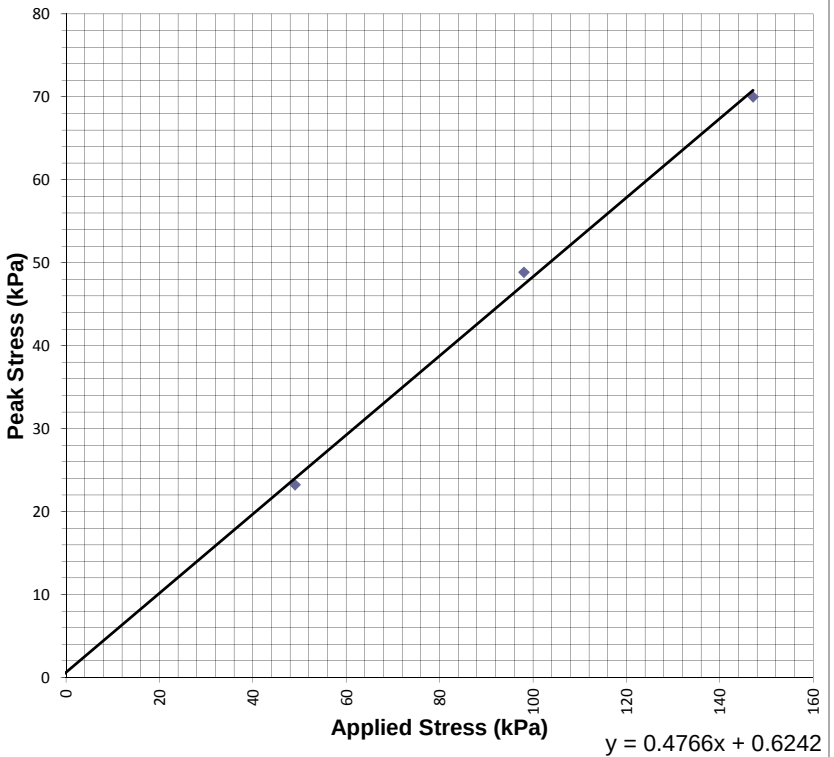
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	23
●	Stage 2	98	49
▲	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	25.48 °
Apparent Cohesion	0.62 kPa

Borehole: MBH-23

Sample Type: SPT-27

Depth: 39.00-39.15 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-24

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 : ° (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

