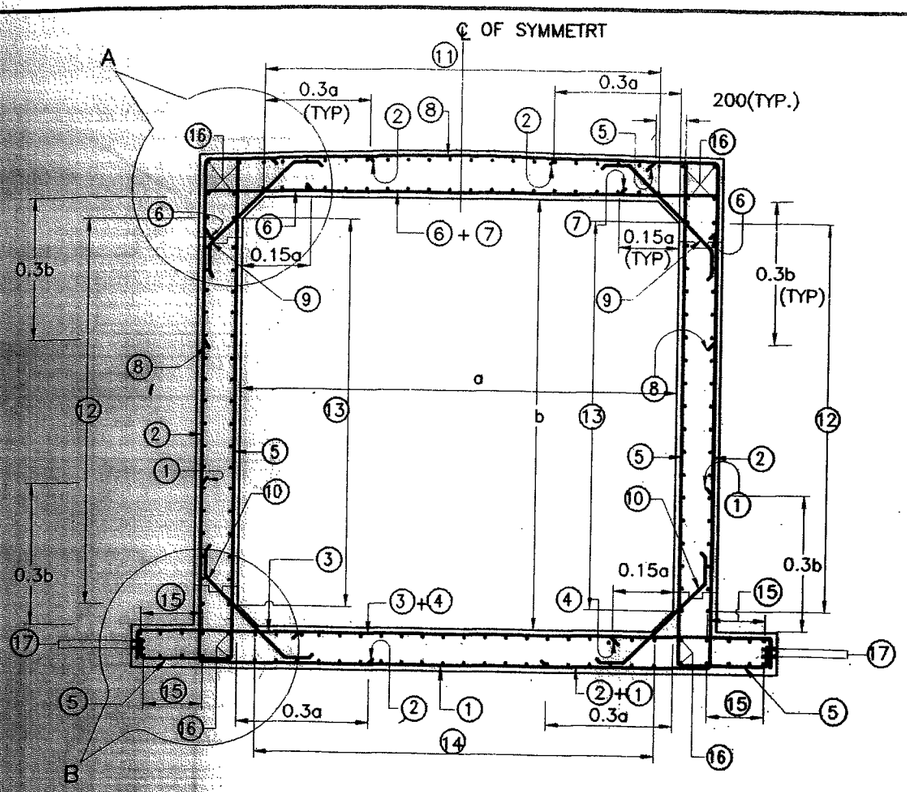
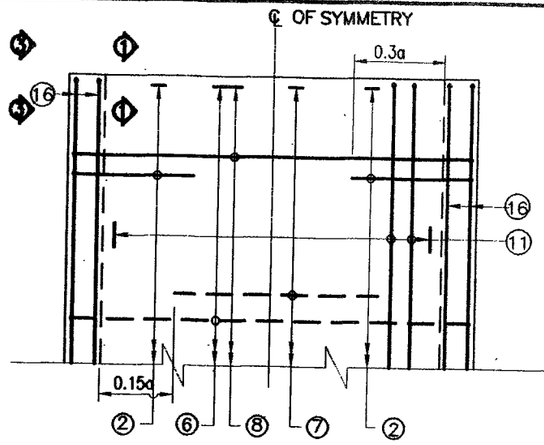
DRG.NO. SD/109 (SHEET 1 OF 16)

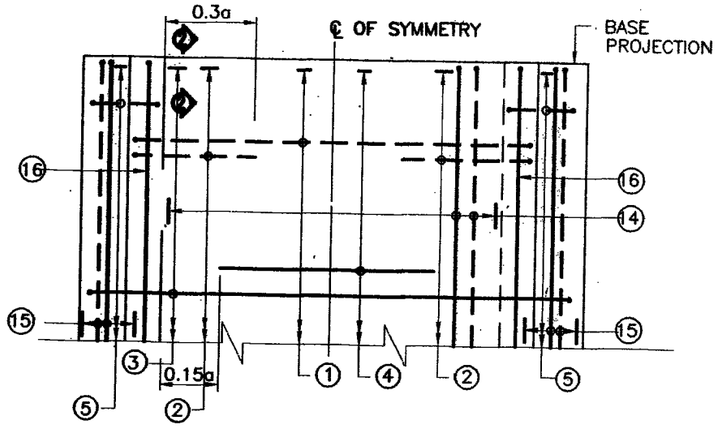


REINFORCEMENT DETAILS OF SINGLE CELL BOX CULVERT



TOP SLAB R/F PLAN

(BAR MARK ⑤,⑯a KERB & HAUNCH LINES NOT SHOWN IN PLAN)



BOTTOM SLAB R/F PLAN

(HAUNCH LINES NOT SHOWN IN PLAN)

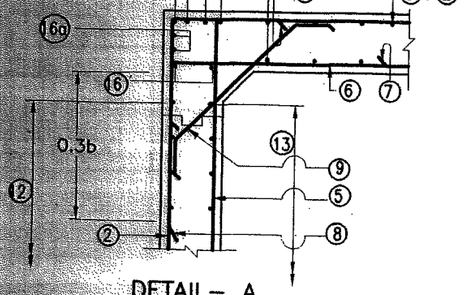
NOTES:

1. FOR GENERAL NOTES REFER DRG. NO. SD/101.
2. FOR GENERAL ARRANGEMENT REFER DRG. NO. SD/103 (SHEET 1 OF 2).
3. FOR BAR BENDING SCHEDULE REFER DRG. NO. SD/109 (SHEET 2 TO 16 OF 16)
4. FOR LAP ZONES REFER DRG. NO SD/117 (SHEET 1 OF 2)
5. FOR DIMENSION SCHEDULE OF BOX-CULVERT REFER DRG. NO SD/103 (SHEET 2 OF 2)
6. BAR ⑯a IS NOT SHOWN IN THE BAR BENDING SCHEDULE. THE NO OF ⑯a BAR SHOULD BE DECIDED AT SITE BY ENGINEER-IN-CHARGE DEPENDING ON WALL/ TOP SLAB THICKNESS AS PER MENTIONED SPACING IN DETAIL-A.

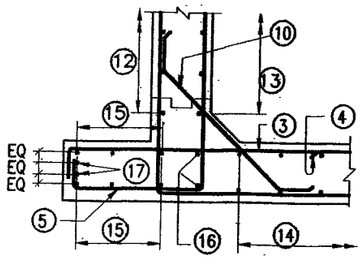
LEGEND:

——— : TOP FACE BARS/ OUTER FACE BARS

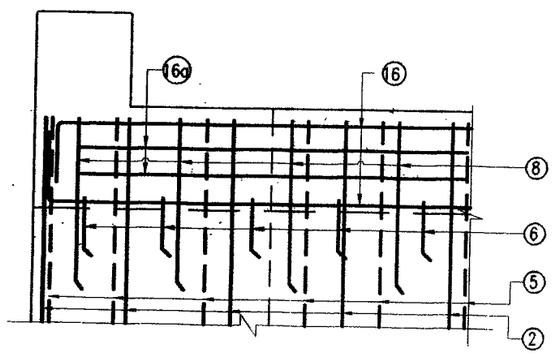
– – – – : BOTTOM FACE BARS/ INNER FACE BARS



DETAIL- A

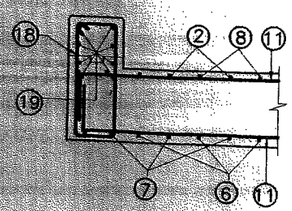


DETAIL-B

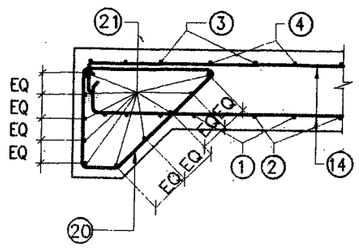


VIEW 3-3

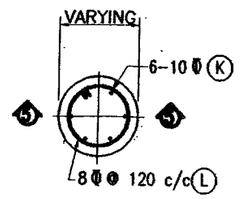
(HAUNCH LINES NOT SHOWN)



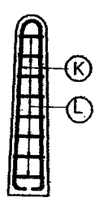
SECTION 1-1



SECTION 2-2



SECTION 4-4



SECTION 5-5

R/F DETAILS OF PRECAST GUARD STONE

(FOR LOCATION REFER DWG NO. SD/103 (SHEET 1 OF 2))

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

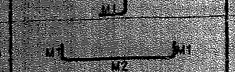
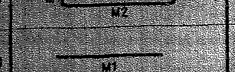
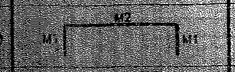
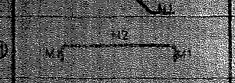
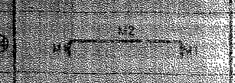
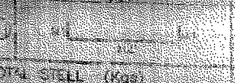
SINGLE CELL BOX CULVERTS (WITH EARTH CUSHION)

