

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

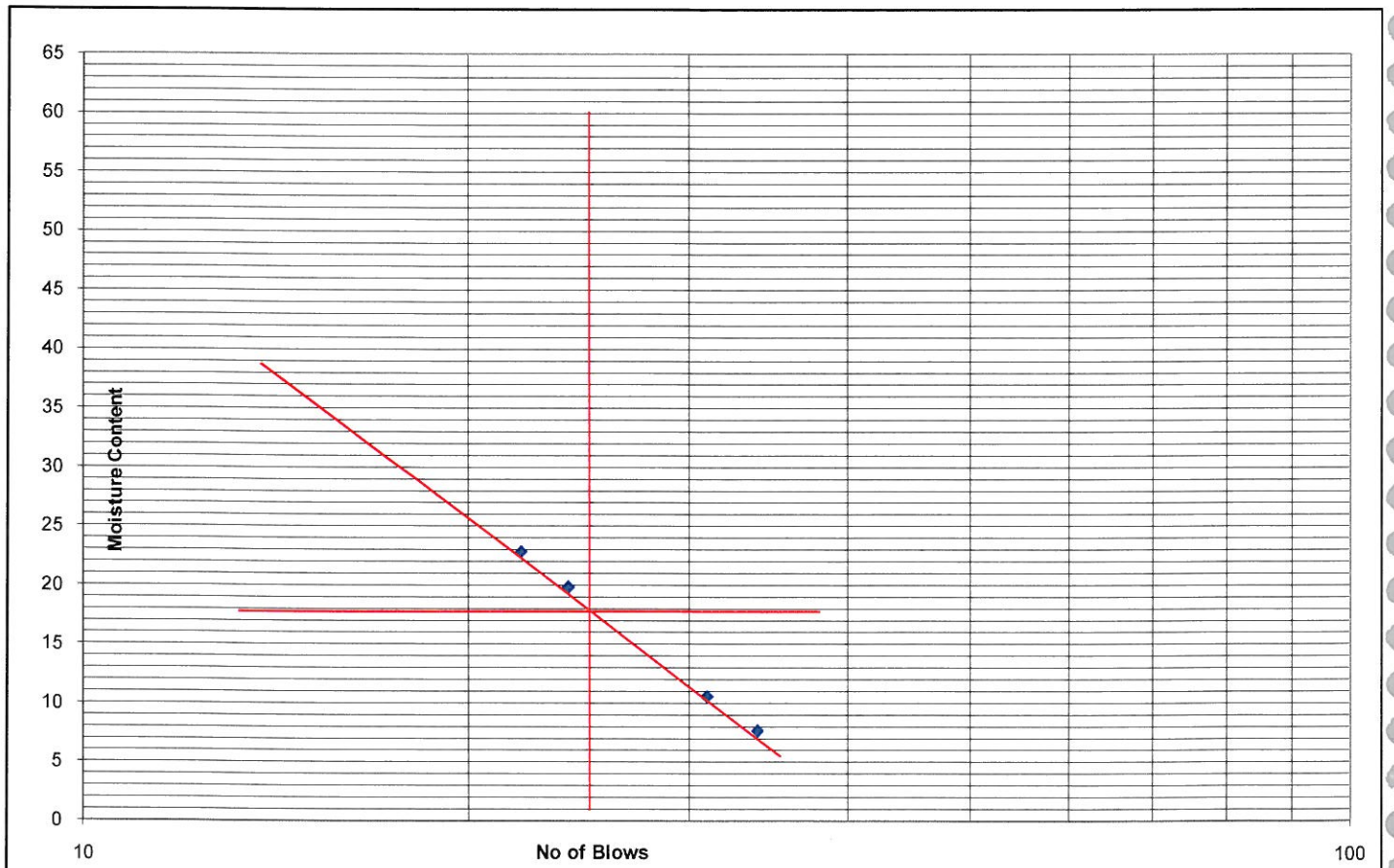
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 13.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-6(Yamuna River-Ambala)		
Depth	: 7.5m		

Number of Blows	31	34	22	24	Plastic Limit
Container No.	W1	W2	W3	W4	NP
Container Weight (gm) (W1)	33.21	34.52	35.61	36.28	
Container + Wt. of wet soil (gm) (W2)	82.56	93.07	97.44	97.35	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	4.73	4.16	11.50	10.10	
Wt. of oven dry soil (gm) (W3-W1)	44.63	54.40	50.33	50.97	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	10.59	7.64	22.85	19.81	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

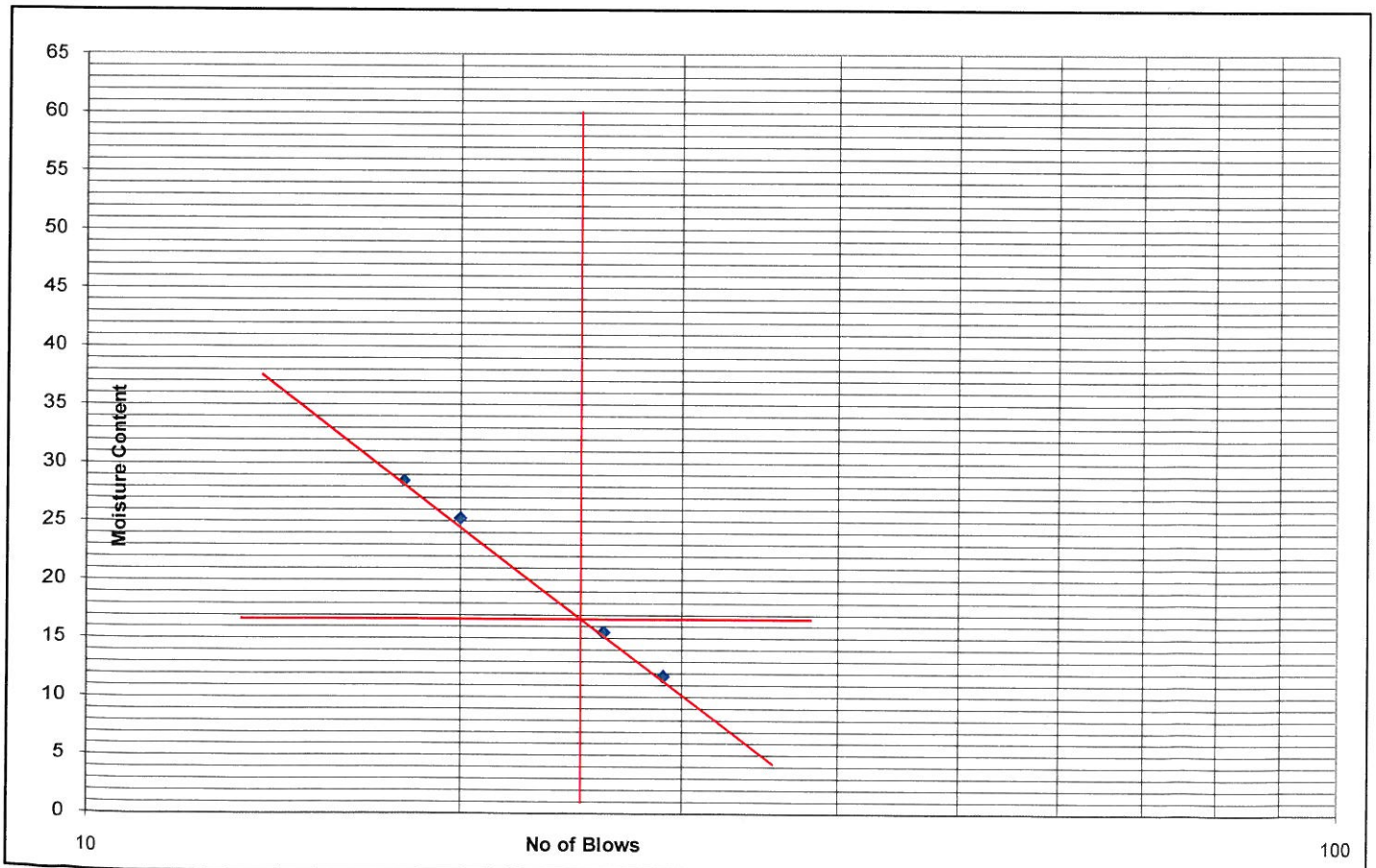
IS : 2720 (Part -5)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-6(Yamuna River-Ambala)
 Depth : 13.0m
 Date Of Testing : 13.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	29	26	20	18	Plastic Limit
Container No.	F1	F2	F3	F4	NP
Container Weight (gm) (W1)	35.55	34.12	36.52	33.29	
Container + Wt. of wet soil (gm) (W2)	82.82	97.42	98.42	102.64	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	4.98	8.50	12.47	15.39	
Wt. of oven dry soil (gm) (W3-W1)	42.29	54.80	49.42	53.96	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	11.78	15.52	25.24	28.51	

Result Summary

Liquid Limit (WL)	17	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

IS : 2720 (Part -5)

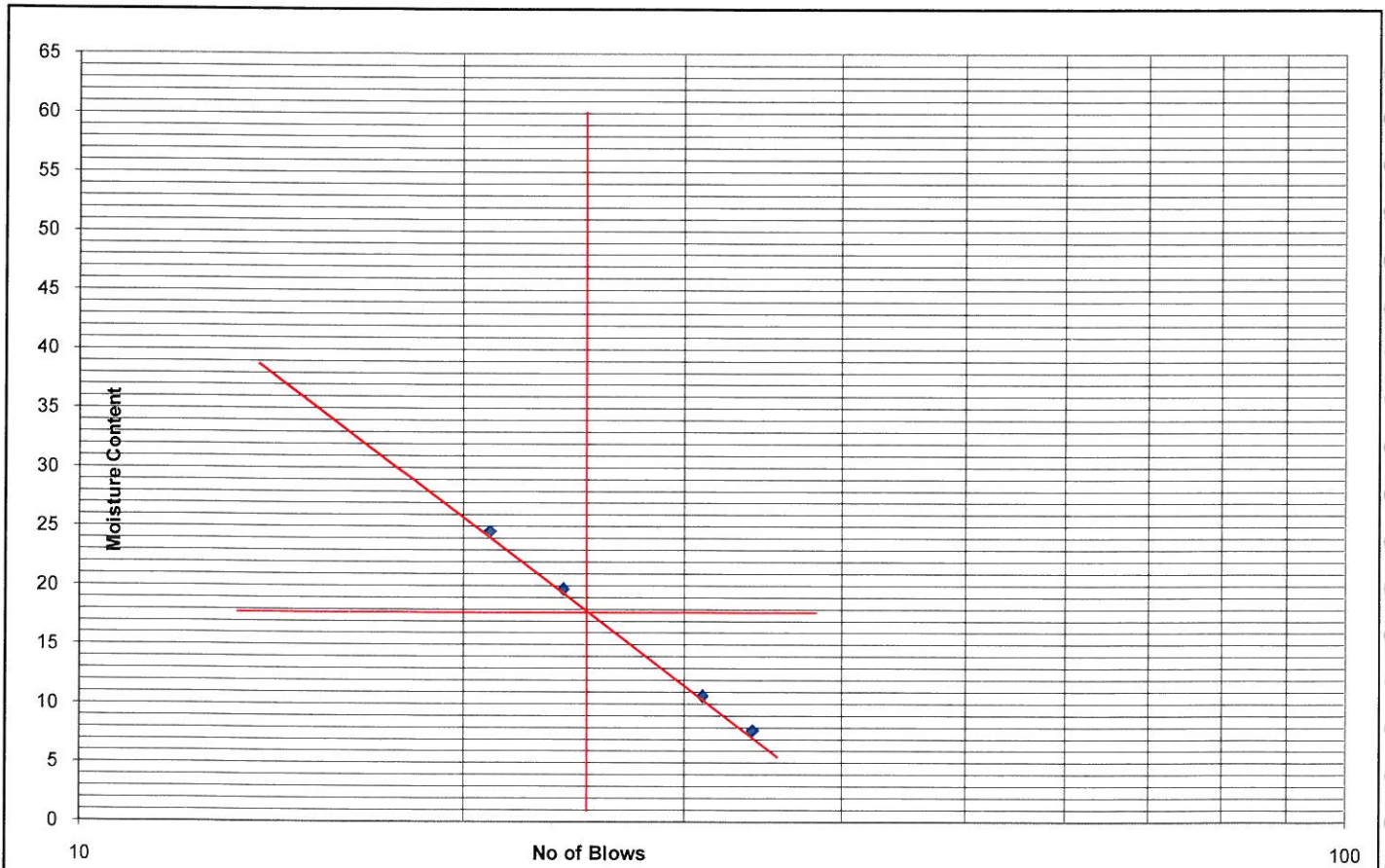
Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-6(Yamuna River-Ambala)
 Depth : 15.0m

Date Of Testing : 13.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	34	31	24	21	Plastic Limit
Container No.	Y1	Y2	Y3	Y4	NP
Container Weight (gm) (W1)	32.52	33.63	34.41	35.52	
Container + Wt. of wet soil (gm) (W2)	81.36	94.81	96.09	99.97	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	3.53	5.89	10.15	12.72	
Wt. of oven dry soil (gm) (W3-W1)	45.32	55.29	51.53	51.73	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	7.78	10.65	19.69	24.59	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

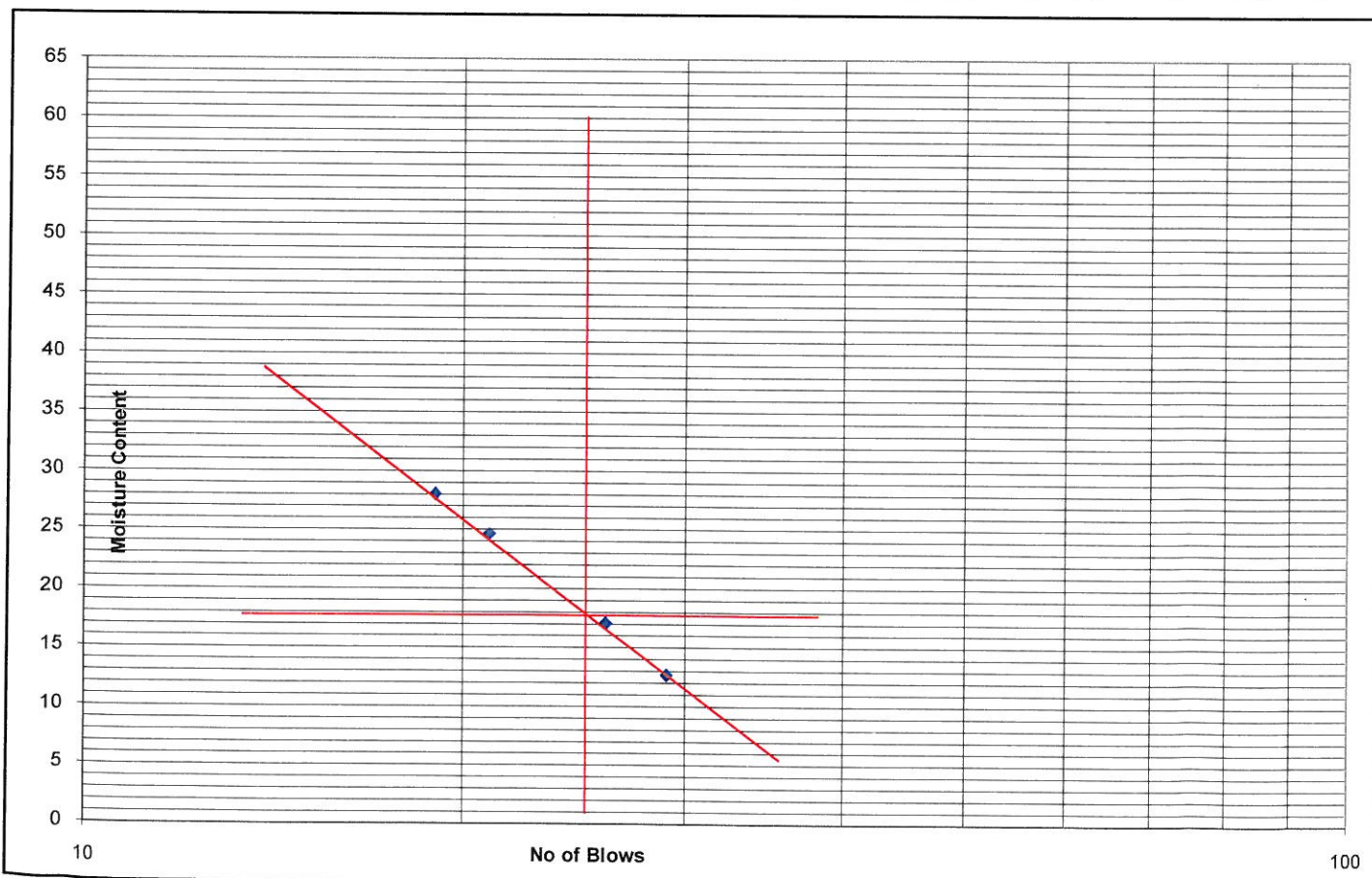
IS : 2720 (Part -5)