$$\vdots$$

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

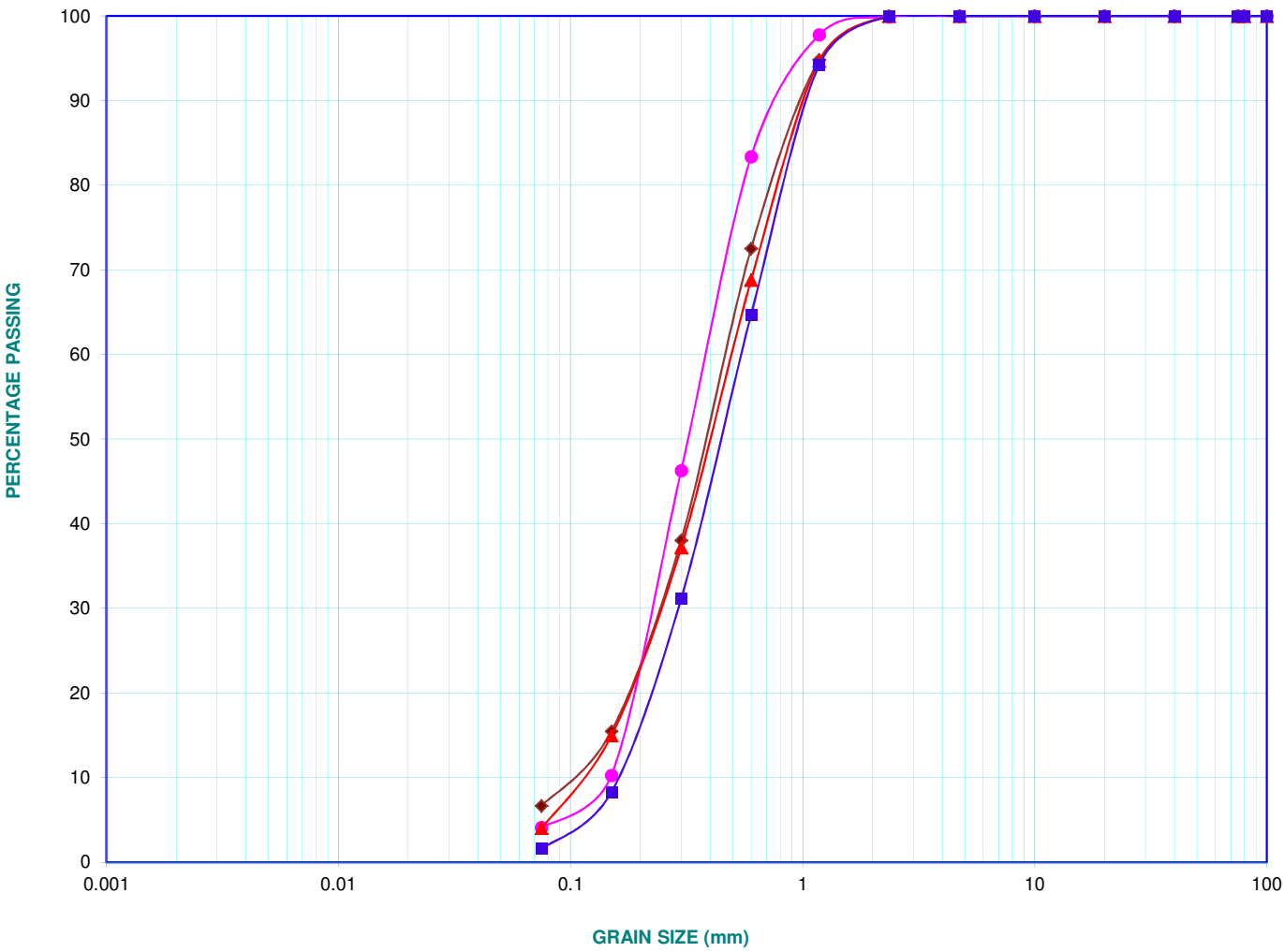