TYPICAL REINFORCEMENT DETAILS

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 1 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

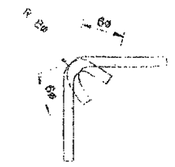
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE)	1/22/3 BAR DIA in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/33/3 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/33/3 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/34/3 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.
①		10	200	850	2400	4066	121	491.9	303.3	12	200	1150	3600	4807	121	581.9	522.9	12	200	1300	3700	6759	121	757.3	672.4	16	260	1520	3860	7045	93	655.2	1034.1
②		10	200	800	2450	4016	244	979.3	604.1	12	200	950	3480	5249	245	1276.3	1134.9	12	200	1250	3720	6179	244	1507.6	1338.5	16	260	1330	4740	7345	190	1395.6	2202.7
③		12	125	200	3600	3959	197	780.1	674.8	12	130	200	4800	5159	185	954.4	847.3	16	150	350	5300	5965	160	951.2	1501.3	16	130	370	6660	7345	185	1358.8	2144.7
④		BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤		10	200	2450	750	3548	242	860.7	529.4	10	200	3450	1350	5178	242	1253.2	772.6	10	250	3720	1700	5166	194	1002.7	618.2	10	200	4740	1780	6868	242	1662.2	1024.8
⑥		10	100	160	2400	2686	240	644.6	397.2	12	160	200	2600	2959	134	396.5	352.0	10	180	280	3700	4165	134	558.1	880.9	16	280	260	3860	4325	87	376.3	593.9
⑦		BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								10	280	2100	–	2100	86	180.6	111.3
⑧		10	200	800	2400	3966	121	479.8	295.9	10	200	1130	2600	4619	121	583.1	517.7	12	200	1220	3700	6099	121	738.0	655.2	16	260	1520	3860	6845	93	636.6	1004.8
⑨		10	200	200	676	1031	242	249.4	153.9	10	200	250	862	1214	242	293.9	181.2	10	200	200	1060	1412	242	341.8	210.7	10	260	200	1173	1525	186	283.7	174.9
⑩		10	200	200	748	1114	242	269.6	166.1	10	200	200	890	1255	242	303.8	187.3	10	200	200	1175	1538	242	372.5	229.5	10	260	200	1314	1680	186	312.4	192.6
⑪		10	250	160	23848	24134	16	386.1	238.1	10	250	160	23848	24134	16	386.1	238.1	10	250	190	23848	24194	24	580.6	358.0	10	250	190	23848	24194	24	580.6	358.0
⑫		10	250	160	23848	24134	18	386.1	238.1	10	250	180	23848	24174	24	580.2	357.7	10	250	200	23848	24214	24	581.1	358.3	10	250	240	23848	24294	32	777.4	479.3
⑬		10	250	160	23848	24134	16	386.1	238.1	10	250	180	23848	24174	24	580.2	357.7	10	250	200	23848	24214	24	581.1	358.3	10	250	240	23848	24294	32	777.4	479.3
⑭		10	250	160	23848	24134	16	386.1	238.1	10	250	180	23848	24134	16	386.1	238.1	10	250	230	23848	24074	24	580.6	359.2	10	250	240	23848	24294	24	583.0	359.5
⑮		10	250	160	23848	24134	16	386.1	238.1	10	250	160	23848	24134	24	579.2	357.1	10	250	230	23848	24274	20	485.5	299.3	10	250	240	23848	24294	28	680.2	419.4
⑯		10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑰		BAR IS NOT USED								BAR IS NOT USED								10	–	150	23848	24134	2	48.3	29.8	10	–	150	23848	24134	2	48.3	29.8
⑱		10	150	150	450	1231	34	41.9	25.8	10	150	150	480	1261	38	49.1	30.3	10	150	150	570	1471	50	76.5	47.2	10	150	150	570	1471	54	79.5	49.0
⑲		10	–	160	2400	2686	16	43.0	26.5	10	–	160	2600	2886	16	46.2	28.5	10	–	160	3700	3986	16	63.8	39.3	10	–	160	3860	4146	16	66.3	40.9
⑳		10	150	1100	1556	4172	34	141.8	87.5	10	150	1100	1556	4172	38	158.5	97.7	10	150	1100	1556	4172	52	216.9	133.8	10	150	1100	1556	4172	54	225.3	138.9
㉑		10	–	160	2400	2759	20	55.2	34.0	12	–	200	2600	2959	28	82.9	52.5	12	–	200	3700	4059	28	113.7	72.1	12	–	200	3860	4219	20	84.4	74.9
TOTAL STEEL (Kgs)				4682.5						6451.1								8340.4								11091.3							
TOTAL CONCRETE (Cum)				72.59						112.57								158.18								213.25							

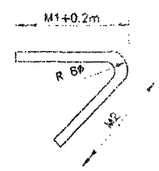
NOTES:

1. JOINT OR LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 304.6 OF IRC:21–1987
2. FULL SCALE ELEVATION FOR THE BARS SHALL BE LINED OUT ON A PLAIN PLASTERED FLOOR TO THE DIMENSIONS SHOWN ON THE DRAWING SO AS TO GET CORRECT CLEARANCE BETWEEN DIFFERENT BARS AND THEN THE BARS SHALL BE BENT TO PROPER SHAPE.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING No. SD/109 (SHEET 1 OF 16).
4. QUANTITY OF CONCRETE DOES NOT INCLUDE GUARD STONES.
5. QUANTITY OF STEEL DOES NOT INCLUDE 5% EXTRA FOR WASTAGE AND LAPS.

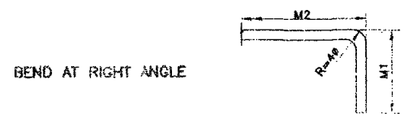
BENDING OF BARS



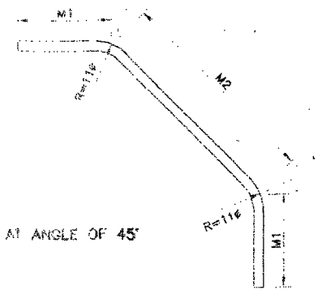
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ϕ = GIVEN DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.PANDIAN) TOR	(D.C.BHATTACHARYA) CE (I) MR WEST	DRG. NO. SD/109 (SHEET 2 OF 16)

