

कार्यपालक अभियंता का कार्यालय
ग्रामीण कार्य विभाग, कार्य प्रमंडल
पुपरी (सीतामढ़ी)

पत्रांक :- 1562(अनु०)पुपरी,
प्रेषक,

दिनांक :- 01/07/2024

कार्यपालक अभियंता
ग्रामीण कार्य विभाग,
कार्य प्रमंडल, पुपरी।

सेवा में,

अपर मुख्य कार्यपालक पदाधिकारी,
ग्रामीण कार्य विभाग,
विश्वेश्वरैया भवन, बिहार, पटना।

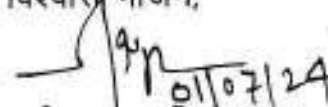
विषय :- NABARD योजना अन्तर्गत आवंटन उपलब्ध कराने के संबंध में।

महाशय,

उपर्युक्त विषयक NABARD योजना अन्तर्गत संलग्न विहित प्रपत्र के अनुसार कुल
90.39361 /- (नवें लाख उनचालीस हजार तीन सौ एकसठ) रुपया मात्र का आवंटन उपलब्ध
कराने की कृपा करें।

अनु० :- उपरोक्त यथावत्।

विश्वास भाजन,

 01/07/24

कार्यपालक अभियंता
ग्रामीण कार्य विभाग कार्य प्रमंडल
पुपरी (सीतामढ़ी)

Rural Works Department NABARD Allotment Requisition Format

Name of Division :- Pupri

S.No.	Year	Name of Road/Bridge	Name of Contractor (in English)	Administrative		Agreement Amount		Allotment Received (in Lacs)	Total Expenditure as per MIS (in Lacs)	Value of Measurement (in Lacs)	Current Demand (in Lacs) (11-9)	Remarks
				Length (Road in Km/Bridge in M.)	Amount (In Lac)	Main Work	Maintenance					
1	2	3	4	5	6	7	8	9	10	11	12	13
1	2023-24	Construction of Bridge Over Damodar Nadi Paktola to Chakauti	Achal Deo Singh	19.360	290.640	263.20270	1.50408	50.00000	50.00000	140.39361	90.39361	
		Total		19.360	290.640	263.20270	1.50408	50.00000	50.00000	140.39361	90.39361	
Total : Rs 90.39361 (Ninty Lakh Thirty Nine Thousand Three Hundred Sixty One) Rupees only												

नोट 1. खर्च का ब्यौरा MIS में दर्ज होना आवश्यक है।

2. अधियाचित राशि का पथवार मापीपुस्त की प्रथम एवं अन्तिम पेज की अभिप्रमाणित छाया प्रति संलग्न होना आवश्यक है।

3. पूर्व निर्गत राशि का उपयोगिता प्रमाण पत्र संलग्न होना आवश्यक है।

4. योजनावार सभी पथों का अधियाचना एक साथ भेजना आवश्यक है।

5. अधियाचित योजना में किये गये कार्यों का फोटोग्राफ एवं फोटोग्राफ के पारस्पृष्ट पर योजना का नाम एवं संबंधित कार्यपालक अभियंता द्वारा अभिप्रमाणित प्रति भेजना आवश्यक है।

अभिप्रमाणित प्रति भेजना आवश्यक है।

Executive Engineer
RWD, Works Division Pupri

NABARD Fund for Work A/C No 36840541005
FROM GFR 19-A
(See Government of India's decision (1) below Rule-150)
Form of Utilization Certificate upto 24-June-2024

SL NO	Name of Scheme	Sanction No. & date with Amount (in lacs)	Amount Received (in lacs)	Particulars
1.	Construction of Rural roads under NABARD	Fund Received from Secretary Cum Empowered officer BRRDA Patna upto F/Y -2024-25 i. Through CFMS- Total:- Expenditure during the F/Y -2024-25 i. Through CFMS- Balance- i. Through CFMS-	 <u>4281.28478</u> 4281.28478 <u>4182.47985</u> 4182.47985 <u>98.80493</u> 98.80493	Certified that out of Rs. 4281.28478 lacs of grants-in-aid sanctioned during the year 2024-25 in favour of Executive Engineer R.W.D (Works) Division Pupri under this department, a sum of Rs. 4182.47985 lacs has been utilized for the purpose of NABARD schemes Fund, as given in the margin for which it was sanctioned and then the balance of Rs. 4182.48000 lacs remaining unutilized at the end of the period under report.

2. Certified that I have satisfied myself that the condition on which the grant in aid was sanctioned have been duly fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

Kind of Checks exercised: -

- (i) Works have been supervised by Executive Engineer /Superintending Engineer.
- (ii) Periodical inspection has been conducted by Executive Engineer/ Superintending Engineer.
- (iii) Construction Materials have been tested.
- (iv) Measurements have been recorded in the MB'S and test check conducted by the Assistant Engineer/ Executive Engineer
- (v) All other formalities have been observed.

3. **Physical Progress achieved:-**

- (vi) Construction of Road Works.
- (vii) Construction of CD Works.


Divisional Account Officer
R.W.D Works Division, Pupri


Executive Engineer
R.W.D Works Division, Pupri.

J. P. Singh

REPORT ON
CONCRETE MIX DESIGN (M-35)
(With Super Plasticizer)
FOR THE PROPOSED

**Construction of Bridge works with maintainence for Over
Damodar Nadi From Paktola to Chakauti (Tender id-127099)
Under NABARD, R.W.D, (W) Div. Pupri in in Block-Bokhara
District Sitamarhi**

SUBMITTED TO:

**Executive Engineer
R.W.D. (W) Division Pupri**



Name of Agency :-

**Achal Deo Singh,
Vill+Po-Bakhorapur, Ps-Barahara, Dist-Bhojpur (Bihar)**

TESTING DONE BY

OM SAI CONSULTANTS

(AN ISO 9001:2015 & ISO/IEC 17025: 2017 CERTIFIED, NABL ACCREDITED LAB)

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Mix Design of M - 35

(With Super Plasticizer)

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GEOTECHNICAL, MATERIALS TESTINGS, SURVEY, DPR, ERT & NDT
www.omsaiconsultantsandlaboratory.com
—CONCRETE MIX DESIGN—

Report No: OSC/MIX/151123/562	Date of Receiving: 15.10.2023
Job Description: Concrete Mix Design M-35 with O.P.Cement 43 Grade and Plasticizer	Date of Testing: 15.10.2023 to 15.11.2023
Agreement No:- 28/580/2023-24 Dated:- 13.10.2023	Date of Reporting: 15.11.2023

1. PROTOCOL:- IS: 10262:2019 & SP-23 GUIDELINE & MORTH

The method of concrete mix design consists of selection of optimum proportion of water, cement, fine/coarse aggregate & admixture to produce concrete of specified properties most economically. The proportion of concrete mix is obtained experimentally evolved relationship between the factors in the choice of mix design.

It provides reasonably accurate guide to arrive at an optimum proportion of ingredients. The final mix proportion is obtained on the basis of trial mix. The mix design has been carried out as per IS:10262 guideline keeping in the view. The recommended mix design deviation and targeted mean strength. The recommended mix proportion should be tested at site their workability and strength.

