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Ministry of Surface Transport
(Roads Wing)

STANDARD PLANS FOR HIGHWAY BRIDGES

PRESTRESSED CONCRETE BEAMS & R. C. C. SLAB TYPE SUPERSTRUCTURE

VOLUME - II

ONE END STRESSING

PART 1 : STRAND SYSTEM
PART 2 : MULTI WIRE SYSTEM

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PREFACE

In 1991, Ministry had issued standard T-beam and slab prestressed concrete superstructure plans for 2-lane carriageway having spans 30 m (with and without footpaths) 35 m (with footpaths) and 40 m (without footpaths). These drawings envisage strand prestressing from both ends. In such method, it is essential that prestressing force at both ends should be applied simultaneously and of equal magnitude. This requirement can be achieved only if there is proper coordination/control between the technical staff at both the ends.

To overcome these difficulties and to maintain pace with the developed countries, it was decided to review the designs and drawings which envisage imparting prestressing force from one end only so that technical site staff can have better control during cable extensions.

Further, since high capacity multi-wire cables are available in the market, it was decided to evolve prestressed concrete superstructure drawings using such multi-wire cables.

Accordingly, suitability of already evolved prestressed concrete superstructure plans has been reviewed for adoption of one end prestressing strand system. It is observed that all other details except cable extensions will be identical to the details finalised for two end prestressing system issued earlier. The minor modifications have been carried out in drawings bearing Nos. SD/301 (Sheets 1 & 2), 312, 322, 332 and 342 for respective spans and new drawings bearing Nos. SD/401 (Sheets 1 & 2), 412, 422, 432 and 442 have been presented in part 1 of this volume. Other drawings pertaining to respective spans are available in earlier drawing folders and should be used without modification.

For adoption of multi wire cables (42 wires of 7 mm dia each), while concrete sections finalised earlier have been kept unaltered, slight modification in the cable profile has been found necessary. While reviewing the design, zero and 6 mm slip has been considered at one end only. Accordingly, drawings indicating general notes, anchorage details, cable profile and reinforcement in each end cross girder have been evolved afresh and presented in Part 2 of this volume.

For each type of system, a statement showing bill of quantities of various items has been appended to facilitate preparation of estimate for bridge superstructure based on these drawings.

It is hoped that the new drawings shall be of great use for adoption in the field. While every care has been taken to eliminate any error, error/omission that may come to notice while using these drawings for execution, may please be communicated to the Ministry.

The work of preparing the design and drawings has been carried out by M/s. Tandon Consultants Pvt. Ltd., New Delhi, and has been finalised by the officers of the Ministry. Their efforts deserve appreciation.

Dated: 6th June, 1995

M.V. Sastry
Director General
(Road Development)

CONTENTS

PART 1. STRAND SYSTEM

PART-2 MULTI WIRE SYSTEM

PART 1. STRAND SYSTEM

(A) GENERAL

1. These notes are applicable for the Standard Drawings for Prestressed Concrete Girders and RC Slab Type Composite Superstructure with and without footpaths.

2. The drawings are applicable only for right bridges.

3. The design is according to the following Codes:

I IRC: 5-1985
II IRC: 6-1966 (1981 Print)
III IRC: 18-1985
IV IRC: 21-1987
V IRC: 22-1986
VI IRC: 83-1982 (Part 1)
VII IRC: SP: 33-1989

4. All dimensions are in mm. Only written dimensions shall be followed. No drawing shall be scaled.

5. Public utility services (except water supply and sewerage), if required, shall be carried over the bridge through 150 mm dia ducts provided in the footpaths. Total load of such services shall not be more than 1.0 kN/m on each footpath.

6. Bituminous wearing coat shall comprise the following:

(i) A layer of mastic asphalt, 6mm thick (12 mm for high rainfall area) after applying a prime coat over the top of the deck, before the wearing coat is laid.

(ii) 50 mm thick asphaltic concrete wearing coat in two layers of 25 mm each.

Note 1. For high traffic density, an alternative specification for wearing course comprising 40 mm bituminous concrete overlaid with 25 mm thick bitumen mastic layer can be adopted.

Note 2. All the work of wearing coat may be done as per Section 500 of MOST's Specification.

7. The following loads have been considered in the design:

(i) One lane of IRC Class 70R or two lanes of IRC Class A on carriageway, whichever governs.

ii) Footpath load of 5 kN/sq.m. for superstructure having footpaths.

(iii) Wearing Coat load of 2 kN/sq.m.

8. The designs are applicable for "moderate" and "severe" conditions of exposure. In case of "severe" conditions suitable anti-corrosion treatment as approved by Engineer-in-Charge may be provided to reinforcement bars and exposed concrete surface.

(B) MATERIALS SPECIFICATIONS

Concrete

1. Concrete shall be design mix and have minimum 28 days characteristic strength of 40 MPa on 150 mm cubes for all elements of superstructure.

2. Ordinary Portland Cement conforming to IS: 269 or High strength Ordinary Portland Cement conforming to IS: 8112 capable of achieving the required design concrete strength shall only be used.

3. To improve workability of concrete and cement grout, admixtures conforming to IS: 6925 and IS: 9103 could be permitted subject to satisfactory proven use. Admixtures generating hydrogen, nitrogen, chlorides, etc., should not be used.

4. Cement content in concrete shall neither be less than 400 kg/cu.m. nor more than 540 kg/cu. m. of concrete.

5. Maximum water cement ratio shall be as follows:

Deck Slab 0.40;
Precast Girder 0.40

Reinforcement

6. Reinforcing Steel shall be of HYSD bars (Grade designation S:415) conforming to IS: 1786.

Prestressing Steel and Accessories

7. Cable consisting of 12 nos. of 12.7 mm dia. 7-ply Class 2 Strand as per IS: 6006-1983 shall be used for main prestressing.

8. For future prestressing, single 12.7 mm dia. 7-ply Class 2 Strand as per IS: 6006-1983 shall be used.

9. The prestressing steel and accessories shall be subjected to an acceptance test prior to their actual use on the works (Guidance may be taken from BS: 4447). Only multistrand jacks shall be used for tensioning of cables. Direct and indirect force measurement device (e.g. Pressure Gauge) to be attached in consultation with system manufacturer.

10. Anchorages at dead end shall be used similar to those used at the "live end". The use of buried type of anchorages at "dead end" are not permitted.

11. The strands at dead end anchorage shall be pre-blocked prior to tensioning from the live end. During tensioning of cable if there is any slip at the "dead end" the same shall be added to the extension required at the stressing end.

Sheathing

12. Sheathing shall be of "Drossbach" type 75 mm ID manufactured from minimum 0.4 mm thick bright metal strip. It shall be tested as per IRC: 18-1985, *Appendix: 1.*

Water

13. Water to be used in concreting, grouting and curing shall conform to Clause 5.1 (ii) of IRC: SP: 33-1989.

Expansion Joints

14. Expansion joints must be robust, durable, water-tight and replaceable. It must be provided over the full width of deck and follow the profile including kerb, footpath (where relevant) and facia. Expansion joints shall be obtained only from approved manufacturers and be of proven type. Details of expansion joints may be got approved before commencement of construction. Site fabricated expansion joints shall be prohibited.

15. Expansion joints shall have the following additional essential features:

(a) It shall cater for a total movement of ± 40 mm
(b) It shall be provided with a waterproof membrane to ensure against leakage below the joint.
(c) It shall have a cushion of elastomer to enable absorption of shock transmitted by vehicles.

16. Fabricated steel parts shall be positioned accurately before concreting the portion of deck slab beyond the end faces of the main girders.

17. Presence of manufacturer's representative at the time of positioning of embedded parts and installation of expansion joints is mandatory.

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GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB
COMPOSITE SUPERSTRUCTURE
WITH AND WITHOUT FOOTPATHS
GENERAL NOTES

ONE END STRESSING

RECOMMENDED BY	APPROVED BY	1992
Sd/- (D.K. RASTOGI) S.E.	Sd/- (M.K. MUKHERJEE) C.E.	DRG NO. SD/401 SHEET NO. 1

18. The initial gap between the adjacent movable concrete faces shall be fixed in consultation with the manufacturer of the expansion joint. However, the initial gap shall not be less than 38mm at the time of concreting.

(C) CONSTRUCTION

Sequence

Day (After casting of main girders)	Activity
14	Stressing of 1st stage cables
21	Casting of cross girders and deck slab except its portion beyond the end faces of main girders
49	Casting of portion of the deck slab beyond the end faces of main girders and casting of superimposed dead loads other than wearing coat
56	Stressing of 2nd stage cables
After 56	Laying of wearing coat

Stressing of 1st stage cables can be done earlier on achieving a strength of 35 MPa. Subsequent activities can also be advanced keeping the same time intervals.

2nd stage cables shall be stressed progressively one at a time in the three girders.

Launching Truss

The design is based on cast-in-situ construction. However, launching of girders may be permitted for which the load from leg of launching truss should not exceed the value given in relevant drawing.

(D) WORKMANSHIP/DETAILING

1. Minimum cover to any reinforcement shall be 50 mm unless shown otherwise in the drawing.

2. For ensuring proper cover of concrete to reinforcement bars, specially made polymer cover blocks shall only be used.

3. Construction joints shall be provided at locations shown in drawings.

4. Welding of reinforcement bars shall not be permitted.

5. Bending of reinforcement bars to be as per IS: 2502-1963.

6. Minimum lap length shall be kept as 63 d where "d" is the diameter of bar.

7. Supporting chairs of 12 mm dia. shall be provided at suitable intervals, as per IS: 2502.

8. Sharp edges of concrete shall be chamfered (10 mm x 10 mm)

9. Shuttering plates shall suitably be stiffened to enable the compaction by form vibrators.

10. Full width screed vibrator shall be used for compaction of concrete in deck slab.

11. The jacking force in each cable is 1543 kN to be imparted at stressing end only by using multistrand jack.

12. The following properties have been considered in the design.

(i) Area of 1 strand = 98.7 mm^2
(ii) Wobble coefficient k = 0.0046/m
(iii) Friction coefficient μ = 0.25
(iv) Modulus of elasticity of steel in strand = 1.95 x 10^5 MPa
(v) Average slip = 6 mm

13. Minimum strength of concrete at the time of tensioning of cables shall be 35 MPa or as recommended by system manufacturer, whichever is higher.

14. Grouting shall be carried out as per Appendix-2 of IRC: 18-1985.

15. For future prestressing in case of bridge distress, single 12.7 mm dia. 7-ply Class 2 strands as per IS: 6006-1983 shall be used. The tensioning force per strand shall be 128.6 kN. Mono strand jacks shall be used for tensioning of strands utilising approved prestressing system only. The externally placed strands shall be protected by polyethylene sheathing and grouted.

16. The location of jacks for lifting up the superstructure to replace bearing etc., is shown thus↑. This shall be distinctly etched on end cross-girders and pier/abutment caps.

(E) REFERENCE TO DRAWINGS

Drawing No.	Title
SD/302	General Arrangement
SD/303	Details of wearing coat and drainage system
SD/304	Details of RCC Railing for Superstructure without footpaths
SD/305	Details of RCC Railing for Superstructure with footpaths
SD/306 (Sheets 1, 2 & 3)	Details of Bearings.

In case any other type of railing is used, prior approval shall be obtained.

(F) SPECIAL NOTE FOR PRESTRESSING

If the calculated elongation is reached before the calculated gauge pressure is obtained, continue tensioning till attaining the calculated gauge pressure, provided the elongation does not exceed 1.05 times the calculated elongation. If this elongation is achieved before the calculated gauge pressure is attained, stop stressing and inform the engineer.

If the calculated elongation has not been reached continue tensioning by intervals of 5 kg/sq. cm. until the calculated elongation is reached provided the gauge pressure does not exceed 1.05 times the calculated gauge pressure.

If the elongation at 1.05 times the calculated gauge pressure is less than 0.95 times the calculated elongation, the following measures must be taken, in succession, to define the cause of this lack of elongation.

- Recalibrate the pressure gauge.
- Check the correct functioning of the jack, pump and leads.
- De-tension the cable. Slide it in its duct to check that it is not blocked by mortar which has entered through holes in the sheath. Re-tension the cable, if free.

If the required elongation is not obtained, further finishing operations such as cutting or sealing, should not be undertaken without the approval of the engineer.

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MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB
COMPOSITE SUPERSTRUCTURE
WITH AND WITHOUT FOOTPATHS
GENERAL NOTES

ONE END STRESSING

RECOMMENDED BY	APPROVED BY	1992
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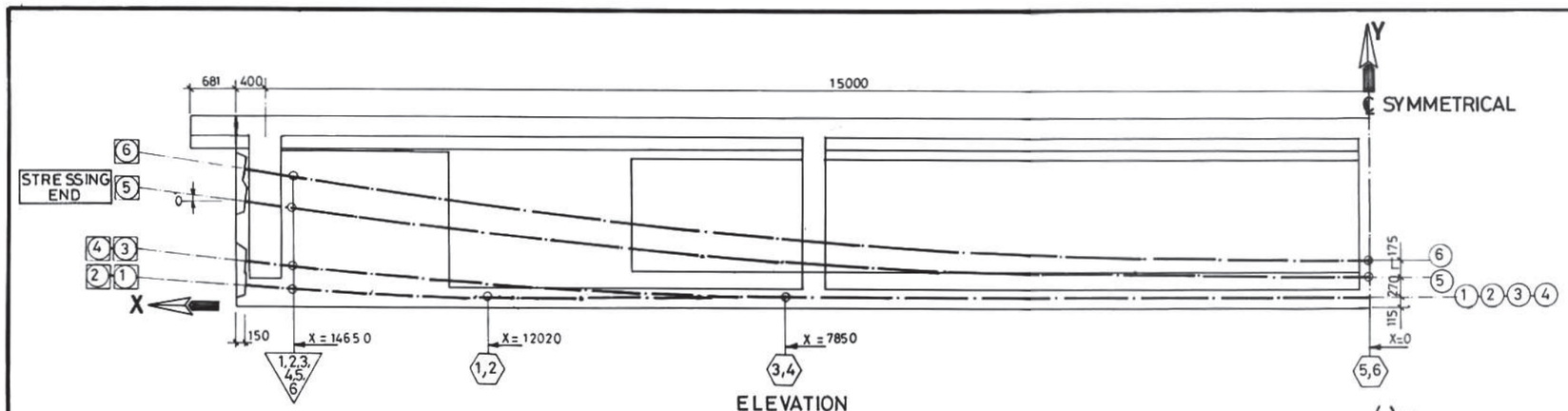
BILL OF QUANTITIES (PER SPAN)
FOR STANDARD PLANS FOR HIGHWAY BRIDGES
PRESTRESSED GIRDER & RCC SLAB SUPERSTRUCTURE
(WITH PRESTRESSING CABLES COMPRISING OF STRANDS)

S. No.	Item	MOST Specs. Section No.	Unit	QUANTITY			
				30m span without footpath	30m span with footpath	35m span with footpath	40m span without footpath
1.	Cement Concrete Prestressed M40	1500 1700 1800	M^3	214.00	263.00	320.62	318.00
2.	Steel Reinforcement S415 for item 1	1600	t	27.99	37.37	46.82	38.96
3.	Prestressing Tendons incl. ancillaries	1800	t	5.69	6.62	8.41	9.81
4.	Elastomeric Expansion Joints	2100	m	18.36	23.66	23.66	18.36
5.	Asphaltic Wearing Coat	2200 512, 515	m^2	241.50	241.50	278.25	316.50
6.	Railings	1500 1600 1700 2200	m	64.40	64.40	74.30	84.40
7.	Drainage Spouts	2200	nos.	10	10	12	14
8.	Steel Bearing	2000					
	(i) Rocker Bearing		nos.	3	3	3	3
	(ii) Rocker-cum-Roller Bearings		nos.	3	3	3	3

Note: Quantities mentioned above are applicable to Drawings issued in Vol. I as well as Vol. II Part 1.