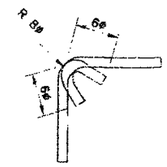
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE)	1/43/3								1/44/3								1/45/3								1/53/3							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	12	240	1400	4740	7680	101	757.4	672.4	16	250	1550	5000	8155	97	819.2	1282.2	16	240	2050	5160	9205	101	923.7	1457.4	16	250	1550	5900	8845	97	858.0	1354.2
②	M1 M2 M1	16	240	1570	3920	7005	204	1429.0	2255.1	16	250	1700	4150	7635	195	1489.8	2352.2	20	240	1780	3950	9441	204	1925.7	4749.9	16	250	1950	4100	7945	195	1557.2	2457.8
③	M1 M2	20	200	450	5740	6571	121	795.1	1960.0	25	250	800	7395	7914	93	736.0	2536.1	20	150	500	8360	9291	160	1486.6	3668.2	25	250	550	6550	7514	97	728.9	2808.6
④	M1	10	200	2800	-	3800	120	336.0	207.2	BAR IS NOT USED								BAR IS NOT USED								12	250	3500	-	3500	96	336.0	298.3
⑤	0.2m M1 0.2m M1	10	200	3920	820	5085	242	1231.1	759.2	0	200	4970	1490	5788	242	1638.0	1009.9	10	200	5950	2130	8428	242	2039.7	1257.6	10	200	4100	700	5148	242	1245.9	768.2
⑥	M1 M2 M1	20	200	520	4740	5311	121	642.6	1139.5	16	150	650	5000	5765	172	840.0	1483.6	16	150	260	5160	5625	160	900.0	1420.5	20	200	320	5900	6471	121	783.0	1931.1
⑦	M1	10	200	3920	-	4720	120	566.4	349.4	BAR IS NOT USED								BAR IS NOT USED								12	200	3500	-	3500	120	420.0	372.9
⑧	M1 M2 M1	12	240	1320	4740	7380	101	741.2	658.1	16	250	1620	5000	8165	97	794.0	1253.1	16	240	1900	5160	8905	101	899.4	1419.0	16	250	1400	5900	8645	97	838.6	1323.6
⑨	M2 M1 M1	10	240	1320	1220	1582	302	319.5	197.0	10	250	1200	1413	1768	194	342.6	211.2	10	240	1200	1498	1851	202	373.8	230.5	10	250	1200	1455	1808	194	350.8	216.3
⑩	M2 M1 M2	10	240	1200	1342	1708	202	345.0	212.7	10	250	1200	1587	1962	194	380.7	234.7	10	240	1200	1710	2078	202	419.3	258.5	10	250	1200	1587	1962	194	380.7	234.7
⑪	M1 M2 M1	10	200	240	23848	24294	40	971.7	598.1	10	200	240	23848	24294	40	971.7	599.1	10	200	230	23848	24274	50	970.9	598.6	10	150	250	23848	24374	62	1511.3	931.7
⑫	M1 M2 M1	10	200	240	23848	24294	40	971.7	598.1	10	200	260	23848	24374	40	974.9	600.1	10	200	320	23848	24454	50	1222.7	753.8	10	200	250	23848	24314	30	729.4	449.7
⑬	M1 M2 M1	10	200	240	23848	24234	24	581.6	358.3	10	200	280	23848	24374	32	779.9	480.2	10	200	320	23848	24454	30	1222.7	753.8	10	200	250	23848	24314	24	583.5	359.8
⑭	M1 M2 M1	10	200	280	23848	24374	40	974.9	601.1	10	200	300	23848	24414	40	976.5	602.1	10	200	300	23848	24414	40	976.5	602.1	10	200	300	23848	24474	50	1219.3	751.4
⑮	M1 M2 M1	10	200	280	23848	24374	16	389.9	240.4	10	200	300	23848	24414	16	390.5	240.8	10	200	300	23848	24414	36	878.5	541.3	10	200	300	23848	24474	12	293.7	181.1
⑯	M1 M2 M1	10	-	160	23848	24134	12	289.6	178.6	10	-	160	23848	24134	12	289.6	178.6	10	-	160	23848	24134	12	289.6	178.6	10	-	160	23848	24134	12	289.6	178.6
⑰	M1 M2 M1	10	-	160	23848	24134	2	48.3	29.8	10	-	160	23848	24134	2	48.3	29.8	10	-	160	23848	24134	2	48.3	29.8	10	-	160	23848	24134	2	48.3	29.8
⑱	M1 M2	10	150	150	670	1671	68	113.6	70.0	10	150	150	850	1831	72	131.9	81.3	10	150	150	850	1831	72	131.9	81.4	10	150	150	750	1831	62	113.6	70.0
⑲	M1 M2 M1	10	-	160	4740	5028	16	80.4	49.6	10	-	160	5000	5288	16	84.6	52.1	10	-	160	5160	5448	16	87.1	53.7	10	-	160	5900	6188	16	99.0	61.0
⑳	M1 M2	10	150	1100	1550	4172	70	292.0	180.0	10	-	1100	1550	4172	70	292.0	180.0	10	150	1100	1550	4172	72	300.4	185.2	10	150	1100	1550	4172	32	133.5	82.3
㉑	M1 M2	12	-	200	6740	7080	30	212.4	188.6	12	-	200	6740	7080	30	212.4	188.6	12	-	200	6740	7080	30	212.4	188.6	12	-	200	6740	7080	30	212.4	188.6
TOTAL STEEL (Kgs)									1128								1128								1128								1128
TOTAL CONCRETE (cum)									6.0								6.0								6.0								6.0

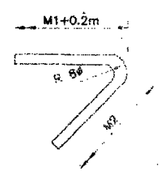
NOTES:

1. FOR ALL NOTES REFER DRG NO. SD/109 (SHEET 2 OF 16).

BENDING OF BARS

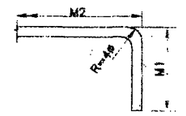


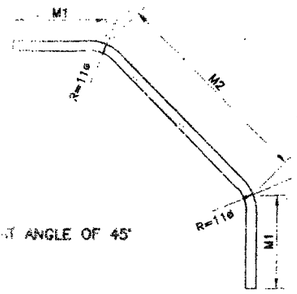
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°

BEND AT RIGHT ANGLE





BEND AT ANGLE OF 45°

LEGEND: ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

RECOMD.	APPROVED FOR ISSUE BY	
	(C.C.BHATTACHARYA) C.E. (R) S&R	SD/109

DRG.NO. SD/109 (SHEET 4 OF 16)

SCHEDULE OF REINFORCEMENT

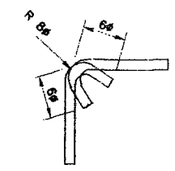
BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/54/3								1/55/3							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.
①	M1 M2 M1	16	280	1850	5960	9605	87	835.6	1318.9	16	220	2200	6200	10545	110	1160.0	1830.8
②	M1 M2 M1	20	280	1980	5150	9041	176	1591.3	3924.3	20	220	2100	6200	10331	222	2293.6	5656.3
③	M1 M2 M1	20	120	600	7560	8691	200	1738.3	4286.8	25	220	650	9000	10214	110	1123.6	4329.5
④	M1	BAR IS NOT USED								12	220	3500	–	3500	109	381.5	338.7
⑤	0.2m M1, 0.2m M2	10	200	5150	1230	6728	242	1628.3	1003.9	10	200	6200	1950	8498	242	2056.6	1268.0
⑥	M1 M2 M1	20	200	320	5960	6531	121	790.3	1949.0	25	260	400	6200	6914	93	643.0	2477.8
⑦	M1	12	200	3500	–	3500	120	420.0	372.9	BAR IS NOT USED							
⑧	M1 M2 M1	16	280	1700	5960	9305	87	809.5	1277.7	12	220	2000	6200	10159	110	1117.5	992.1
⑨	M1 M2 M1	10	280	200	1498	1851	174	322.0	198.5	10	220	200	1668	2020	220	444.5	274.0
⑩	M1 M2 M1	10	280	200	1710	2076	174	361.2	222.7	10	220	200	1950	2316	220	509.5	314.1
⑪	M1 M2 M1	10	160	280	23848	24374	62	1511.2	931.7	10	180	280	23848	24374	56	1364.9	841.5
⑫	M1 M2 M1	10	180	270	23848	24354	44	1071.6	660.7	10	150	330	23848	24474	66	1615.3	995.9
⑬	M1 M2 M1	10	240	270	23848	24354	34	828.0	510.5	10	200	330	23848	24474	50	1223.7	754.4
⑭	M1 M2 M1	10	180	350	23848	24514	56	1372.8	846.4	10	160	380	23848	24574	62	1523.6	939.3
⑮	M1 M2 M1	10	160	350	23848	24514	24	588.3	362.7	10	160	380	23848	24574	40	982.9	606.0
⑯	M1 M2 M1	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑰	M1 M2 M1	10	–	160	23848	24134	4	96.5	59.5	10	–	160	23848	24134	4	96.5	59.5
⑱	M1 M2	10	150	150	750	1831	82	150.2	92.6	10	150	150	750	1831	86	157.5	97.1
⑲	M1 M2 M1	10	–	160	5960	6245	16	99.9	61.6	10	–	160	6200	6486	16	103.8	64.0
⑳	M1+0.2m, 135°, M2, 0.2m	10	150	1100	1556	4172	82	342.1	210.9	10	150	1100	1556	4172	86	358.8	221.2
㉑	M1 M2 M1	12	–	200	5960	6319	20	126.4	112.2	12	–	200	6200	6559	20	131.2	116.5
TOTAL STEEL (Kgs)		18582.1								22355.3							
TOTAL CONCRETE (cum)		320.36								413.16							

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/63/3								1/64/3							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.
①	M1 M2 M1	16	240	1600	7060	10205	101	1030.7	1626.8	16	250	1950	7060	10905	97	1057.8	1669.6
②	M1 M2 M1	20	240	2330	4300	8891	204	1813.8	4473.2	20	250	2330	5400	9991	196	1958.3	4829.5
③	M1 M2 M1	28	280	650	7660	8864	87	771.2	3727.5	28	260	700	7860	9164	93	852.2	4119.4
④	M1	16	280	4200	–	4200	86	361.2	570.1	16	260	4200	–	4200	92	386.4	609.9
⑤	0.2m M1, 0.2m M2	10	200	4300	780	5428	242	1313.7	809.9	10	200	5400	880	6628	242	1604.1	989.0
⑥	M1 M2 M1	25	260	400	7060	7774	93	723.0	2788.0	25	240	400	7060	7774	101	785.2	3025.6
⑦	M1	BAR IS NOT USED								12	240	4200	–	4200	100	420.0	372.9
⑧	M1 M2 M1	16	240	1500	7060	10005	101	1010.5	1594.9	16	250	1850	7060	10705	97	1038.4	1638.9
⑨	M1 M2 M1	10	240	200	1710	2063	202	416.7	256.9	10	250	200	1781	2133	194	413.9	255.2
⑩	M1 M2 M1	10	240	200	1851	2217	202	447.8	276.1	10	250	200	1922	2288	194	443.8	273.6
⑪	M1 M2 M1	10	130	330	23848	24474	90	2202.6	1358.0	10	140	350	23848	24514	84	2059.1	1269.5
⑫	M1 M2 M1	10	160	290	23848	24394	36	878.2	541.4	10	160	290	23848	24394	50	1219.7	752.0
⑬	M1 M2 M1	10	220	290	23848	24394	28	683.0	421.1	10	220	290	23848	24394	36	878.2	541.4
⑭	M1 M2 M1	10	160	380	23848	24574	74	1818.5	1121.1	10	160	400	23848	24614	74	1821.4	1123.0
⑮	M1 M2 M1	10	160	380	23848	24574	12	294.9	181.8	10	160	400	23848	24614	16	393.8	242.8
⑯	M1 M2 M1	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑰	M1 M2 M1	10	–	160	23848	24134	4	96.5	59.5	10	–	160	23848	24134	4	96.5	59.5
⑱	M1 M2	10	150	150	850	2031	96	195.0	120.2	10	150	150	900	2131	96	204.6	126.1
⑲	M1 M2 M1	10	–	160	7060	7346	16	117.5	72.5	10	–	160	7060	7346	16	117.5	72.5
⑳	M1+0.2m, 135°, M2, 0.2m	10	150	1100	1556	4172	96	400.5	246.9	10	150	1100	1556	4172	96	400.5	246.9
㉑	M1 M2 M1	12	–	200	7060	7419	20	148.4	131.7	12	–	200	7060	7419	20	148.4	131.7
TOTAL STEEL (Kgs)		21164.2								22527.6							
TOTAL CONCRETE (cum)		346.13								395.12							