Client	: DFCC		Date Of Testing	: 13.05.2013
Project Name	: G.I For 3 Nos. Important Bridges		Sampled by	: Binayak Swain
Type of Sample	: SPT		Tested by	: D.Mohanty
Location	: BH-6(Yamuna River-Ambala)			
Depth	: 18.0m			

Number of Blows	26	29	19	21	Plastic Limit
Container No.	G1	G2	G3	G4	NP
Container Weight (gm) (W1)	31.25	34.25	33.15	31.2	
Container + Wt. of wet soil (gm) (W2)	85.79	95.85	100.73	101.07	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	7.95	6.93	14.79	13.82	
Wt. of oven dry soil (gm) (W3-W1)	46.59	54.67	52.79	56.05	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	17.06	12.68	28.01	24.65	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

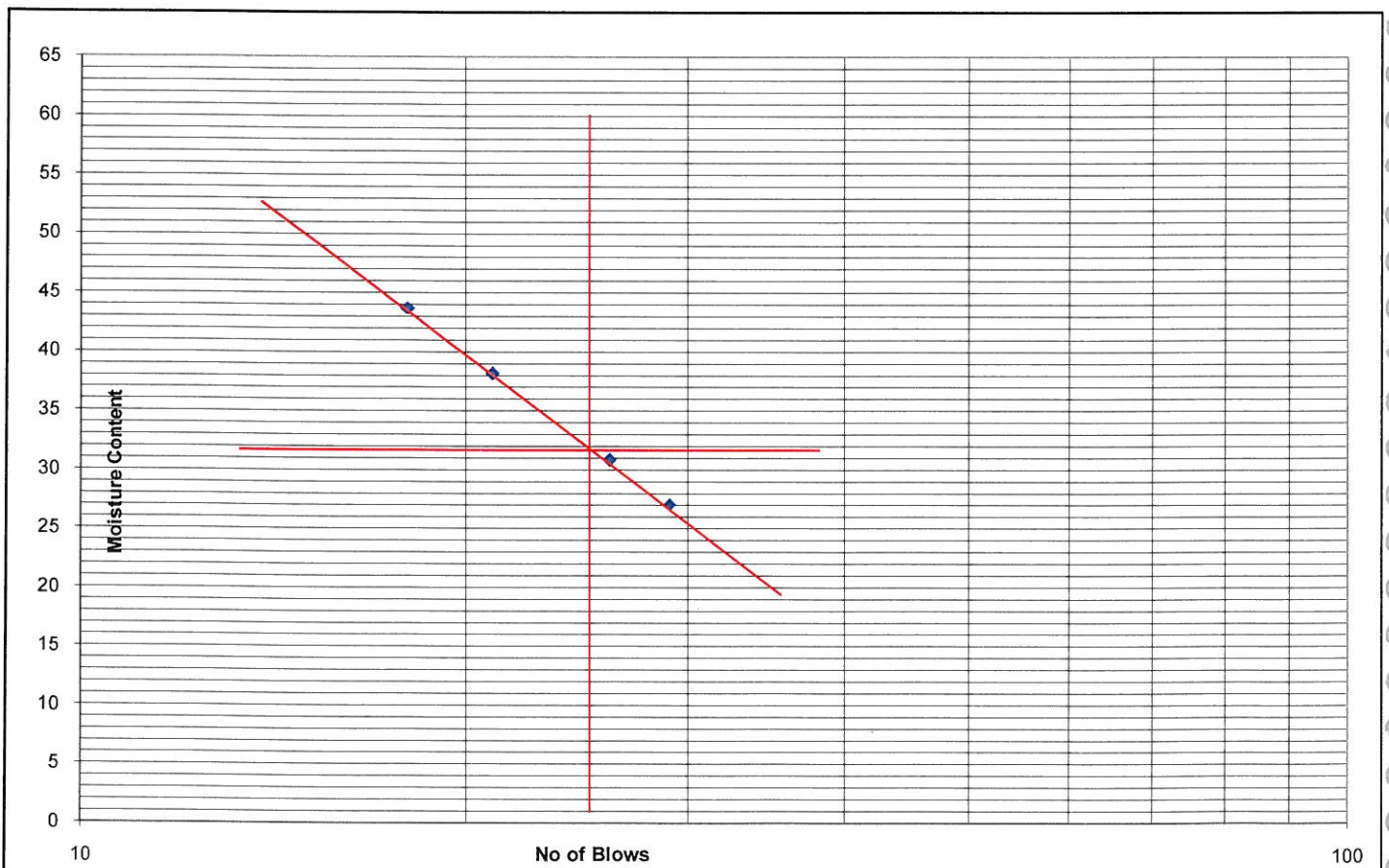
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 13.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-6(Yamuna River-Ambala)		
Depth	: 30.0m		

Number of Blows	29	26	21	18	Plastic Limit	
	T1	T2	T3	T4	T5	T6
Container No.						
Container Weight (gm) (W1)	32.51	36.63	34.48	35.59	31.25	30.42
Container + Wt. of wet soil (gm) (W2)	90.11	105.05	105.58	109.82	83.47	97.71
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	76.14	88.26
Wt. Of water (gm) (W2-W1)-(W3-W1)	12.27	16.13	19.64	22.57	7.33	9.45
Wt. of oven dry soil (gm) (W3-W1)	45.33	52.29	51.46	51.66	44.89	57.84
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	27.08	30.85	38.16	43.68	16.32	16.34

Result Summary

Liquid Limit (WL)	32	%
Plastic Limit (Wp)	16	%
Plasticity Index (Ip)	16	%



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

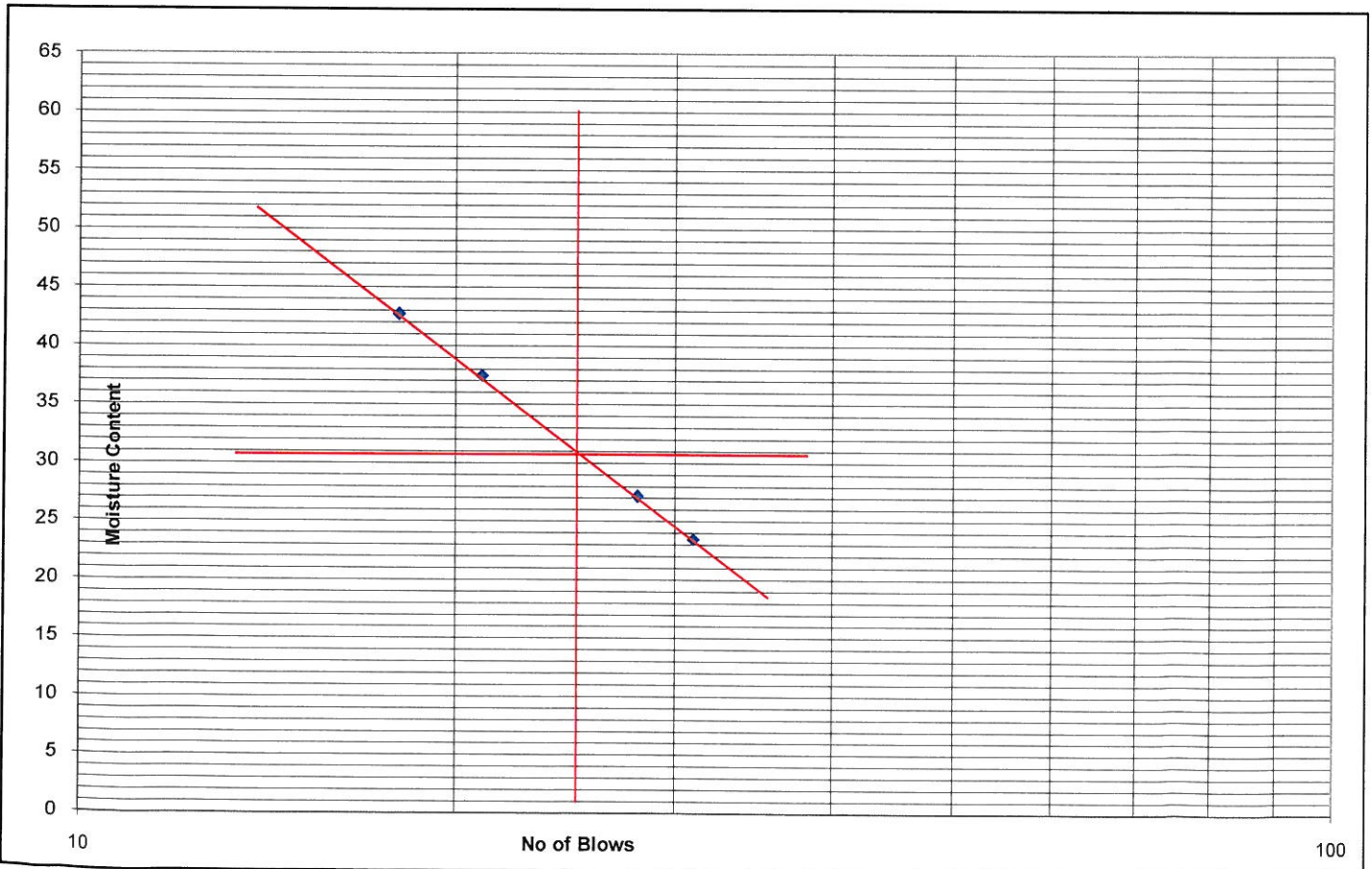
IS : 2720 (Part -5)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-6(Yamuna River-Ambala)
 Depth : 33.0m
 Date Of Testing : 13.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	28	31	21	18	Plastic Limit	
Container No.	S1	S2	S3	S4	S5	S6
Container Weight (gm) (W1)	31.25	32.26	34.18	30.52	35.59	36.52
Container + Wt. of wet soil (gm) (W2)	90.49	102.22	105.32	111.47	82.33	96.35
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	76.14	88.26
Wt. Of water (gm) (W2-W1)-(W3-W1)	12.65	13.30	19.38	24.22	6.19	8.09
Wt. of oven dry soil (gm) (W3-W1)	46.59	56.66	51.76	56.73	40.55	51.74
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	27.16	23.48	37.44	42.69	15.26	15.64

Result Summary

Liquid Limit (WL)	31	%
Plastic Limit (Wp)	15	%
Plasticity Index (Ip)	16	%



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

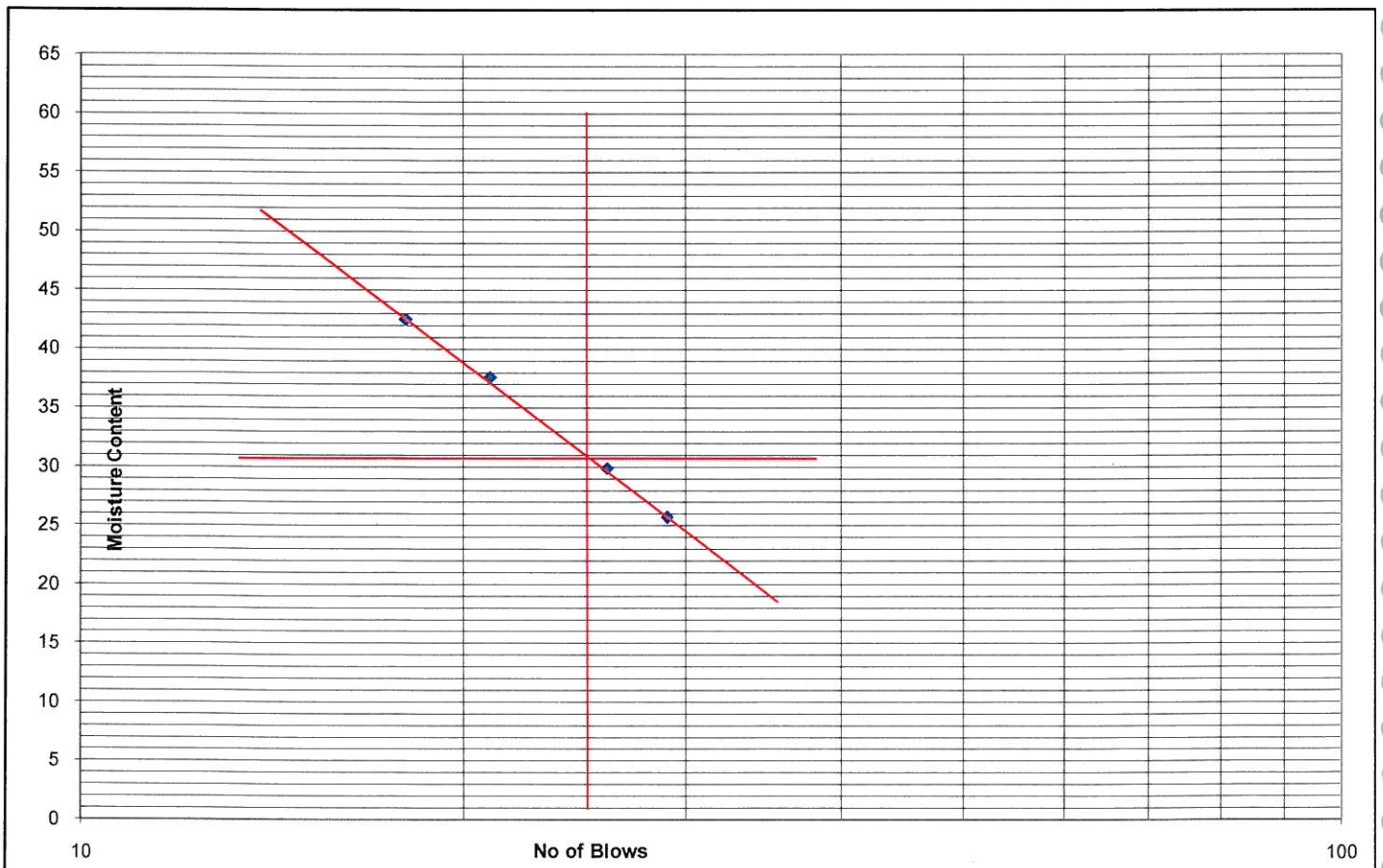
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 13.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-6(Yamuna River-Ambala)		
Depth	: 39.0m		