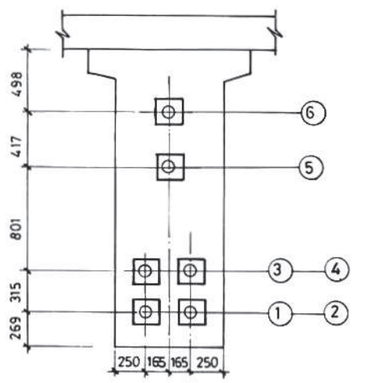


NOTES.....

1. The stressing or live anchorages of all the cables will be located at same end of the girder.
2. The length of cables indicated are measured along profile between end faces of precast girder. Additional length required for attaching jack at live end is to be added in consultation with system manufacturer.
3. The extensions indicated are for portion of cables lying between end faces of precast girder. Additional extension for portion lying between end face and gripping point of jack at stressing end is to be added (approx.7mm/m)
4. The extensions are based on the following data:
   i) Wobble coefficient $k = 0.0046/m$
   ii) Friction coefficient $\mu = 0.25$
   iii) Modulus of Elasticity of steel in strand, $Es = 1.95 \times 10^5$ MPa
5. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1. Nos 6, 1, 2, 3 and 4 (14th day after casting of girder.)
   Stage 2. No.5 (56th day after casting of girder or 35th day after casting deck slab whichever is later). Superimposed dead loads will be placed immediately after stage 2 prestressing.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings:
   i) General Notes: Drg. No. SD/401 (sheet 1 & 2).
   ii) Dimensions & Anchorage Details: Drg. No. SD/311.
   iii) Reinforcement in Deck slab & Kerbs: Drg. No. SD/313.
   iv) Reinforcement in Main Girders: Drg. No. SD/314.
   v) Reinforcement in End Cross Girders: Drg. No. SD/315.
   vi) Reinforcement in Intermediate Cross Girders: Drg. No. SD/316.
   vii) Schedule of Reinforcement: Drg. No. SD/317 (sheet 1,2&3)

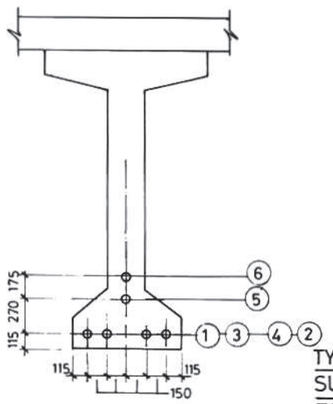
ORDINATES AT DISTANCE 'X' (mm) FROM CENTRE

CABLE NO	15250		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	269	+165	175	+181	130	+263	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	269	-165	175	-181	130	-263	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	584	+165	441	+154	344	+150	264	+150	201	+150	155	+150	126	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	584	-165	441	-154	344	-150	264	-150	201	-150	155	-150	126	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	1386	0	1229	0	1113	0	1005	0	906	0	816	0	734	0	661	0	596	0	540	0	493	0	454	0	424	0	402	0	389	0	385	0
6	1802	0	1608	0	1464	0	1330	0	1207	0	1095	0	993	0	902	0	822	0	753	0	694	0	646	0	608	0	581	0	565	0	560	0

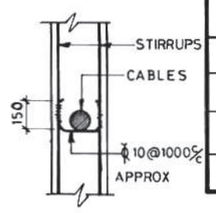


END VIEW OF BEAM

150 mm INSIDE FROM GIRDER FACE



SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable nos	Length (mm)	Extention at stressing end (mm)	Emergence angle (θ) (Degree)
1 & 2	30820	179.0	4.596
3 & 4	30846	184.0	6.688
5	30890	186.7	7.191
6	30938	185.7	8.906

LEGEND:-

- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLES NUMBER

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STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE

30.0m SPAN WITHOUT FOOTPATHS

PRESTRESSING CABLES

ONE END STRESSING

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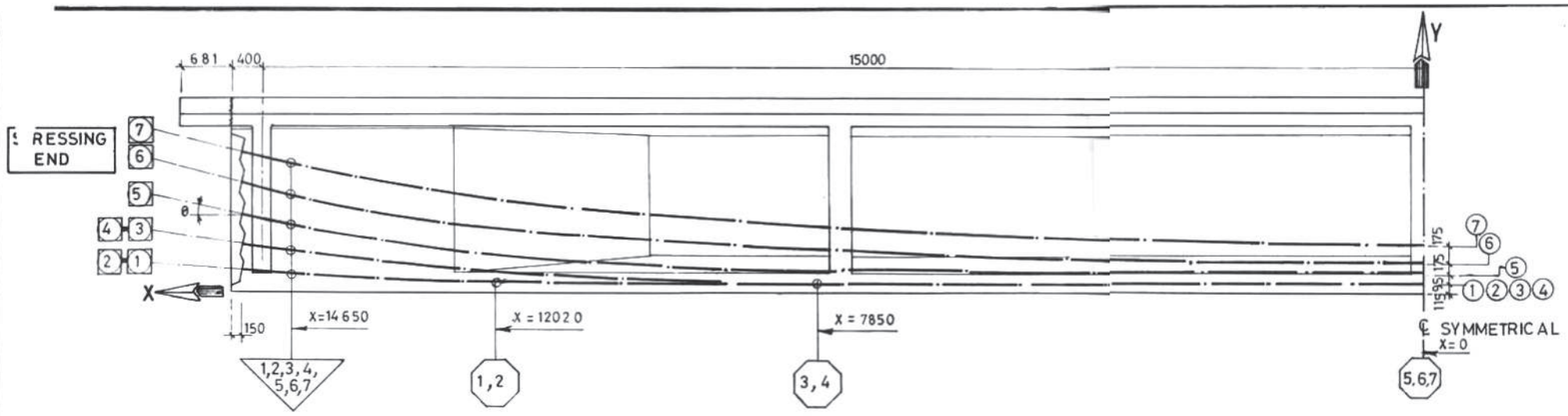
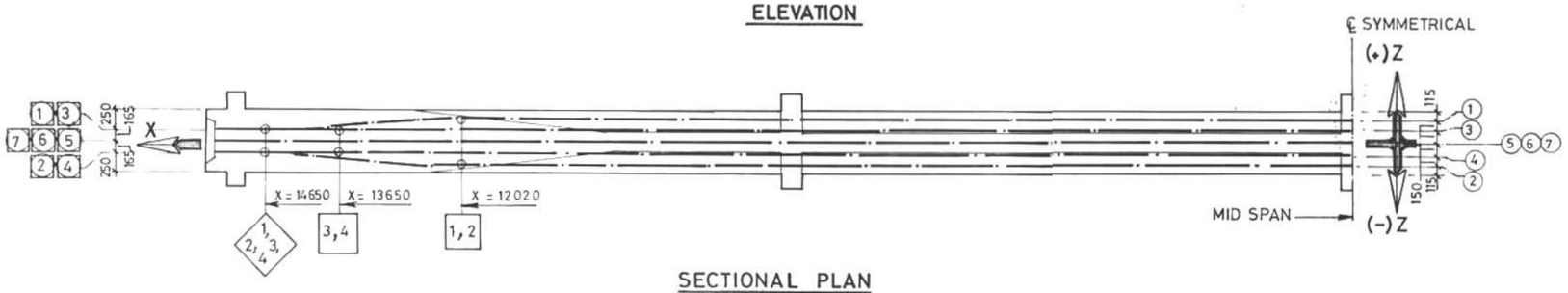
(D.K. RASTOGI) S.E.	(M.K. MUKHERJEE) C.E.	DRG. NO. SD/412



ELEVATION



SECTIONAL PLAN

CABLE NO	ORDINATES AT DISTANCE 'X' (mm) FROM CENTRE																											
	15250		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	269	+165	175	+181	130	+263	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	269	-165	175	-181	130	-263	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
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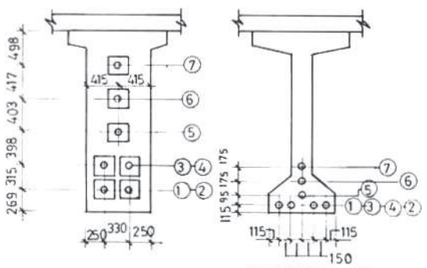
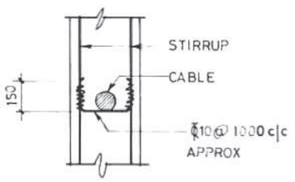
5	982	0	817	0	772	0	689	0	612	0	542	0	479	0	423	0	373	0	330	0	293	0	263	0	240	0	223	0	213	0	210	0
6	1385	0	1229	0	1113	0	1005	0	906	0	816	0	734	0	667	0	596	0	540	0	493	0	454	0	424	0	402	0	389	0	385	0
7	1802	0	1608	0	1464	0	1330	0	1207	0	1095	0	993	0	902	0	822	0	752	0	694	0	646	0	608	0	581	0	565	0	560	0



END VIEW OF BEAM
150 mm INSIDE FROM GIRDER FACE

SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable No.	Length (mm)	Extention at Stressing end (mm)	Emergence angle (θ) (Degree)
1 & 2	30820	179.0	4.596
3 & 4	30846	184.0	6.688
5	30852	187.8	5.563
6	30890	186.7	7.191
7	30938	185.7	8.906

LEGEND:-

- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLE NUMBER

NOTES.....

1. The stressing or live anchorages of all the cables will be located at same end of the girder.
2. The length of cables indicated are measured along profile between end faces of precast girder. Additional length required for attaching jack at live end is to be added in consultation with system manufacturer.
3. The extensions indicated are for portion of cables lying between end faces of precast girder. Additional extension for portion lying between end face and gripping point of jack at stressing end is to be added (approx. 7mm/m)
4. The extensions are based on the following data
   i) Wobble coefficient $k = 0.0046/m$
   ii) Friction coefficient $\mu = 0.25$
   iii) Modulus of Elasticity of steel in strand, $Es = 1.95 \times 10^5$ MPa
5. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1 Nos 6, 1, 2, 3 and 4 (14th day after casting of girder)
   Stage 2 No. 5, 7 (56th day after casting of girder or 35th day after casting of deck slab whichever is later) Superimposed dead loads will be placed immediately after stage 2 prestressing.
6. All cables are to have smooth profile without kinks passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings.
   i) General Notes: Drg. no. SD/401 (sheet 1 & 2)
   ii) Dimension & Anchorage Details. Drg. no. SD/321
   iii) Reinforcement in Deck slab, kerbs and Footpaths. Drg. no. SD/323
   iv) Reinforcement in main Girders. Drg. no. SD/324
   v) Reinforcement in End Cross Girders. Drg. no SD/325
   vi) Reinforcement in Intermediate Cross Girders. Drg. no. SD/326
   vii) Schedule of Reinforcement. Drg. no. SD/327 Sheets (1, 2 & 3)

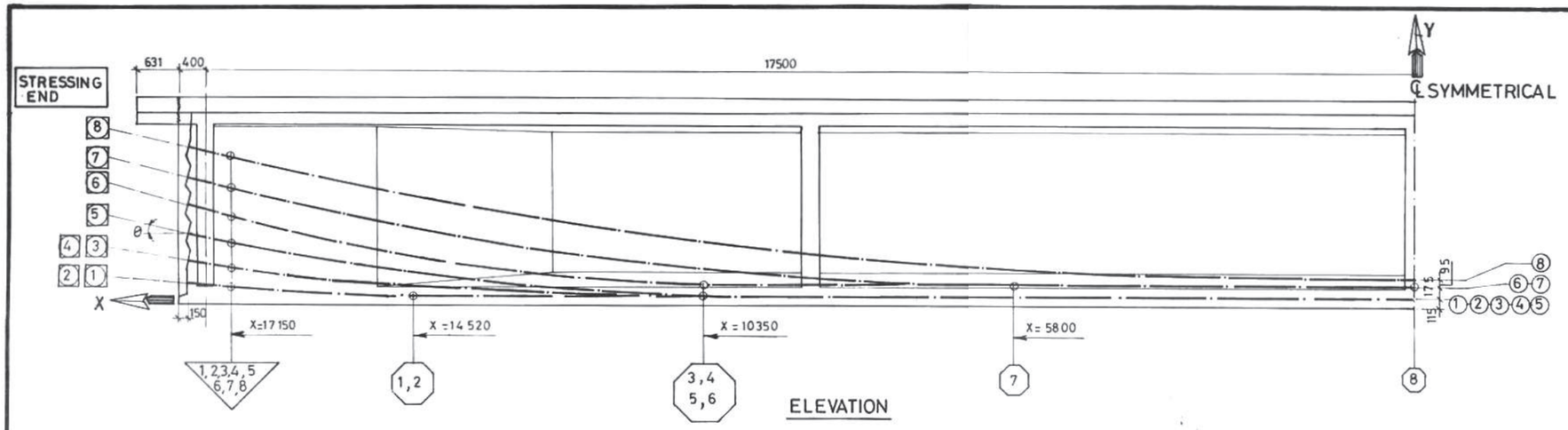
MKD	DATE	DESCRIPTION	BY
		REVISION	

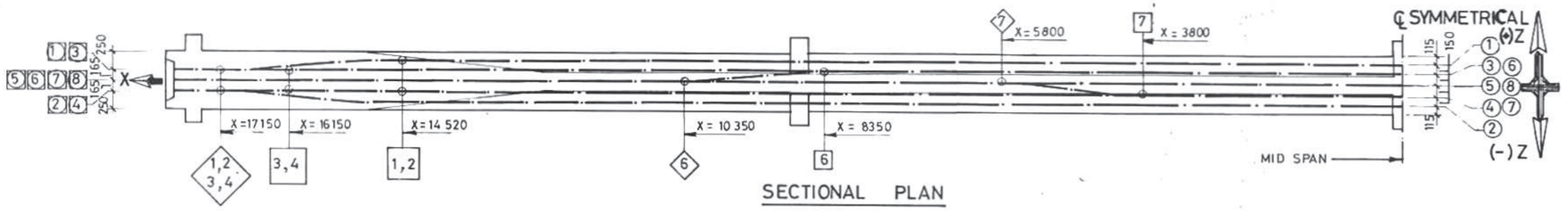
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