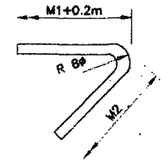
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

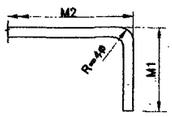
BENDING OF BARS



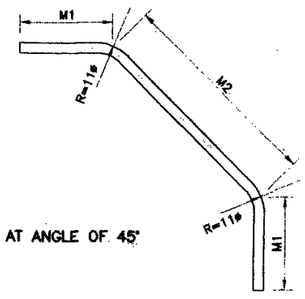
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 4 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 5 OF 16)

SCHEDULE OF REINFORCEMENT

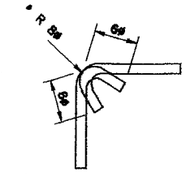
BAR MARK	BOX – CELL DESIGNATION No/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/65/3								1/66/3							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	20	250	2300	7260	11791	97	1143.8	2820.7	20	260	2650	7600	12831	93	1193.3	2942.9
③	M1 M2 M1	20	250	2430	6400	11191	196	2193.5	5409.5	25	260	2600	7450	12564	190	2387.2	9198.7
④	M1 M2 M1	28	240	750	9260	10664	101	1077.0	5206.1	28	180	800	10600	12104	134	1621.9	7839.8
⑭	M1	16	240	4200	–	4200	100	420.0	662.9	BAR IS NOT USED							
⑤	0.2m. M1 0.2m. M2	10	200	6400	1580	8328	242	2015.5	1242.6	10	200	7450	2250	10048	242	2431.7	1499.3
⑥	M1 M2 M1	25	280	400	7260	7974	87	693.8	2673.3	20	200	320	7600	8171	121	988.7	2438.4
⑨	M1	16	280	4200	–	4200	86	361.2	570.1	12	200	4200	–	4200	120	504.0	447.5
⑧	M2 M1 M1	16	250	2100	7260	11405	97	1106.3	1746.1	20	260	2400	7600	12331	93	1146.8	2828.2
⑫	M2 M1 M1	10	250	200	1851	2204	194	427.6	263.6	10	260	200	2092	2445	186	454.7	280.3
⑩	M1 M2 M1	10	250	200	2134	2500	194	485.0	299.0	10	260	200	2445	2811	186	522.8	322.3
⑪	M2 M1 M1	12	200	330	23848	24467	60	1468.0	1303.3	12	220	330	23848	24467	54	1321.2	1173.0
⑰	M2 M1 M1	12	220	340	23848	24487	46	1126.4	1000.0	12	160	430	23848	24667	74	1825.3	1620.6
⑬	M2 M1 M1	10	180	340	23848	24494	56	1371.6	845.7	10	160	430	23848	24674	74	1825.9	1125.7
⑱	M2 M1 M1	12	220	430	23848	24667	54	1332.0	1182.6	12	200	450	23848	24707	60	1482.4	1316.1
⑮	M2 M1 M1	12	220	430	23848	24667	24	592.0	525.6	12	200	450	23848	24707	36	889.4	789.7
⑯	M2 M1 M1	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑦	M2 M1 M1	10	–	160	23848	24134	4	96.5	59.5	10	–	160	23848	24134	4	96.5	59.5
⑯	M1 M2	10	150	150	850	2031	100	203.1	125.2	10	150	150	850	2031	104	211.3	130.2
⑰	M1 M2 M1	10	–	160	7260	7546	16	120.7	74.4	10	–	160	7600	7886	16	126.2	77.8
⑳	M1 M2 0.2m. 135° 0.2m.	10	150	1100	1556	4172	100	417.2	257.2	10	150	1100	1556	4172	104	433.9	267.5
㉑	M1 M2 M1	12	–	200	7260	7619	20	152.4	135.3	12	–	200	7600	7959	20	159.2	141.3
TOTAL STEEL (Kgs)		26581.4								34677.4							
TOTAL CONCRETE (cum)		479.72								306.97							

BAR MARK	1/75/3								1/76/3							
	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	20	250	2450	8300	13131	97	1273.7	3141.2	16	250	2850	8500	14145	97	1372.1	2165.6
③	20	250	2750	6650	12081	196	2367.9	5839.7	25	250	2850	7750	13384	196	2619.4	10093.1
④	32	260	900	9700	11390	93	1059.3	6687.6	32	260	1000	11100	12990	93	1208.1	7627.1
⑭	16	260	4900	–	4900	92	450.8	711.5	16	260	4900	–	4900	92	450.8	711.5
⑤	12	160	6650	1300	8288	300	2486.5	2207.5	12	160	7750	2000	10088	300	3026.5	2686.9
⑥	28	260	450	8300	9104	93	846.7	4092.5	25	250	400	8500	9214	97	893.8	3444.0
⑨	16	260	4900	–	4900	92	450.8	711.5	16	250	4900	–	4900	96	470.4	742.5
⑧	20	250	2200	8300	12631	97	1225.2	3021.6	16	250	2500	8500	13445	97	1304.2	2058.4
⑫	10	250	200	2021	2374	194	460.5	283.9	10	250	200	2162	2515	194	488.0	300.8
⑩	10	250	200	2375	2740	194	531.6	327.8	10	250	200	2657	3023	194	586.5	361.6
⑪	12	160	380	23848	24567	86	2112.7	1875.7	12	160	380	23848	24567	86	2112.7	1875.7
⑰	12	160	350	23848	24507	62	1519.4	1349.0	12	160	400	23848	24607	74	1820.9	1616.6
⑬	10	180	350	23848	24514	56	1372.8	846.4	10	160	400	23848	24614	74	1821.4	1123.0
⑱	12	160	500	23848	24807	86	2133.4	1894.1	12	160	550	23848	24907	86	2142.0	1901.7
⑮	12	160	500	23848	24807	24	595.4	528.6	12	160	550	23848	24907	36	896.6	796.1
⑯	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑦	10	–	160	23848	24134	6	144.8	89.3	10	–	160	23848	24134	6	144.8	89.3
⑯	10	150	150	950	2231	114	254.4	156.8	10	150	150	950	2231	116	258.8	159.6
⑰	10	–	160	8300	8556	16	137.4	84.7	10	–	160	8500	8786	16	140.6	86.7
⑳	10	150	1200	1697	4513	114	514.5	317.2	10	150	1300	1838	4855	116	563.2	347.2
㉑	12	–	200	8300	8659	20	173.2	153.7	12	–	200	8500	8859	20	177.2	157.3
TOTAL STEEL (Kgs)	34498.9								38523.5							
TOTAL CONCRETE (cum)	566.63								693.65							

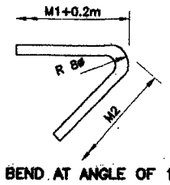
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

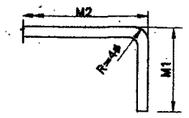
BENDING OF BARS



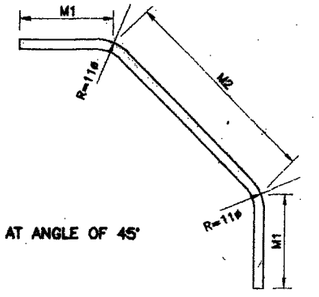
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 5 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 6 OF 16)

