

3. It is requested that the contents of this circular be brought to the notice of all Officers in your Department dealing with National Highway works.

Enclosures : Not printed.

500.15.

No. RW/RD/MISC./19/84-OR

Dated the December, 1984

To

All State Chief Engineers dealing with National Highways

Subject : Details of reinforcement of R.C.C. Deck-slabs for culverts using high yield strength deformed bars

The need for evolving standard design for R.C.C. deck slabs for culverts using high yield strength deformed bars has been felt for quite some time. In view of this reinforcement, details for deck-slabs upto 6 metre span for culverts on National Highways have been worked out in this Ministry. The same have been shown in a chart form separately for Ordinary Cement Concrete (M-150) and Controlled Cement Concrete (M-200) along with a sketch showing general arrangement of reinforcement. Since, it has been felt that this chart may be useful for day to day work of field engineers also, a copy of the same is enclosed herewith for your reference and guidance.

REINFORCEMENT DETAILS OF R.C.C. SLAB FOR CULVERTS

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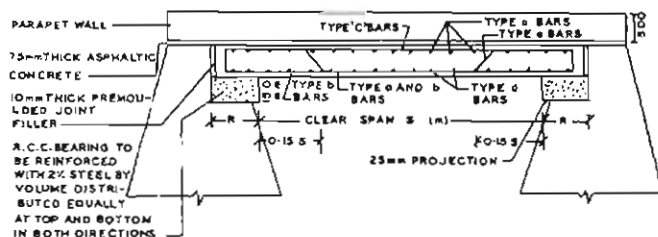
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(USING HIGH YIELD STRENGTH DEFORMED BARS)

LONGITUDINAL - SECTION

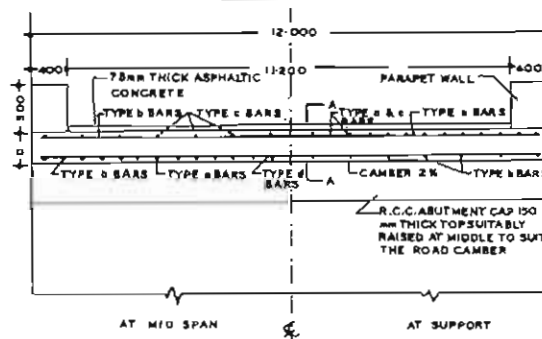
AT - AA

(NOT TO SCALE)



CROSS - SECTION

(NOT TO SCALE)



ORDINARY CEMENT CONCRETE M - 150

CLEAR SPAN OF SLAB S (m)	BEARING LENGTH AT EACH END (mm)	OVERALL LENGTH OF SLAB (m)	OVER ALL SLAB THICKNESS (mm)	STEEL IN LONGITUDINAL DIRECTION												STEEL IN TRANSVERSE DIRECTION												TOTAL QTY. OF REINFORCEMENT PER SPAN IN TONNES (INCLUDING 5% FOR LAPS AND WASTAGE)	TOTAL QTY. OF CONCRETE PER SPAN IN CUBIC METRES.	
				TYPE 'C' BARS (BOTTOM)						TYPE 'B' BARS (BOTTOM)			TYPE 'A' BARS (TOP)			TYPE 'B' BARS (BOTTOM)						TYPE 'A' BARS (TOP)								
				DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)	Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)	DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)	Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)	DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)	Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)			
1.00	300	1.6	190	10	200	60	0.268	0.198	0.714	1.646	98.78	10	200	60	1.53	0.118	1.768	70.88	12	150	11	11.95	131.40	10	300	6	11.95	71.70	0.340	3.65
1.50	300	2.1	220	10	150	80	0.304	0.240	1.071	2.159	172.72	10	150	80	2.03	0.123	2.326	93.04	12	150	14	11.95	167.30	10	300	7	11.95	83.65	0.487	5.55
2.00	300	2.6	250	12	150	80	0.351	0.283	1.428	2.696	215.68	10	150	80	2.53	0.140	2.816	115.44	12	125	21	11.95	250.95	16	300	9	11.95	107.55	0.679	7.80
3.00	300	3.6	320	12	150	80	0.423	0.382	2.143	3.783	300.24	12	150	80	3.53	0.202	4.026	161.04	12	125	28	11.95	346.55	10	300	12	11.95	143.40	1.018	13.82
4.00	300	4.6	400	16	150	80	0.493	0.475	2.837	4.793	383.44	12	150	80	4.53	0.328	5.166	207.44	12	125	37	11.95	442.15	10	300	16	11.95	181.20	1.568	22.08
5.00	400	5.8	450	16	150	80	0.575	0.560	3.571	6.043	483.44	12	150	80	5.73	0.437	6.484	259.36	12	128	47	11.95	561.65	10	300	20	11.95	230.00	1.981	32.02
6.00	400	6.8	520	16	150	80	0.759	0.643	4.286	7.094	567.52	16	150	80	6.73	0.437	7.604	304.16	12	125	55	11.95	687.25	10	300	23	11.95	274.85	2.682	42.43