Project Code

: CM 19 01 03

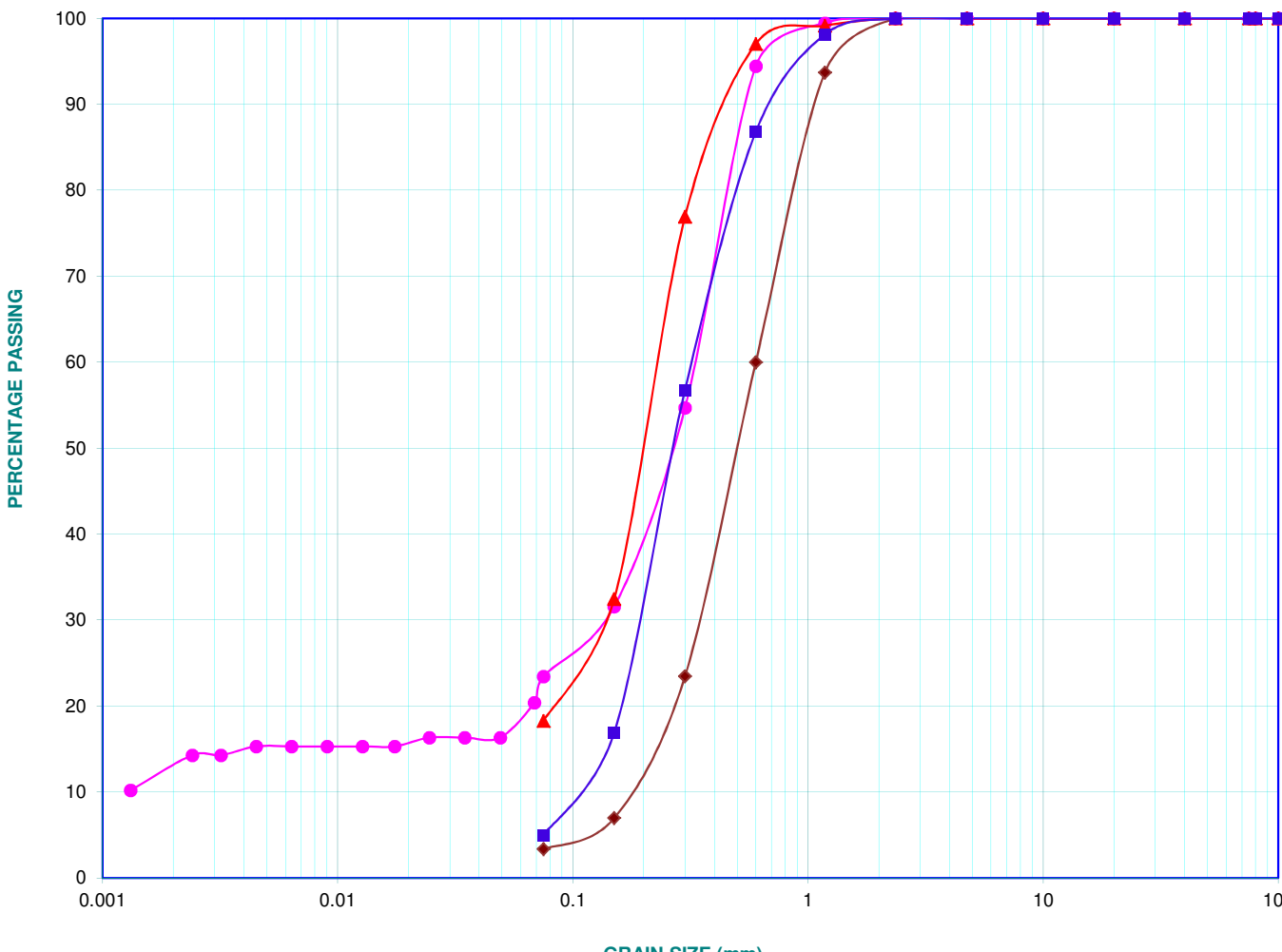
Borehole No.