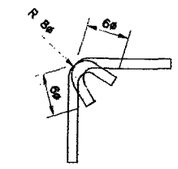
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/77/3								1/85/3								1/86/3								1/87/3							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	25	260	3150	8900	15114	93	1405.6	5416.4	20	220	2550	9400	14431	110	1587.4	3914.9	20	280	2950	9700	15531	87	1351.2	3332.3	25	280	3250	10000	16414	87	1428.0	5502.7
②	M1 M2 M1	25	260	3050	8750	14764	190	2805.2	10809.4	20	220	3100	6870	13001	222	2886.3	7118.1	25	280	3250	7950	14364	176	2528.1	9741.7	28	280	3400	8950	15654	176	2755.1	13317.
③	M1 M2 M1	32	240	1000	12300	14190	101	1433.2	9048.3	32	240	1000	10000	11890	101	1200.9	7581.7	28	150	1100	11300	13404	160	2144.6	10366.4	28	140	1100	12600	14704	172	2529.1	12224.6
④	M1	16	240	4900	–	4900	100	490.0	773.4	16	240	5600	–	5600	100	560.0	883.9	BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m M1 0.2m M2	12	160	8750	2600	11688	300	3506.5	3113.1	12	160	6870	950	8158	300	2447.5	2172.9	12	160	7950	1600	9888	300	2966.5	2633.7	12	160	8950	2250	11538	300	3461.5	3073.1
⑥	M1 M2 M1	25	260	400	8900	9614	93	894.1	3445.4	28	250	450	9400	10204	97	989.8	4784.2	28	280	450	9700	10504	87	913.8	4417.2	25	250	400	10000	10714	97	1039.3	4004.7
⑦	M1	16	260	4900	–	4900	92	450.8	711.5	20	250	5600	–	5600	96	537.6	1325.8	20	280	5600	–	5600	86	481.6	1187.7	20	250	5600	–	5600	96	537.6	1325.8
⑧	M2 M1 M1	20	260	2800	8900	14431	93	1342.1	3309.9	20	220	2320	9400	13971	110	1536.8	3790.1	20	280	2600	9700	14831	87	1290.3	3182.1	20	280	2900	10000	15731	87	1368.6	3375.2
⑨	M2 M1 M1	10	260	200	2445	2798	186	520.4	320.9	10	220	200	2261	2614	220	575.1	354.6	10	280	200	2445	2798	174	486.9	300.2	10	280	200	2657	3010	174	523.8	322.9
⑩	M1 M2 M1	10	260	200	2940	3306	186	614.9	379.1	10	220	200	2587	2952	220	649.5	400.4	10	280	200	2940	3306	174	575.2	354.6	10	280	200	3152	3518	174	612.1	377.4
⑪	M2 M1 M1	12	160	380	23848	24567	86	2112.7	1875.7	12	140	440	23848	24687	112	2764.9	2454.7	12	150	430	23848	24667	106	2614.7	2321.4	12	160	430	23848	24667	100	2466.7	2190.0
⑫	M2 M1 M1	12	140	500	23848	24807	98	2431.1	2158.3	12	160	380	23848	24567	62	1523.1	1352.3	12	150	450	23848	24707	78	1927.1	1710.9	12	130	530	23848	24867	106	2635.9	2340.2
⑬	M2 M1 M1	12	180	500	23848	24807	78	1934.9	1717.9	10	170	380	23848	24574	58	1425.3	878.7	12	200	450	23848	24707	60	1482.4	1316.1	12	170	530	23848	24867	82	2039.1	1810.3
⑭	M2 M1 M1	12	160	550	23848	24907	86	2142.0	1901.7	12	160	550	23848	24907	100	2490.7	2211.3	12	150	600	23848	25007	106	2650.7	2353.4	12	150	600	23848	25007	106	2650.7	2353.4
⑮	M2 M1 M1	12	160	550	23848	24907	48	1195.5	1061.4	12	160	550	23848	24907	12	298.9	265.4	12	150	600	23848	25007	28	700.2	621.6	12	150	600	23848	25007	40	1000.3	888.1
⑯	M2 M1 M1	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6	10	–	160	23848	24134	12	289.6	178.6
⑰	M2 M1 M1	10	–	160	23848	24134	6	144.8	89.3	10	–	160	23848	24134	6	144.8	89.3	10	–	160	23848	24134	6	144.8	89.3	10	–	160	23848	24134	6	144.8	89.3
⑱	M1 M2	10	150	150	950	2231	122	272.2	167.8	10	150	150	1070	2471	128	316.3	195.0	10	150	150	1050	2431	132	320.9	197.9	10	150	150	1050	2431	136	330.7	203.9
⑲	M1 M2 M1	10	–	160	8900	9186	16	147.0	90.6	10	–	160	9400	9686	16	155.0	95.5	10	–	160	9700	9986	16	159.8	98.5	10	–	160	10000	10286	16	164.6	101.5
⑳	M1 0.2m 135° M2 0.2m	10	150	1300	1838	4855	122	592.3	365.2	10	150	1300	1838	4855	128	621.4	383.1	10	150	1400	1980	5196	132	685.9	422.9	10	150	1400	1980	5196	136	706.7	435.7
㉑	M1 M2 M1	12	–	200	8900	9259	20	185.2	164.4	12	–	200	9400	9759	20	195.2	173.3	12	–	200	9700	10059	20	201.2	178.6	12	–	200	10000	10359	20	207.2	183.9
TOTAL STEEL (Kgs)		47098.2								40603.8								45004.9								54298.4							
TOTAL CONCRETE (cum)		839.05								659.64								802.86								940.83							

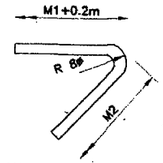
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

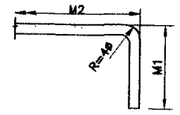
BENDING OF BARS



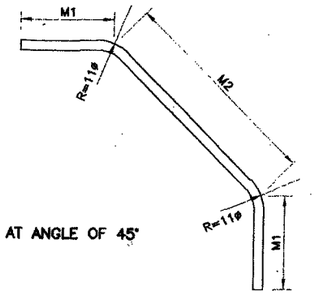
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

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(WITH EARTH CUSHION)
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(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 6 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 7 OF 16)

SCHEDULE OF REINFORCEMENT

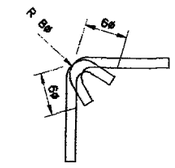
BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/22/4								1/23/4							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	10	220	900	2460	4226	128	540.9	333.5	12	240	1220	2700	5099	117	596.6	529.6
②	M1 M2 M1	10	220	830	2530	4156	258	1072.2	661.0	12	240	950	3590	5449	238	1296.8	1151.3
③	M1 M2 M1	12	120	250	3460	3919	233	913.1	810.6	12	130	270	4700	5199	216	1122.9	997.0
④	M1	BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m M1 0.2m M2	10	200	2530	680	3558	282	1003.5	618.7	10	200	3590	1300	5238	282	1477.3	910.8
⑥	M1 M2 M1	12	130	200	2460	2819	216	608.9	540.6	10	120	160	2700	2986	233	695.7	428.9
⑦	M1	BAR IS NOT USED								BAR IS NOT USED							
⑧	M1 M2 M1	12	220	830	2460	4079	128	522.1	463.5	12	240	1170	2700	4999	117	584.9	519.2
⑨	M1 M2 M1	10	220	200	763	1115	256	285.5	176.0	10	240	200	989	1342	234	313.9	193.6
⑩	M1 M2 M1	10	220	200	862	1227	256	314.2	193.7	10	240	200	1060	1425	234	333.5	205.6
⑪	M1 M2 M1	10	250	160	27848	28134	16	450.1	277.5	10	250	160	27848	28134	16	450.1	277.5
⑫	M1 M2 M1	10	250	160	27848	28134	16	450.1	277.5	10	250	200	27848	28214	24	677.1	417.5
⑬	M1 M2 M1	10	250	160	27848	28134	16	450.1	277.5	10	250	200	27848	28214	24	677.1	417.5
⑭	M1 M2 M1	10	250	180	27848	28174	16	450.8	277.9	10	250	190	27848	28194	16	451.1	278.1
⑮	M1 M2 M1	10	250	180	27848	28174	12	338.1	208.4	10	250	190	27848	28194	20	563.9	347.6
⑯	M1 M2 M1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1
⑰	M1 M2 M1	10	–	160	27848	28134	2	56.3	34.7	10	–	160	27848	28134	2	56.3	34.7
⑱	M1 M2	10	150	150	480	1291	36	46.5	28.7	10	150	150	520	1371	38	52.1	32.1
⑲	M1 M2 M1	10	–	160	2460	2746	16	43.9	27.1	10	–	160	2700	2986	16	47.8	29.5
⑳	M1+0.2m M1 135° M2 0.2m	10	150	1100	1556	4172	36	150.2	92.6	10	150	1100	1556	4172	38	158.5	97.7
㉑	M1 M2 M1	12	–	200	2460	2819	20	56.4	50.1	12	–	200	2700	3059	20	61.2	54.3
TOTAL STEEL (Kgs)		5557.8								7130.8							
TOTAL CONCRETE (cum)		93.10								150.22							