1.	Grade of Concrete	M-35
2.	Characteristic Strength At 28 Days, N/mm ²	35.0 N/mm ²
3.	Targeted Strength At 28 Days, N/mm ²	43.25 N/mm ²
4.	Degree of Quality Control	Good
5.	Exposure Condition	Very Severe
6.	Degree of workability	0.9 Compacting Factor
7.	Slump Required	(75-85) mm
8.	Nominal Size of Aggregate	20 mm
9.	Type of Cement	O.P.C - 43 grade
10.	Minimum Cement Content	340 kg/m ³
11.	Admixture Type	Plasticizer

2. Test data of materials

- (i) Cement used OPC (43 Grade)
 - (a) Specific gravity of cement 3.15
- (ii) Specific gravity of coarse aggregate 2.74
- (iii) Specific gravity of sand 2.64
- (iv) Water absorption of coarse aggregate 0.56 %
- (v) Water absorption of sand 1.12 %
- (vi) Sieve analysis of coarse aggregate (MIRZACHOUKI)

Table 1 (Single-Sized Aggregate of Nominal size 20 mm)

Wt-10.00 kg Total 10000 gm

Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (%-passing)
40	0	0	0	100	100
20	426	426	4.26	95.74	95-100
10	7872	8298	82.98	17.02	0-20
4.75	1364	9662	96.62	3.38	0-5
Pan	338	10000	100	-	-



Table 2 (Single-Sized Aggregate of Nominal size 10 mm)

10 mm wt.-10.00 kg			Total		10000 gm
Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (% passing)
20	0	0	0	100	100
12.5	0	0	0	100	100
10	424	424	4.24	95.76	65-100
4.75	7892	8316	83.16	16.84	0-20
2.36	1376	9692	96.92	3.08	0-5
Pan	308	10000	100	-	-

Table 3 (Graded Aggregate of Nominal size 20 mm)

(After mixing 20 mm single- Sized (60%) and 10 mm single- sized (40%) Aggregate

			Total		10000 gm
Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (% passing)
40	0	0	0	100	100
20	256	256	2.56	97.44	95-100
10	4893	5149	51.49	48.51	25-55
4.75	3975	9124	91.24	8.76	0-10
Pan	876	10000	100.00	-	-

Conforms to IS-383 for 20 mm graded chips.

(vii) **Sieve analysis of sand (KOILWAR)**

Table 4 SAND TAKEN 2000 gm

Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 % passing for			
					Gr. Zone I	Gr. Zone II	Gr. Zone III	Gr. Zone IV
10	0	0	0	100	100	100	100	100
4.75	86	86	4.30	95.7	90 - 100	90 - 100	90-100	95 - 100
2.36	185	271	13.55	86.45	60 - 85	75 - 100	85-100	95 - 100
1.18	202	473	23.65	76.35	30 - 70	55 - 90	75-100	90 - 100
0.6	244	717	35.85	64.15	15 - 34	35 - 59	60-79	80 - 100
0.3	782	1499	74.95	25.05	5 - 20	8 - 30	12-40	15 - 50
0.15	478	1977	98.85	1.15	0 - 10	0 - 10	0-10	0 - 15
Pan	23	2000	100.0	0	-	-	-	-

Finess Modules of Sand = 2.512

Hence conforms to zone III of IS - 383

3 Target mean strength concrete :

For quality control and M - concrete

Standard Deviation as per table - 1 of IS-10262 - 2019 =

5

So for M -

Target mean strength f_{ck}

=

$f_{ck} = 1.65 \times S$

=

$35 + 1.65 \times 5$

43.25 N / mm²

Say 43 N / mm²

4 Selection of Water Cement Ratio

From fig. 1 of IS 10262 & IS 456

For target mean strength of 43 N/mm²

Maximum Water Cement Ratio

0.45

Water cement ratio =

0.390



5 Selection of water and sand content

From table - 4, of IS 10262, for 20 mm nominal size chips water is 186 kg/m³ and sand percentage for Zone II sand = 35 %

For change in values in water cement ratio compacting factor and sand Zone III, the following adjustment is required as follows :-

Change in Condition	Water content
(a) For decrease in w.c. ratio by (0.6 - 0.36) that is 0.21	0 4.2
(b) For sand zone conforming to sand Zone III of Table - 4 of IS 383	0 1.5
(c) For increase in compacting factor by (0.9-0.8) that is 0.1	3 0
	3 % 5.7

Therefore required sand content = 35-5.7 = 29.3
water content = 186 kg + 3 % 191.58 kg

6 Determination of Cement Content

W/C ratio = 0.39
Water = 191.58 kg
Cement = 491.23 kg

Superplasticizer used here is CONPLAST SP430BH of Fosroc Chemicals (India) Pvt. Ltd., H.O. Vishnu Chittam, No. 10, 2nd Floor, Sirur Park B Street, Seshadripuram, Bangalore 560020 (website: www.fosroc.com). Water content is to be reduced up to 25% as per the brochure of CONPLAST SP430BH of Fosroc Chemicals (India) Pvt. Ltd.

As per IS: 9103 - 1999 for the reduction of water content up to 11.50 % after application of the superplasticizer/admixtures by 0.6% by weight of cement one gets:
Reduced water content = 169.5483 litre/m³ of fresh concrete.

Determination of cement content

W/C = 0.390
W = 169.55 litre/m³
Cement = 434.74 kg per cum of fresh concrete.

As Per IS 456 : 2000 Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl. No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	—	300	0.55	M 20
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40



NOTES :-

1. Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken in the concrete composition with respect to the cement and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of pozzolona and slag specified in IS 1489 (Part-1) and IS 455 respectively.
2. Minimum grade for plain concrete under mild exposure condition is not specified.

Therefore Required cement content = 434.74 kg (greater than above three) per Cum of fresh concrete.

7 Determination of coarse and fine aggregate

$$V = \left[W + \frac{C}{S_c} + \frac{1}{p} \cdot \frac{f_a}{S_{fa}} \right] \times \frac{1}{1000} \quad , \text{ and}$$

$$V = \left[W + \frac{C}{S_c} + \frac{1}{1-p} \cdot \frac{c_a}{S_{ca}} \right] \times \frac{1}{1000}$$

where

V = absolute volume of fresh concrete, which is equal to gross volume (m³) minus the volume of entrapped air.

W = mass of water (kg) per m³ of concrete.

C = mass of cement (kg) per m³ of concrete.

S_c = specific gravity of cement.

p = ratio of fine aggregate to total aggregate by absolute volume.

f_a, c_a = total masses of fine aggregate and coarse aggregate (kg) per m³ of concrete respectively, and

S_{fa}, S_{ca} = specific gravities of saturated surface dry fine aggregate and coarse aggregate respectively.