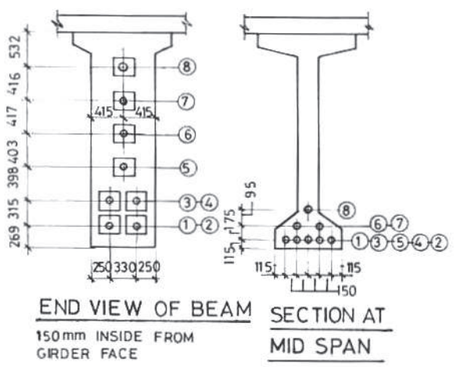
PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
30.0m SPAN WITH FOOTPATHS
PRESTRESSING CABLES
ONE END STRESSING

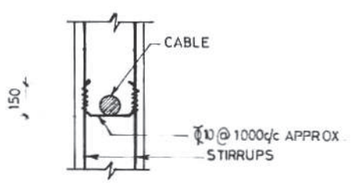
RECOMMENDED BY	APPROVED BY	1992
(D.K. RASTOGI) S.E	(M.K. MUKHERJEE) C.E.	DRG NO SD/422





CABLE NO.	ORDINATES AT DISTANCE 'X' (mm) FROM CENTRE																															
	17750		17000		1600		15000		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0.000	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	269	+165	209	+165	148	+217	119	+291	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	269	-165	209	-165	148	-217	119	-291	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	584	+165	496	+164	390	+150	305	+150	230	+150	176	+150	138	+150	119	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	584	-165	496	-164	390	-150	305	-150	230	-150	176	-150	138	-150	119	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	982	0	820	0	624	0	460	0	327	0	227	0	158	0	122	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0
6	1385	0	1180	0	933	0	725	0	558	0	431	0	345	0	299	0	290	+9	290	+118	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150
7	1802	0	1622	0	1395	0	1189	0	1004	0	841	0	698	0	577	0	477	0	399	0	341	0	305	0	290	0	290	-48	290	-147	290	-150	290	-150	290	-150
8	2218	0	2068	0	1876	0	1695	0	1526	0	1369	0	1224	0	1090	0	967	0	857	0	758	0	670	0	595	0	531	0	478	0	437	0	408	0	391	0	385	0





Cable No.	Length (m m)	Extension at Stressing end (mm)	Emergence Angle (Ø) (DEGREE)
1 & 2	35820	205.7	4.598
3 & 4	35846	211.4	6.687
5	35940	210.2	12.230
6	36038	193.9	15.310
7	36078	196.1	13.548
8	36058	212.0	11.30

LEGEND :-

- INDICATES START OF CURVE IN ELEVATION.
- INDICATES END OF CURVE IN ELEVATION.
- INDICATES START OF CURVE IN PLAN.
- INDICATES END OF CURVE IN PLAN.
- INDICATES END OF CABLE.
- INDICATES CABLE NUMBER.

NOTES.....

1. The stressing or live anchorages of all the cables will be located at same end of the girder.
2. The length of cables indicated are measured along profile between end faces of precast girder. Additional length required for attaching jack at live end is to be added in consultation with system manufacturer.
3. The extensions indicated are for portion of cables lying between end faces of precast girder. Additional extension for portion lying between end face and gripping point of jack at stressing end is to be added (approx. 7mm/m)
4. The extensions are based on the following data:
   i) Wobble coefficient k = 0.0046/m
   ii) Friction coefficient μ = 0.25
   iii) Modulus of Elasticity of steel in strand, Es = 1.95×10^5 MPa
5. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1. Nos 5,1,2,3,4 and 8 (14th day after casting of girder.)
   Stage 2. Nos 6 and 7 (56 th day after casting of girder or 35th day after casting of deck slab whichever is later). Superimposed dead loads will be Placed immediately after stage 2 Prestressing.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings :
   i) General Notes: Drg. NO. SD/401 (sheet 1 & 2)
   ii) Dimensions & Anchorage Details Drg. No. SD/331
   iii) Reinforcement in Deck slab, Kerbs and Footpaths Drg. No. SD/333.
   iv) Reinforcement in Main Girders Drg. No. SD/334
   v) Reinforcement in End Cross Girders Drg. No. SD/335
   vi) Reinforcement in Intermediate Cross Girders Drg. No. SD/336
   vii) Schedule of Reinforcement Drg. No. SD/337 (Sheet 1,2 & 3)

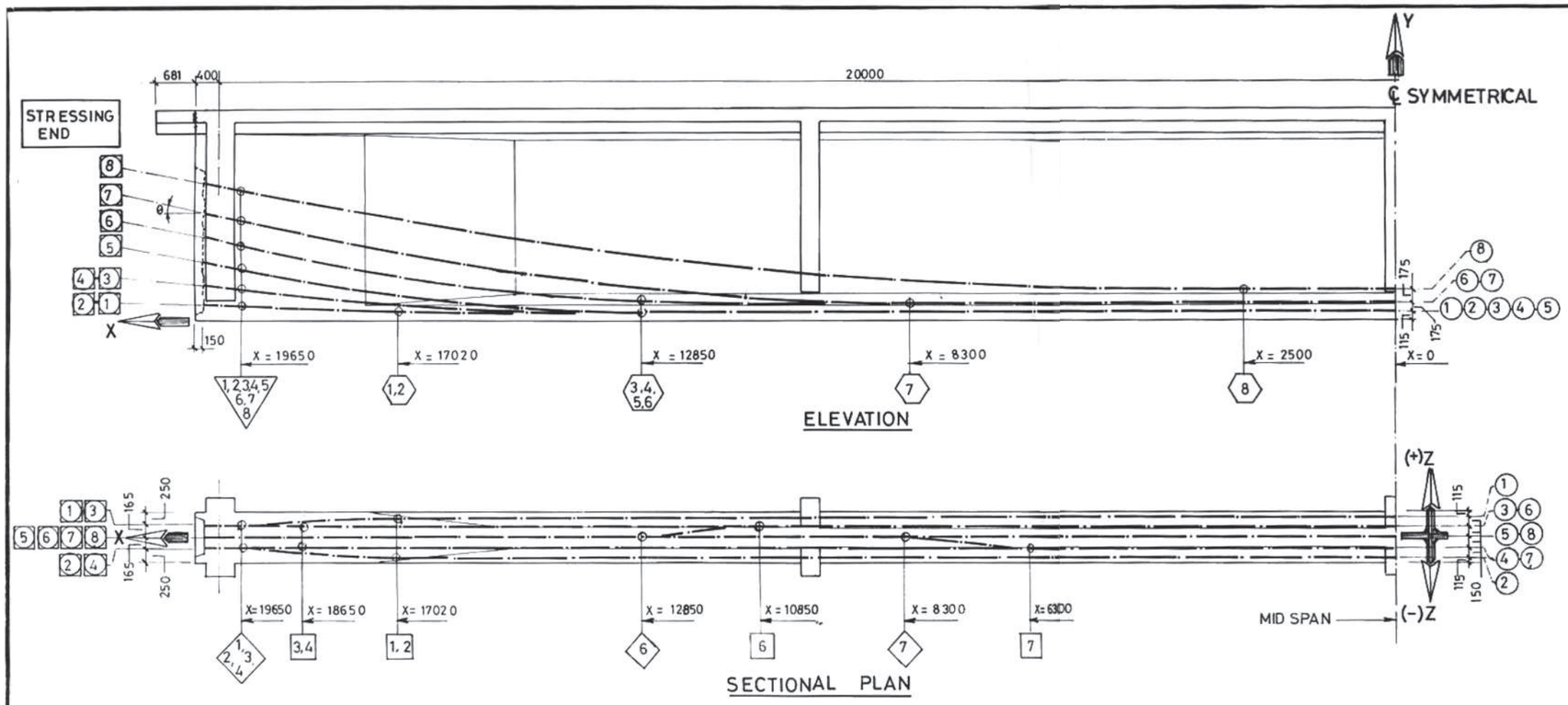
MKD	DATE	DESCRIPTION	BY
		REVISION	

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

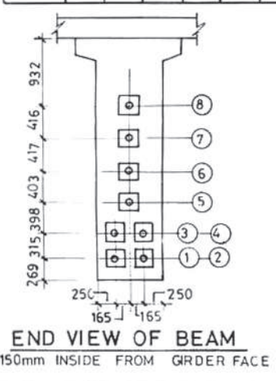
STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
35.0m SPAN WITH FOOTPATHS
PRESTRESSING CABLES
ONE END STRESSING

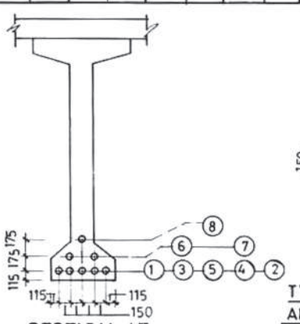
RECOMMENDED BY	APPROVED BY	1992
(D.K. RASTOGI) S.E	(M.K. MUKHERJEE) C.E	DRG. NO. SD/432



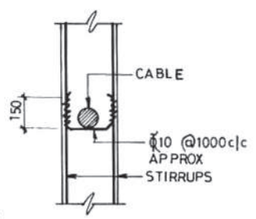
CABLE NO.	ORDINATES AT DISTANCE 'X' (mm) FROM CENTRE																																	
	20250		20000		19000		18000		17000		16000		15000		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000/1000		0	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	269	+165	249	+165	175	+182	130	+263	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	269	-165	249	-165	175	-182	130	-263	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	584	+165	555	+165	441	+154	344	+150	264	+150	201	+150	155	+150	126	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	584	-165	555	-165	441	-154	344	-150	264	-150	201	-150	155	-150	126	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	982	0	928	0	718	0	538	0	390	0	273	0	189	0	136	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0
6	1385	0	1317	0	1051	0	824	0	637	0	490	0	383	0	317	0	290	0	290	+54	290	+148	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150
7	1802	0	1742	0	1506	0	1289	0	1094	0	920	0	767	0	635	0	525	0	435	0	367	0	321	0	295	0	290	-7	290	-113	290	-150	290	-150	290	-150	290	-150	290	-150
8	2218	0	2170	0	1981	0	1803	0	1636	0	1480	0	1335	0	1202	0	1079	0	968	0	867	0	778	0	700	0	634	0	578	0	533	0	500	0	478	0	466	0	465	0	465	0



END VIEW OF BEAM
150mm INSIDE FROM GIRDER FACE



SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable No.	Length (mm)	Exension at Stressing end mm)	Emergence angle θ (degree)
1 & 2	40820	31.9	4.596
3 & 4	40842	138.2	6.684
5	40940	36.7	12.225
6	41038	218.4	15.310
7	41078	220.7	13.546
8	41034	239.0	10.817

LEGEND :-
- ⬡ – INDICATES START OF CURVE IN ELEVATION
- ▽ – INDICATES END OF CURVE IN ELEVATION
- □ – INDICATES START OF CURVE IN PLAN
- ◇ – INDICATES END OF CURVE IN PLAN
- ⊡ – INDICATES END OF CABLE
- ○ – INDICATES CABLE NUMBER

NOTES.....

1. The stressing or live anchorages of all the cables will be located at same end of the girder.
2. The length of cables indicated are measured along profile between end faces of precast girder. Additional length required for attaching jack at live end is to be added in consultation with system manufacturer.
3. The extensions indicated are for portion of cables lying between end faces of precast girder. Additional extension for portion lying between end face and gripping point of jack at stressing end is to be added (approx. 7mm/m)
4. The extensions are based on the following data
   i) Wobble coefficient $k = 0.0046/m$
   ii) Friction coefficient $\mu = 0.25$
   iii) Modulus of Elasticity of steel in strand, $Es = 1.95 \times 10^5$ MPa
5. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1. Nos 1, 2, 3, 4, 5 and 8 (14th day after casting of girder)
   Stage 2. No 6 and 7 (56th day after casting of girder or 35th day after casting deck slab whichever is later)
   Superimposed dead loads will be placed immediately after stage 2 prestressing.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings.
   i) General Notes Drg. No. SD/401 (sheet 1 & 2)
   ii) Dimensions & Anchorage Details. Drg. No. SD/341
   iii) Reinforcement in Deck slab & Kerbs. Drg. No. SD/343.
   iv) Reinforcement in Main Girders. Drg. No. SD/344
   v) Reinforcement in End Cross Girders. Drg. No. SD/345
   vi) Reinforcement in Intermediate Cross Girders. Drg. No. SD/346
   vii) Schedule of Reinforcement Drg. No. SD 347 (sheet 1, 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
40.0m SPAN WITHOUT FOOTPATHS
PRESTRESSING CABLES
ONE END STRESSING

RECOMMENDED BY	APPROVED BY	1992
(D.K. RASTOGI) S.E.	(M.K. MUKHERJEE) C.E.	DRG. NO. SD/442

PART 2. MULTI-WIRE SYSTEM

(A) GENERAL

1. These notes are applicable for the Standard Drawings for Prestressed Concrete Girders and RC Slab Type Composite Superstructure with and without footpaths.

2. The drawings are applicable only for right bridges.

3. The design is according to the following Codes:

I IRC: 5-1985
II IRC: 6-1966 (1981 Print)
III IRC: 18-1985
IV IRC: 21-1987
V IRC: 22-1986
VI IRC: 83- 1982 (Part 1)
VII IRC: SP: 33-1989

4. All dimensions are in mm. Only written dimensions shall be followed. No drawing shall be scaled.

5. Public utility services (except water supply and sewerage), if required, shall be carried over the bridge through 150 mm dia ducts provided in the footpaths. Total load of such services shall not be more than 1.0 kN/m on each footpath.

6. Bituminous wearing coat shall comprise the following:

(i) A layer of mastic asphalt, 6 mm thick (12 mm for high rainfall area) after applying a prime coat over the top of the deck before the wearing coat is laid.

(ii) 50 mm thick asphaltic concrete wearing coat in two layers of 25 mm each.

Note 1. For high traffic density, an alternative specification for wearing course comprising 40 mm bituminous concrete overlaid with 25 mm thick bitumen mastic layer can be adopted.

Note 2. All the work of wearing coat may be done as per Section 500 of MOST's Specification.

7. The following loads have been considered in the design:

(i) One lane of IRC Class 70R or two lanes of IRC Class A on carriageway, whichever governs.

(ii) Footpath load of 5 kN/sq.m. for superstructure having footpaths.

(iii) Wearing Coat load of 2 kN/sq.m.

8. The designs are applicable for "moderate" and "severe" conditions of exposure. In case of "severe" conditions suitable anti-corrosion treatment as approved by Engineer-in-Charge may be provided to reinforcement bars and exposed concrete surface.