BAR MARK	1/33/4								1/34/4							
	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	12	250	1320	3740	6339	113	716.3	635.9	16	260	1700	3900	7245	109	789.7	1246.4
②	16	250	1270	3750	6235	228	1421.6	2243.8	16	260	1350	4850	7495	220	1648.9	2602.5
③	20	250	370	5240	5911	113	668.0	1647.3	20	260	450	6700	7531	109	820.9	2024.5
④	10	250	2100	–	2100	112	235.2	145.0	10	260	2100	–	2100	108	226.8	139.8
⑤	10	200	3750	1070	5168	282	1457.5	898.6	10	200	4850	1800	6998	282	1973.6	1216.8
⑥	20	250	320	3740	4311	113	487.2	1201.5	16	260	260	3900	4365	109	475.8	751.0
⑦	BAR IS NOT USED								10	260	2100	–	2100	108	226.8	139.8
⑧	12	250	1230	3740	6159	113	695.9	617.9	16	260	1550	3900	6945	109	757.0	1194.8
⑨	10	250	200	1102	1455	226	328.8	202.7	10	260	200	1243	1596	218	348.0	214.5
⑩	10	250	200	1229	1595	226	360.4	222.2	10	260	200	1455	1821	218	397.0	244.8
⑪	10	250	190	27848	28194	24	676.6	417.2	10	250	200	27848	28214	24	677.1	417.5
⑫	10	250	210	27848	28234	24	677.6	417.8	10	220	250	27848	28314	36	1019.3	628.4
⑬	10	250	210	27848	28234	24	677.6	417.8	10	250	250	27848	28314	32	906.0	558.6
⑭	10	250	240	27848	28294	24	679.0	418.7	10	220	280	27848	28374	28	794.5	489.8
⑮	10	250	240	27848	28294	16	452.7	279.1	10	220	280	27848	28374	32	908.0	559.8
⑯	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1
⑰	10	–	160	27848	28134	2	56.3	34.7	10	–	160	27848	28134	2	56.3	34.7
⑱	10	150	150	580	1491	52	77.5	47.8	10	150	150	600	1531	54	82.7	51.0
⑲	10	–	160	3740	4026	16	64.4	39.7	10	–	160	3900	4186	16	67.0	41.3
⑳	10	150	1100	1556	4172	52	216.9	133.8	10	150	1100	1556	4172	54	225.3	138.9
㉑	12	–	200	3740	4099	20	82.0	72.8	12	–	200	3900	4259	20	85.2	75.6
TOTAL STEEL (Kgs)	10302.3								12978.8							
TOTAL CONCRETE (cum)	190.43								270.65							

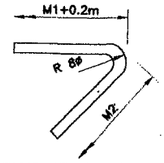
NOTES:

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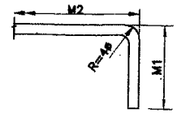
BENDING OF BARS



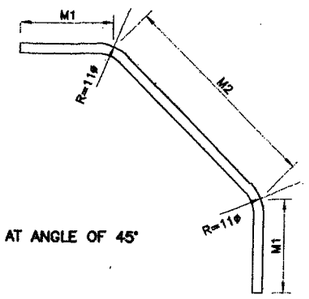
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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(WITH EARTH CUSHION)

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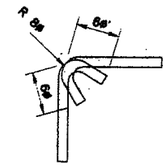
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE) / BOX – CELL DESIGNATION No/ab/Ea	1/43/4								1/44/4								1/45/4								1/53/4							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	16	260	1450	4800	7845	109	833.3	1315.2	16	220	1750	5000	8445	128	1081.0	1706.1	20	260	2100	5200	9331	109	1017.1	2508.4	16	220	1550	5940	8985	128	1150.1	1815.2
②	M1 M2 M1	16	260	1600	4000	7145	220	1571.9	2481.0	16	220	1700	5000	8345	258	2153.0	3398.2	20	260	1800	6050	9581	220	2107.9	5198.4	16	220	1970	4220	8105	258	2091.1	3300.5
③	M1 M2 M1	25	280	500	5800	6814	101	657.9	2535.2	25	280	500	7000	7914	101	799.3	3080.1	25	260	550	8400	9414	109	1026.1	3954.1	25	220	600	6540	7854	128	979.7	3775.3
④	M1	12	280	2800	–	2800	100	280.0	248.6	12	280	2800	–	2800	100	280.0	248.6	12	260	2800	–	2800	108	302.4	268.5	12	220	3500	–	3500	127	444.5	394.6
⑤	0.2m. M1 0.2m. M2	10	200	4000	750	5098	282	1437.8	886.4	10	200	5000	1450	6798	282	1917.2	1182.0	10	200	6050	2150	8548	282	2410.7	1486.3	10	200	4220	720	5288	282	1491.4	919.5
⑥	M2 M1 M1	20	220	320	4800	5371	128	687.5	1695.6	20	250	320	5000	5571	113	629.6	1552.6	20	280	320	5200	5771	101	582.9	1437.5	25	280	400	5940	6654	101	672.1	2589.7
⑦	M1	12	220	2800	–	2800	127	355.6	315.7	12	250	2800	–	2800	112	313.6	276.4	12	280	2800	–	2800	100	280.0	248.6	16	280	3500	–	3500	100	350.0	552.4
⑧	M2 M1 M1	16	260	1350	4800	7445	109	811.5	1280.8	16	220	1850	5000	8245	128	1055.4	1665.7	16	260	1950	5200	9045	109	985.9	1556.1	16	220	1470	5940	8825	128	1129.6	1782.9
⑨	M2 M1 M1	10	260	200	1314	1667	218	363.4	224.0	10	280	200	1455	1808	202	365.3	225.2	10	260	200	1597	1950	218	425.0	282.0	10	220	200	1583	1935	256	495.5	305.5
⑩	M1 M2 M1	10	260	200	1455	1821	218	397.0	244.8	10	280	200	1597	1962	202	396.4	244.4	10	260	200	1809	2175	218	474.1	292.3	10	220	200	1698	2061	256	527.7	325.4
⑪	M2 M1 M1	10	150	250	27848	28314	44	1245.8	768.1	10	200	250	27848	28314	40	1132.5	698.3	10	200	250	27848	28314	40	1132.5	698.3	10	150	310	27848	28434	66	1876.6	1157.0
⑫	M2 M1 M1	10	200	230	27848	28274	30	848.2	523.0	10	180	280	27848	28374	44	1248.4	769.7	10	150	330	27848	28474	66	1879.3	1158.6	10	200	260	27848	28334	30	850.0	524.1
⑬	M2 M1 M1	10	250	230	27848	28274	24	678.6	418.4	10	220	280	27848	28374	36	1021.5	629.8	10	200	330	27848	28474	50	1423.7	877.8	10	250	260	27848	28334	24	680.0	419.3
⑭	M2 M1 M1	10	200	300	27848	28414	40	1136.5	700.7	10	200	300	27848	28414	40	1136.5	700.7	10	200	330	27848	28474	40	1138.9	702.2	10	180	350	27848	28514	56	1596.8	984.5
⑮	M2 M1 M1	10	200	300	27848	28414	12	341.0	210.2	10	200	300	27848	28414	24	681.9	420.4	10	200	330	27848	28474	36	1025.1	632.0	10	180	350	27848	28514	12	342.2	211.0
⑯	M2 M1 M1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1
⑰	M2 M1 M1	10	–	160	27848	28134	2	56.3	34.7	10	–	160	27848	28134	2	56.3	34.7	10	–	160	27848	28134	4	112.5	69.4	10	–	160	27848	28134	4	112.5	69.4
⑱	M1 M2	10	150	150	700	1731	66	114.3	70.5	10	150	150	700	1731	70	121.2	74.7	10	150	150	700	1731	72	124.7	76.9	10	150	150	820	1971	82	161.6	99.7
⑲	M1 M2 M1	10	–	160	4800	5086	16	81.4	50.2	10	–	160	5000	5286	16	84.6	52.1	10	–	160	5200	5486	16	87.8	54.1	10	–	160	5940	6226	16	99.6	61.4
⑳	R=150mm M1 135° M2 150mm	10	150	1100	1556	4172	66	275.3	169.8	10	150	1100	1556	4172	70	292.0	180.1	10	150	1100	1556	4172	72	300.4	185.2	10	150	1100	1556	4172	82	342.1	210.9
㉑	M1 M2 M1	12	–	200	4800	5159	20	103.2	91.6	12	–	200	5000	5359	20	107.2	95.2	12	–	200	5200	5559	20	111.2	98.7	12	–	200	5940	6299	20	126.0	111.8
TOTAL STEEL (Kgs)		14472.6								17445.2								21973.4								19818.1							
TOTAL CONCRETE (cum)		248.97								324.07								421.49								332.67							