Number of Blows	26	29	21	18	Plastic Limit
Container No.	P1	P2	P3	P4	NP
Container Weight (gm) (W1)	32.48	33.36	34.41	30.29	
Container + Wt. of wet soil (gm) (W2)	91.39	103.22	105.32	111.47	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	13.55	14.30	19.38	24.22	
Wt. of oven dry soil (gm) (W3-W1)	45.36	55.56	51.53	56.96	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	29.88	25.74	37.61	42.52	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

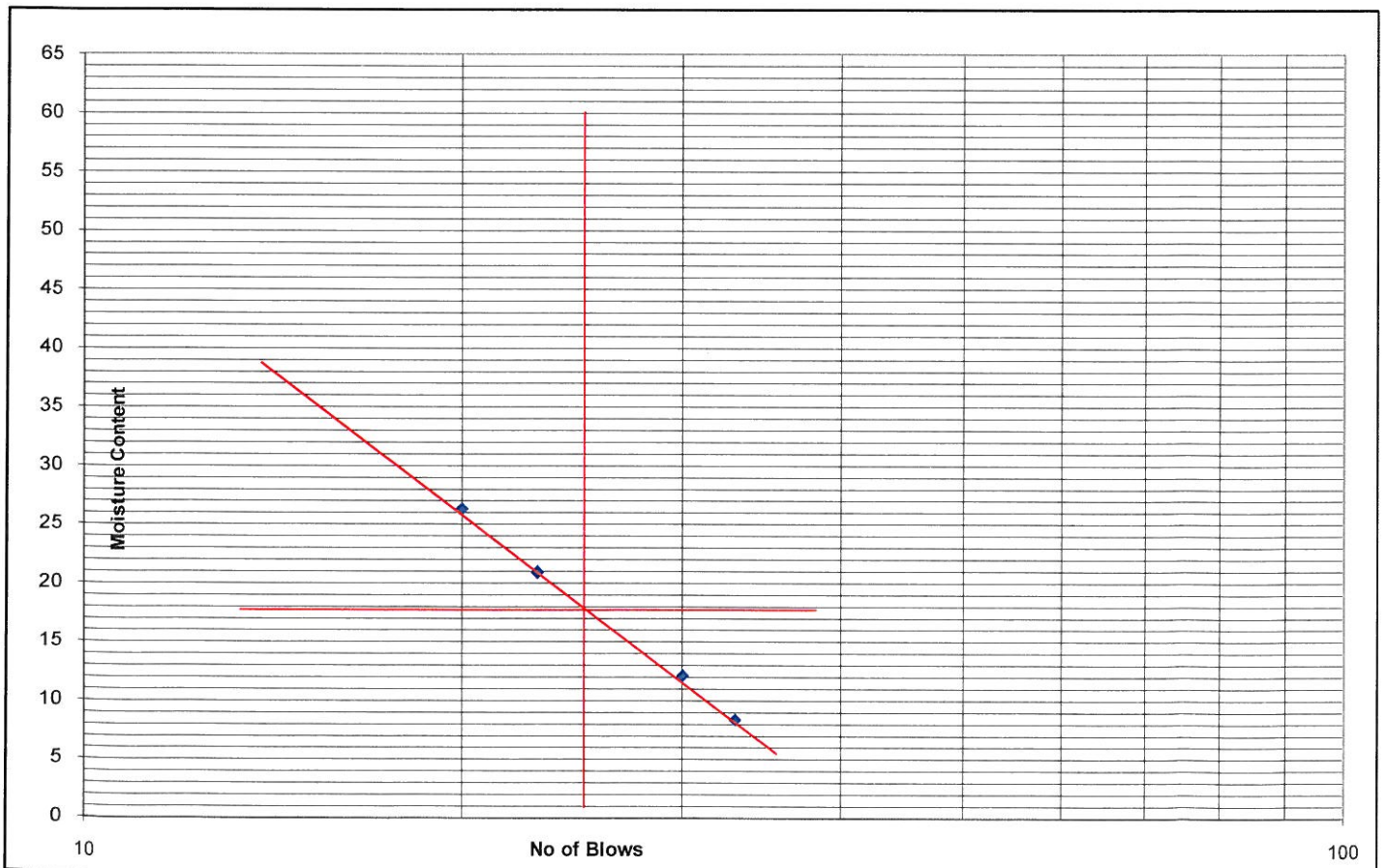
IS : 2720 (Part -5)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-6(Yamuna River-Ambala)
 Depth : 42.0m
 Date Of Testing : 13.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	33	30	23	20	Plastic Limit
Container No.	L1	L2	L3	L4	NP
Container Weight (gm) (W1)	32.12	31.1	34.45	33.26	
Container + Wt. of wet soil (gm) (W2)	81.69	95.96	96.72	101.48	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	3.85	7.04	10.77	14.23	
Wt. of oven dry soil (gm) (W3-W1)	45.72	57.82	51.49	53.99	
Moisture Content (%)= $(W2-W1)-(W3-W1)/(W3-W1) \times 100$	8.42	12.18	20.92	26.35	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



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N 3/91, IRC Village, Bhubaneswar

DIFFERENTIAL FREE SWELL INDEX OF SOIL (D.F.S.)

AS PER IS: 2720 (PART - 40)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Date Of Testing : 13.05.2013
Type of Sample : SPT
Tested by : D.Mohanty
Location : BH-6(Yamuna River-Ambala)
Sampled by : Binayak Swain
Depth : 33.0m
Weight of Sample : 10gm

SAMPLE NO.	VOLUME IN KEROSENE OIL V_k	VOLUME IN WATER V_d	SWELL ($V_d - V_k$)	SWELL INDEX = $\frac{(V_d - V_k)}{V_k} \times 100$ (%)	AVERAGE SWELL %	SPECIFIC LIMIT
1	10	12.5	2.50	25	18	50%
2	10	12.0	2.00	20		
3	10	11.0	1.00	10		

Remarks:

5085



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 13.05.2013
Location : BH-6(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 3.0m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.40	
3	Weight of bottle with soil and water W3 in gm	134.26	
4	Weight of bottle full of water W4 in gm	132.93	
5	Weight of dry soil (W2-W1)in gm	3.88	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.55	
7	Specific Gravity G = (5) / (6)	1.52	

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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 13.05.2013
Location : BH-6(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 4.5m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	36.45	
3	Weight of bottle with soil and water W3 in gm	136.52	
4	Weight of bottle full of water W4 in gm	134.83	
5	Weight of dry soil (W2-W1)in gm	4.93	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	3.24	
7	Specific Gravity G = (5) / (6)	1.52	

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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC

Project Name : G.I For 3 Nos. Important Bridges

Type of Sample : SPT

Date Of Testing : 13.05.2013

Location : BH-6(Yamuna River-Ambala)

Sampled by : Binayak Swain

Depth : 7.5m

Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.62	
3	Weight of bottle with soil and water W3 in gm	135.26	
4	Weight of bottle full of water W4 in gm	133.80	
5	Weight of dry soil (W2-W1)in gm	4.10	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.64	
7	Specific Gravity G = (5) / (6)	1.55	

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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 13.05.2013
Location : BH-6(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 15.5m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.26	
3	Weight of bottle with soil and water W3 in gm	134.41	
4	Weight of bottle full of water W4 in gm	133.04	
5	Weight of dry soil (W2-W1)in gm	3.74	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.37	
7	Specific Gravity G = (5) / (6)	1.58	

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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC

Project Name : G.I For 3 Nos. Important Bridges

Type of Sample : SPT

Date Of Testing : 13.05.2013

Location : BH-6(Yamuna River-Ambala)

Sampled by : Binayak Swain

Depth : 30.0m

Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	36.26	
3	Weight of bottle with soil and water W3 in gm	134.28	
4	Weight of bottle full of water W4 in gm	132.56	
5	Weight of dry soil (W2-W1)in gm	4.74	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	3.02	
7	Specific Gravity G = (5) / (6)	1.57	

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ARKI TECHNO CONSULTANTS (I) PVT. LTD.

N 3/91, IRC Village, Bhubaneswar

DETERMINATION OF BULK DENSITY & MOISTURE CONTENT OF SOIL SAMPLE

Sl No.	BH No.	Depth in m	Type of Sample	Date of Testing	Weight of Container in gm	Diameter of Sample in cm	Length of Sample in cm	Volume of Sample in cc	Weight of Container + Wet Soil in gm	Weight of Container + Dry soil in gm	Weight of Dry soil in gm	Weight of water in gm	Moisture Content in %	Bulk Density in gm/cc	Dry Density in gm/cc
1	BH-6(Yamuna River-Ambala)	1.5	SPT	13.05.2013	62.34	3.8	7	79.39	195.72	187.66	125.32	8.06	6.43	1.68	1.58
2		3.0	SPT	13.05.2013	61.82	3.8	7	79.39	201.55	191.63	129.81	9.92	7.64	1.76	1.64
3		4.5	SPT	13.05.2013	60.71	3.8	7	79.39	202.02	191.79	131.08	10.24	7.81	1.78	1.65
4		6.0	SPT	13.05.2013	63.49	3.8	7	79.39	204.80	194.28	130.79	10.53	8.05	1.78	1.65
5		15.0	SPT	13.05.2013	60.77	3.8	7	79.39	208.44	198.27	137.50	10.16	7.39	1.86	1.73
6		30.0	SPT	13.05.2013	64.84	3.8	7	79.39	221.24	196.75	131.91	24.48	18.56	1.97	1.66
7		33.0	SPT	13.05.2013	65.31	3.8	7	79.39	223.30	198.03	132.72	25.27	19.04	1.99	1.67

Client : DFCC

Project Name : G.I For 3 Nos. Important Bridges

Location : BH-6(Yamuna River-Ambala)

13001



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N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 1.5m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
Weight of oven dried sample after washing (gm) :- 87.57

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.84	1.84	1.84	98.16
2.00	33.36	33.36	35.20	64.80
0.425	29.56	29.56	64.76	35.24
0.075	22.81	22.81	87.57	12.43
Total	100.00			

Gravel Content (%)= 1.84
Sand Content (%) = 85.73 Silt and clay % 12.43

Remarks :-

5092

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 3.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 85.77

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	2.26	2.26	2.26	97.74
2.00	32.52	32.52	34.78	65.22
0.425	28.62	28.62	63.40	36.60
0.075	22.37	22.37	85.77	14.23
Total	100.00			

Gravel Content (%)= 2.26
 Sand Content (%) = 83.51 Silt and clay % 14.23

Remarks :-

5093

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 4.5m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 86.72

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.98	1.98	1.98	98.02
2.00	33.11	33.11	35.09	64.91
0.425	29.26	29.26	64.35	35.65
0.075	22.37	22.37	86.72	13.28
Total	100.00			

Gravel Content (%)= 1.98
 Sand Content (%) = 84.74 Silt and clay % 13.28

Remarks :-

5094

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 6.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 83.97

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	2.41	2.41	2.41	97.59
2.00	31.25	31.25	33.66	66.34
0.425	28.65	28.65	62.31	37.69
0.075	21.66	21.66	83.97	16.03
Total	100.00			

Gravel Content (%)= 2.41

Sand Content (%) = 81.56 Silt and clay % 16.03

Remarks :-

5005



Arki Techno Consultants (India) Pvt. Ltd

N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 9.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 82.07

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	2.85	2.85	2.85	97.15
2.00	31.25	31.25	34.10	65.90
0.425	27.52	27.52	61.62	38.38
0.075	20.45	20.45	82.07	17.93
Total	100.00			

Gravel Content (%)= 2.85
 Sand Content (%) = 79.22 Silt and clay % 17.93

Remarks :-

5096



Arki Techno Consultants (India) Pvt. Ltd
N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 12.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 91.27

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	14.71	14.71	14.71	85.29
2.00	30.52	30.52	45.23	54.77
0.425	25.56	25.56	70.79	29.21
0.075	20.48	20.48	91.27	8.73
Total	100.00			

Gravel Content (%)= 14.71
Sand Content (%) = 76.56 Silt and clay % 8.73

Remarks :-

- 5097 -

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 15.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 94.80

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	16.28	16.28	16.28	83.72
2.00	31.29	31.29	47.57	52.43
0.425	26.76	26.76	74.33	25.67
0.075	20.48	20.48	94.81	5.19
Total	100.00			

Gravel Content (%)= 16.28
 Sand Content (%) = 78.53 Silt and clay % 5.19

Remarks :-

- 2005098 -



Arki Techno Consultants (India) Pvt. Ltd

N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 18.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
Weight of oven dried sample after washing (gm) :- 84.89

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	3.46	3.46	3.46	96.54
2.00	31.85	31.85	35.31	64.69
0.425	27.46	27.46	62.77	37.23
0.075	22.12	22.12	84.89	15.11
Total	100.00			

Gravel Content (%)= 3.46
Sand Content (%) = 81.43 Silt and clay % 15.11

Remarks :-

5000

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 21.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 85.32

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.81	1.81	1.81	98.19
2.00	32.59	32.59	34.40	65.60
0.425	28.36	28.36	62.76	37.24
0.075	22.56	22.56	85.32	14.68
Total	100.00			

Gravel Content (%)= 1.81
 Sand Content (%) = 83.51 Silt and clay % 14.68

Remarks :-

5100



Arki Techno Consultants (India) Pvt. Ltd

N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 24.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 94.17

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	12.44	12.44	12.44	87.56
2.00	32.74	32.74	45.18	54.82
0.425	28.21	28.21	73.39	26.61
0.075	20.78	20.78	94.17	5.83
Total	100.00			

Gravel Content (%)= 12.44
Sand Content (%) = 81.73 Silt and clay % 5.83

Remarks :-

5101



Arki Techno Consultants (India) Pvt. Ltd
N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 33.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 28.28