I. Coarse aggregate

$$\text{Here, } V = \frac{0.98}{2.74} \quad C = \frac{434.74}{2.64} \quad S_c = 3.15 \quad p = 0.293$$

$$0.98 = \left[169.5483 + 434.74/3.15 + \frac{1}{1/0.293} \times \frac{ca}{2.74} \right] \times 1/1000$$

$$ca = 1302.64 \text{ kg/m}^3$$

ii. Fine aggregate

$$0.98 = \left[169.5483 + 434.74/3.15 + \frac{1}{1/0.293} \times \frac{fa}{2.64} \right] \times 1/1000$$

$$fa = 520.15 \text{ kg/m}^3$$

Quantities per m³

Water (kg)	Cement (kg)	Coarse aggregate (kg)	Fine aggregate (kg)
169.55	434.74	1302.64	520.15
0.390	1.0	3.00	1.20

FOR ONE BAG OF CEMENT

Water -	19.5	kg
Coarse aggregate -	149.8	kg
20 mm size (60%) =	89.9	kg
10 mm size (40%) =	59.9	kg
sand [fine aggregate] =	59.8	kg (dry)

Adjustment in water for water absorption

$$\text{Total Wt. of water} = 19.5 + 149.82 \times 0.58\% + 59.82 \times 1.12\% = 21.0 \text{ kg}$$

Considering 2% free water in sand

$$\text{So net water} = 21.04 - 59.82 \times 2\% = 19.8 \text{ kg}$$

$$\text{Or } 19.8 \text{ litre}$$

So for one bag of cement

$$\text{Coarse aggregate} = 149.8 \text{ kg}$$

$$\text{Sand} = 59.8 \text{ kg (dry)}$$

$$\text{Water} = 19.8 \text{ litre}$$





OM SAI CONSULTANTS

Head Office & Laboratory Address: Bank of India Colony,
Near Jai Shree Gas Godown, South D/SS P.O. B.V. College,
Raja Bazaar, Patna - 800014

Branch Laboratory Address: TATA Enclave, 90 Feet Road, A. G. Colony More, Patna - 800014
AN ISO 9001:2015 CERTIFIED, NABL ACCREDITED LABORATORY

TEST REPORT

DOC No.: OSC/T.A/P/01

Mix Design of M - 35
(With Super Plasticizer)

Dated :- 15.11.2023

To,
Executive Engineer
R.W.D. (W) Division Pupri

Project Name :- Construction of Bridge works with maintainance for Over Damodar Nadi
From Paktola to Chakaurti (Tender id-127099) Under NABARD, R.W.D. (W) Div. Pupri in in
Block-Bokhara District Sitamarhi

Agreement No.- 28/SBD/2023-24 Dated- 13.10.2023

Quantities per m ³			
Water (kg)	Cement (kg)	Coarse aggregate (kg)	Fine aggregate (kg)
169.55	434.74	1302.64	520.15
0.390	1.0	3.00	1.20

Size no. of Cubes were Casted on 18.10.2023 (7 days & 28 Days) Compressive Strength
are tabulated below.

Sample no.	7 days Comp.Strength (N/mm ²)	7 days Av. Comp.Strength (N/mm ²)	Sample no.	28 days Comp.Strength (N/mm ²)	28 days Av. Comp.Strength (N/mm ²)
1	29.16	29.13	4	44.04	43.67
2	28.64		5	43.32	
3	29.58		6	43.66	

Conclusion : 7 days compressive strength is higher than 65% of target mean strength , 28
Days compressive strength is higher than target mean strength hence the above mix
design may be adopted.


Checked by:-



REMARKS:

- The result (s) listed in the report refer only to the item(s) tested and it's Parameters(s). Endorsement of products is neither inferred nor implied.
- Sample will be destroyed after 30 days from the date of issue of test report unless otherwise specified.
- Report refers to the sample as received and not drawn by us unless mentioned otherwise
- The report shall not be reproduced except in full, without the approval of the laboratory and cannot be used as evidence in the Court of law and should not be used in any advertising media without our special permission in writing.

Contact No.: 9097468838, Email ID: omsaiconsultantspatna@gmail.com

REPORT ON
CONCRETE MIX DESIGN (M-30)
(With Super Plasticizer)
FOR THE PROPOSED

**Construction of Bridge works with maintainence for Over
Damodar Nadi From Paktola to Chakauti (Tender id-127099)
Under NABARD, R.W.D, (W) Div. Pupri in in Block-Bokhara
District Sitamarhi**

SUBMITTED TO:

**Executive Engineer
R.W.D. (W) Division Pupri**



Name of Agency :-

**Achal Deo Singh,
Vill+Po-Bakhorapur, Ps-Barahara, Dist-Bhojpur (Bihar)**

TESTING DONE BY

OM SAI CONSULTANTS

(AN ISO 9001:2015 & ISO/IEC 17025: 2017 CERTIFIED, NABL ACCREDITED LAB)

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Mix Design of M - 30

(With Super Plasticizer)

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---CONCRETE MIX DESIGN---

Report No: OSG/MIX/151123/563	Date of Receiving: 15.10.2023
Job Description: Concrete Mix Design M-30 with O.P Cement 43 Grade and Plasticizer	Date of Testing: 15.10.2023 to 15.11.2023
Agreement No: 28/188/2023-24 Dated: 13.10.2023	Date of Reporting: 15.11.2023

1. PROTOCOL: IS: 10262-2019 & SP-23 GUIDELINE & MORTH

The method of concrete mix design consists of selection of optimum proportion of water, cement, fine/coarse aggregate & admixture to produce concrete of specified properties most economically. The proportion of concrete mix is obtained experimentally evolved relationship between the factors in the choice of mix design.

It provides reasonably accurate guide to arrive at an optimum proportion of ingredients. The final mix proportion is obtained on the basis of trial mix. The mix design has been carried out as per IS:10262 guideline keeping in the view. The recommended mix design deviation and targeted mean strength. The recommended mix proportion should be tested at site their workability and strength.

1	Grade of Concrete	M-30
2	Characteristic Strength At 28 Days, N/mm ²	30.0 N/mm ²
3	Targeted Strength At 28 Days, N/mm ²	38.25 N/mm ²
4	Degree of Quality Control	Good
5	Exposure Condition	Severe
6	Degree of workability	0.9 Compacting Factor
7	Slump Required	(75-85) mm
8	Nominal Size of Aggregate	20 mm
9	Type of Cement	OPC - 43 grade
10	Minimum Cement Content	320 kg/m ³
11	Admixture Type	Plasticizer

2. Test data of materials

- (i) Cement used OPC (43 Grade)
 - (a) Specific gravity of cement 3.15
- (ii) Specific gravity of coarse aggregate 2.74
- (iii) Specific gravity of sand 2.64
- (iv) Water absorption of coarse aggregate 0.58 %
- (v) Water absorption of sand 1.12 %
- (vi) Sieve analysis of coarse aggregate (MIRZACHOUKI)

Table 1 (Single-Sized Aggregate of Nominal size 20 mm)

Wt.-10.00 kg Total 10000 gm

Sieve (mm)	Wt. Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (% passing)
40	0	0	0	100	100
20	426	426	4.26	95.74	85-100
10	7872	8298	82.98	17.02	0-20
4.75	1364	9662	96.62	3.38	0-5
Pan	338	10000	100	-	-



Table 2 (Single-Sized Aggregate of Nominal size 10 mm)

10 mm wt.-10.00 kg			Total		10000 gm
Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (% passing)
20	0	0	0	100	100
12.5	0	0	0	100	100
10	424	424	4.24	95.76	85-100
4.75	7892	8316	83.16	16.84	0-20
2.36	1376	9692	96.92	3.08	0-5
Pan	308	10000	100	-	-

Table 3 (Graded Aggregate of Nominal size 20 mm)

(After mixing 20 mm single- Sized (60%) and 10 mm single- sized (40%) Aggregate

			Total		10000 gm
Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	As per IS-383 (% passing)
40	0	0	0	100	100
20	256	256	2.56	97.44	95-100
10	4893	5149	51.49	48.51	25-55
4.75	3975	9124	91.24	8.76	0-10
Pan	876	10000	100.00	-	-

Conforms to IS-383 for 20 mm graded chips.