: MBH-24

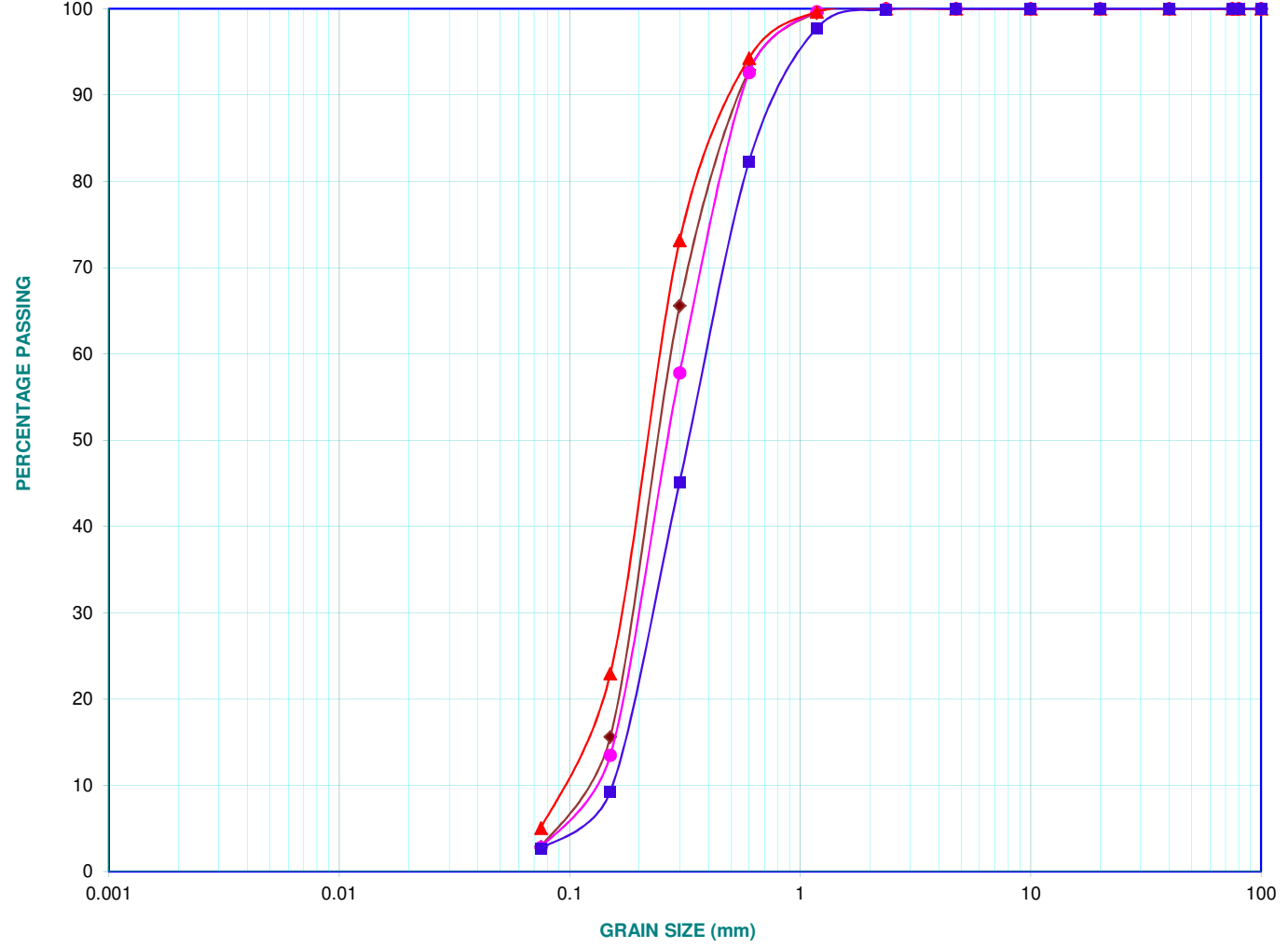
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-24					Date :			15-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-24	MBH-24	MBH-24	MBH-24										
Depth (m)	1.50-1.70	3.00-3.20	6.00-6.18	7.50-7.72										
Sample Type	SPT-01	SPT-03	SPT-05	SPT-06										
Classification	SP-SM	SP	SP	SP										
Gravel %	0	0	0	0										
Sand %	93	96	96	98										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	7	4	4	2										
D60 mm	0.480	0.400	0.460	0.560										
D30 mm	0.250	0.220	0.250	0.300										
D10 mm	0.100	0.150	0.120	0.180										
Cu	4.80	2.67	3.83	3.11										
Cc	1.30	0.81	1.13	0.89										
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-24					Date :		15-Jun-19				
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-24	MBH-24	MBH-24	MBH-24										
Depth (m)	10.50-10.72	15.00-15.35	16.50-16.73	19.50-19.68										
Sample Type	SPT-08	SPT-11	SPT-12	SPT-14										
Classification	SP	CL	SM/SC	SP-SM										
Gravel %	0	0	0	0										
Sand %	97	77	82	95										
Silt %	<---->	9	<---->	<---->										
Clay %	<---->	14	<---->	<---->										
Fines % (Silt+Clay)	3	23	18	5										
D60 mm	0.600	0.320		0.310										
D30 mm	0.350	0.150		0.200										
D10 mm	0.190	0.001		0.110										
Cu	3.16	246.15		2.82										
Cc	1.07	54.09		1.17										
Liquid Limit %	---	29.1	---	---										
Plastic Limit %	---	13.0	---	---										
Plasticity Index	---	16.1	---	---										
								Checked By :						