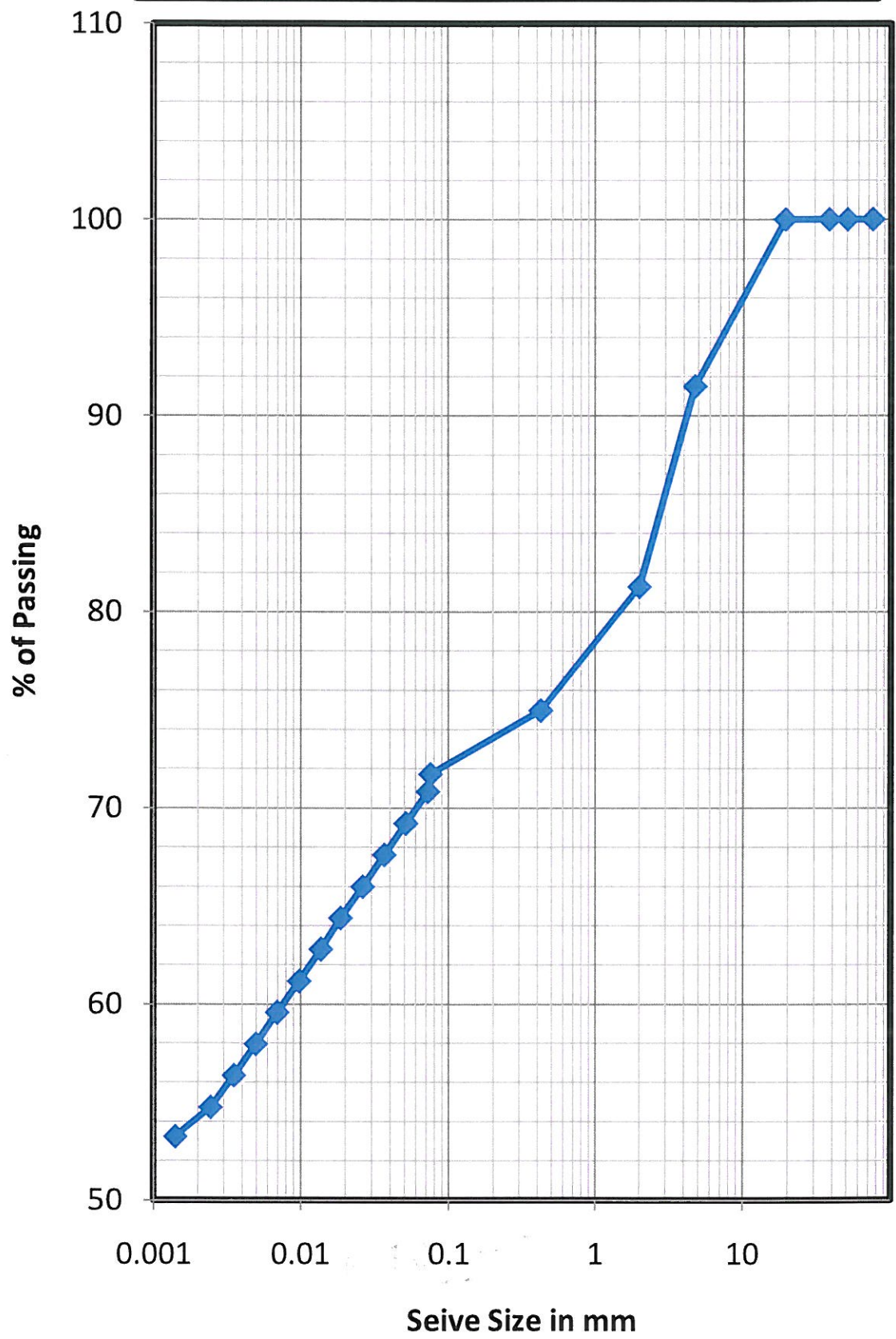
Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	8.51	8.51	8.51	91.49
2.00	10.20	10.20	18.71	81.29
0.425	6.32	6.32	25.03	74.97
0.075	3.25	3.25	28.28	71.72
Total	100.00			

Gravel Content (%)= 8.51
 Sand Content (%) = 19.77 Silt and clay % 71.72

Remarks :-

- 15102 -

Grain Size Distribution Curve BH-7,D-33.0m



5103



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GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 36.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 90.21

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	11.28	11.28	11.28	88.72
2.00	31.42	31.42	42.70	57.30
0.425	25.98	25.98	68.68	31.32
0.075	21.53	21.53	90.21	9.79
Total	100.00			

Gravel Content (%)= 11.28
 Sand Content (%) = 78.93 Silt and clay % 9.79

Remarks :-

510A



Arki Techno Consultants (India) Pvt. Ltd
N 3/91, IRC Village, Bhubaneswar

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 42.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 91.29

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	3.76	3.76	3.76	96.24
2.00	34.58	34.58	38.34	61.66
0.425	29.65	29.65	67.99	32.01
0.075	23.30	23.30	91.29	8.71
Total	100.00			

Gravel Content (%)= 3.76
Sand Content (%) = 87.53 Silt and clay % 8.71

Remarks :-

5105



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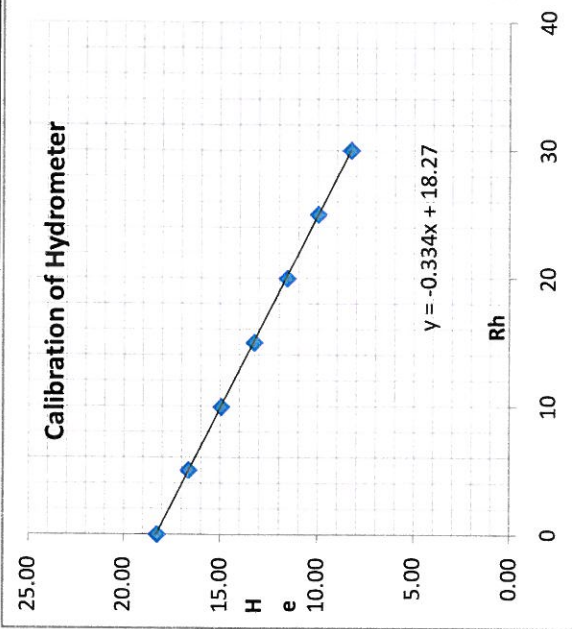
GRAIN SIZE ANALYSIS OF SOIL - HYDROMETER METHOD

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-7(Yamuna River- Ambala)
 Sampled by : Binayak Swain
 Depth : 33.0m
 Date of Testing : 17.05.2013
 Tested by : D.Mohanty

CALIBRATION OF HYDROMETER	
(Rh)	He (cm)
30	8.25
25	9.95
20	11.55
15	13.25
10	14.95
5	16.65
0	18.25
-5	19.95

Percentage of 75 micron passing (from sieve analysis) 71.72
 Mass of dry soil passing 2mm sieve taken (gm) 50
 Mass of dry soil retained on 75micron sieve (gm) 14.1
 Mass of dry soil passing 75 micron Wh (gm) 35.9
 Specific gravity of soil grains, Gs 2.64
 Top Meniscus reading on hydrometer stem 2.0
 Bottom meniscus reading on hydrometer stem 2.5
 Meniscus correction, Cm = + [(VII) - (VI)] 0.5
 Hydrometer No 1
 Volume of Hydrometer V (cm3) 50
 Height of bulb (h) in cm 16.5
 Sedimentation Jar No 1
 Cross sectional area of jar (A) in cm2 35.714

Rh = hydrometer Reading
 H = height corresponding to Rh
 He = Effective height = H + 0.5*(h - V/A)



Time	Elapsed Time (min)	Hydrometer Reading (Rh)	Temperature (o C)	Composite Correction +/- C	Effective depth h (cm)	Rc1 = Rh + Cm	Sqrt (h/t)	Viscosity (gm/cm2)	Factor M	Particle 'C' (cm) (8) x (10)	Rc2 = Rh + C (3) + (5)	Factor N	% Finner w.r.t Wd F (12) x (13)	% Finner w.r.t total mass (14) x (1)/100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
10.30	0.5	24.00	29	-2.0	10.25	24.50	0.585	0.000008341	0.012352284	0.00722160	22.00	4.489	98.76	70.83
	1	23.50	29	-2.0	10.42	24.00	0.417	0.000008341	0.012352284	0.00514786	21.50	4.489	96.51	69.22
	2	23.00	29	-2.0	10.59	23.50	0.297	0.000008341	0.012352284	0.00366913	21.00	4.489	94.27	67.61
	4	22.50	29	-2.0	10.76	23.00	0.212	0.000008341	0.012352284	0.00261485	20.50	4.489	92.02	66.00
	8	22.00	29	-2.0	10.92	22.50	0.151	0.000008341	0.012352284	0.00186328	20.00	4.489	89.78	64.39
	15	21.50	29	-2.0	11.09	22.00	0.111	0.000008341	0.012352284	0.00137111	19.50	4.489	87.54	62.78
	30	21.00	29	-2.0	11.26	21.50	0.079	0.000008341	0.012352284	0.00097679	19.00	4.489	85.29	61.17
	60	20.50	29	-2.0	11.42	21.00	0.056	0.000008341	0.012352284	0.00069580	18.50	4.489	83.05	59.56
	120	20.00	29	-2.0	11.59	20.50	0.040	0.000008341	0.012352284	0.00049559	18.00	4.489	80.80	57.95
	240	19.50	29	-2.0	11.76	20.00	0.029	0.000008341	0.012352284	0.00035295	17.50	4.489	78.56	56.34
	480	19.00	32	-2.0	11.92	19.50	0.020	0.000007821	0.011961022	0.00024338	17.00	4.489	76.31	54.73
	1440	18.54	32	-2.0	12.08	19.04	0.012	0.000007821	0.011961022	0.000141424	16.54	4.489	74.23	53.24

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

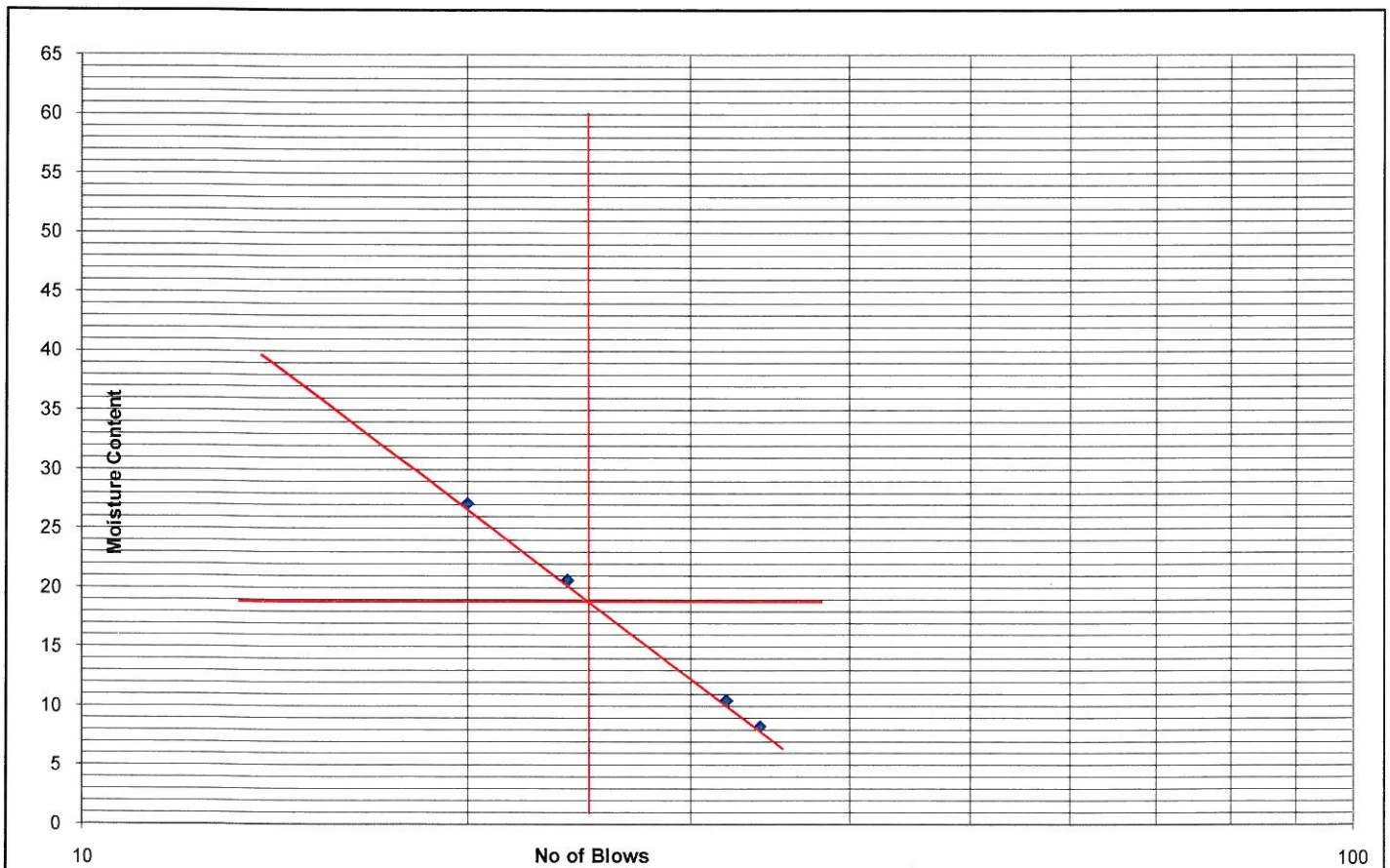
IS : 2720 (Part -5)

Client	: DFCC		Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by		: Binayak Swain
Type of Sample	: SPT	Tested by		: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)			
Depth	: 1.5m			

Number of Blows	34	32	24	20	Plastic Limit
Container No.	F1	F2	F3	F4	
Container Weight (gm) (W1)	30.25	33.24	34.18	32.74	
Container + Wt. of wet soil (gm) (W2)	81.80	94.74	96.61	102.04	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	3.96	5.82	10.67	14.79	
Wt. of oven dry soil (gm) (W3-W1)	47.59	55.68	51.76	54.51	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	8.32	10.45	20.61	27.13	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5107

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

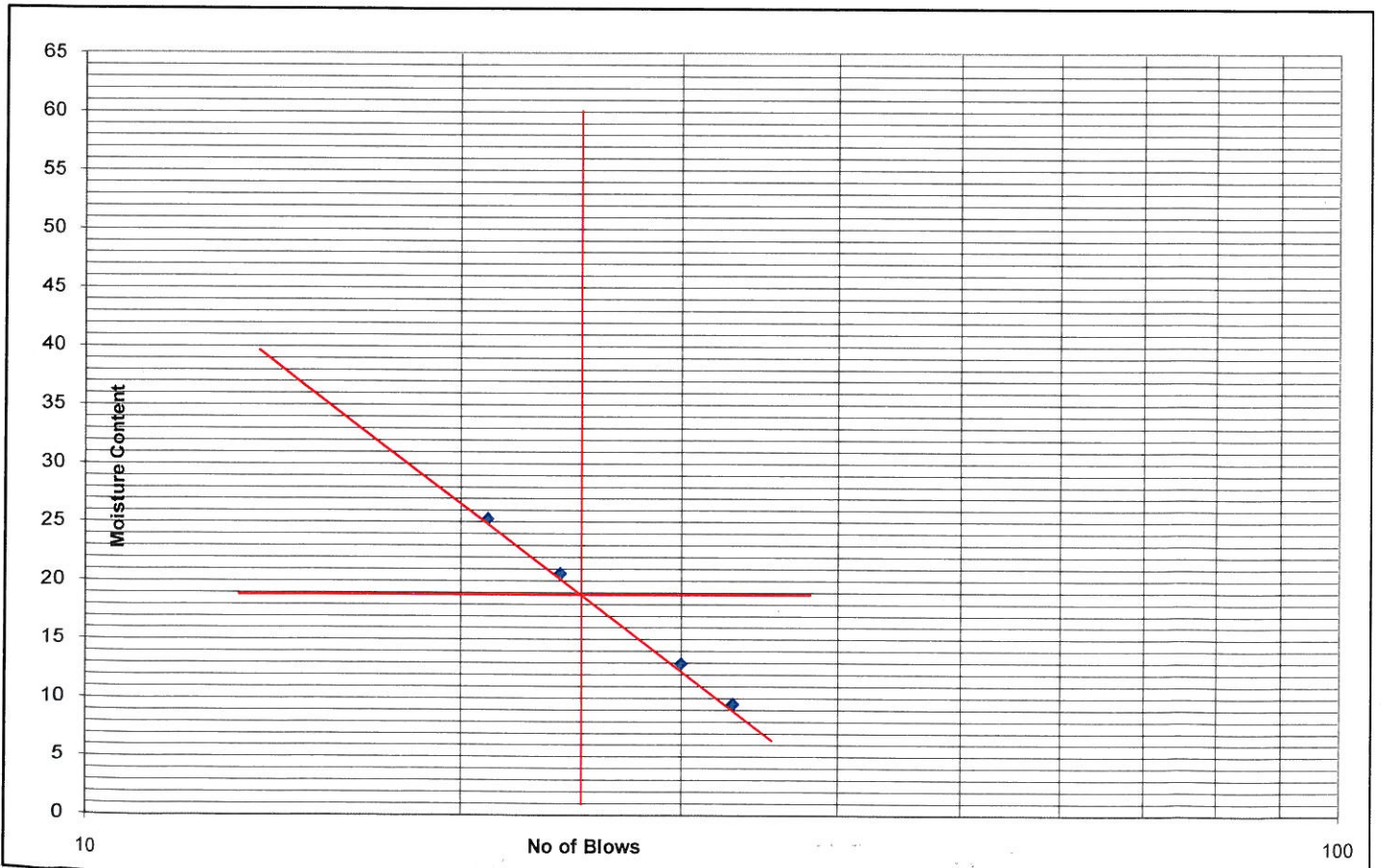
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)		
Depth	: 3.0m		