(vi) **Sieve analysis of sand (KOILWAR)**

Table 4 SAND TAKEN

		2000 gm		As per IS-383 % passing for				
Sieve (mm)	Wt.Retained (gm)	Cumulative wt. Retained (gm)	Retained %	% passing	Gr. Zone I	Gr. Zone II	Gr. Zone III	Gr. Zone IV
10	0	0	0	100	100	100	100	100
4.75	86	86	4.30	95.7	90 - 100	90 - 100	90-100	95 - 100
2.36	185	271	13.55	86.45	60 - 95	75 - 100	85-100	95 - 100
1.18	202	473	23.65	76.35	30 - 70	55 - 90	75-100	90 - 100
0.6	244	717	35.85	64.15	15 - 34	35 - 59	60-79	80 - 100
0.3	782	1499	74.95	25.05	5 - 20	8 - 30	12-40	15 - 50
0.15	478	1977	98.85	1.15	0 - 10	0 - 10	0-10	0 - 15
Pan	23	2000	100.0	0	-	-	-	-

Fineness Modulus of Sand = 2.512

Hence conforms to zone III of IS - 383

3 Target mean strength concrete :

For quality control and M - concrete

Standard Deviation as per table - 1 of IS-10262 - 2019 = 5

So for M -

$$\begin{aligned} \text{Target mean strength } f_{ck} &= f_{ck} + 1.65 \times S \\ &= 30 + 1.65 \times 5 = 38.25 \text{ N / mm}^2 \\ &\text{Say } 38 \text{ N / mm}^2 \end{aligned}$$

4 Selection of Water Cement Ratio

From fig. 1 of IS 10262 & IS 456

For target mean strength of 38 N/mm²

Maximum Water Cement Ratio = 0.45

Water cement ratio = 0.415



5 Selection of water and sand content

From table - 4, of IS 10262, for 20 mm nominal size chips water is 185 kg/m³ and sand percentage for Zone II sand = 35 %

For change in values in water cement ratio compacting factor and sand Zone III, the following adjustment is required as follows :-

Change in Condition	Water content	
(a) For decrease in w.c. ratio by (0.6 - 0.415) that is 0.185	0	3.7
(b) For sand zone conforming to sand Zone III of Table - 4 of IS 383	0	1.5
(c) For increase in compacting factor by (0.9-0.8) that is 0.1	3	0
	3 %	5.2

Therefore required sand content = $35 - 5.2 = 29.8$
water content = $185 \text{ kg} + 3 \% = 191.58 \text{ kg}$

6 Determination of Cement Content

W/C ratio = 0.415
Water = 191.58 kg
Cement = 461.64 kg

Superplasticizer used here is CONPLAST SP430BH of Fosroc Chemicals (India) Pvt. Ltd., H.O. Vishnu Chittam, No. 10, 2nd Floor, Sirur Park B Street, Seshadripuram, Bangalore 560020 (website: www.fosroc.com). Water content is to be reduced up to 25% as per the brochure of CONPLAST SP430BH of Fosroc Chemicals (India) Pvt. Ltd.

As per IS: 9103 - 1999 for the reduction of water content up to 11.50 % after application of the superplasticizer/admixtrue by 0.6% by weight of cement one gets:
Reduced water content = 169.5483 litre/m³ of fresh concrete.

Determination of cement content

W/C = 0.415
W = 169.55 litre/m³
Cement = 408.55 kg per cum of fresh concrete.

@ As Per IS 456 : 2000 Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	—	300	0.55	M 20
ii)	Moderate	240	0.58	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40



NOTES :-

1. Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2. The additions such as fly ash or ground granulated blast furnace slag may be taken in the concrete composition with respect to the cement and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of pozzolons and slag specified in IS 1489 (Part-1) and IS 455 respectively.
2. Minimum grade for plain concrete under mild exposure condition is not specified.

Therefore Required cement content = 408.55 kg (greater than above three) per Cum of fresh concrete.

7 Determination of coarse and fine aggregate

$$V = \left[W + \frac{C}{S_c} + \frac{1}{p} \cdot \frac{f_a}{S_{sa}} \right] \times \frac{1}{1000} \quad \text{and}$$

$$V = \left[W + \frac{C}{S_c} + \frac{1}{1-p} \cdot \frac{c_a}{S_{sa}} \right] \times \frac{1}{1000}$$

where

V = absolute volume of fresh concrete, which is equal to gross volume (m^3) minus the volume of entrapped air,

W = mass of water (kg) per m^3 of concrete,

C = mass of cement (kg) per m^3 of concrete,

S_c = specific gravity of cement,

p = ratio of fine aggregate to total aggregate by absolute volume,

f_a, c_a = total masses of fine aggregate and coarse aggregate (kg) per m^3 of concrete respectively, and

S_{sa}, S_{sc} = specific gravities of saturated surface dry fine aggregate and coarse aggregate respectively.

i. Coarse aggregate

Here, V = 0.98 C = 408.55 S_c = 3.15 p = 0.298
 S_{sa} = 2.74 S_{sc} = 2.64

$$0.98 = \left[169.5483 + 408.55/3.15 + (1/0.702) \times (c_a/2.74) \right] \times 1/1000$$

$$c_a = 1309.42 \text{ kg/m}^3$$

ii. Fine aggregate

$$0.98 = \left[169.5483 + 408.55/3.15 + (1/0.298) \times (f_a/2.64) \right] \times 1/1000$$

$$f_a = 535.58 \text{ kg/m}^3$$

Quantities per m^3

Water (kg)	Cement (kg)	Coarse aggregate (kg)	Fine aggregate (kg)
169.55	408.55	1309.42	535.56
0.415	1.0	3.21	1.31

FOR ONE BAG OF CEMENT

Water -	20.8	kg
Coarse aggregate -	160.3	kg
20 mm size (60%) =	96.2	kg
10 mm size (40%) =	64.1	kg
sand [fine aggregate] =	65.5	kg (dry)

Adjustment in water for water absorption

$$\text{Total Wt. of water} = 20.75 + 160.25 \times 0.58\% + 65.54 \times 1.12\% = 22.4 \text{ kg}$$

Considering 2% free water in sand

$$\text{So net water} = 22.41 - 65.54 \times 2\% = 21.1 \text{ kg}$$

Or 21.1 litre

So for one bag of cement

Coarse aggregate - 160.3 kg

Sand = 65.5 kg (dry)