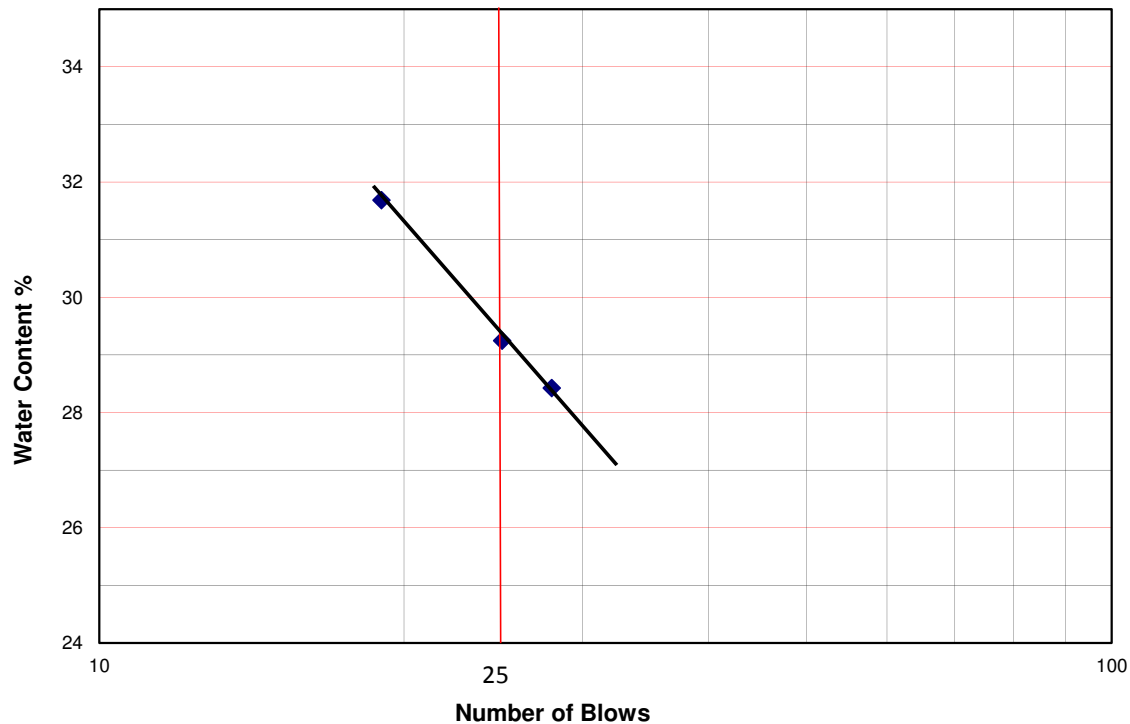
GRAIN SIZE ANALYSIS

Project	: Geotechnical Investigation for development of Captive Jetty(ies) at Jatadharmuhan, Dist Jagatsinghpur, Odisha.													
Job No.	: CM 19 01 03			Borehole No. : MBH-24					Date :			15-Jun-19		
Symbol					Particle size mm	CLAY	SILT	SAND			GRAVEL			
								F	M	C	F	C		
Bore Hole .	MBH-24	MBH-24	MBH-24	MBH-24										
Depth (m)	24.00-24.20	25.50-25.65	27.00-27.20	30.00-30.25										
Sample Type	SPT-17	SPT-18	SPT-19	SPT-21										
Classification	SP	SP	SP-SM	SP										
Gravel %	0	0	0	0										
Sand %	97	97	95	97										
Silt %	<---->	<---->	<---->	<---->										
Clay %	<---->	<---->	<---->	<---->										
Fines % (Silt+Clay)	3	3	5	3										
D60 mm	0.280	0.300	0.250	0.400										
D30 mm	0.190	0.200	0.170	0.250										
D10 mm	0.130	0.140	0.095	0.150										
Cu	2.15	2.14	2.63	2.67										
Cc	0.99	0.95	1.22	1.04										
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-24					Date :		15-Jun-19			
Symbol					Particle size mm	CLAY	SILT		SAND			GRAVEL		
									F	M	C	F	C	
Bore Hole .	MBH-24				PERCENTAGE PASSING GRAIN SIZE (mm)									
Depth (m)	33.00-33.20													
Sample Type	SPT-23													
Classification	SP-SM													
Gravel %	0													
Sand %	93													
Silt %	<---->													
Clay %	<---->													
Fines % (Silt+Clay)	7													
D60 mm	0.200													
D30 mm	0.120													
D10 mm	0.080													
Cu	2.50													
Cc	0.90													
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)	38.63	39.14	45.73		
Dry Weight + Can (g)	32.86	33.13	37.93		
Can Weight (g)	12.56	12.58	13.31		
Water Content, %	28.4	29.2	31.7		
Number of Blows	28	25	19		

Plastic Limit %

Wet Weight + Can (g)	17.24	16.58	17.40
Dry Weight + Can (g)	16.35	15.75	16.47
Can Weight (g)	9.48	9.49	9.22
Water Content, %	13.0	13.3	12.8