Number of Blows	30	33	21	24	Plastic Limit
Container No.	V1	V2	V3	V4	
Container Weight (gm) (W1)	31.52	32.48	33.58	34.61	
Container + Wt. of wet soil (gm) (W2)	83.85	94.27	99.16	98.09	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	6.01	5.36	13.22	10.84	
Wt. of oven dry soil (gm) (W3-W1)	46.32	56.44	52.36	52.64	
Moisture Content (%)= $[(W2-W1)-(W3-W1)]/(W3-W1) \times 100$	12.97	9.49	25.24	20.59	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5108

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

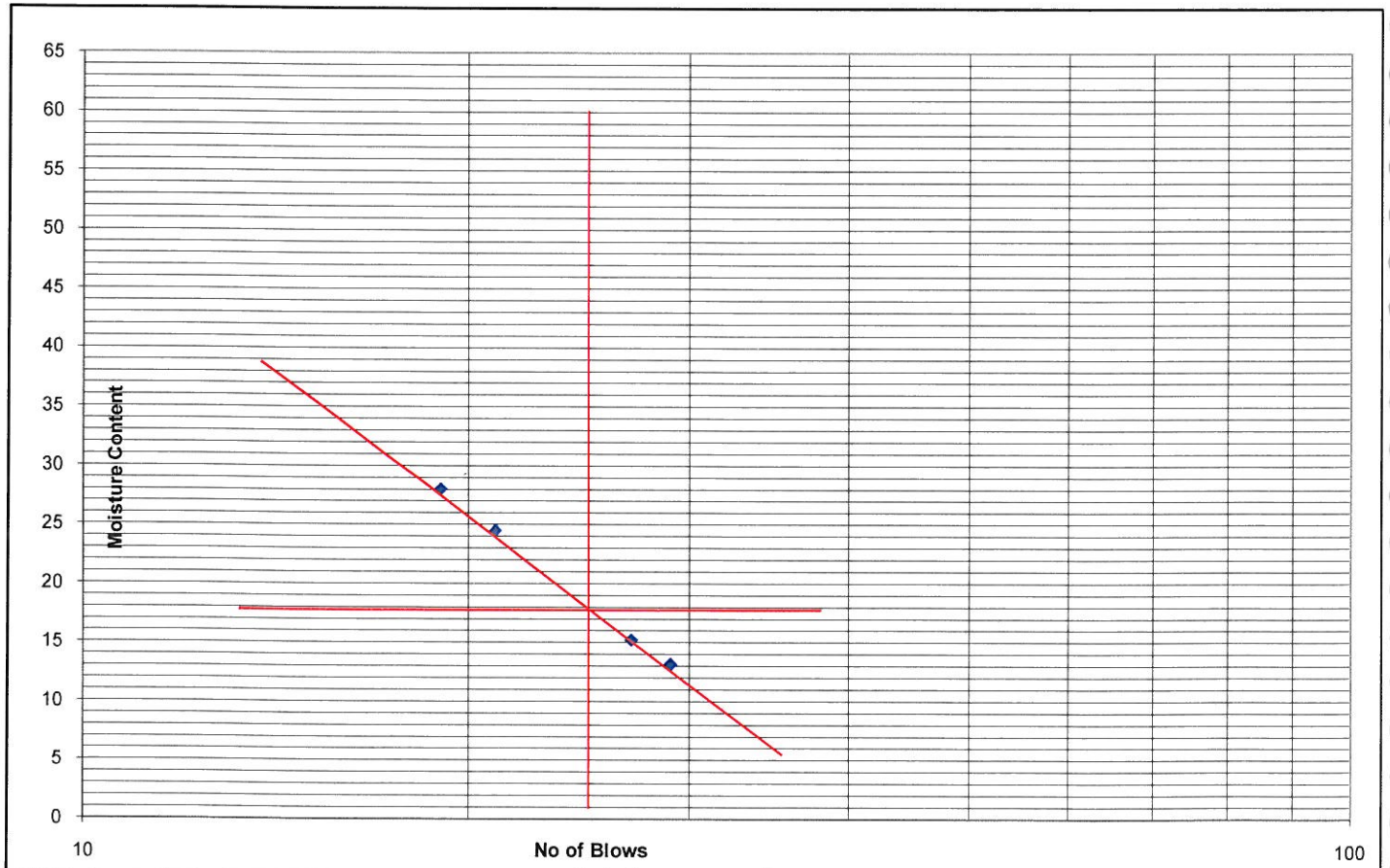
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)		
Depth	: 4.5m		

Number of Blows	29	27	19	21	Plastic Limit
Container No.	B1	B2	B3	B4	
Container Weight (gm) (W1)	32.2	34.15	33.36	31.28	
Container + Wt. of wet soil (gm) (W2)	83.85	97.26	100.68	100.94	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	6.01	8.35	14.74	13.69	
Wt. of oven dry soil (gm) (W3-W1)	45.64	54.77	52.58	55.97	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	13.16	15.24	28.03	24.45	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5109



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

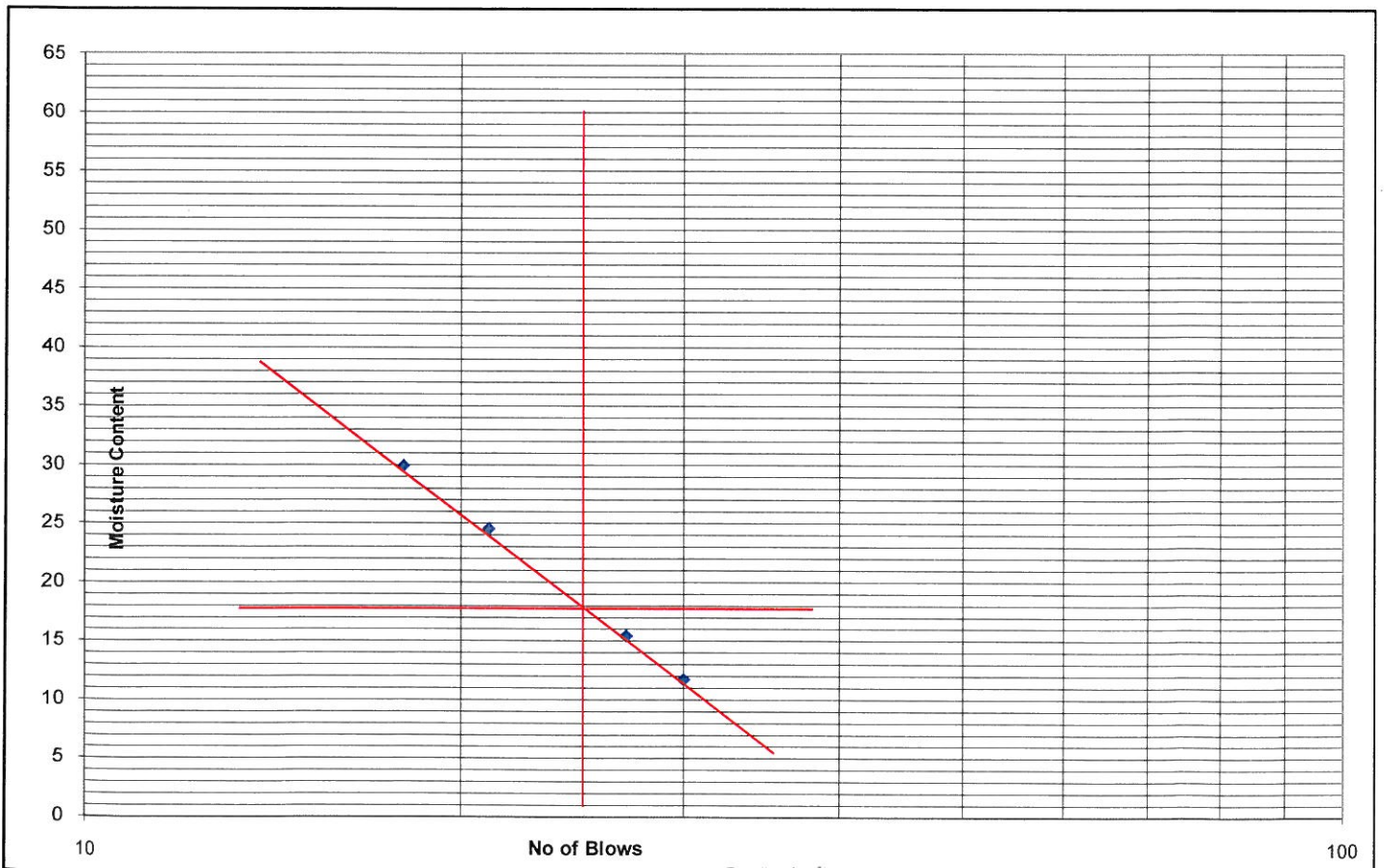
IS : 2720 (Part -5)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-7(Yamuna River-Ambala)
 Depth : 6.0m
 Date Of Testing : 16.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	30	27	21	18	Plastic Limit
Container No.	K1	K2	K3	K4	
Container Weight (gm) (W1)	31.41	33.25	34.51	30.85	
Container + Wt. of wet soil (gm) (W2)	83.29	97.52	98.55	104.14	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	5.46	8.60	12.61	16.89	
Wt. of oven dry soil (gm) (W3-W1)	46.43	55.67	51.43	56.40	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	11.75	15.45	24.51	29.94	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5110

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

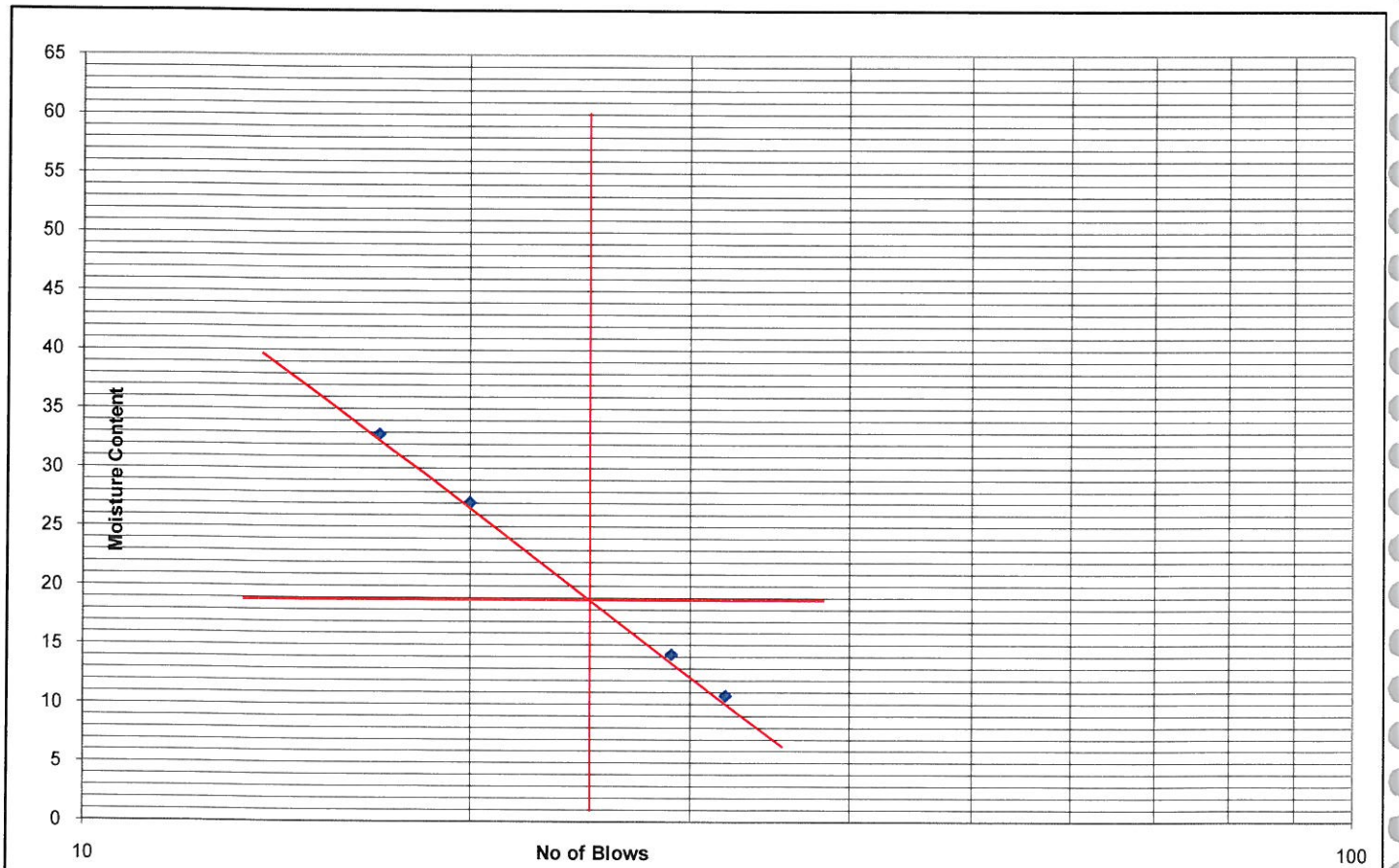
IS : 2720 (Part -5)

Client	:	DFCC	Date Of Testing	:	16.05.2013
Project Name	:	G.I For 3 Nos. Important Bridges	Sampled by	:	Binayak Swain
Type of Sample	:	SPT	Tested by	:	D.Mohanty
Location	:	BH-7(Yamuna River-Ambala)			
Depth	:	9.0m			

Number of Blows	32	29	17	20	Plastic Limit
Container No.	N1	N2	N3	N4	
Container Weight (gm) (W1)	34.15	33.63	35.12	36.52	
Container + Wt. of wet soil (gm) (W2)	82.53	96.78	102.63	100.98	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	87.25	
Wt. Of water (gm) (W2-W1)-(W3-W1)	4.70	7.87	16.69	13.72	
Wt. of oven dry soil (gm) (W3-W1)	43.69	55.29	50.82	50.73	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	10.75	14.23	32.84	27.05	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5111