Water = 21.1 litre





OM SAI CONSULTANTS

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Raja Bazaar, Patna - 800014

Branch Laboratory Address: TATA Enclave, 90 Feet Road, A. G. Colony More, Patna - 800014
AN ISO 9001:2015 CERTIFIED, NABL ACCREDITED LABORATORY

TEST REPORT

DOC No.: HNC/T.R/01

Mix Design of M - 30
(With Super Plasticizer)

Dated - 15.11.2023

To,
Executive Engineer
R.W.D. (W) Division Pupri

Project Name :- Construction of Bridge works with maintainence for Over Damodar Nadi
From Pakola to Chakauti (Tender Id-127099) Under NABARD, R.W.D. (W) Div. Pupri in in
Block-Bokhara District Sitamarhi

Agreement No.- 28/SBD/2023-24 Dated- 13.10.2023

Quantities per m ³			
Water (kg)	Cement (kg)	Coarse aggregate (kg)	Fine aggregate (kg)
169.55	408.55	1309.42	535.56
0.415	1.0	3.21	1.31

Size no. of Cubes were Casted on 18.10.2023 (7 days & 28 Days) Compressive Strength
are tabulated below.

Sample no.	7 days Comp.Strength (N/mm ²)	7 days Av. Comp.Strength (N/mm ²)	Sample no.	28 days Comp.Strength (N/mm ²)	28 days Av. Comp.Strength (N/mm ²)
1	26.52	26.49	4	38.56	38.93
2	25.82		5	38.88	
3	27.12		6	39.34	

Conclusion : 7 days compressive strength is higher than 65% of target mean strength , 28
Days compressive strength is higher than target mean strength hence the above mix
design may be adopted.

Checked By:



REMARKS:

- The result (s) listed in the report refer only to the item(s) tested and it's Parameters(s). Endorsement of products is neither inferred nor implied.
- Sample will be destroyed after 30 days from the date of issue of test report unless otherwise specified.
- Report refers to the sample as received and not drawn by us unless mentioned otherwise
- The report shall not be reproduced except in full, without the approval of the laboratory and cannot be used as evidence in the Court of law and should not be used in any advertising media without our special permission in writing.

Contact No.: 9097468838, Email ID: omsaiconsultantspatna@gmail.com

REPORT

ON

PILE INTEGRITY TEST

**NAME OF WORK :- CONSTRUCTION OF BRIDGE WORK WITH
MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO
CHAKAUTI .UNDER SITAMARHI DISTRICT .**

**UNDER
NABARD**

**SUBMITTED TO
R.W.D WORKS DIVISION,PUPRI**

**AGENCY NAME
ACHAL DEO SINGH
ADD- VILL+PO-BAKHORAPUR,PS-BARAHARA**



Test Conducted By

CIVIL SOLUTION PVT. LTD.

(AN ISO 9001:2015 & ISO/IES 17025:2017 CERTIFIED, NABL ACCREDITED LAB

Lab Add - Behind Viswesawraiya Bhawan , Beside of Puspa Modi Photo Copier ,

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Mail ID :- civilsolutionlabpvtltd@gmail.com

Mob :- 08538985610 , 09279295759 ,8507730027

IGST NO-10AAGCC5365D1ZS , PAN NO : AAGCC5365D

**Our Services :- Soil Test , Cement test, Mix Design , Bitumen Testing ,Pile Load Test , Plate Load Test ,Materials Testings,
Water Testing ,Drawing, Quantity and Cost Estimation of Roads and Bridges (DPR)**



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Mail ID :- civilsolutionlabpvtltd@gmail.com, Contact No. +918538985610 , 09279295759

ISSUE TO : R.W.D WORKS DIVISION,PUPRI	Report No.: PSCL/Pile Integrity/2024072/1 Date of Casting : 08-02-2024 To 16-06-2024
AGENCY : ACHAL DEO SINGH	Period of Testing : 01-07-2024 Date of Reporting : 2-07-2024
NAME OF WORK :- CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .	
GRADE OF CONCRETE : M-35 PILE LENGTH: ABUTMENT - A-1- 25.0 M Dia :- 1200 mm	

PILE INTEGRITY TEST

Sl. No.	Location	Test Date	Pile No.	Test Length (M)		Dia Of Pile (Mm)	Remarks
1	Abutment (A1 -P1)	01-07-2024	Pile No. A1-1	25	24.94	1200 mm	Very mild undulation occurs through the length upto founding level.
2	Abutment (A1 -P2)	01-07-2024	Pile No. A1-2	25	24.89	1200 mm	Very mild undulation occurs through the length upto founding level.
3	Abutment (A1 -P3)	01-07-2024	Pile No. A1-3	25	24.91	1200 mm	Very mild undulation occurs through the length upto founding level.
4	Abutment (A1 -P4)	01-07-2024	Pile No. A1-4	25	24.93	1200 mm	Very mild undulation occurs through the length upto founding level.
5	Abutment (A1 -P5)	01-07-2024	Pile No. A1-5	25	24.87	1200 mm	Very mild undulation occurs through the length upto founding level.
6	Abutment (A1 -P6)	01-07-2024	Pile No. A1-6	25	24.89	1200 mm	Very mild undulation occurs through the length upto founding level.

Remarks: The Test Method :- ASTM D-5882-07

.....End of Report.....



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Ground Floor , Circle no-249 , Ward No-20 , Punaichak , Patna

Mail ID :- civilsolutionlabpvtltd@gmail.com, Contact No. +918538985610 , 09279295759

ISSUE TO :	Report No.: PSCL/Pile Integrity/2024072/2
R.W.D WORKS DIVISION,PUPRI	Date of Casting : 08-02-2024 To 16-06-2024
AGENCY :	Period of Testing : 01-07-2024
ACHAL DEO SINGH	Date of Reporting : 2-07-2024
NAME OF WORK :- CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .	
GRADE OF CONCRETE : M-35	
PILE LENGTH: ABUTMENT - A-2- 25.0 M Dia :- 1200 mm	

PILE INTEGRITY TEST

Sl. No.	Location	Test Date	Pile No.	Test Length (M)		Dia Of Pile (Mm)	Remarks
1	Abutment (A2 -P1)	01-07-2024	Pile No. A2-1	25	24.88	1200 mm	Very mild undulation occurs through the length upto founding level.
2	Abutment (A2 -P2)	01-07-2024	Pile No. A2-2	25	24.93	1200 mm	Very mild undulation occurs through the length upto founding level.
3	Abutment (A2 -P3)	01-07-2024	Pile No. A2-3	25	24.86	1200 mm	Very mild undulation occurs through the length upto founding level.
4	Abutment (A2 -P4)	01-07-2024	Pile No. A2-4	25	24.74	1200 mm	Very mild undulation occurs through the length upto founding level.
5	Abutment (A2 -P5)	01-07-2024	Pile No. A2-5	25	24.84	1200 mm	Very mild undulation occurs through the length upto founding level.
6	Abutment (A2 -P6)	01-07-2024	Pile No. A2-6	25	24.87	1200 mm	Very mild undulation occurs through the length upto founding level.

Remarks: The Test Method :- ASTM-D5882-07

.....End of Report.....