(B) MATERIALS SPECIFICATIONS

Concrete

1. Concrete shall be design mix and have minimum 28 days characteristic strength of 40 MPa on 150 mm cubes for all elements of superstructure.

2. Ordinary Portland Cement conforming to IS: 269 or High strength Ordinary Portland cement conforming to IS: 8112 capable of achieving the required design concrete strength shall only be used.

3. To improve workability of concrete and cement grout, admixtures conforming to IS: 6925 and IS: 9103 could be permitted subject to satisfactory proven use. Admixtures generating hydrogen, nitrogen, chlorides, etc., should not be used.

4. Cement content in concrete shall neither be less than 400 kg/cu. m. nor more than 540 kg/cu. m. of concrete.

5. Maximum water cement ratio shall be as follows:

Deck Slab 0.40;
Precast Girder 0.40

Reinforcement

6. Reinforcing Steel shall be of HYSD bars (Grade designation S:415) conforming to IS: 1786.

Prestressing Steel and Accessories

7. Cable consisting of 42 nos. of 7.0 mm dia wire as per IS: 1785-1983 (Part I) shall be used for main prestressing.

8. For future prestressing, single 12.7 mm dia 7-ply Class 2 Strand as per IS: 6006-1983 shall be used.

9. The prestressing steel and accessories shall be subjected to an acceptance test prior to their actual use on the works (Guidance may be taken from BS: 4447). Direct and indirect force measurement device (e.g. Pressure Gauge) to be attached in consultation with system manufacturer.

Sheathing

10. Sheathing shall be of "Drossbach" type 75 mm ID manufactured from minimum 0.4 mm thick bright metal strip. It shall be tested as per IRC: 18-1985, *Appendix-1*.

Water

11. Water to be used in concreting, grouting and curing shall conform to Clause 5.1 (ii) of IRC: SP: 33-1989.

Expansion Joints

12. Expansion joints must be robust, durable, water-tight and replaceable. It must be provided over the full width of deck and follow the profile including kerb, footpath (where relevant) and facia. Expansion joints shall be obtained only from approved manufacturers and be of proven type. Details of expansion joints may be got approved before commencement of construction. Site fabricated expansion joints shall be prohibited.

13. Expansion joints shall have the following additional essential features:

(a) It shall cater for a total movement of ± 40 mm.

(b) It shall be provided with a waterproof membrane to ensure against leakage below the joint.

(c) It shall have a cushion of elastomer to enable absorption of shock transmitted by vehicles.

14. Fabricated steel parts shall be positioned accurately before concreting the portion of deck slab beyond the end faces of the main girders.

15. Presence of manufacturer's representative at the time of positioning of embedded parts and installation of expansion joints is mandatory.

16. The initial gap between the adjacent movable concrete faces shall be fixed in consultation with the manufacturer of the expansion joint. However, the initial gap shall not be less than 38 mm at the time of concreting.

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REVISION			

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB
COMPOSITE SUPERSTRUCTURE
WITH AND WITHOUT FOOTPATHS
GENERAL NOTES

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	DEC. 1993
Sd/- (D.K. RASTOGI) S.E.	Sd/- (M.R. KACHHWAHA) C.E.	DRG NO. SD/501 SHEET NO. 1

(C) CONSTRUCTION

Sequence

Day (After casting of main girders)	Activity
14	Stressing of 1st stage cables
21	Casting of cross girders and deck slab except its portion beyond the end faces of main girders
49	Casting of portion of the deck slab beyond the end faces of main girders and casting of superimposed dead loads other than wearing coat
56	Stressing of 2nd stage cables
After 56	Laying of wearing coat

Stressing of 1st stage cables can be done earlier on achieving a strength of 35 MPa. Subsequent activities can also be advanced keeping the same time intervals.

2nd stage cables shall be stressed progressively one at a time in the three girders.

Launching Truss

The design is based on cast-in-situ construction. However, launching of girders may be permitted for which the load from leg of launching truss should not exceed the value given in relevant drawing.

(D) WORKMANSHIP/DETAILING

1. Minimum cover to any reinforcement shall be 50 mm unless shown otherwise in the drawing.

2. For ensuring proper cover of concrete to reinforcement bars, specially made polymer cover blocks shall only be used.

3. Construction joints shall be provided at locations shown in drawings.

4. Welding of reinforcement bars shall not be permitted.

5. Bending of reinforcement bars to be as per IS: 2502-1963.

6. Minimum lap length shall be kept as 63 d where "d" is the diameter of bar.

7. Supporting chairs of 12 mm dia. shall be provided at suitable intervals, as per IS: 2502.

8. Sharp edges of concrete shall be chamfered (10 mm x 10 mm).

9. Shuttering plates shall suitably be stiffened to enable the compaction by form vibrators.

10. Full width screed vibrator shall be used for compaction of concrete in deck slab.

11. The jacking force in each cable is 1776. 3 kN, to be imparted at one end of the girder using multi-pull jack.

12. The following properties have been considered in the design:

(i) Area of one wire = 38.48 mm^2
(ii) Area of one cable = 1616.3 mm^2
(iii) Wobble coefficient, k = 0.0091 rad/m
(iv) Friction coefficient, μ = 0.25
(v) Modulus of elasticity of steel in wires = $2.1*10^5$ MPa
(vi) Slip = 0 to 6 mm.

13. Minimum strength of concrete at the time of tensioning of cables shall be 35 MPa or as recommended by system manufacturer, whichever is higher.

14. Grouting shall be carried out as per Appendix 2 of IRC: 18-1985.

15. For future prestressing in case of bridge distress, single 12.7 mm dia 7-ply Class 2 strand as per IS: 6006-1983 shall be used. The tensioning force per strand shall not exceed 128.6 kN. Mono strand jack shall be used for tensioning of strand utilising approved prestressing system only. The externally placed strands shall be protected by polyethylene sheathing and grouted.

16. The location of jacks for lifting up the superstructure to replace bearing etc., is shown thus↑. This shall be distinctly etched on end cross-girders and pier/abutment caps.

(E) REFERENCE TO DRAWINGS

Drawing No.	Title
SD/302	General Arrangement
SD/303	Details of wearing coat and drainage system
SD/304	Details of RCC Railing for Superstructure without footpaths
SD/305	Details of RCC Railing for Superstructure with footpaths
SD/306 (Sheets 1, 2 & 3)	Details of Bearings

In case any other type of railing is used, prior approval shall be obtained.

(F) SPECIAL NOTE FOR PRESTRESSING

If the calculated elongation is reached before the calculated gauge pressure is obtained, continue tensioning till attaining the calculated gauge pressure, provided the elongation does not exceed 1.05 times the calculated elongation. If this elongation is achieved before the calculated gauge pressure is attained, stop stressing and inform the engineer.

If the calculated elongation has not been reached continue tensioning by intervals of 5 kg/sq. cm. until the calculated elongation is reached provided the gauge pressure does not exceed 1.05 times the calculated gauge pressure.

If the elongation at 1.05 times the calculated gauge pressure is less than 0.95 times the calculated elongation, the following measures must be taken, in succession, to define the cause of this lack of elongation.

- Recalibrate the pressure gauge
- Check the correct functioning of the jack, pump and leads
- De-tension the cable. Slide it in its duct to check that it is not blocked by mortar which has entered through holes in the sheath. Re-tension the cable, if free.

If the required elongation is not obtained, further finishing operations such as cutting or sealing, should not be undertaken without the approval of the engineer.

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REVISION			

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

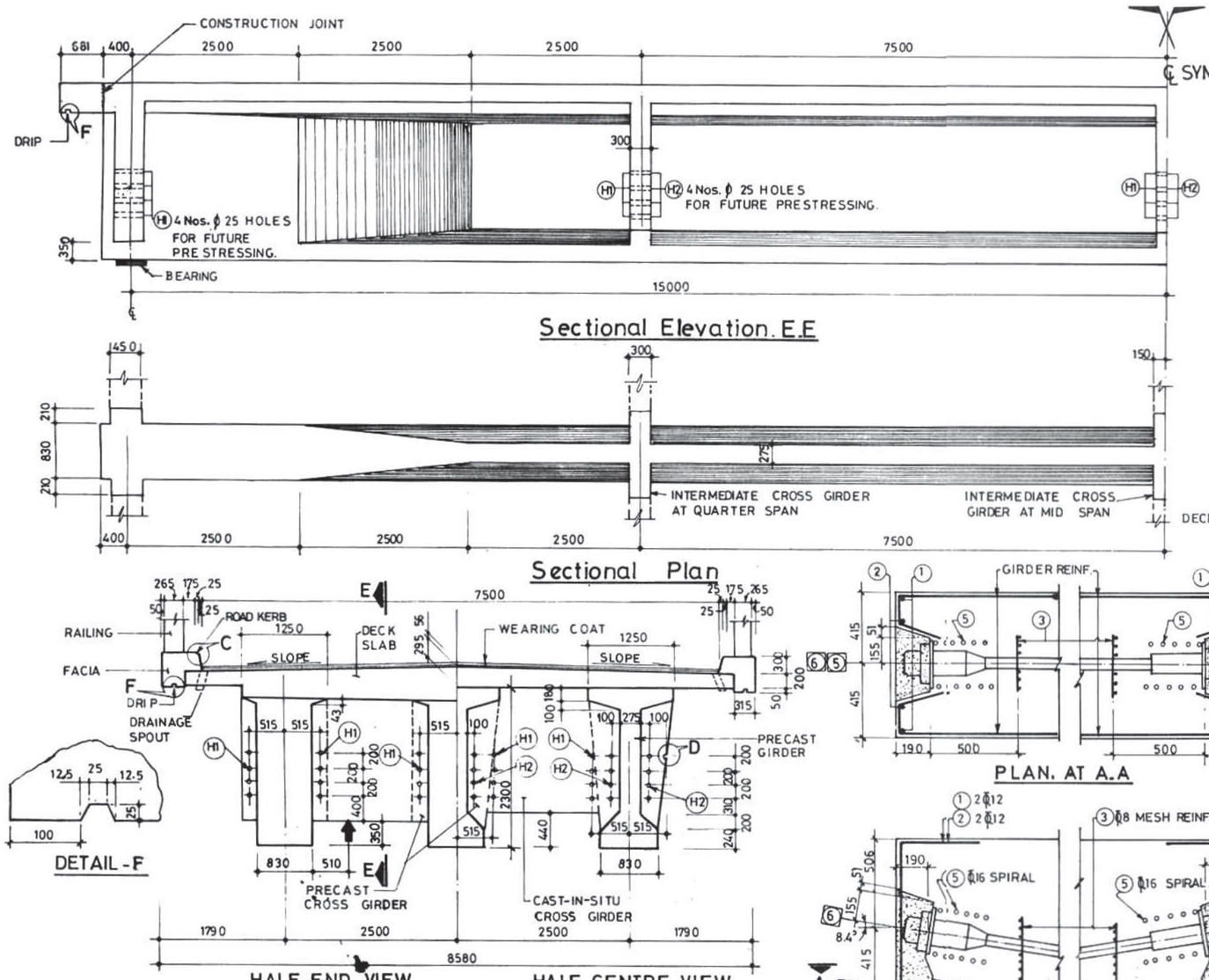
PSC GIRDER AND RC SLAB
COMPOSITE SUPERSTRUCTURE
WITH AND WITHOUT FOOTPATHS
GENERAL NOTES

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY		APPROVED BY	DEC. 1993
	Sd/- (D.K. RASTOGI) S.E.	Sd/- (M.R. KACHHWAHA) C.E.	DRG NO. SD/501 SHEET NO. 2

BILL OF QUANTITIES (PER SPAN)
FOR STANDARD PLANS FOR HIGHWAY BRIDGES
PRESTRESSED GIRDER & RCC SLAB SUPERSTRUCTURE
(WITH PRESTRESSING CABLES COMPRISING OF 7 MM DIA WIRES)

S. No.	Item	MOST SPECS. Section No.	UNIT	QUANTITY			
				30 m span without footpath	30 m span with footpath	35 m span with footpath	40 m span without footpath
1.	Cement Concrete Prestressed M40	1500 1700 1800	m^3	214.00	263.00	320.62	318.00
2.	Steel Reinforcement S415 for item 1	1600	t	27.99	37.37	46.82	38.96
3.	Prestressing Tendons incl. ancillaries	1800	t	7.19	8.39	11.14	12.66
4.	Elastomeric Expansion Joints	2100	m	18.36	23.66	23.66	18.36
5.	Asphaltic Wearing Coat	2200 512, 515	m^2	241.50	241.50	278.25	316.50
6.	Railings	1500 1600 1700 2200	m	64.40	64.40	74.30	84.40
7.	Drainage Spouts	2200	nos	10	10	12	14
8.	Steel Bearing	2000					
	(i) Rocker Bearing		nos	3	3	3	3
	(ii) Roller-cum-Roller Bearings		nos	3	3	3	3



NOTES.....