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

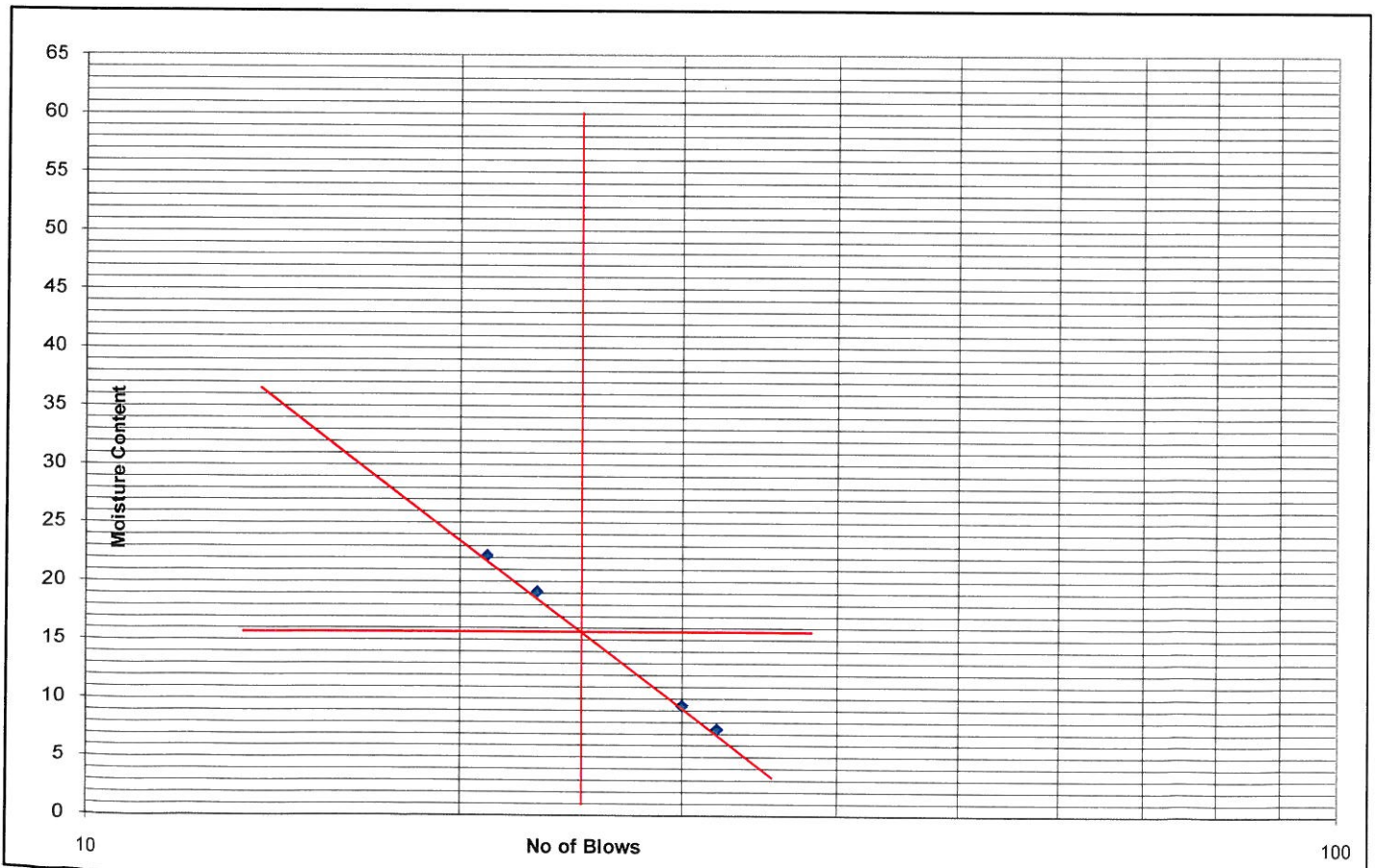
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)		
Depth	: 12.0m		

Number of Blows	30	32	21	23	Plastic Limit
Container No.	D1	D2	D3	D4	
Container Weight (gm) (W1)	30.52	31.26	32.41	33.58	
Container + Wt. of wet soil (gm) (W2)	82.30	93.20	97.84	100.98	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	4.46	4.28	11.90	10.83	
Wt. of oven dry soil (gm) (W3-W1)	47.32	57.66	53.53	56.57	
Moisture Content (%)= $[(W2-W1)-(W3-W1)]/(W3-W1) \times 100$	9.43	7.42	22.22	19.14	

Result Summary

Liquid Limit (WL)	16	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5112

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

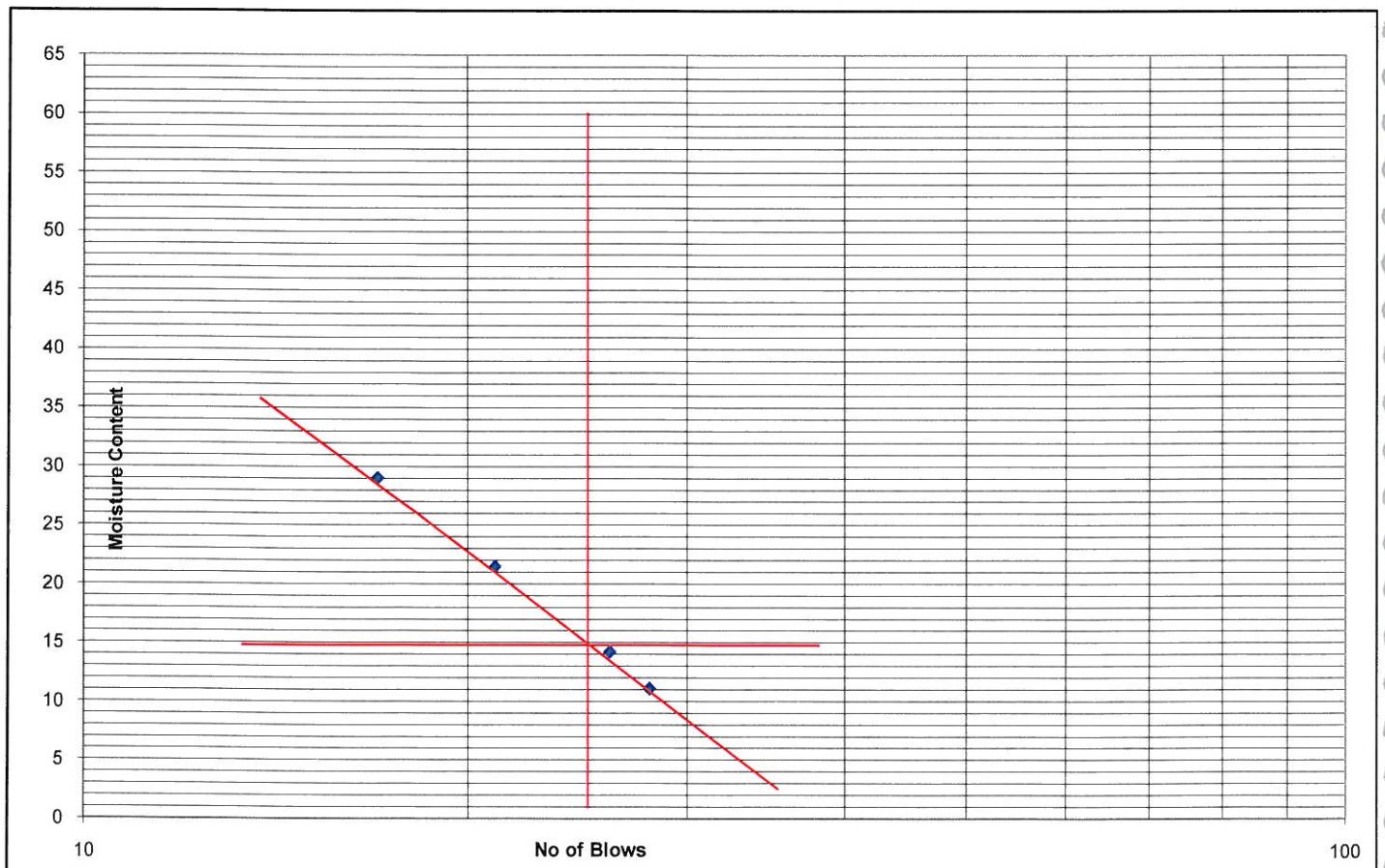
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)		
Depth	: 15.0m		

Number of Blows	26	28	17	21	Plastic Limit
Container No.	Z1	Z2	Z3	Z4	
Container Weight (gm) (W1)	34.15	33.63	32.74	31.1	
Container + Wt. of wet soil (gm) (W2)	84.05	95.04	101.38	102.82	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	6.21	6.13	15.44	12.67	
Wt. of oven dry soil (gm) (W3-W1)	43.69	55.29	53.20	59.05	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	14.21	11.08	29.02	21.46	

Result Summary

Liquid Limit (WL)	15	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5113

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

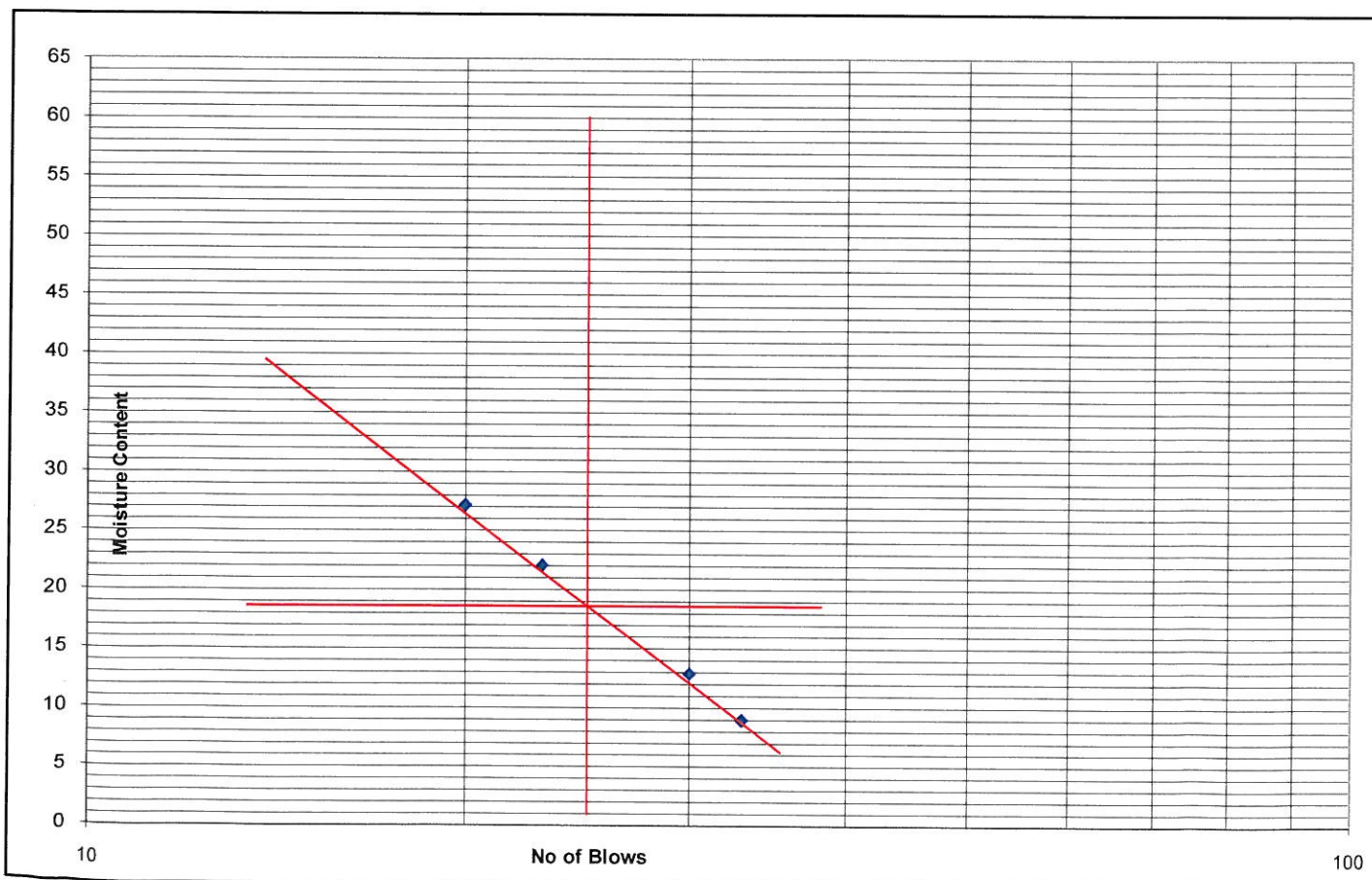
IS : 2720 (Part -5)

Client	: DFCC		Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges		Sampled by	: Binayak Swain
Type of Sample	: SPT		Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)			
Depth	: 18.0m			

Number of Blows	30	33	20	23	Plastic Limit
Container No.	C1	C2	C3	C4	
Container Weight (gm) (W1)	31.24	34.15	33.52	32.62	
Container + Wt. of wet soil (gm) (W2)	83.85	93.84	100.18	102.82	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	6.02	4.92	14.23	12.67	
Wt. of oven dry soil (gm) (W3-W1)	46.60	54.77	52.42	57.53	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	12.91	8.98	27.15	22.03	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5114

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

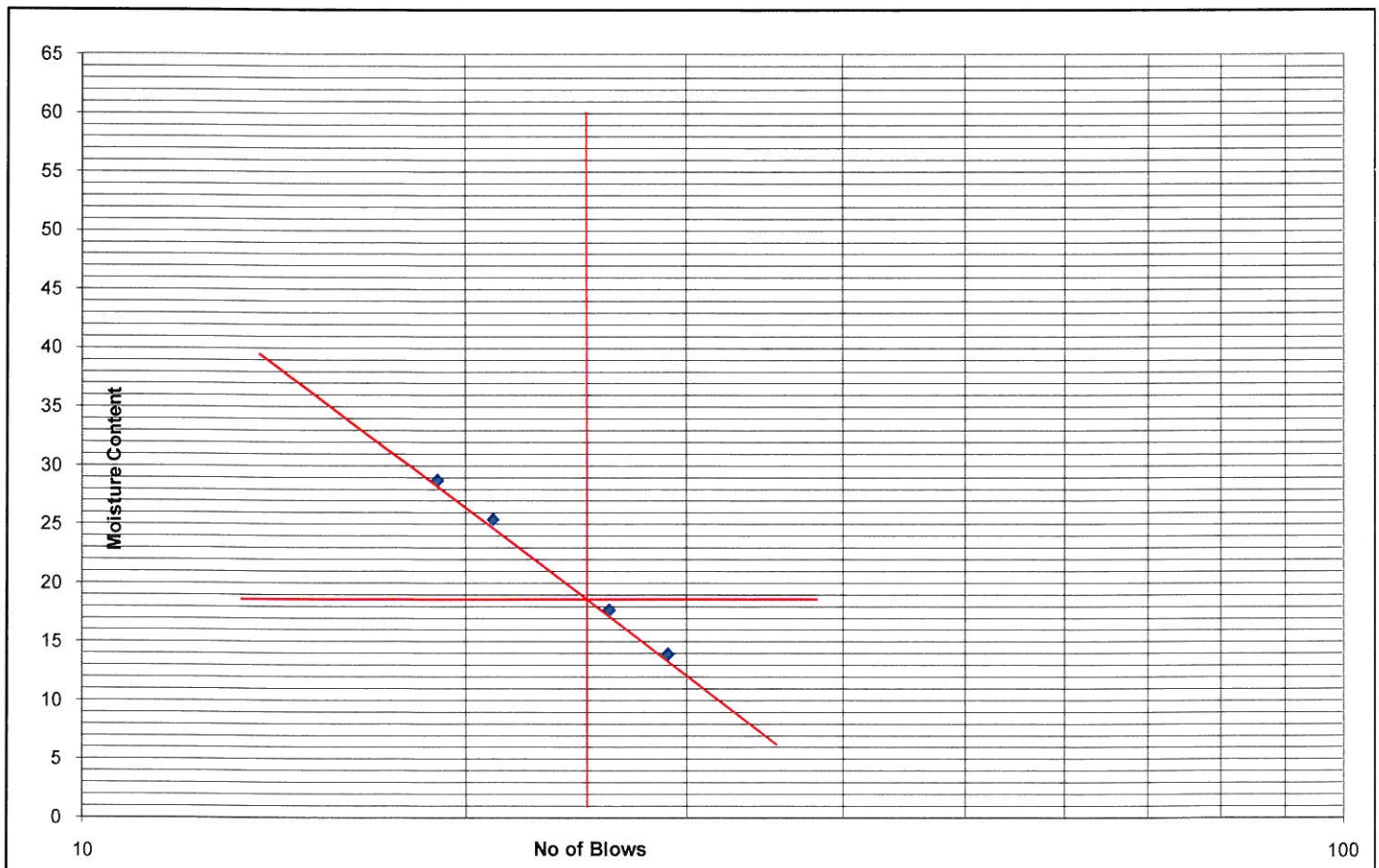
IS : 2720 (Part -5)