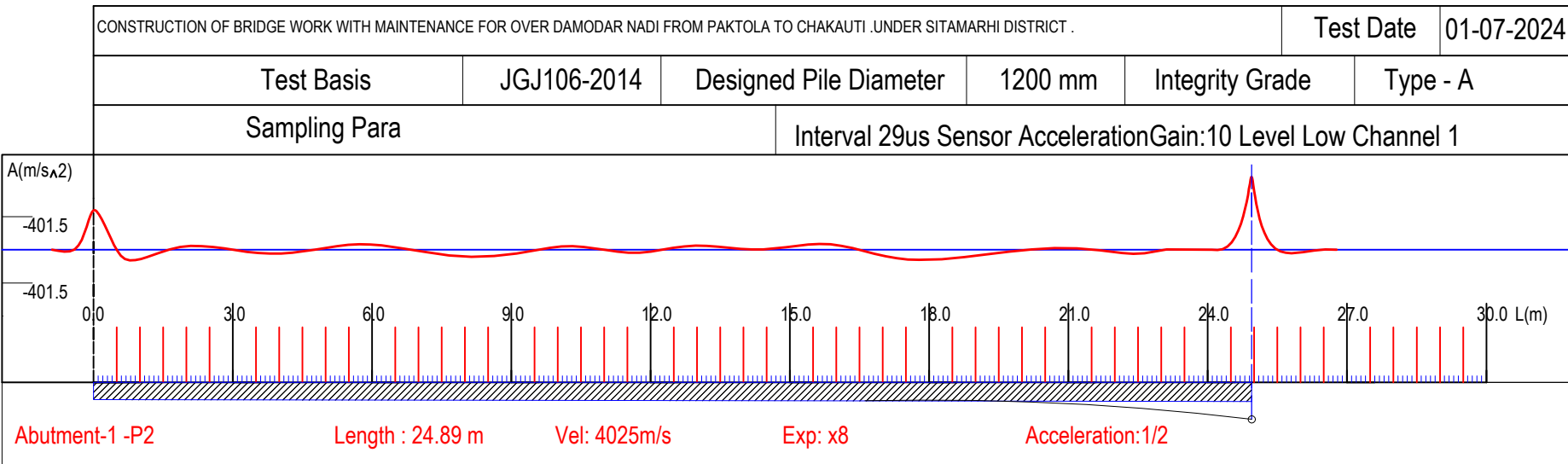
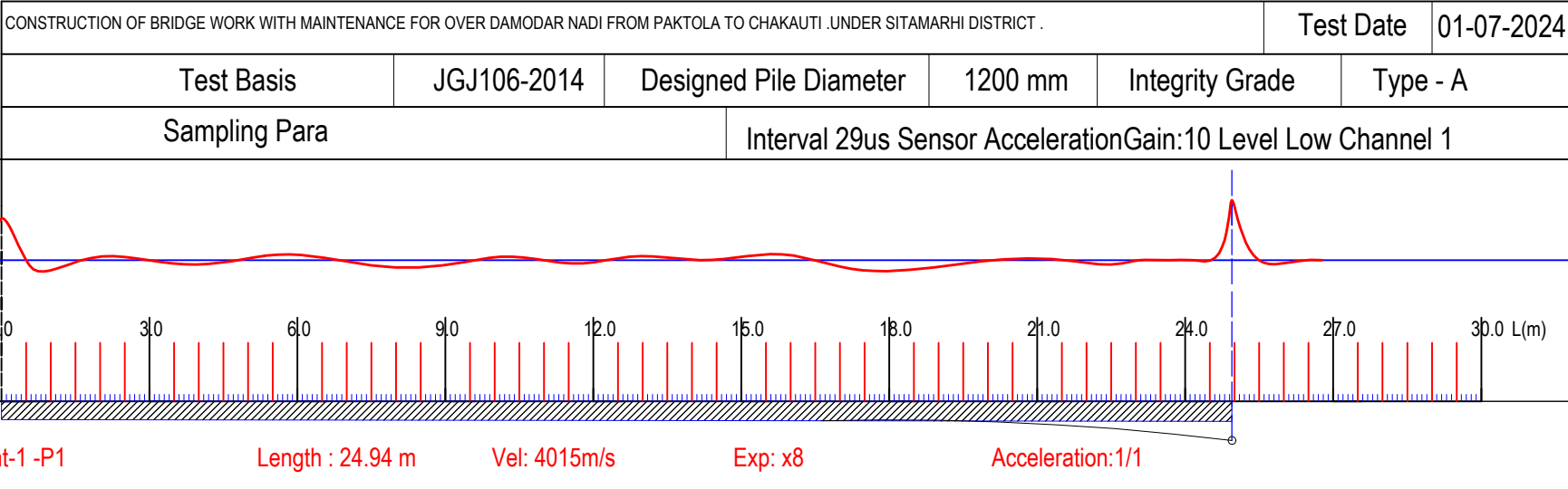


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CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

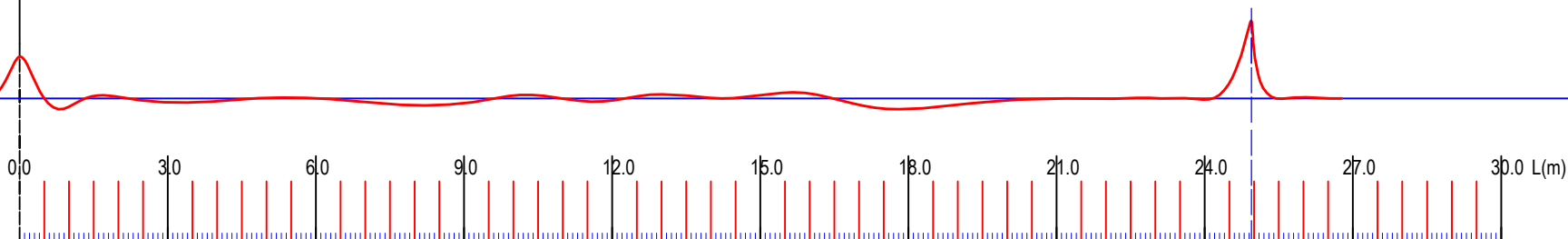
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-1 -P3

Length : 24.91 m

Vel: 4020m/s

Exp: x8

Acceleration:1/3

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

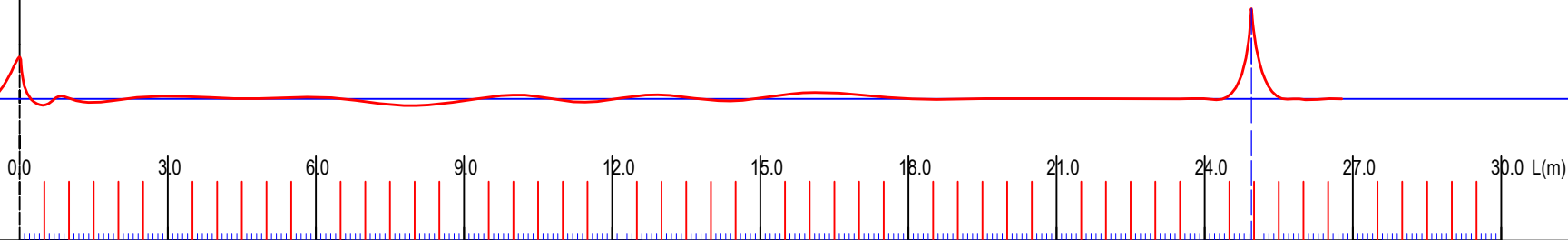
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-1 -P4