Liquid Limit % 29.1
 Plastic Limit % 13.0
 Plasticity Index % 16.1

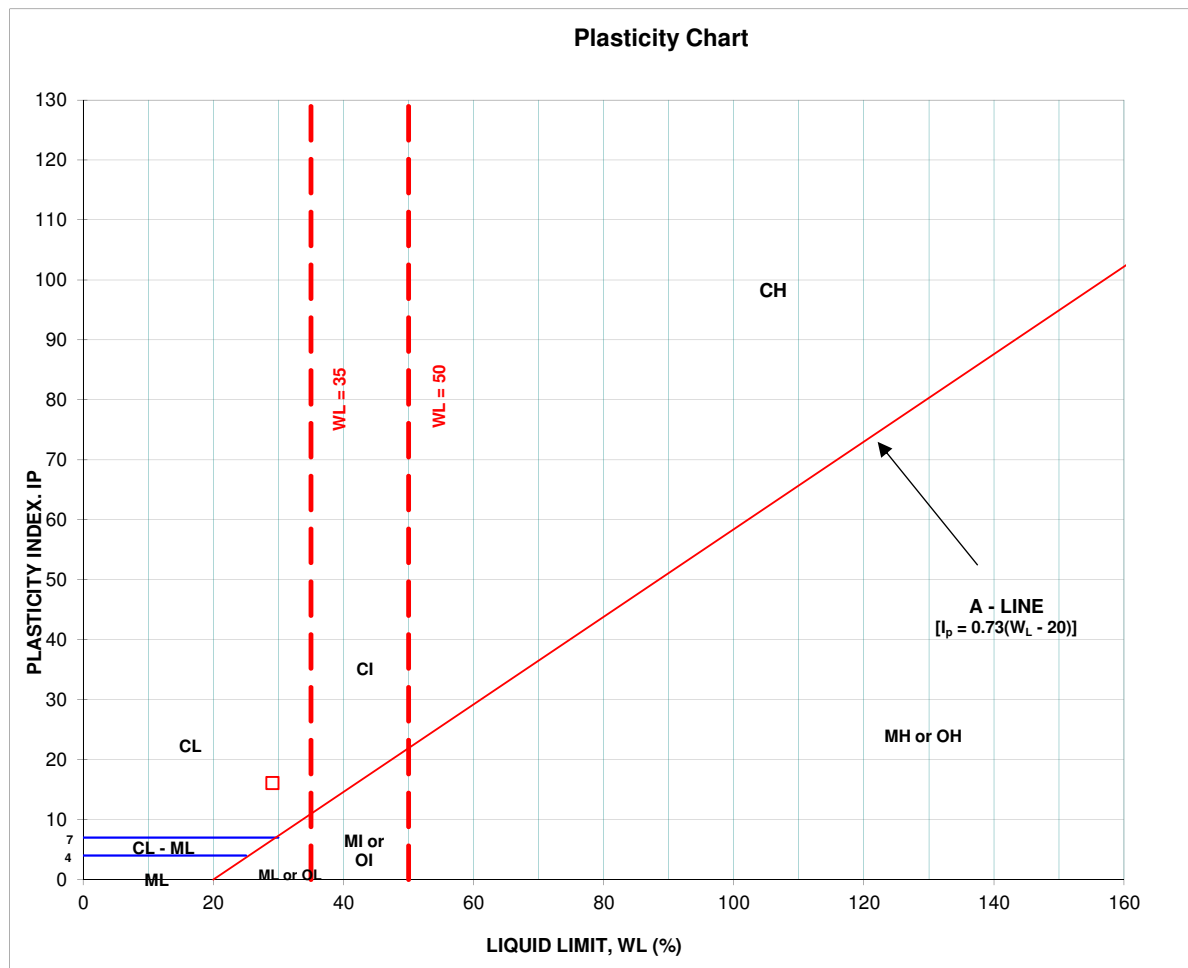
Preparation of Sample :
 Dry State

Sample Type: SPT-02

Borehole no.: MBH-24

Depth :15.00-15.35

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-11	15.00-15.35	29.1	13.0	16.1	CL: Inorganic clays of low to medium plasticity.
◇						
△					p	
●						
+						
■						