1. The location of jacks for lifting up the superstructure to replace bearingsetc is shown thus ⬆. These should be distinctly etched on the end cross girder and pier/abutment cap.
2. Anchorage recesses to be sealed with prepackaged non-shrink mortar. The end faces of girders to be coated with 2 coats of epoxy with a total dry film thickness of not less than 150 microns.
3. Maximum reaction to any jack under lifting condition is 1510 kN
4. During jacking operation both jacks placed under one end cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on both the jacks is equal at all times.
5. The precast girder is safe for a maximum reaction of 950 kN from leg of moving launching truss.
6. Holes in end cross girders and intermediate cross girders at places shown in this drawing shall be left during construction for inserting strands for future prestressing if any.
7. For other details refer following drawings:
   - i) General Notes: Drg.no. SD/501 (Sheets 1&2)
   - ii) Prestressing cables Drg.no. SD/512.
   - iii) Reinforcement in deck slab and kerb Drg.no. SD/313.
   - iv) Reinforcement in main girders Drg.no. SD/314
   - v) Reinforcement in end cross girders Drg.no. SD/315
   - vi) Reinforcement in intermediate cross girders Drg.no. SD/316
   - vii) Schedule of reinforcement Drg.no. SD/317 (Sheets 1,2&3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

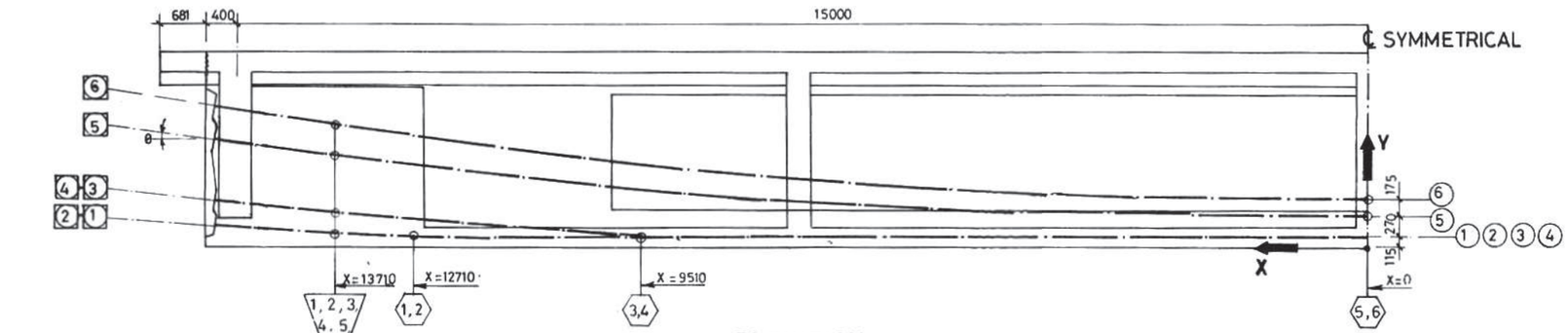
PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE

30 m. SPAN WITHOUT FOOTPATHS

DIMENSIONS AND ANCHORAGE DETAILS

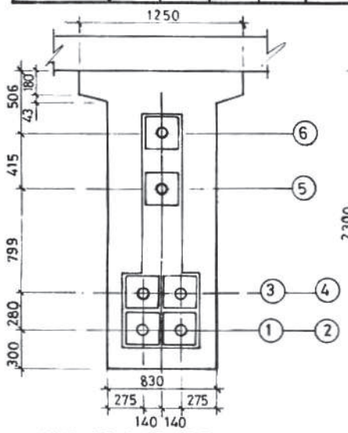
MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	DEC. 1993
D. K. RASTOGI S.E.	M.R. KACHHWAHA C.E.	DRG. NO. SD/511



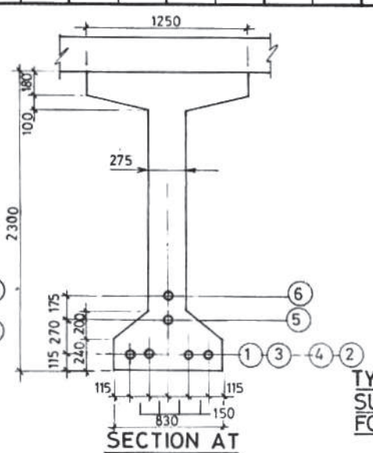
ORDINATES AT DISTANCE 'X' (mm) FROM MID SPAN

CABLE NO.	15000		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	281	+140	188	+140	119	+273	115	+300	115	+300	+115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	281	-140	188	-140	119	-273	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	553	+140	424	+140	302	+150	210	+150	149	+150	119	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	553	-140	424	-140	302	-150	210	-150	149	-150	119	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	1354	0	1235	0	1118	0	1010	0	910	0	819	0	736	0	663	0	598	0	541	0	493	0	454	0	424	0	402	0	389	0	385	0
6	1763	0	1615	0	1470	0	1336	0	1212	0	1099	0	996	0	905	0	824	0	754	0	695	0	646	0	608	0	582	0	565	0	560	0

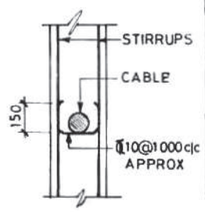


VIEW AT ANCHORAGF FACE

AT ANCHORAGE FACE
AT X =15210 FROM MID SPAN



SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable no	Length (mm)	Extension (mm)	Emergence angle (deg.)
1 & 2	30470	117·3	5·3
3 & 4	30470	122·6	7·35
5	30510	135·8	6·78
6	30550	135·1	8·4

LEGEND:-

- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLE NUMBER

NOTES.....

1. The length of cables indicated are measured along profile between the outer faces of anchorage bearing plates. The actual cutting length of wires shall be calculated in consultation with the manufacturer of the prestressing system.
2. The extensions indicated are for portion of cables lying between the outer faces of anchorage bearing plates.
3. The extensions are based on the following data:
   i) Wobble coefficient, k = 0·0091 rad/m
   ii) Friction coefficient, μ = 0·25
   iii) Modulus of Elasticity of steel (H.T wires), Es = 2.1×10^5 MPa
4. The sequence of stressing of prestressing cables shall be as follows :
   Stage 1. Cable No. 3, 4, 6, 2, 1 (14th day after casting of girder)
   Stage 2. Cable No. 5 (56th day after casting of girder or 35th day after casting deck slab whichever is later)
5. All the cables shall be stressed from one end of the girder.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings
   i) General Notes: Drg.No. SD/501 (sheet 1 & 2)
   ii) Dimensions & anchorage details Drg.No. SD/511
   iii) Reinforcement in deck slab & kerbs Drg. No. SD/313
   iv) Reinforcement in main girders Drg. No. SD/314
   v) Reinforcement in end cross girders Drg No SD/315
   vi) Reinforcement in intermediate cross girders Drg. No. SD/316
   vii) Schedule of reinforcement Drg. No. SD/317 (Sheets 1, 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

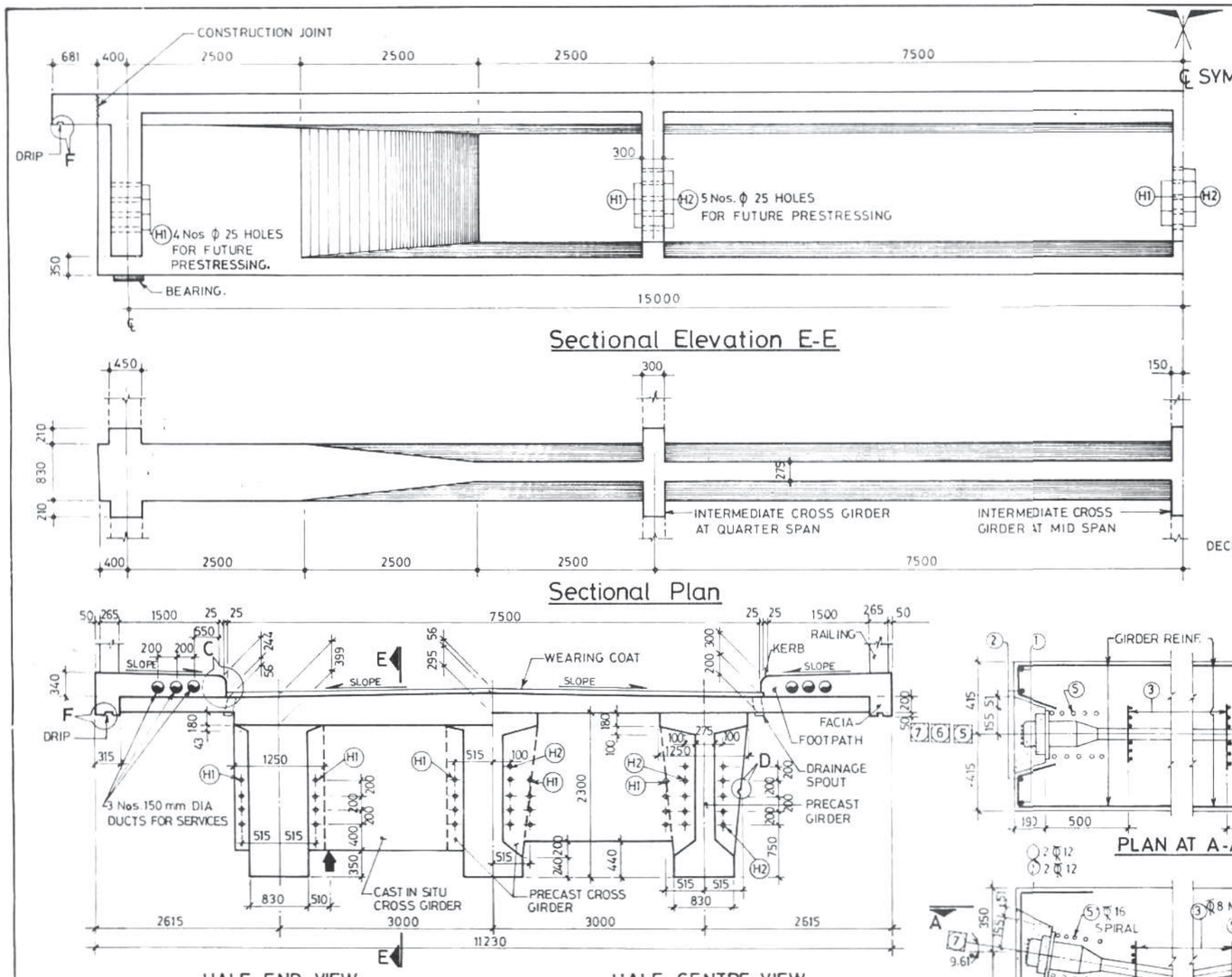
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND R C SLAB COMPOSITE SUPERSTRUCTURE 30 m. SPAN WITHOUT FOOTPATHS PRESTRESSING CABLES

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	DEC. 1993
D.K. RASTOGI S.E.	M.R. KACHHWAHA C.E.	DRG NO. SD/512



NOTES.....

1. The location of jacks for lifting up the superstructure to replace bearings etc is shown thus ⬆. These should be distinctly etched on the end cross girders and pier / abutment cap.
2. Anchorage recesses to be sealed with prepackaged non-shrink mortar. The end faces of girders to be coated with 2 coats of epoxy with a total dry film thickness of not less than 150 microns.
3. Maximum reaction to any jack under lifting condition is 1810 kN.
4. During jacking operation both jacks placed under one end cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on both the jacks is equal at all times.
5. The precast girder is safe for a maximum reaction of 950 kN from leg of moving launching truss.
6. Holes in end cross girders and intermediate cross girders at places shown in this drawing shall be left during construction for inserting strands for future prestressing if any.
7. For other details refer following drawings:
   - i) General notes: Drg. no. SD/501 (Sheets 1&2)
   - ii) Prestressing cables. Drg. no. SD/522
   - iii) Reinforcement in deck slab, kerb and footpaths Drg. no. SD/323
   - iv) Reinforcement in main girders Drg. no. SD/324
   - v) Reinforcement in end cross girders Drg. no. SD/325
   - vi) Reinforcement in intermediate cross girders Drg. no. SD/326
   - vii) Schedule of reinforcement Drg. no. SD/327 (Sheets 1, 2 & 3).

MKD	DATE	DESCRIPTION	BY
		REVISION	

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

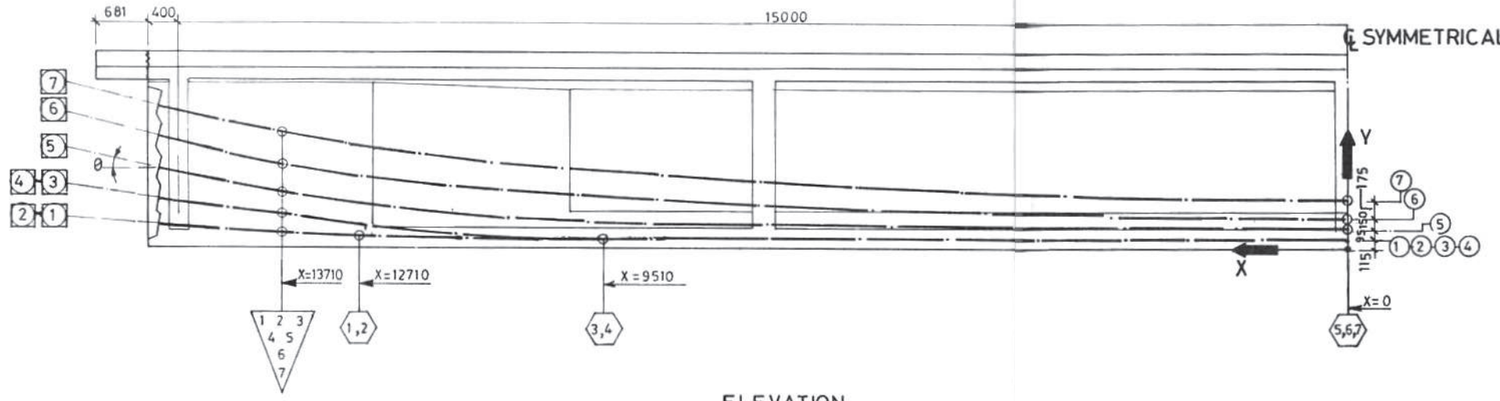
PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE

30 m. SPAN WITH FOOTPATHS

DIMENSIONS AND ANCHORAGE DETAILS

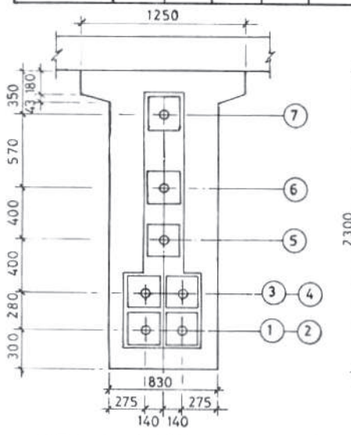
MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K. RASTOGI) S.E.	(M.R. KACHHWAHA) C.E.	DRG. NO. SD/521



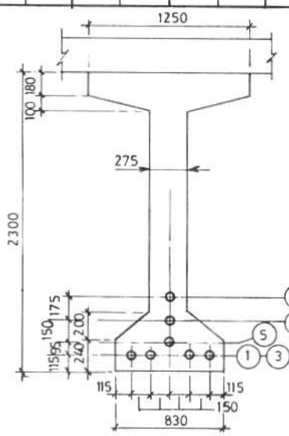
SECTIONAL PLAN

CABLE NO.	ORDINATES AT DISTANCE 'X' (mm) FROM MID SPAN																													
	15000		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	281	+140	188	+140	119	+273	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	281	-140	188	-140	119	-273	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	553	+140	424	+140	302	+150	210	+150	149	+150	119	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	553	-140	424	-140	302	-150	210	-150	149	-150	119	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	961	0	868	0	778	0	694	0	617	0	546	0	482	0	425	0	375	0	331	0	294	0	264	0	240	0	223	0	213	0	210	0
6	1354	0	1232	0	1112	0	1001	0	899	0	805	0	721	0	645	0	578	0	520	0	471	0	431	0	400	0	378	0	364	0	360	0
7	1914	0	1745	0	1579	0	1424	0	1282	0	1153	0	1035	0	930	0	838	0	757	0	689	0	634	0	591	0	560	0	541	0	535	0

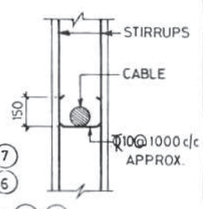


VIEW AT ANCHORAGE FACE

AT ANCHORAGE FACE
AT X = 15210 FROM MID SPAN



SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable no.	Length (m m)	Extension (m m)	Emergence angle (deg)
1 & 2	30470	117.2	5.3
3 & 4	30470	122.6	7.35
5	30470	136.8	5.27
6	30510	135.7	6.96
7	30590	134.6	9.61

LEGEND :-

- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLE NUMBER

NOTES.....