Length : 24.93 m

Vel: 3985m/s

Exp: x8

Acceleration:1/4

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

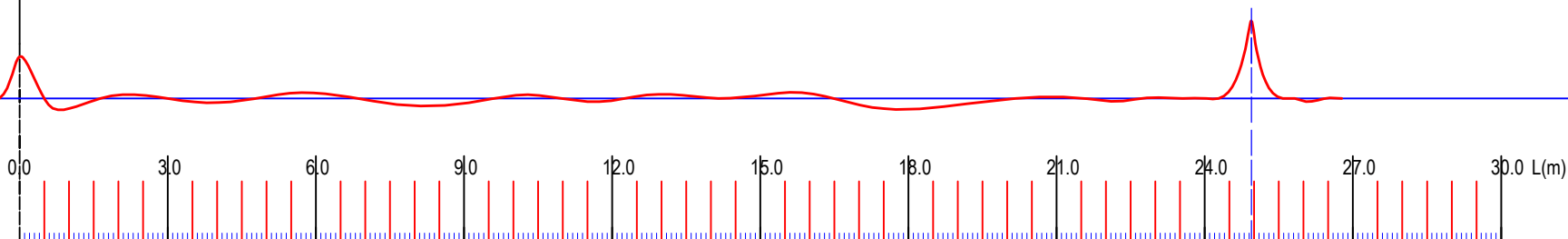
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-1 -P5

Length : 24.87 m

Vel: 3980m/s

Exp: x8

Acceleration:1/5

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

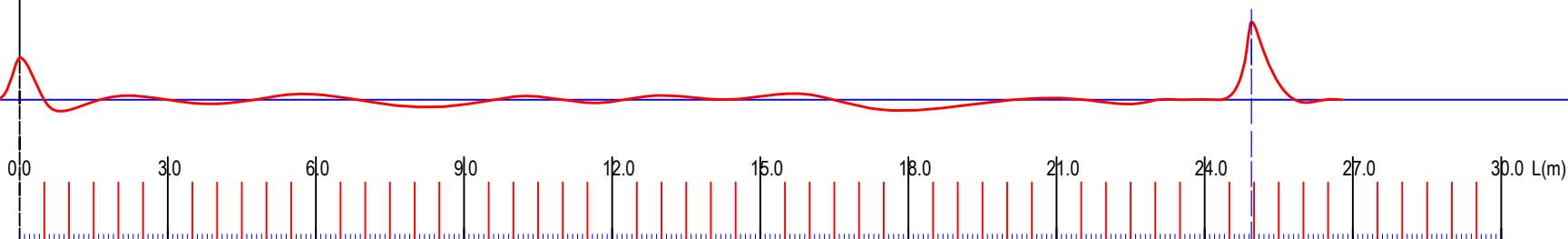
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



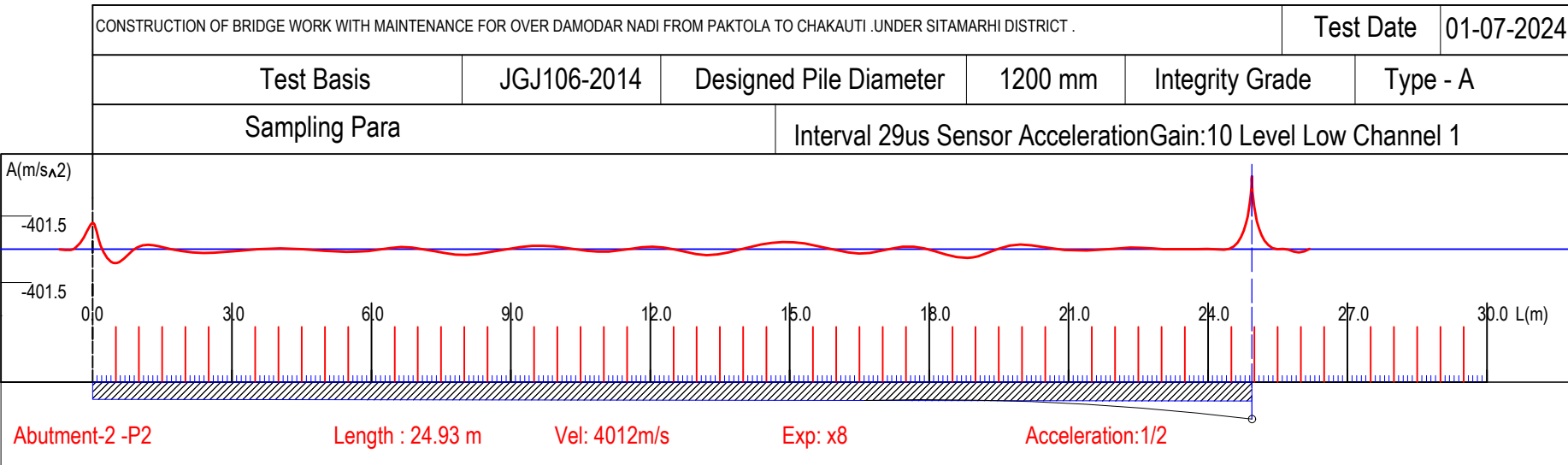
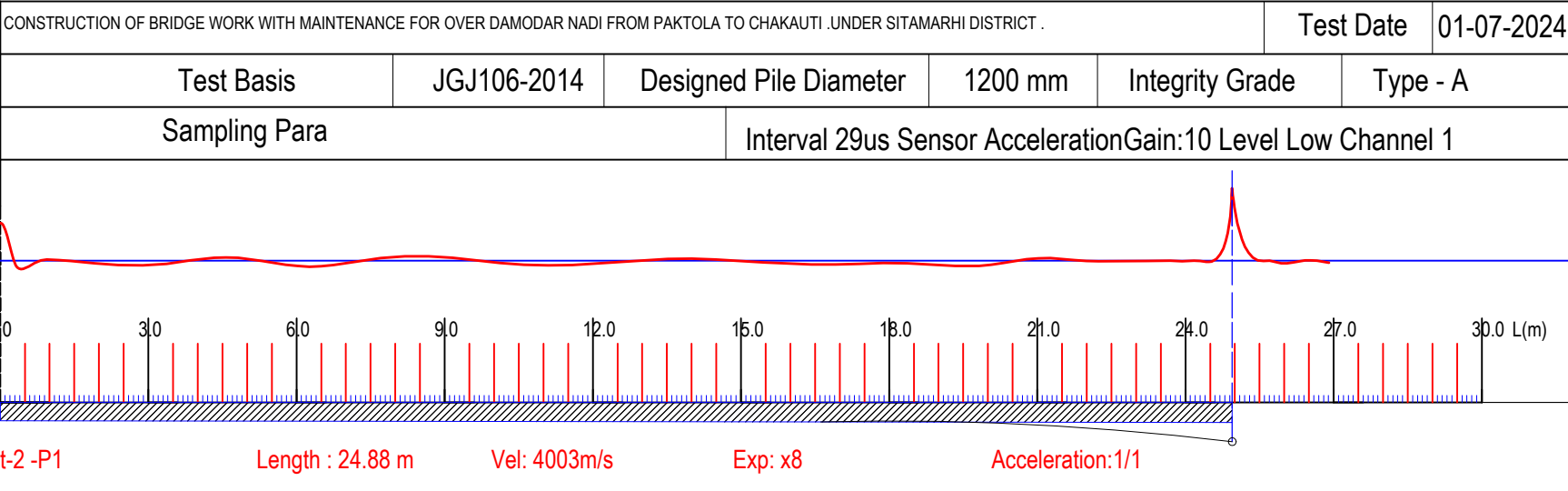
Abutment-1 -P6