Client	: DFCC		Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges		Sampled by	: Binayak Swain
Type of Sample	: SPT		Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)			
Depth	: 21.0m			

Number of Blows	26	29	21	19	Plastic Limit
Container No.	Q1	Q2	Q3	Q4	
Container Weight (gm) (W1)	33.32	31.15	34.52	32.22	
Container + Wt. of wet soil (gm) (W2)	85.72	96.98	99.01	106.80	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	7.88	8.06	13.07	16.65	
Wt. of oven dry soil (gm) (W3-W1)	44.52	57.77	51.42	57.93	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	17.71	13.95	25.41	28.75	

Result Summary

Liquid Limit (WL)	19	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5110

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

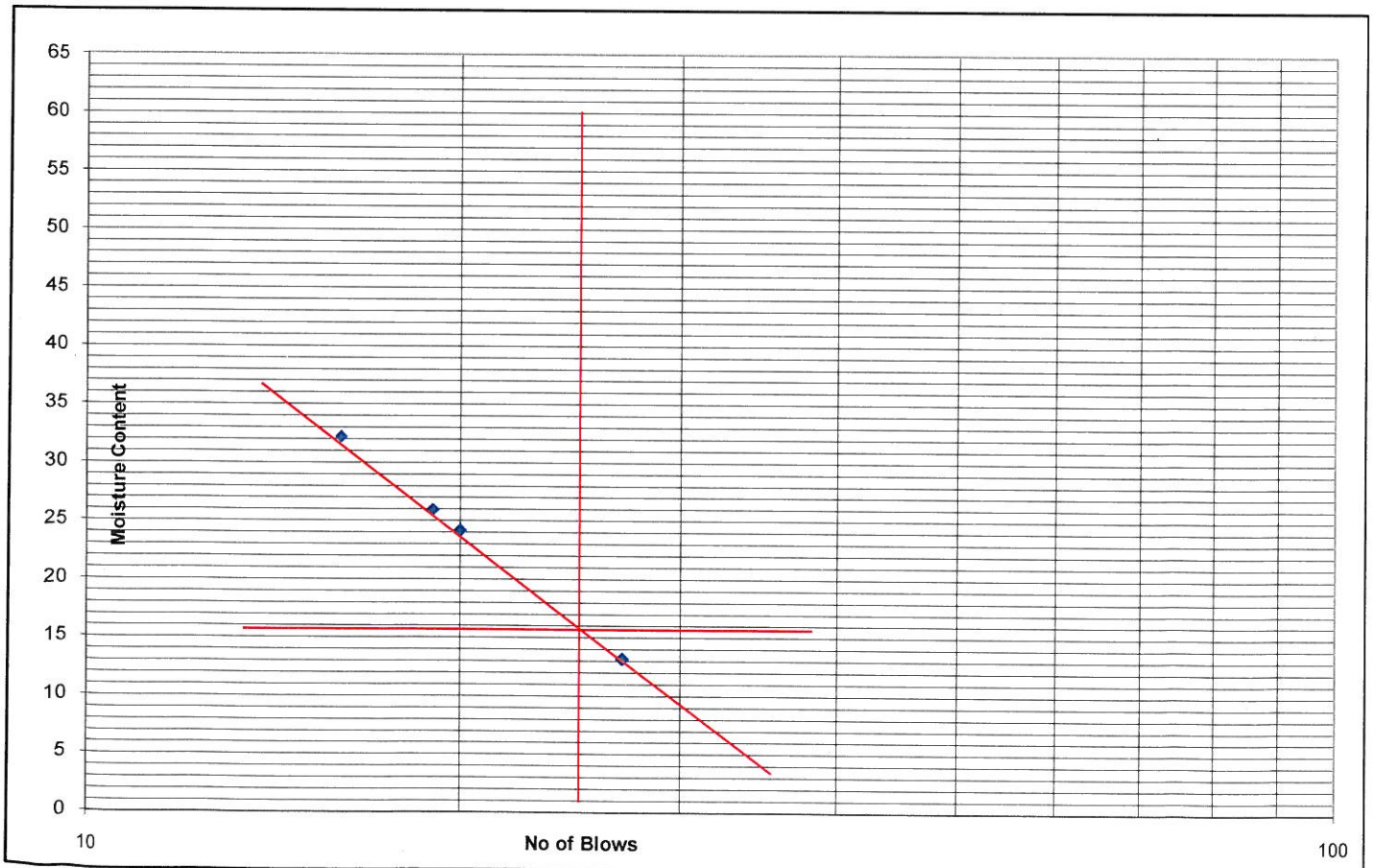
IS : 2720 (Part -5)

Client	: DFCC	Date Of Testing	: 16.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-7(Yamuna River-Ambala)		
Depth	: 24.0m		

Number of Blows	27	20	16	19	Plastic Limit
Container No.	A2	A3	A4	A5	
Container Weight (gm) (W1)	33.63	31.41	34.52	30.74	
Container + Wt. of wet soil (gm) (W2)	83.68	102.81	102.51	105.58	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	5.84	13.89	16.56	15.43	
Wt. of oven dry soil (gm) (W3-W1)	44.21	57.51	51.42	59.41	
Moisture Content (%)= $[(W2-W1)-(W3-W1)]/(W3-W1) \times 100$	13.21	24.16	32.21	25.97	

Result Summary

Liquid Limit (WL)	16	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5116

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

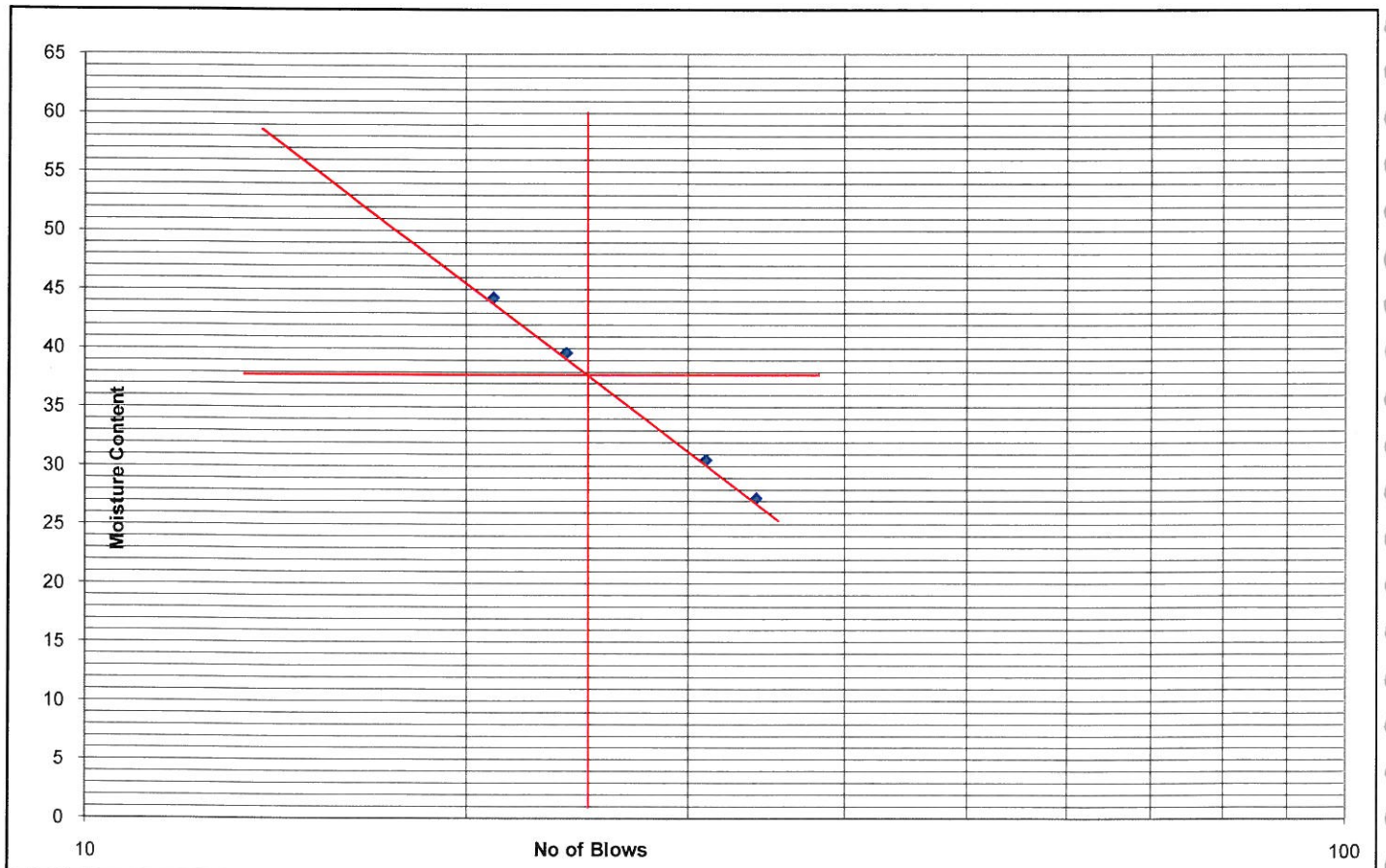
IS : 2720 (Part -5)

Client	:	DFCC	Date Of Testing	:	16.05.2013
Project Name	:	G.I For 3 Nos. Important Bridges	Sampled by	:	Binayak Swain
Type of Sample	:	SPT	Tested by	:	D.Mohanty
Location	:	BH-7(Yamuna River-Ambala)			
Depth	:	33.0m			

Number of Blows	34	31	21	24	Plastic Limit	
Container No.	U1	U2	U3	U4	U5	U6
Container Weight (gm) (W1)	31.1	30.24	33.15	34.51	35.12	36.52
Container + Wt. of wet soil (gm) (W2)	90.59	106.82	109.34	112.19	83.70	96.73
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	76.15	87.41
Wt. Of water (gm) (W2-W1)-(W3-W1)	12.75	17.90	23.39	22.04	7.55	9.32
Wt. of oven dry soil (gm) (W3-W1)	46.74	58.68	52.79	55.64	41.03	50.89
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	27.28	30.51	44.31	39.62	18.41	18.32

Result Summary

Liquid Limit (WL)	38	%
Plastic Limit (Wp)	18	%
Plasticity Index (Ip)	20	%



5117



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DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

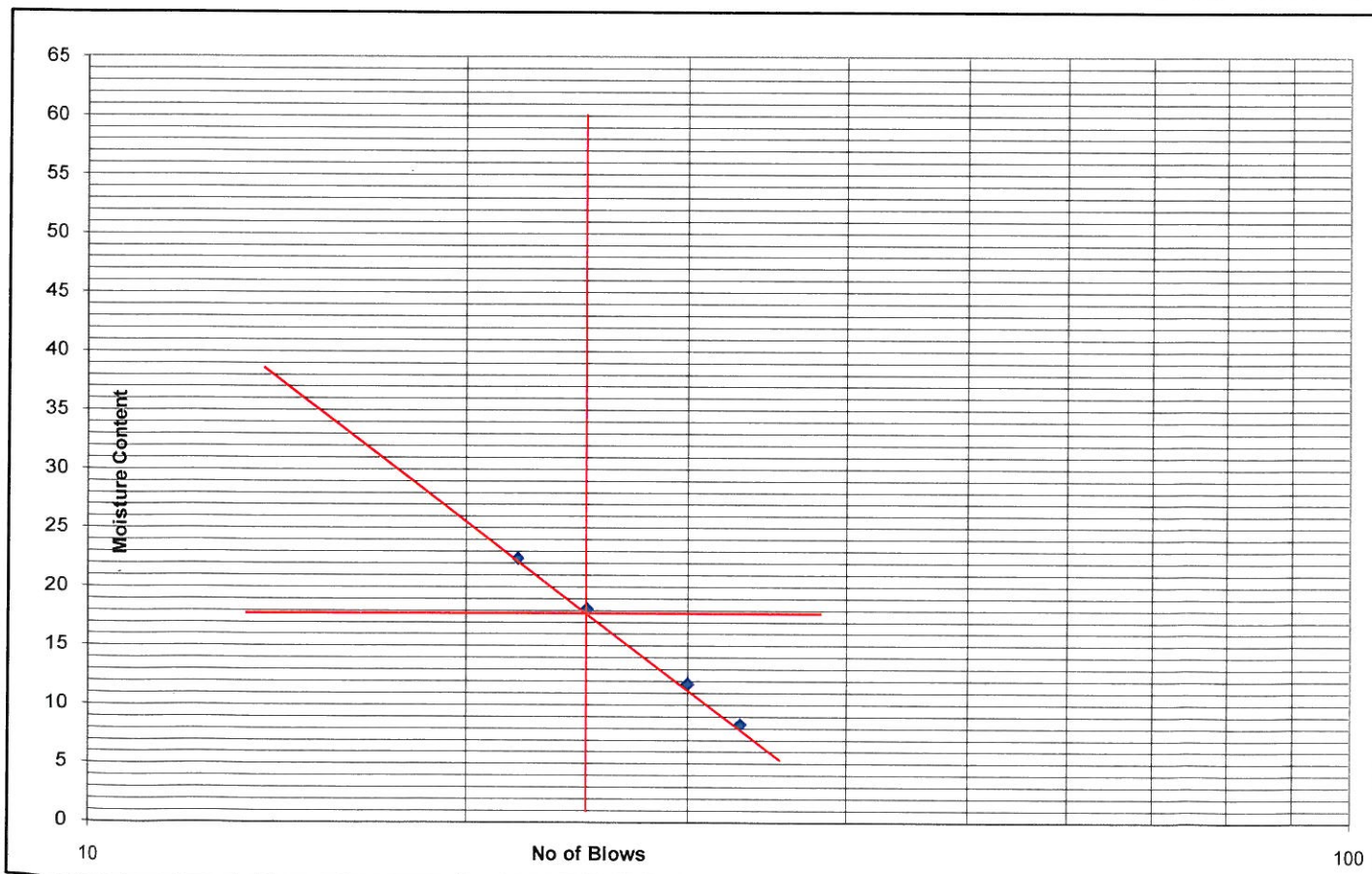
IS : 2720 (Part -5)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT
 Location : BH-7(Yamuna River-Ambala)
 Depth : 36.0m
 Date Of Testing : 16.05.2013
 Sampled by : Binayak Swain
 Tested by : D.Mohanty

Number of Blows	33	30	22	25	Plastic Limit
Container No.	G1	G2	G3	G4	NP
Container Weight (gm) (W1)	32.25	33.15	34.57	36.98	
Container + Wt. of wet soil (gm) (W2)	81.65	95.48	97.46	99.78	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	3.81	6.56	11.51	9.63	
Wt. of oven dry soil (gm) (W3-W1)	45.59	55.77	51.37	53.17	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	8.36	11.76	22.41	18.12	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5118