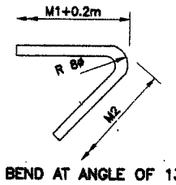
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

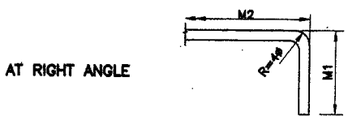
BENDING OF BARS



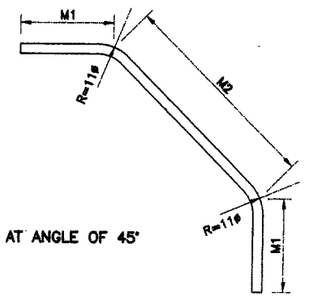
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

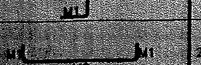
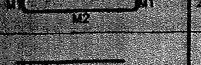
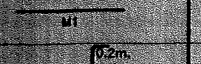
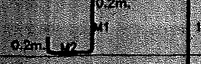
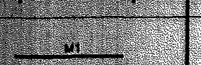
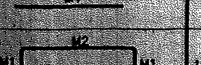
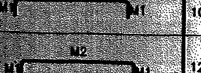
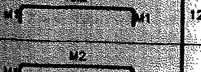
SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 8 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 9 OF 16)

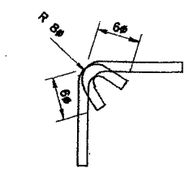
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/qb/Ec / SHAPE OF BARS (NOT TO SCALE)	1/54/4								1/55/4								1/63/4								1/64/4							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①		16	200	1900	6040	9785	141	1379.7	2177.6	20	260	2230	6300	10691	109	1165.4	2873.9	16	240	1700	7160	10505	117	1229.1	1939.9	20	280	2000	7160	11091	101	1120.2	2762.6
③		16	200	2020	5250	9235	284	2622.8	4139.6	20	280	2150	6280	10511	220	2312.5	5703.0	20	240	2380	4500	9191	238	2187.5	5394.8	20	280	2380	5500	10191	204	2079.0	5127.2
④		25	170	850	7440	8654	165	1427.9	5502.4	28	220	680	8700	9964	128	1275.4	6164.7	32	300	750	7760	9150	94	860.1	5430.2	28	180	750	7760	9164	156	1429.6	6910.0
⑤		BAR IS NOT USED								BAR IS NOT USED								16	300	4200	–	4200	93	390.6	616.5	BAR IS NOT USED							
⑥		10	200	5250	1170	6768	282	1908.7	1176.8	12	200	6280	1800	8418	282	2373.9	2107.6	12	200	4500	830	5668	282	1598.4	1419.1	12	200	5500	830	6668	282	1880.4	1669.5
⑦		20	130	320	6040	6611	216	1428.0	3521.8	20	200	320	6300	6871	141	968.9	2389.4	28	280	450	7160	7964	101	804.3	3888.0	28	280	450	7160	7964	101	804.3	3888.0
⑧		BAR IS NOT USED								12	200	3500	–	3500	140	490.0	435.0	16	280	4200	–	4200	100	420.0	662.9	16	280	4200	–	4200	100	420.0	662.9
⑨		16	200	1750	6040	9485	141	1337.4	2110.9	20	260	2050	6300	10331	109	1126.1	2777.2	16	240	1600	7160	10305	117	1205.7	1903.0	20	280	1900	7160	10891	101	1100.0	2712.6
⑩		10	200	200	1625	1978	282	557.8	343.9	10	260	200	1809	2162	218	471.3	290.5	10	240	200	1922	2275	234	532.3	328.2	10	220	200	1922	2275	256	582.4	359.0
⑪		10	200	200	1837	2203	282	621.2	383.0	10	260	200	2063	2429	218	529.5	326.5	10	240	200	2063	2429	234	568.4	350.4	10	220	200	2063	2429	256	621.9	383.4
⑫		12	220	300	27848	28407	46	1306.7	1160.1	12	240	300	27848	28407	42	1193.1	1059.2	12	180	380	27848	28567	66	1885.4	1673.9	12	180	380	27848	28567	66	1885.4	1673.9
⑬		12	250	290	27848	28387	32	908.4	806.5	12	200	350	27848	28507	50	1425.3	1265.4	12	250	320	27848	28447	24	682.7	606.1	12	220	320	27848	28447	36	1024.1	909.2
⑭		10	220	290	27848	28394	36	1022.2	630.2	10	180	350	27848	28514	56	1596.8	984.5	10	200	320	27848	28454	30	853.6	526.3	10	200	320	27848	28454	40	1138.1	701.7
⑮		12	250	380	27848	28567	40	1142.7	1014.5	12	240	390	27848	28587	42	1200.6	1066.0	12	220	430	27848	28667	54	1548.0	1374.3	12	220	430	27848	28667	54	1548.0	1374.3
⑯		12	250	380	27848	28567	16	457.1	405.8	12	240	390	27848	28587	24	686.1	609.1	12	220	430	27848	28667	12	344.0	305.4	12	220	430	27848	28667	12	344.0	305.4
⑰		12	–	200	27848	28207	12	338.5	300.5	12	–	200	27848	28207	12	338.5	300.5	12	–	200	27848	28207	12	338.5	300.5	12	–	200	27848	28207	12	338.5	300.5
⑱		10	–	160	27848	28134	4	112.5	69.4	10	–	160	27848	28134	4	112.5	69.4	10	–	160	27848	28134	4	112.5	69.4	10	–	160	27848	28134	4	112.5	69.4
⑲		10	150	150	800	1931	84	162.2	100.0	10	150	150	800	1931	86	166.1	102.4	10	150	150	950	2231	98	218.7	134.8	10	150	150	950	2231	98	218.7	134.8
⑳		10	–	160	6040	6326	16	101.2	62.4	10	–	160	6300	6586	16	105.4	65.0	10	–	160	7160	7446	16	119.1	73.4	10	–	160	7160	7446	16	119.1	73.4
㉑		10	150	1100	1556	4172	84	350.4	216.1	10	150	1100	1556	4172	86	358.8	221.2	10	150	1100	1556	4172	98	408.8	252.1	10	150	1100	1556	4172	98	408.8	252.1
		12	–	200	6040	6399	20	128.0	113.6	12	–	200	6300	6659	20	133.2	118.2	12	–	200	7160	7519	20	150.4	133.5	12	–	200	7160	7519	20	150.4	133.5
TOTAL STEEL (Kgs)		24235.0								28928.8								27382.8								30403.8							
TOTAL CONCRETE (cum)		399.46								506.50								456.87								492.08							

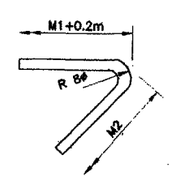
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

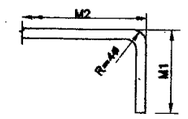
BENDING OF BARS



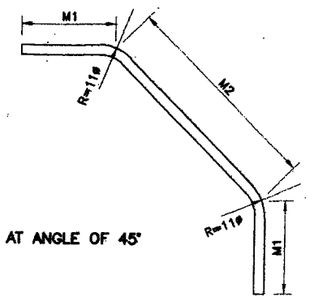
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)

BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 9 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 10 OF 16)