Length : 24.89 m

Vel: 4005m/s

Exp: x8

Acceleration:1/6



CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

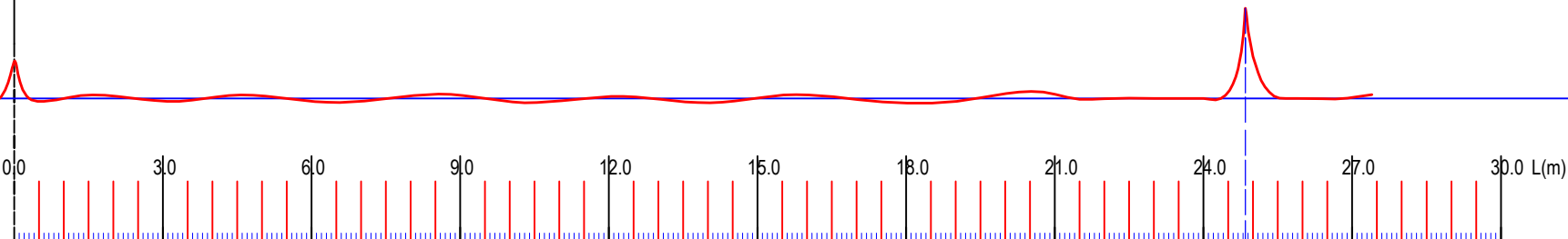
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-2 -P3

Length : 24.86 m

Vel: 4005m/s

Exp: x8

Acceleration:1/3

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

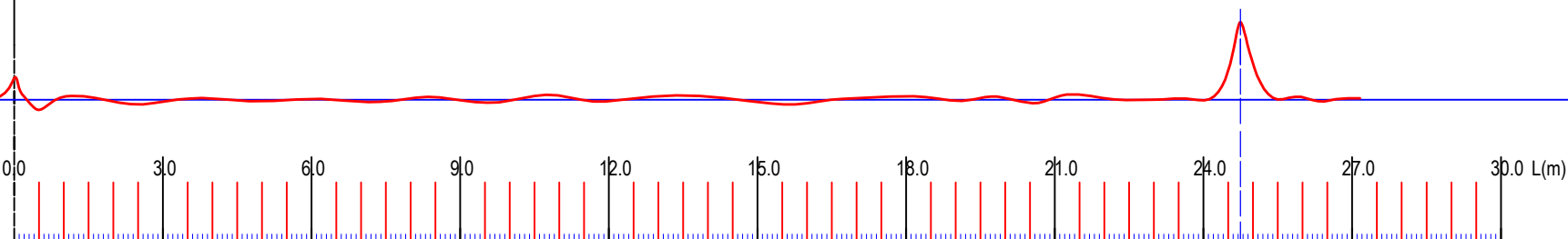
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-2 -P4

Length : 24.74 m

Vel: 4025m/s

Exp: x8

Acceleration:1/4

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

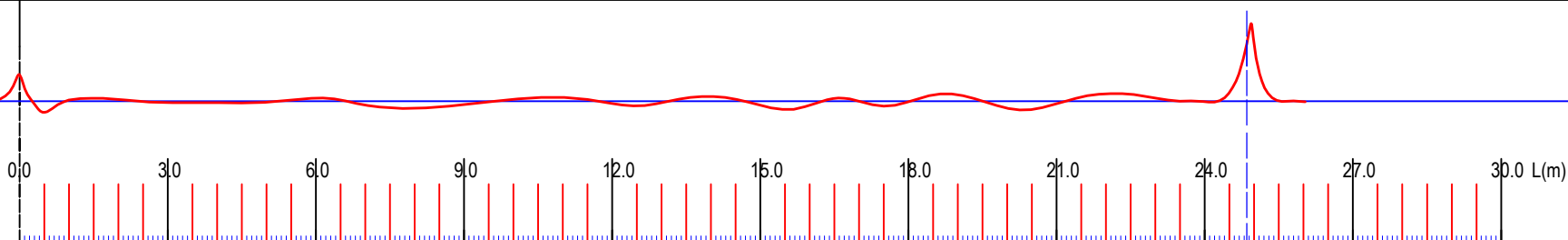
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-2 -P5

Length : 24.84 m

Vel: 4110m/s

Exp: x8

Acceleration:1/5

CONSTRUCTION OF BRIDGE WORK WITH MAINTENANCE FOR OVER DAMODAR NADI FROM PAKTOLA TO CHAKAUTI .UNDER SITAMARHI DISTRICT .

Test Date

01-07-2024

Test Basis

JGJ106-2014

Designed Pile Diameter

1200 mm

Integrity Grade

Type - A

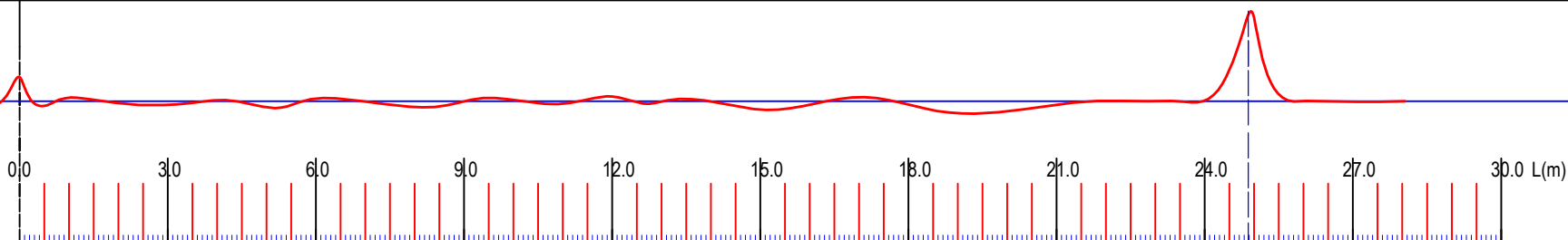
Sampling Para

Interval 29us Sensor AccelerationGain:10 Level Low Channel 1

A(m/s²)

-401.5

-401.5



Abutment-2 -P6

Length : 24.87 m

Vel: 4105m/s

Exp: x8

Acceleration:1/6