1. The length of cables indicated are measured along profile between the outer faces of anchorage bearing plates. The actual cutting length of wires shall be calculated in consultation with the manufacturer of the prestressing system.
2. The extensions indicated are for portion of cables lying between the outer faces of anchorage bearing plates.
3. The extensions are based on the following data:
   i) Wobble coefficient k = 0.0091 rad/m
   ii) Friction coefficient μ = 0.25
   iii) Modulus of Elasticity of steel (H.T wires) Es 2.1 x 10^5 MPa
4. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1. Cable No. 3, 4, 7, 2, 1 (14 th day after casting of girder)
   Stage 2. Cable No. 6, 5 (56th day after casting of girder or 35 th day after casting of deck slab whichever is later)
5. All the cables shall be stressed from one end of the girder.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings.
   i) General Notes: Drg. no. SD/501 (sheet 1 &2)
   ii) Dimensions & anchorage details. Drg. no. SD/521.
   iii) Reinforcement in deck slab, kerbs and footpaths. Drg. no. SD/323
   iv) Reinforcement in main girders. Drg. no. SD/324
   v) Reinforcement in end cross girders. Drg. no. SD/325
   vi) Reinforcement in intermediate cross girders. Drg. no. SD/326
   vii) Schedule of reinforcement. Drg. no. SD/327 (Sheets 1, 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

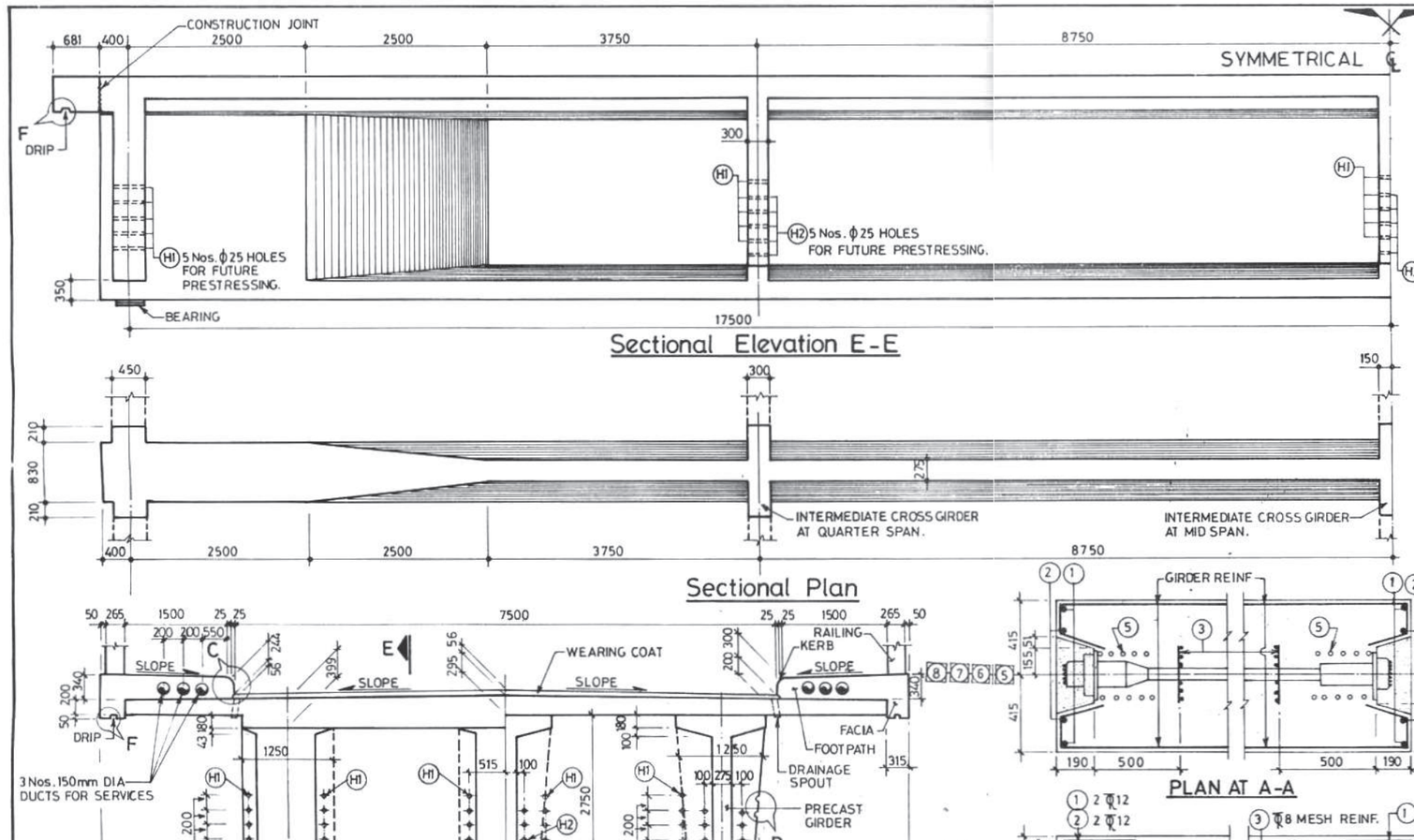
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
30 m. SPAN WITH FOOTPATHS
PRESTRESSING CABLES

MULTI-WIRE SYSTEM (ONE END STRESSING)

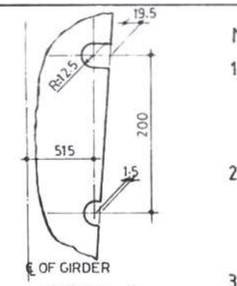
RECOMMENDED BY	APPROVED BY	MARCH 1994
(D. K. RASTOGI) S.E.	(M. R. KACHHWAHA) C.E.	DRG. NO. SD/522



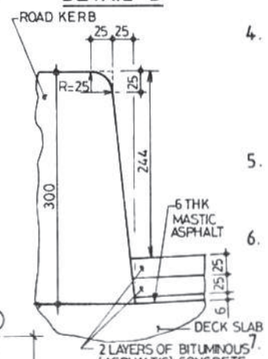
Sectional Elevation E-E

Sectional Plan

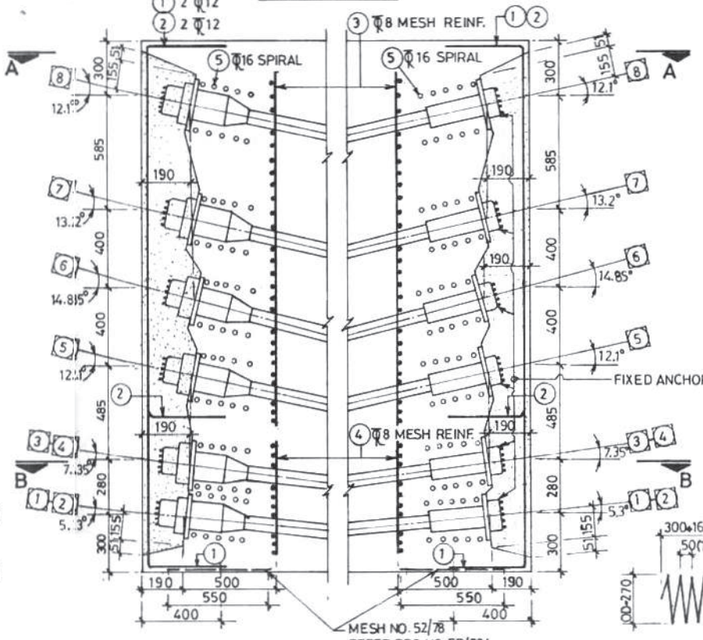
HALF END VIEW HALF CENTRE VIEW



DETAIL-D

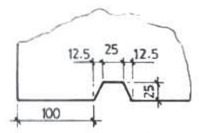


DETAIL-C

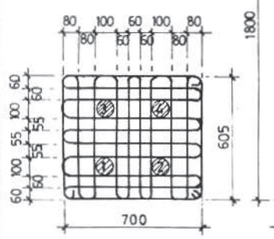


ELEVATION AT LIVE END ELEVATION AT DEAD END

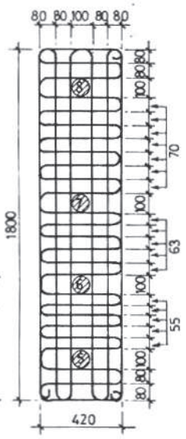
END BLOCK DETAIL



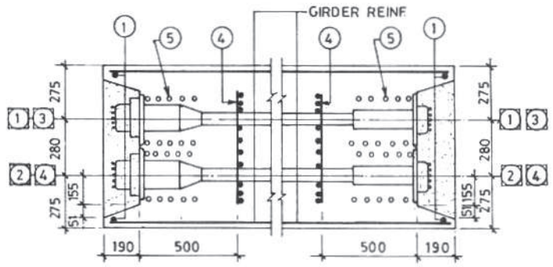
DETAIL-F



④ ϕ8 MESH



③ ϕ8 MESH



PLAN AT B-B

⑤ ϕ16 SPIRAL

NOTES.....

1. The location of jacks for lifting up the superstructure to replace bearings etc is shown thus ⬆ These should be distinctly eatched on the end cross girder and pier / abutment cap.
2. Anchorage recesses to be sealed with prepackaged non-shrink mortar. The end faces of girders to be coated with 2 coats of epoxy with a total dry film thickness of not less than 150 microns.
3. Maximum reaction to any jack under lifting condition is 2220 kN.
4. During jacking operation both jacks placed under one end cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on both the jacks is equal at all times.
5. The precast girder is safe for a maximum reaction of 1100 kN from leg of moving launching truss.
6. Holes in end cross girder and intermediate cross girders at places shown in this drawing shall be left during construction for inserting strands for future prestressing if any.

For other details refer following drawings.

i) General notes
Drg. no. SD/501 (Sheets 1 & 2)
ii) Prestressing cables:
Drg. no. SD/532
iii) Reinforcement in deck slab, kerb and footpaths
Drg.no. SD/333
iv) Reinforcement in main girders
Drg. no. SD/334
v) Reinforcement in end cross girders
Drg. no. SD/535
vi) Reinforcement in intermediate cross girders
Drg. no. SD/336
vii) Schedule of reinforcement
Drg.no. SD/337 (Sheets 1, 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

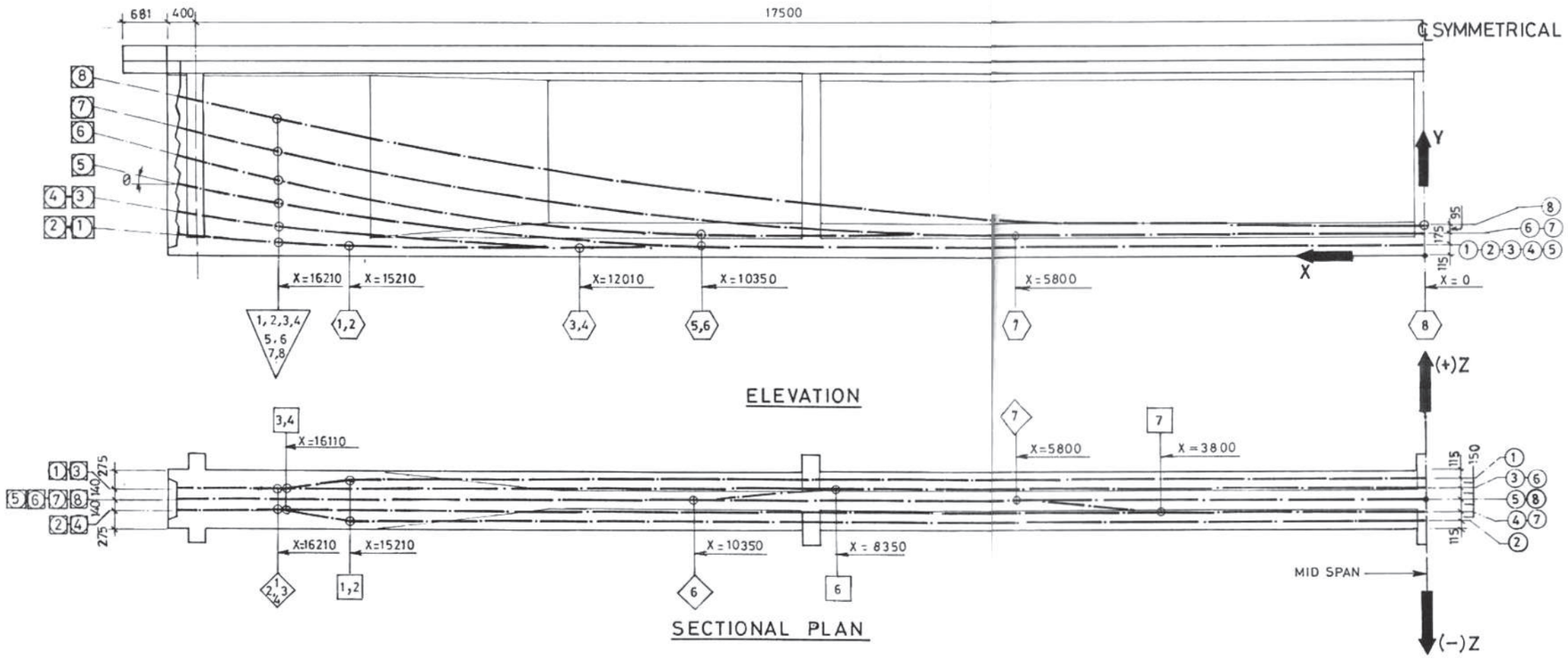
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

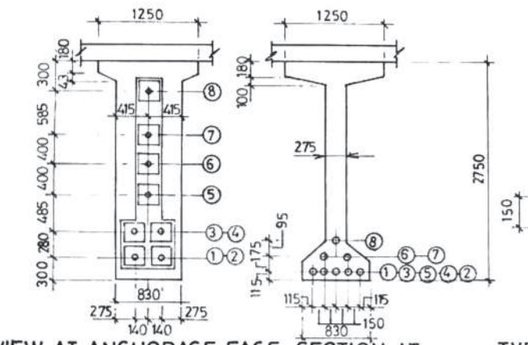
PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
35m. SPAN WITH FOOTPATHS
DIMENSIONS AND ANCHORAGE DETAILS

MULTI WIRE SYSTEM ONE END STRESSING

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K. RASTOGI) S.E	(M.R. KACHHWAHA) C.E	DRG. NO. SD/531

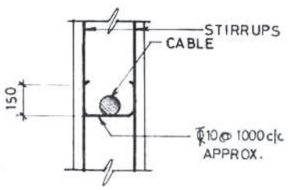


CABLE NO	ORDINATES AT DISTANCE 'X' (mm) FROM MID SPAN																															
	17710		17000		16000		15000		14000		13000		12000		11000		10000		9000		8000		7000		6000		5000		4000		3000		2000		1000		0.000	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	300	+140	234	+140	144	+154	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	300	-140	234	-140	144	-154	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	580	+140	488	+140	360	+150	252	+150	176	+150	130	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	580	-140	488	-140	360	-150	252	-150	176	-150	130	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	1065	0	913	0	699	0	511	0	359	0	243	0	165	0	123	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0	115	0
6	1465	0	1277	0	1012	0	779	0	592	0	449	0	352	0	300	0	290	+9	290	+118	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150	290	+150
7	1865	0	1698	0	1464	0	1245	0	1049	0	875	0	724	0	595	0	489	0	406	0	345	0	306	0	290	0	290	-48	290	-147	290	-150	290	-150	290	-150
8	2450	0	2297	0	2083	0	1877	0	1685	0	1506	0	1340	0	1187	0	1048	0	922	0	809	0	710	0	624	0	551	0	491	0	445	0	412	0	392	0	385	0



VIEW AT ANCHORAGE FACE
AT ANCHORAGE FACE
AT X = 17710 FROM MID SPAN

SECTION AT MID SPAN



TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable no.	Length (m m)	Extension (m m)	Emergence angle (deg.)
1 & 2	35470	133.6	5.3
3 & 4	35470	139.7	7.35
5	35580	151.3	12.1
6	35680	140.1	14.86
7	35710	141.7	13.22
8	35740	152.5	12.13

LEGEND :-

- INDICATES START OF CURVE IN ELEVATION.
- INDICATES END OF CURVE IN ELEVATION.
- INDICATES START OF CURVE IN PLAN.
- INDICATES END OF CURVE IN PLAN.
- INDICATES END OF CABLE.
- INDICATES CABLE NUMBER.