CONTROLLED CEMENT CONCRETE M - 200

CLEAR SPAN OF SLAB S (m)	BEARING LENGTH AT EACH END (m)	OVERALL LENGTH OF SLAB (m)	OVER ALL SLAB THICKNESS S DR=	STEEL IN LONGITUDINAL DIRECTION										STEEL IN TRANSVERSE DIRECTION										TOTAL QTY. OF REINFORCEMENT PER SPAN IN TONNES (INCLUDING 5% FOR LAPS AND WASTAGE)	TOTAL QTY. OF CONCRETE PER SPAN IN CUBIC METRES.					
				TYPE 'C' BARS (BOTTOM)					TYPE 'B' BARS (BOTTOM)					TYPE 'A' BARS (TOP)					TYPE 'B' BARS (BOTTOM)							TYPE 'A' BARS (TOP)				
				DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)	Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)	DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)	Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)	DIA (mm)	SPACING (mm)	NO. OF BARS	X (m)			Y (m)	Z (m)	2(X+Y+Z) (m)	TOTAL LENGTH (m)	
1.00	3.00	1.6	170	10	180	67	0.288	0.170	0.714	1.530	109.210	10	180	67	1.53	0.098	1.726	69.04	12	128	11	11.95	153.35	10	300	6	11.95	71.70	0.372	3.26
1.50	3.00	2.1	200	12	180	67	0.329	0.212	1.071	2.153	144.291	12	180	67	2.03	0.128	2.265	91.44	12	100	21	11.95	250.95	10	300	7	11.95	83.65	0.810	5.04
2.00	3.00	2.6	240	10	150	80	0.361	0.269	1.428	2.696	215.040	12	180	80	2.53	0.168	2.866	114.04	12	100	28	11.95	310.70	10	300	9	11.95	107.55	0.764	7.49
3.00	3.00	3.6	300	10	150	80	0.443	0.353	2.143	3.735	298.800	16	150	80	3.53	0.217	3.964	159.96	12	100	36	11.95	430.20	10	300	12	11.95	143.40	1.257	12.96
4.00	3.00	4.6	380	12	150	80	0.508	0.467	2.857	4.803	384.240	16	150	80	4.53	0.297	5.124	204.06	12	150	31	11.95	370.45	10	300	16	11.95	191.20	1.564	20.86
5.00	4.00	5.8	430	16	150	80	0.692	0.537	3.571	6.043	483.440	16	150	80	5.73	0.347	6.424	256.96	12	150	39	11.95	466.05	10	300	20	11.95	230.00	2.321	29.93
6.00	4.00	6.8	500	12	150	80	0.772	0.636	4.286	7.102	568.180	20	150	80	6.73	0.405	7.540	301.60	12	150	46	11.95	549.70	10	300	23	11.95	274.85	2.800	40.00

GENERAL NOTES:-

- DESIGN SPECIFICATION I.R.C. STANDARD SPECIFICATION AND CODES OF PRACTICE FOR ROAD BRIDGES SECTION II & III.
- DESIGN LIVE ROAD TWO LANES OF I.R.C. CLASS A OR ONE LANE OF CLASS B FOR TRACKED OR WHEELED VEHICLE.
- CONCRETE CONCRETE WITH A MINIMUM 28 DAYS WORKS STRENGTH OF 150 kg/cm² 200 kg/cm² ON 100 mm CUBES FOR CEMENT CONCRETE ORDINARY M150 AND CONTROLLED CONCRETE M200 RESPECTIVELY.
- REINFORCEMENT:-HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO I.S.1139 OR I.S.1786 WITH LATEST AMENDMENTS.
- COVER:- MINIMUM CLEAR COVER TO ANY REINFORCEMENT SHALL BE IN ACCORDANCE WITH CLAUSE 304-3 OF I.R.C.21-1972.
- BEARING:- THE TOP SURFACE OF ABUTMENT/PIER CAPS SHALL BE GIVEN A SMOOTH FINISH BY CARBORANUM STONE FOR EVEN SEATING OF DECK SLAB.
- NOTES - ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFICALLY MENTIONED.
- JOINTS OR LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 304.6.3 OF I.R.C. 21-1972.
- DIMENSIONS OF BARS APPEARING IN SCHEDULE ARE FOR THE PURPOSE OF ESTIMATING STEEL QUANTITIES.

REFERENCE		GOVERNMENT OF INDIA MINISTRY OF SHIPPING & TRANSPORT (ROADS WING) NEW DELHI	
DRN.		REINFORCEMENT DETAILS OF REINFORCED CEMENT CONCRETE SLAB FOR CULVERTS (USING HIGH YIELD STRENGTH DEFORMED BARS)	
T&D.			
CHK.		RECOMMENDED	APPROVED
		S.E.(R) STD.	C.E.(STD)
			DT. NOV. 84
			DRN. No.
			RD/1-84.