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

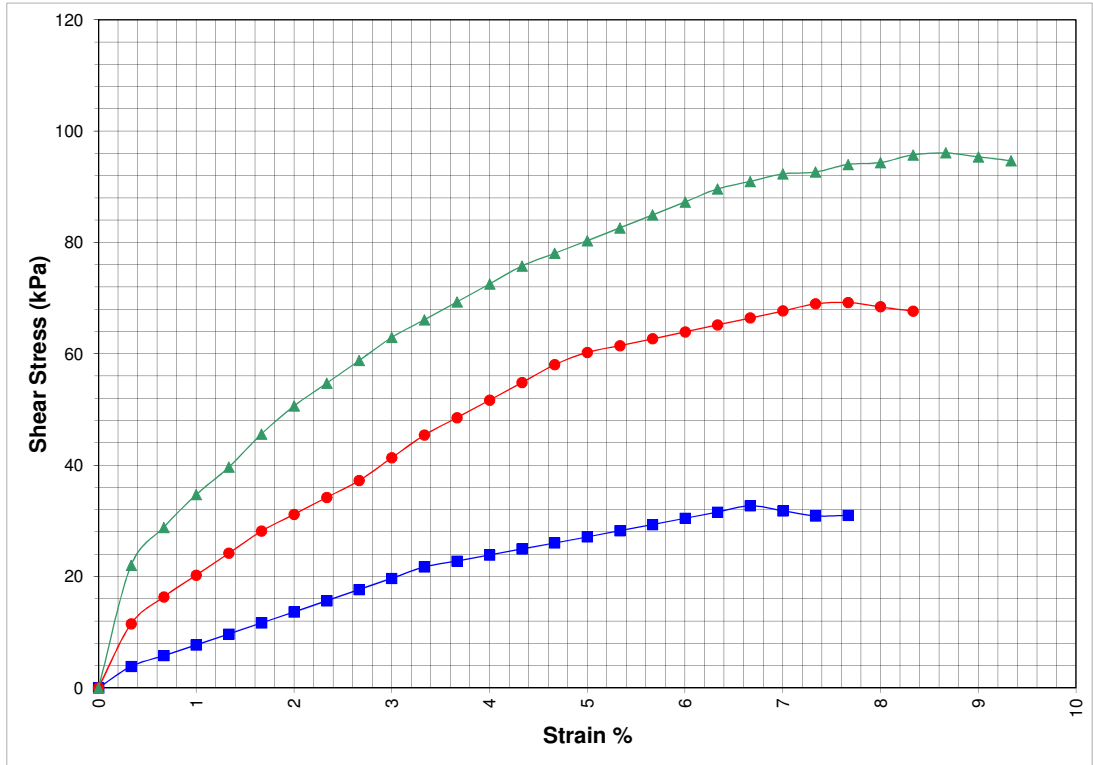
PLASTICITY CHART (IS : 1498 - 1987)

BOREHOLE NAME : MBH-24

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

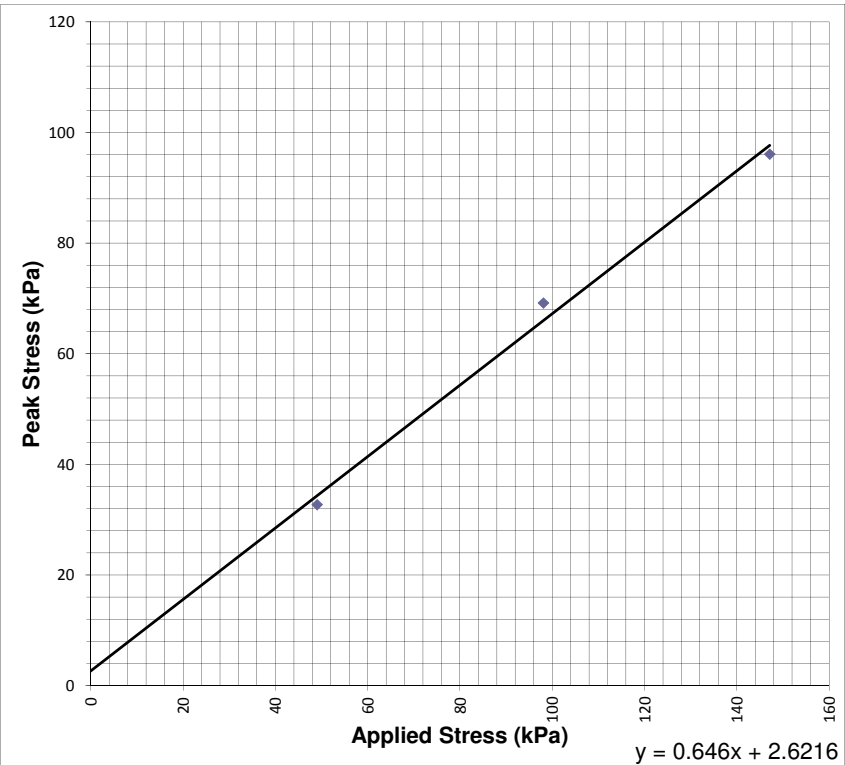
Direct Shear Test Results

Stress - Strain Curves



Legend	Stage No	Applied Stress (kPa)	Peak Stress (kPa)
■	Stage 1	49	33
●	Stage 2	98	69
▲	Stage 3	147	96

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



Angle of Friction	32.86 °
Apparent Cohesion	2.62 kPa

Borehole: MBH-24

Sample Type: SPT-01

Depth: 0.00-0.23 m

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 13:28:21 IST

Location: eProcure-EROC