NOTES.....

1. The length of cables indicated are measured along profile between the outer faces of anchorage bearing plates. The actual cutting length of wires shall be calculated in consultation with the manufacturer of the prestressing system.
2. The extensions indicated are for portion of cables lying between the outer faces of anchorage bearing plates.
3. The extensions are based on the following data:
   i) Wobble coefficient, $k = 0.0091$ rad/m
   ii) Friction coefficient, $\mu_\alpha = 0.25$
   iii) Modulus of Elasticity of steel (H.T wires) $= 2.1 \times 10^5$ MPa
4. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1 Cable No. 3, 4, 8, 5, 2, 1 (14th day after casting of girder)
   Stage 2 Cable No. 6, 7 (56th day after casting of girder or 35 th day after casting of deck slab whichever is later.)
5. All the cables shall be stressed from one end of the girder.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval as shown.
7. For other details refer following drawings
   i) General Notes: Drg no. SD/501 (sheets 1&2)
   ii) Dimensions & anchorage details: Drg. No. SD/531
   iii) Reinforcement in deck slab, kerbs and footpaths Drg. No. SD/333
   iv) Reinforcement in main girders Drg. No. SD/334
   v) Reinforcement in end cross girders Drg. No. SD/535
   vi) Reinforcement in intermediate cross girders. Drg. No. SD/336
   vii) Schedule of reinforcement Drg. No. SD/337 (Sheets 1; 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

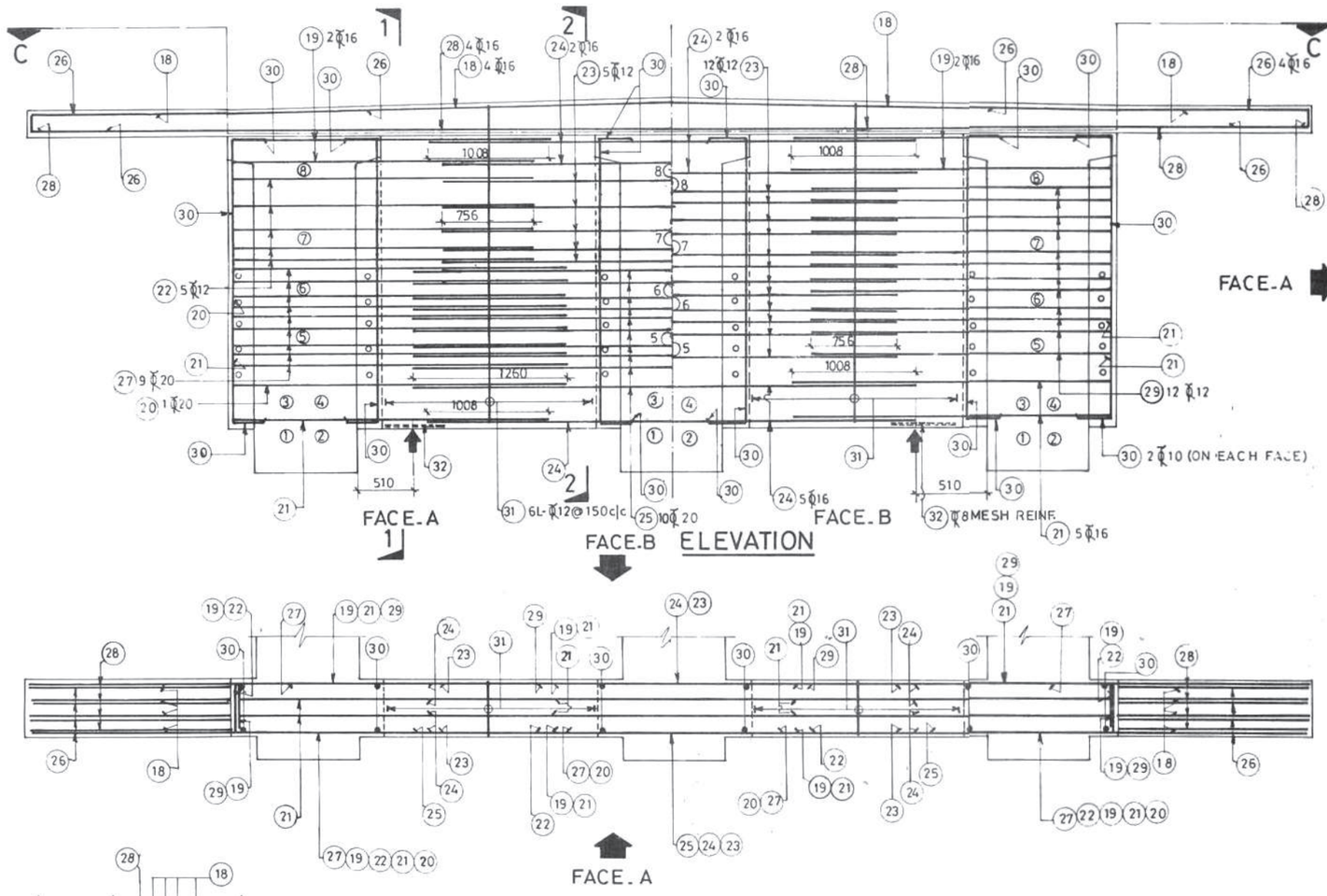
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

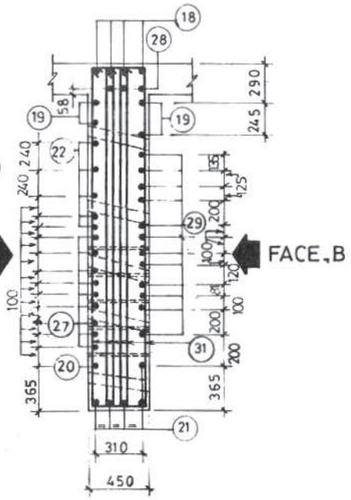
STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
35m. SPAN WITH FOOTPATHS
PRESTRESSING CABLES

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K. RASTOGI) S.E.	(M.R. KACHHWAHA) C.E.	DRG. NO. SD/532

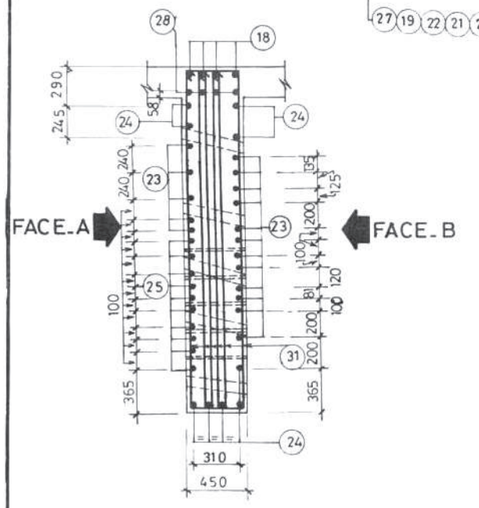




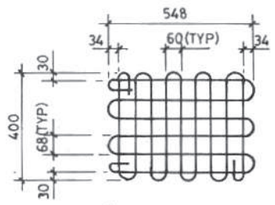
CROSS SECTION 1.1

PLAN.C-C

DETAIL OF END CROSS GIRDER



CROSS SECTION 2.2



32 Ø8 MESH REINF.

NOTES.....

1. The location of jacks for liffting up the superstructure to replace bearings etc is shown thus ⬆. These should be distinctly etched on the cross girders and pier/abutment caps
2. For other details refer following drawings:
   - i) General Notes Drg. no. SD/501 (sheets 1 & 2)
   - ii) Dimensions & ancharage details Drg.no. SD/531
   - iii) Reinforcement in deck slab kerb and footpaths Drg. no. SD/333
   - iv) Reinforcement in main girders Drg. no. SD/334
   - v) Reinforcement in intermediate cross girders Drg. no. SD/336
   - vi) Schedule of reinforcement Drg. no. SD/337 (sheets 1,2 & 3)

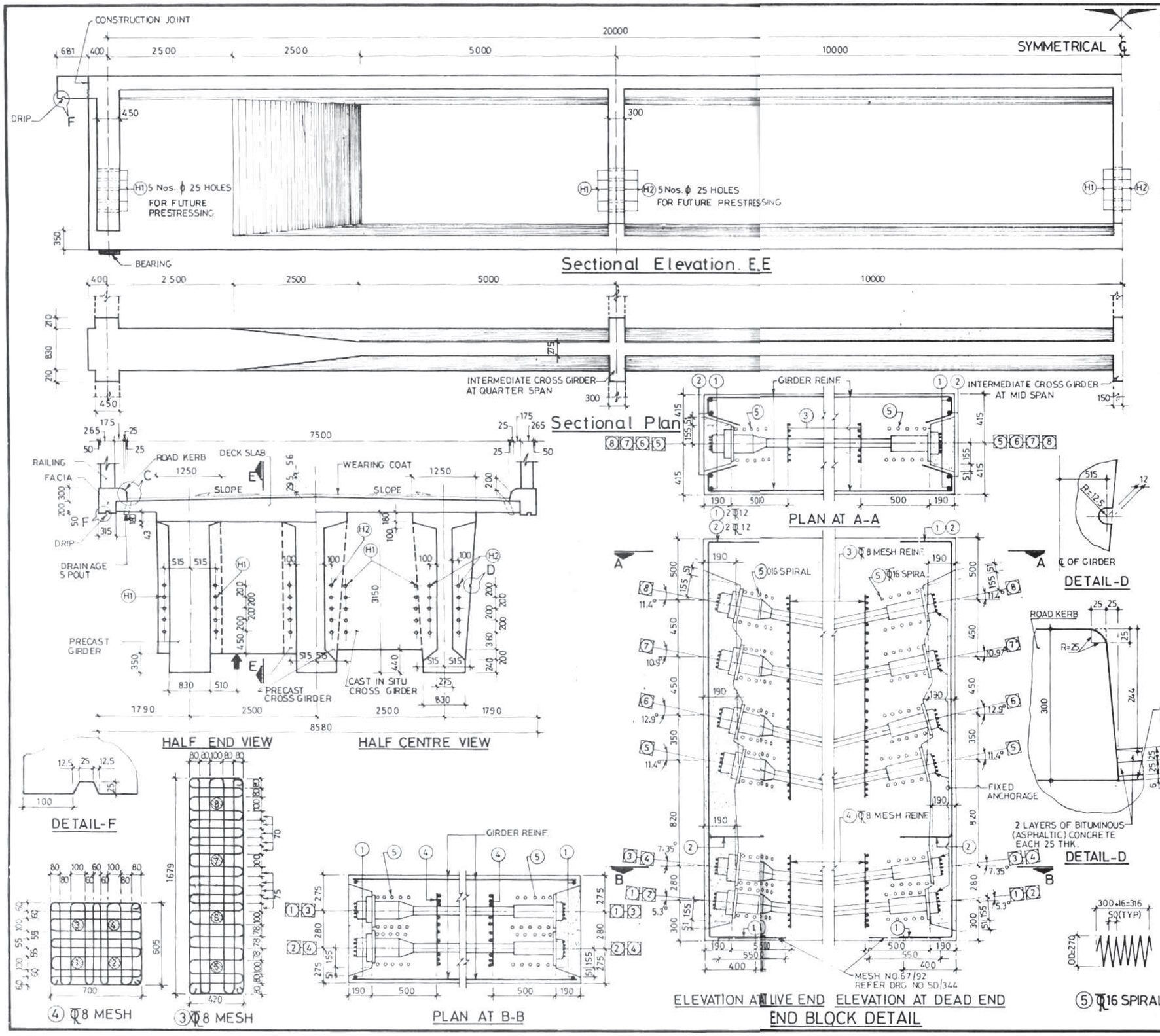
MKD	DATE	DESCRIPTION	BY
		REVISION	

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB
COMPOSITE SUPERSTRUCTURE
35m. SPAN WITH FOOTPATHS
REINFORCEMENT IN END CROSS GIRDERS
MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K. RASTOGI) S.E.	(M.R. KACHHWAHA) C.E.	DRG. NO. SD/535



NOTES.....