DETERMINATION OF LIQUID LIMIT AND PLASTIC LIMIT

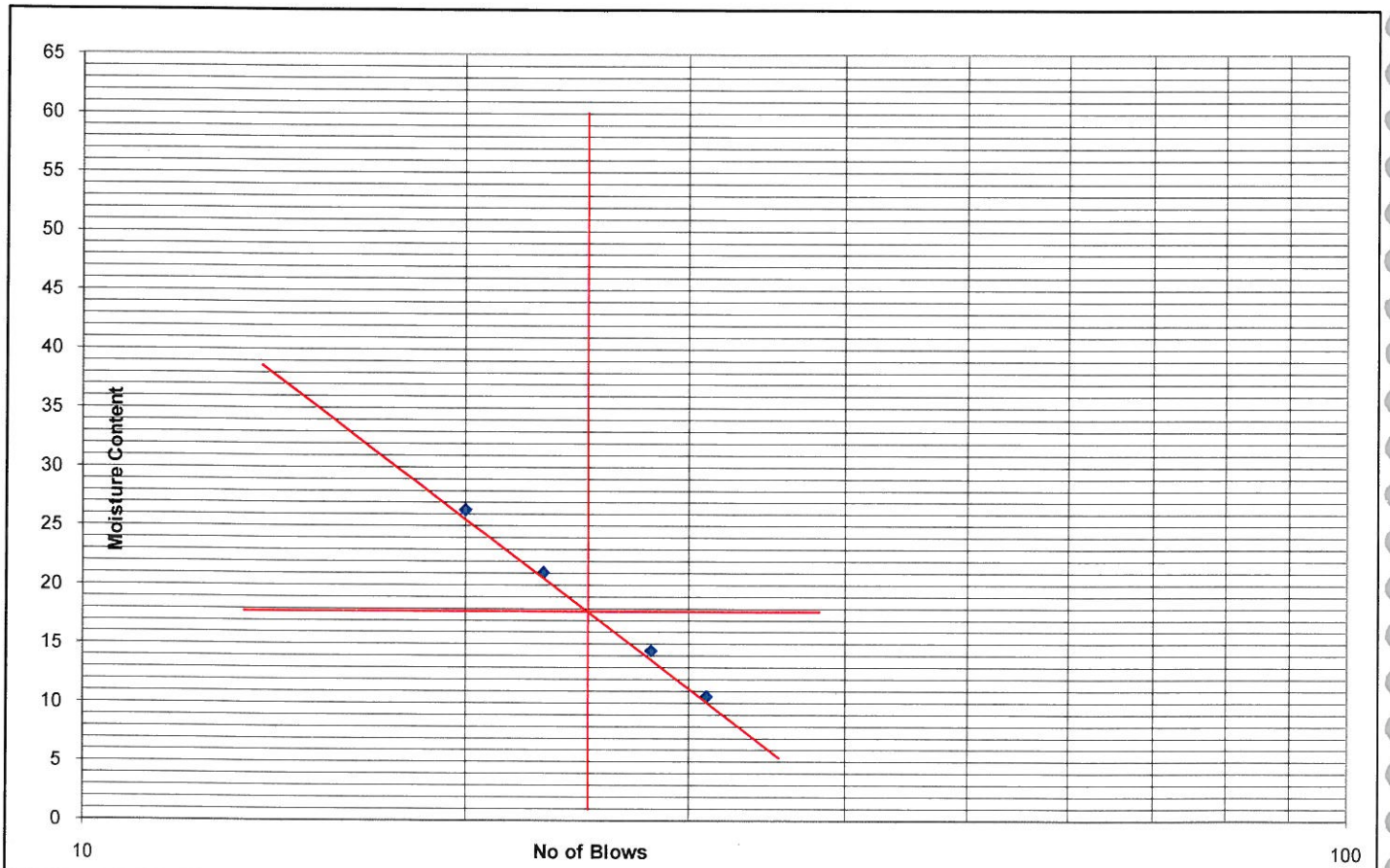
IS : 2720 (Part -5)

Client	:	DFCC	Date Of Testing	:	16.05.2013
Project Name	:	G.I For 3 Nos. Important Bridges	Sampled by	:	Binayak Swain
Type of Sample	:	SPT	Tested by	:	D.Mohanty
Location	:	BH-7(Yamuna River-Ambala)			
Depth	:	42.0m			

Number of Blows	28	31	20	23	Plastic Limit
Container No.	A1	A2	A3	A4	NP
Container Weight (gm) (W1)	35.52	34.12	33.26	32.2	
Container + Wt. of wet soil (gm) (W2)	83.95	94.71	99.84	102.34	
Wt of Container + Wt. of oven dry soil (gm) (W3)	77.84	88.92	85.94	90.15	
Wt. Of water (gm) (W2-W1)-(W3-W1)	6.11	5.79	13.89	12.19	
Wt. of oven dry soil (gm) (W3-W1)	42.32	54.80	52.68	57.95	
Moisture Content (%)= [(W2-W1)-(W3-W1)]/(W3-W1) X 100	14.44	10.57	26.37	21.03	

Result Summary

Liquid Limit (WL)	18	%
Plastic Limit (Wp)	NP	
Plasticity Index (Ip)	-	



5119

DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date Of Testing : 16.05.2013
 Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 1.5m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	36.52	
3	Weight of bottle with soil and water W3 in gm	134.52	
4	Weight of bottle full of water W4 in gm	132.79	
5	Weight of dry soil (W2-W1)in gm	5.00	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	3.27	
7	Specific Gravity G = (5) / (6)	1.53	

5120



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 4.5m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.52	
3	Weight of bottle with soil and water W3 in gm	135.25	
4	Weight of bottle full of water W4 in gm	133.85	
5	Weight of dry soil (W2-W1)in gm	4.00	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.60	
7	Specific Gravity G = (5) / (6)	1.54	

5121



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 9.0m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	36.21	
3	Weight of bottle with soil and water W3 in gm	134.12	
4	Weight of bottle full of water W4 in gm	132.48	
5	Weight of dry soil (W2-W1)in gm	4.69	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	3.05	
7	Specific Gravity G = (5) / (6)	1.54	

5122



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 15.0m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.21	
3	Weight of bottle with soil and water W3 in gm	136.71	
4	Weight of bottle full of water W4 in gm	135.28	
5	Weight of dry soil (W2-W1)in gm	3.69	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.26	
7	Specific Gravity G = (5) / (6)	1.63	

5123



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 21.0m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	36.14	
3	Weight of bottle with soil and water W3 in gm	135.14	
4	Weight of bottle full of water W4 in gm	133.52	
5	Weight of dry soil (W2-W1)in gm	4.62	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	3.00	
7	Specific Gravity G = (5) / (6)	1.54	

5124



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DETERMINATION OF SPECIFIC GRAVITY BY DENSITY BOTTLE METHOD AS PER IS : 2386 (Part -2)

Client : DFCC
Project Name : G.I For 3 Nos. Important Bridges
Type of Sample : SPT Date Of Testing : 16.05.2013
Location : BH-7(Yamuna River-Ambala) Sampled by : Binayak Swain
Depth : 36.0m Tested by : D.Mohanty

Sl. No.	Observations	1	Remarks
1	Weight of density bottle W1 in gm	31.52	
2	Weight of bottle with dry soil in W2 gm	35.26	
3	Weight of bottle with soil and water W3 in gm	134.47	
4	Weight of bottle full of water W4 in gm	133.10	
5	Weight of dry soil (W2-W1)in gm	3.74	
6	Weight of equal volume of water(W2 - W1) - (W3 - W4) in gm	2.37	
7	Specific Gravity G = (5) / (6)	1.58	

5135



ARKE TECHNO CONSULTANTS (I) PVT. LTD.

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DETERMINATION OF BULK DENSITY & MOISTURE CONTENT OF SOIL SAMPLE

Client	: DFCC														
Project Name	: G.I For 3 Nos. Important Bridges														
Location	: BH-7(Yamuna River-Ambala)														
Sl No.	BH No.	Depth in m	Type of Sample	Date of Testing	Weight of Container in gm	Diameter of Sample in cm	Length of Sample in cm	Volume of Sample in cc	Weight of Container + Wet Soil in gm	Weight of Container + Dry soil in gm	Weight of Dry soil in gm	Weight of water in gm	Moisture Content in %	Bulk Density in gm/cc	Dry Density in gm/cc
1	BH-7(Yamuna River-Ambala)	1.5	SPT	16.05.2013	62.34	3.8	7	79.39	199.68	190.32	127.98	9.37	7.32	1.73	1.61
3		4.5	SPT	16.05.2013	60.71	3.8	7	79.39	202.82	193.66	132.95	9.16	6.89	1.79	1.67
4		6.0	SPT	16.05.2013	63.49	3.8	7	79.39	204.80	194.93	131.44	9.87	7.51	1.78	1.66
5		12.0	SPT	16.05.2013	60.77	3.8	7	79.39	210.02	200.99	140.22	9.03	6.44	1.88	1.77
6		21.0	SPT	16.05.2013	64.84	3.8	7	79.39	214.89	204.50	139.66	10.39	7.44	1.89	1.76
7		33.0	SPT	16.05.2013	65.31	3.8	7	79.39	222.50	197.73	132.42	24.78	18.71	1.98	1.67
8		36.0	SPT	16.05.2013	60.5	3.8	7	79.39	209.75	198.43	137.93	11.32	8.21	1.88	1.74
9		42.0	SPT	16.05.2013	61.31	3.8	7	79.39	212.94	199.87	138.56	13.08	9.44	1.91	1.75

5126

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 20.05.2013
 Location : BH-8(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 1.5m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 86.26

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.65	1.65	1.65	98.35
2.00	33.69	33.69	35.34	64.66
0.425	29.11	29.11	64.45	35.55
0.075	21.81	21.81	86.26	13.74
Total	100.00			

Gravel Content (%)= 1.65
 Sand Content (%) = 84.61 Silt and clay % 13.74

Remarks :-

- 5127

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 20.05.2013
 Location : BH-8(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 3.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 84.45

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.48	1.48	1.48	98.52
2.00	31.56	31.56	33.04	66.96
0.425	29.41	29.41	62.45	37.55
0.075	22.00	22.00	84.45	15.55
Total	100.00			

Gravel Content (%)= 1.48
 Sand Content (%) = 82.97 Silt and clay % 15.55

Remarks :-

5123

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client	: DFCC		
Project Name	: G.I For 3 Nos. Important Bridges		
Type of Sample	: SPT	Date of Testing	: 20.05.2013
Location	: BH-8(Yamuna River-Ambala)	Sampled by	: Binayak Swain
Depth	: 4.5m	Tested by	: D.Mohanty

Weight of oven dried sample before washing (gm) :-	100.00
Weight of oven dried sample after washing (gm) :-	86.24

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	1.92	1.92	1.92	98.08
2.00	32.87	32.87	34.79	65.21
0.425	29.79	29.79	64.58	35.42
0.075	21.66	21.66	86.24	13.76
Total	100.00			

Gravel Content (%)=	1.92		
Sand Content (%) =	84.32	Silt and clay %	13.76

Remarks :-

15129

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client	: DFCC		
Project Name	: G.I For 3 Nos. Important Bridges	Date of Testing	: 20.05.2013
Type of Sample	: SPT	Sampled by	: Binayak Swain
Location	: BH-8(Yamuna River-Ambala)	Tested by	: D.Mohanty
Depth	: 6.0m		

Weight of oven dried sample before washing (gm) :-	100.00
Weight of oven dried sample after washing (gm) :-	85.45

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	2.07	2.07	2.07	97.93
2.00	31.52	31.52	33.59	66.41
0.425	29.31	29.31	62.90	37.10
0.075	22.55	22.55	85.45	14.55
Total	100.00			

Gravel Content (%)=	2.07		
Sand Content (%) =	83.38	Silt and clay %	14.55

Remarks :-

5130

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 20.05.2013
 Location : BH-8(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 10.5m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 90.43

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	12.29	12.29	12.29	87.71
2.00	30.52	30.52	42.81	57.19
0.425	25.87	25.87	68.68	31.32
0.075	21.75	21.75	90.43	9.57
Total	100.00			

Gravel Content (%)= 12.29
 Sand Content (%) = 78.14 Silt and clay % 9.57

Remarks :-

5131

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client	: DFCC	Date of Testing	: 20.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-8(Yamuna River-Ambala)		
Depth	: 12.0m		

Weight of oven dried sample before washing (gm) :-	100.00
Weight of oven dried sample after washing (gm) :-	94.22

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	13.48	13.48	13.48	86.52
2.00	31.47	31.47	44.95	55.05
0.425	26.87	26.87	71.82	28.18
0.075	22.40	22.40	94.22	5.78
Total	100.00			

Gravel Content (%)=	13.48		
Sand Content (%) =	80.74	Silt and clay %	5.78

Remarks :-

5432

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 20.05.2013
 Location : BH-8(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 18.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 91.44

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	14.56	14.56	14.56	85.44
2.00	30.74	30.74	45.30	54.70
0.425	27.18	27.18	72.48	27.52
0.075	18.96	18.96	91.44	8.56
Total	100.00			

Gravel Content (%)= 14.56
Sand Content (%) = 76.88 Silt and clay % 8.56

Remarks :-

5133

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client	: DFCC		
Project Name	: G.I For 3 Nos. Important Bridges		
Type of Sample	: SPT	Date of Testing	: 20.05.2013
Location	: BH-8(Yamuna River-Ambala)	Sampled by	: Binayak Swain
Depth	: 21.0m	Tested by	: D.Mohanty

Weight of oven dried sample before washing (gm) :-	100.00
Weight of oven dried sample after washing (gm) :-	91.02

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	11.87	11.87	11.87	88.13
2.00	32.15	32.15	44.02	55.98
0.425	27.76	27.76	71.78	28.22
0.075	19.24	19.24	91.02	8.98
Total	100.00			

Gravel Content (%)=	11.87		
Sand Content (%) =	79.15	Silt and clay %	8.98

Remarks :-

5134

GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client : DFCC
 Project Name : G.I For 3 Nos. Important Bridges
 Type of Sample : SPT Date of Testing : 20.05.2013
 Location : BH-8(Yamuna River-Ambala) Sampled by : Binayak Swain
 Depth : 24.0m Tested by : D.Mohanty

Weight of oven dried sample before washing (gm) :- 100.00
 Weight of oven dried sample after washing (gm) :- 92.67

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	12.61	12.61	12.61	87.39
2.00	32.68	32.68	45.29	54.71
0.425	27.91	27.91	73.20	26.80
0.075	19.47	19.47	92.67	7.33
Total	100.00			

Gravel Content (%)= 12.61
 Sand Content (%) = 80.06 Silt and clay % 7.33

Remarks :-

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GRAIN SIZE ANALYSIS OF SOIL AS PER IS 2720 (P- 4)

Client	: DFCC	Date of Testing	: 20.05.2013
Project Name	: G.I For 3 Nos. Important Bridges	Sampled by	: Binayak Swain
Type of Sample	: SPT	Tested by	: D.Mohanty
Location	: BH-8(Yamuna River-Ambala)		
Depth	: 27.0m		

Weight of oven dried sample before washing (gm) :-	100.00
Weight of oven dried sample after washing (gm) :-	91.78

Sieve Size mm	Individual Weight Retained in gm.	Individual Wt. Retained In %	Cummulative Wt Retained In %	Cummulative Wt Passing In %
75	0	0.00	0.00	100.00
50	0	0.00	0.00	100.00
37.5	0	0.00	0.00	100.00
19	0	0.00	0.00	100.00
4.75	12.95	12.95	12.95	87.05
2.00	31.26	31.26	44.21	55.79
0.425	26.47	26.47	70.68	29.32
0.075	21.10	21.10	91.78	8.22
Total	100.00			

Gravel Content (%)=	12.95		
Sand Content (%) =	78.83	Silt and clay %	8.22

Remarks :-

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