1. The location of jacks for lifting up the superstructure to replace bearing etc.is shown thus ⬆ .These should be distinctly etched on the end cross girders and pier / abutment cap.
2. Anchorage recesses to be sealed with prepackaged non-shrink mortar. The end faces of girders to be coated with 2 coats of epoxy with a total dry film thickness not less than 150 microns.
3. Maximum reaction to any jack under lifting condition is 2205 kN.
4. During jacking operation both jacks placed under one end cross girder shall be operated simultaneously using stress control system so as to ensure that the reaction on both the jacks is equal at all times.
5. The precast girder is safe for a maximum reaction of 990 kN from leg of moving launching truss.
6. Holes in end cross girders and intermediate cross girders at places shown in this drawing shall be left during construction for inserting strands for future prestressing, if any.
7. For other details refer following drawings :
   - i) General notes : Drg. no. SD / 501 (Sheets 1&2).
   - ii) Prestressing cables : Drg. no. SD / 542.
   - iii) Reinforcement in deck slab and kerb Drg. no. SD / 343.
   - iv) Reinforcement in main girders. Drg.no SD/ 344.
   - v) Reinforcement in end cross girders. Drg. no. SD/ 545.
   - vi) Reinforcement in intermediate cross girders. Drg.no. SD/346.
   - vii) Schedule of reinforcement: Drg. no. SD/ 347 (Sheets 1, 2 & 3)

MKD	DATE	DESCRIPTION	BY
		REVISION	

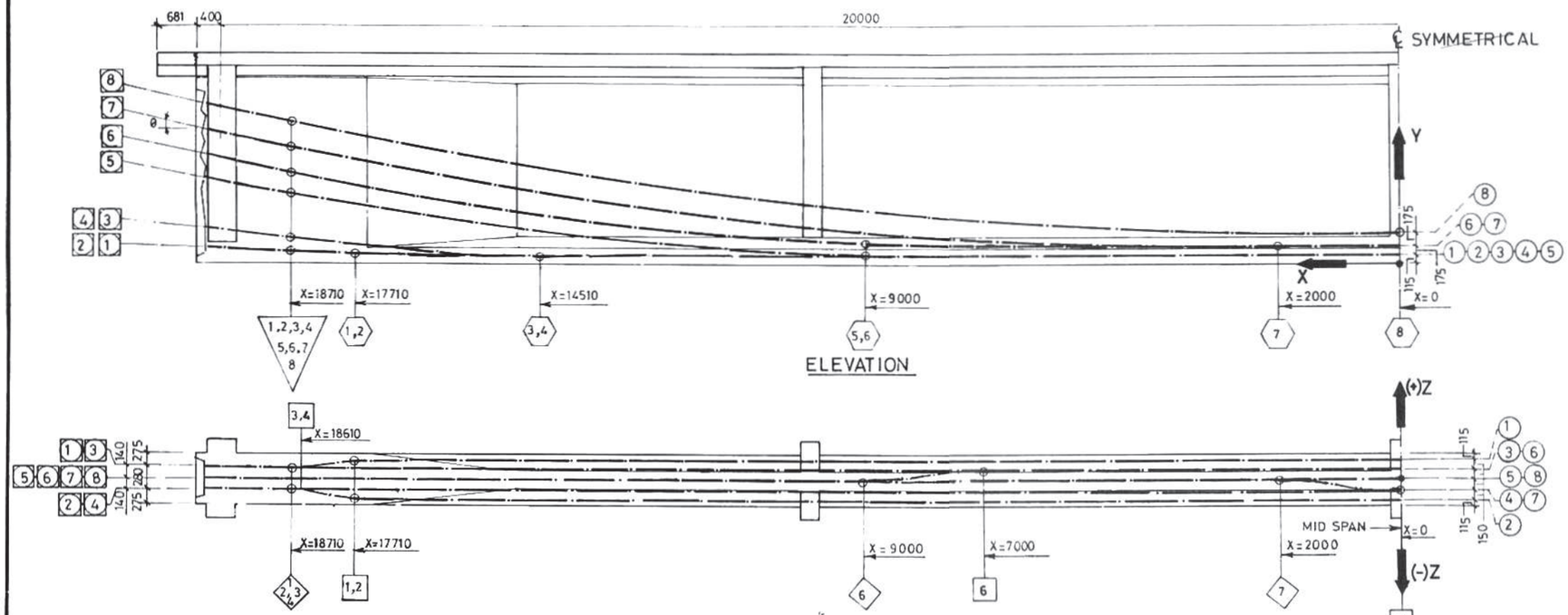
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
40m. SPAN WITHOUT FOOTPATHS
DIMENSIONS AND ANCHORAGE DETAILS

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K RASTOGI) S.E.	(M.R.KACHHWAHA) C.E.	DRG NO SD /541

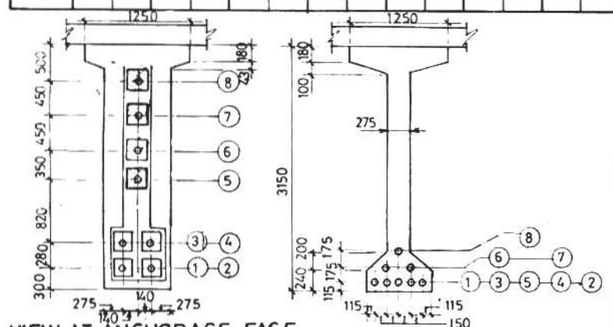


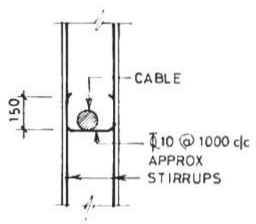
NOTES.....

1. The length of cables indicated are measured along profile between the outer faces of anchorage bearing plates. The actual cutting length of wires shall be calculated in consultation with the manufacturer of the prestressing system.
2. The extensions indicated are for portion of cables lying between the outer faces of anchorage bearing plates.
3. The extensions are based on the following data:
   i) Wobble coefficient, k = 0·0091 rad/m
   ii) Friction coefficient, μ = 0·25
   iii) Modulus of Elasticity of steel (H.T wires) Es = 2.1×10^5 Mpa
4. The sequence of stressing of prestressing cables shall be as follows:
   Stage 1. Cable no. 3, 4, 8, 5, 2, 1 (14th day after casting of girder)
   Stage 2. Cable no. 6, 7 (56th day after casting of girder or 35th day after casting of deck slab whichever is later.)
5. All the cables shall be stressed from one end of the girder.
6. All cables are to have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0 m interval as shown.
7. For other details refer following drawings.
   i) General Notes Drg. no. SD/501 (sheet 1 & 2)
   ii) Dimensions & anchorage details: Drg. no. SD/541
   iii) Reinforcement in deck slab and kerb: Drg. no. SD/343
   iv) Reinforcement in main girders: Drg. no. SD/344
   v) Reinforcement in end cross girders: Drg. no. SD/545
   vi) Reinforcement in intermediate cross girders: Drg. no. SD/346
   vii) Schedule of reinforcement Drg no SD/347 (Sheets 1 2 & 3)

CABLE NO.	ORDINATES AT DISTANCE 'X' (mm) FROM MID SPAN																													
	20210		20000		19000		18000		17000		16000		15000		14000		13000		12000		11000		10000		9000		8000		7000		6000	
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	300	+140	281	+140	188	+140	119	+273	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300	115	+300
2	300	-140	281	-140	188	-140	119	-273	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300	115	-300
3	580	+140	553	+140	424	+140	302	+150	210	+150	149	+150	119	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150	115	+150
4	580	-140	553	-140	424	-140	302	-150	210	-150	149	-150	119	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150	115	-150
5	1400	0	1358	0	1155	0	958	0	781	0	625	0	490	0	375	0	282	0	209	0	157	0	125	0	115	0	115	0	115	0	115	0
6	1750	0	1702	0	1472	0	1248	0	1047	0	870	0	715	0	586	0	479	0	396	0	337	0	302	0	290	0	290	+75	290	+150	290	+150
7	2200	0	2159	0	1965	0	1775	0	1595	0	1427	0	1270	0	1125	0	992	0	870	0	760	0	661	0	574	0	499	0	435	0	383	0
8	2650	0	2608	0	2406	0	2208	0	2020	0	1842	0	1675	0	1519	0	1374	0	1240	0	1116	0	1003	0	901	0	809	0	729	0	659	0

CABLE NO.	ORDINATES AT DISTANCE 'X' (mm) FROM MID SPAN																													
	5000		4000		3000		2000		1000																					
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z																				
1	115	+300	115	+300	115	+300	115	+300	115	+300																				
2	115	-300	115	-300	115	-300	115	-300	115	-300																				
3	115	+150	115	+150	115	+150	115	+150	115	+150																				
4	115	-150	115	-150	115	-150	115	-150	115	-150																				
5	115	0	115	0	115	0	115	0	115	0																				
6	290	+150	290	+150	290	+150	290	+150	290	+150																				
7	342	0	313	0	296	0	290	0	290	-75																				
8	599	0	551	0	513	0	487	0	470	0																				





TYPICAL DETAIL OF SUPPORTING ARRANGEMENT FOR CABLES

Cable	Length (mm)	Extension (mm)	Emergence angle (deg.)
1 & 2	40470	149.3	5.3
3 & 4	40470	156.1	7.35
5	40610	169.7	11.43
6	40680	158.1	12.94
7	40700	160.3	10.97
8	40730	170.8	11.38

LEGEND :-

- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLE NUMBER

MKD	DATE	DESCRIPTION	BY
		REVISION	

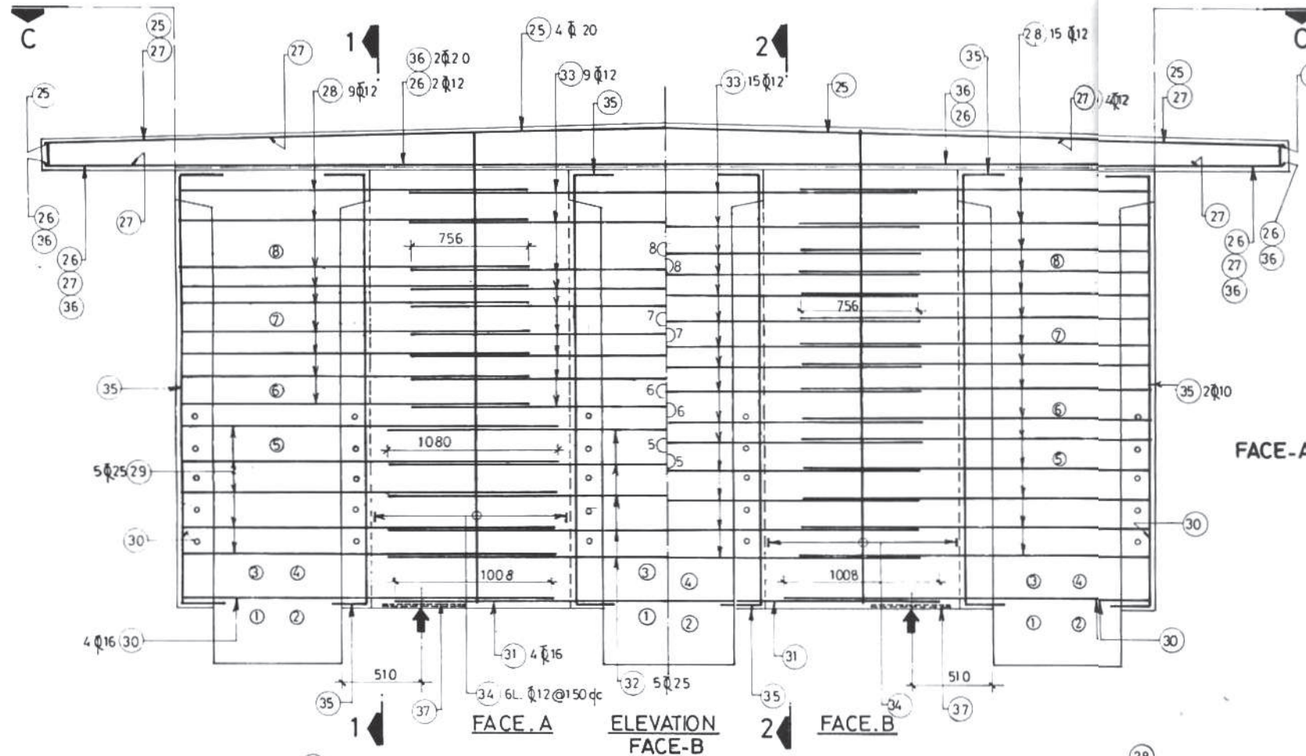
GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROADS WING), NEW DELHI

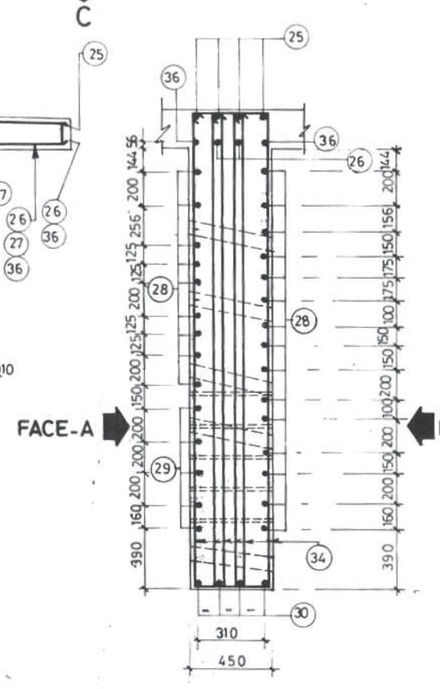
STANDARD DRAWINGS FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
40 m. SPAN WITHOUT FOOTPATHS
PRESTRESSING CABLES

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D. K. RASTOGI) S.E.	(M.R.KACHHWAHA) C.E.	DRG. NO. SD/542



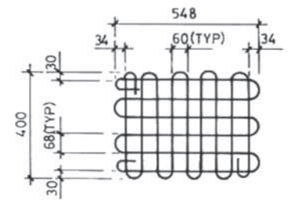


SECTION.1_1

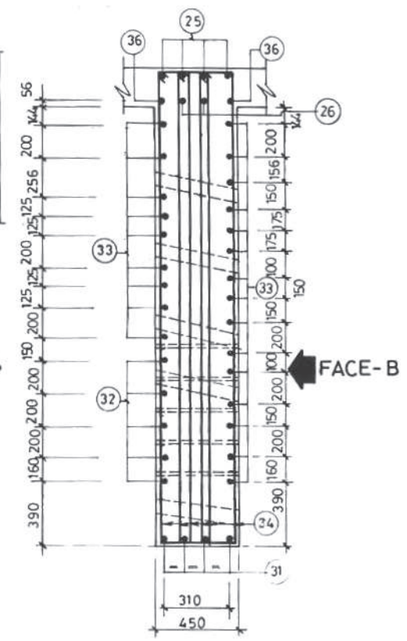
NOTE S.....

1. The location of jacks for lifting up the superstructure to replace bearing etc is shown thus ⬆ These should be distinctly etched on the cross girders and pier/abutment caps
2. For other details refer following drawings
   - i) General Notes Drg. no. SD/501 (sheets 1 & 2)
   - ii) Dimension & anchorage details Drg. no. SD/541
   - iii) Reinforcement in deck slab and kerb Drg. no. SD/343
   - iv) Reinforcement in main girders Drg. no. SD/344
   - v) Reinforcement in intermediate cross girders Drg. no. SD/346
   - vi) Schedule of reinforcement Drg. no. SD/347 (sheets 1, 2 & 3)

DETAIL OF END CROSS GIRDER



(37) ⌀ 8 MESH REINF.



SECTION.2.2

MKD	DATE	DESCRIPTION	BY

REVISION

GOVERNMENT OF INDIA
MINISTRY OF SURFACE TRANSPORT
(ROAD WING), NEW DELHI

STANDARD DRAWING FOR ROAD BRIDGES

PSC GIRDER AND RC SLAB COMPOSITE SUPERSTRUCTURE
40m. SPAN WITHOUT FOOTPATHS
REINFORCEMENT IN END CROSS GIRDERS

MULTI-WIRE SYSTEM (ONE END STRESSING)

RECOMMENDED BY	APPROVED BY	MARCH 1994
(D.K. RASTOGI) S.E.	(M.R. KACHHWAHA) C.E.	DRG. NO. SD/545