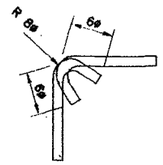
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/65/4 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/66/4 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/75/4 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/76/4 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
(1)	M1 M2 M1	20	300	2350	7340	11971	94	1125.3	2775.2	20	260	2750	7660	13091	109	1427.0	3519.1	16	260	2500	8440	13385	109	1459.0	2302.8	20	260	2850	8660	14291	109	1557.8	3841.7
(2)	M1 M2 M1	25	300	2470	6500	11354	192	2180.0	8400.3	25	260	2630	7600	12774	220	2810.3	10829.2	25	260	2820	6800	12354	220	2717.9	10473.1	25	260	2930	7820	13594	220	2990.7	11524.5
(3)	M1 M2 M1	32	280	800	9140	10630	101	1073.6	6778.3	25	130	900	10460	12174	216	2629.6	10132.9	32	250	950	9440	11230	113	1269.0	8011.7	32	240	1000	10860	12750	117	1491.8	9418.0
(4)	M1	16	280	4200	–	4200	100	420.0	662.9	BAR IS NOT USED								16	250	4900	–	4900	112	548.8	866.2	16	240	4900	–	4900	116	568.4	897.1
(5)	0.2m. M1 0.2m M2	12	200	6500	1520	8358	282	2357.0	2092.6	10	200	7600	2180	10128	282	2856.2	1761.0	12	150	6800	1170	8308	374	3107.3	2758.7	12	150	7820	1880	10038	374	3754.3	3333.1
(6)	M2 M1	25	240	400	7340	8054	117	942.3	3631.2	25	280	400	7660	8374	101	845.8	3259.1	28	240	450	8440	9244	117	1081.5	5227.8	25	220	400	8660	9374	128	1199.9	4623.6
(7)	M1	16	240	4200	–	4200	116	487.2	769.0	16	280	4200	–	4200	100	420.0	662.9	16	240	4900	–	4900	116	568.4	897.1	16	220	4900	–	4900	127	622.3	982.2
(8)	M2 M1 M1	16	300	2150	7340	11585	94	1089.0	1718.8	20	260	2450	7660	12491	109	1361.6	3357.8	20	260	2300	8440	12971	109	1413.9	3486.8	20	260	2570	8660	13731	109	1496.7	3691.1
(9)	M2 M1 M1	10	300	200	1979	2331	188	438.3	270.2	10	260	200	2205	2558	218	557.6	343.8	10	260	200	2261	2614	218	569.9	351.4	10	260	200	2375	2727	218	594.6	366.6
(10)	M1 M2 M1	10	300	200	2261	2627	188	493.9	304.5	10	260	200	2629	2995	218	652.8	402.5	10	260	200	2544	2910	218	634.4	391.1	10	260	200	2770	3136	218	683.7	421.5
(11)	M2 M1	12	180	350	27848	28507	66	1881.4	1670.4	12	200	350	27848	28507	60	1710.4	1518.5	12	150	430	27848	28667	92	2637.3	2341.5	12	160	410	27848	28627	86	2461.9	2185.7
(12)	M2 M1	12	200	360	27848	28527	50	1426.3	1266.3	12	160	440	27848	28687	74	2122.8	1884.7	12	160	390	27848	28587	62	1772.4	1573.5	12	160	440	27848	28687	74	2122.8	1884.7
(13)	M2 M1	10	180	360	27848	28534	56	1597.9	985.2	12	200	440	27848	28687	60	1721.2	1528.1	12	240	390	27848	28587	42	1200.6	1066.0	12	200	440	27848	28687	60	1721.2	1528.1
(14)	M2 M1	12	200	450	27848	28707	60	1722.4	1529.2	12	180	500	27848	28807	66	1901.2	1688.0	12	160	530	27848	28867	86	2482.5	2204.0	12	160	550	27848	28907	86	2486.0	2207.1
(15)	M2 M1	12	200	450	27848	28707	24	689.0	611.7	12	180	500	27848	28807	36	1037.0	920.7	12	160	530	27848	28867	16	461.9	410.1	12	160	550	27848	28907	32	925.0	821.2
(16)	M2 M1	12	–	200	27848	28207	12	338.5	300.5	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1
(17)	M2 M1	10	–	160	27848	28134	4	112.5	69.4	10	–	160	27848	28134	6	168.8	104.1	10	–	160	27848	28134	6	168.8	104.1	10	–	160	27848	28134	6	168.8	104.1
(18)	M1 M2	10	150	150	900	2131	100	213.1	131.4	10	150	150	900	2131	104	221.7	136.7	10	150	150	1050	2431	116	282.0	173.9	10	150	150	1020	2371	118	279.8	172.5
(19)	M1 M2	10	–	160	7340	7626	16	122.0	75.2	10	–	160	7660	7946	16	127.1	78.4	10	–	160	8440	8726	16	139.6	86.1	10	–	160	8660	8946	16	143.1	88.2
(20)	M1 0.2m M2 0.2m	10	150	1100	1556	4172	100	417.2	257.2	10	150	1200	1697	4513	104	469.4	289.4	10	150	1250	1768	4684	116	543.4	335.0	10	150	1300	1838	4855	118	572.9	353.2
(21)	M1 M2	12	–	200	7340	7699	20	154.0	136.7	12	–	200	7660	8019	20	160.4	142.4	12	–	200	8440	8799	20	176.0	156.2	12	–	200	8660	9019	20	180.4	160.1
	(kgs)					34436.1								42767.3								43425.1								48812.5			
	(cum)					591.80								755.76								713.34								849.08			

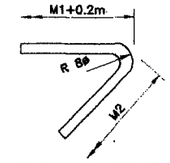
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

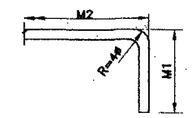
BENDING OF BARS



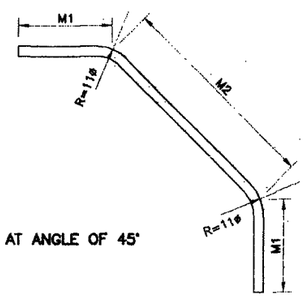
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 10 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 11 OF 16)

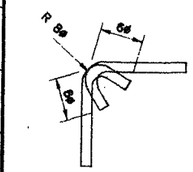
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE) / BOX – CELL DESIGNATION Nc/ab/Ec	1/77/4								1/85/4								1/86/4								1/87/4							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	25	260	3200	9000	15314	109	1669.2	6432.2	20	260	2650	9600	14831	109	1616.6	3986.8	20	250	3000	9800	15731	113	1777.6	4383.9	25	280	3400	10100	16814	101	1698.2	6543.9
②	M1 M2 M1	25	260	3100	8870	14984	220	3296.5	12702.7	25	260	3200	7050	13364	220	2940.1	11329.3	25	250	3300	8100	14614	228	3332.0	12839.5	25	280	3450	9200	16014	204	3266.9	12588.5
③	M1 M2 M1	28	140	1050	12200	14204	200	2840.8	13731.3	28	140	1100	10200	12304	200	2460.8	11894.5	32	180	1150	11200	13390	156	2088.9	13187.7	28	140	1250	12500	14904	200	2980.8	14408.1
④	M1	BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m. M1 0.2m. M2	12	150	8870	2550	11758	374	4397.6	3904.2	12	150	7050	1050	8438	374	3155.9	2801.8	12	150	8100	1550	9988	374	3735.6	3316.5	12	150	9200	2200	11738	374	4390.1	3897.6
⑥	M1 M2 M1	28	280	450	9000	9804	101	990.2	4786.2	32	280	520	9600	10530	101	1063.5	6714.5	28	240	450	9800	10604	117	1240.7	5996.9	28	260	450	10100	10904	108	1177.6	5692.2
⑦	M1	16	280	4900	–	4900	100	490.0	773.4	20	280	5600	–	5600	100	560.0	1381.0	20	240	5600	–	5600	116	649.6	1602.0	20	260	5600	–	5600	108	604.8	1491.5
⑧	M2 M1 M1	25	260	2870	9000	14654	109	1597.3	6155.0	20	260	2400	9600	14331	109	1562.1	3852.4	20	250	2700	9800	15131	113	1709.8	4216.7	25	280	3000	10100	16014	101	1617.4	6232.6
⑨	M2 M1 M1	10	260	200	2615	2968	218	647.0	398.9	10	260	200	2515	2869	218	625.4	385.6	10	250	200	2657	3010	226	680.3	419.4	10	280	200	2869	3222	202	650.9	401.3
⑩	M1 M2 M1	10	260	200	3082	3447	218	751.5	463.3	10	260	200	2869	3235	218	705.3	434.8	10	250	200	3082	3447	226	779.1	480.3	10	280	200	3435	3801	202	767.7	473.3
⑪	M2 M1 M1	12	160	410	27848	28627	86	2461.9	2185.7	12	130	480	27848	28767	122	3509.5	3115.8	12	140	480	27848	28767	112	3221.9	2860.4	12	150	480	27848	28767	106	3049.3	2707.2
⑫	M2 M1 M1	12	150	530	27848	28667	106	3059.9	2716.6	12	150	430	27848	28667	66	1892.0	1679.8	12	160	480	27848	28767	74	2128.7	1889.9	12	140	550	27848	28907	98	2832.9	2515.1
⑬	M2 M1 M1	12	170	530	27848	28667	82	2367.1	2101.5	12	220	430	27848	28667	46	1318.7	1170.7	12	180	480	27848	28767	66	1898.6	1685.6	12	160	550	27848	28907	86	2486.0	2207.1
⑭	M2 M1 M1	12	160	580	27848	28967	86	2491.1	2211.7	12	150	600	27848	29007	106	3074.7	2729.8	12	150	630	27848	29067	106	3081.1	2735.4	12	130	680	27848	29187	122	3558.3	3159.2
⑮	M2 M1 M1	12	160	580	27848	28967	44	1274.5	1131.6	12	150	600	27848	29007	12	348.1	309.0	12	150	630	27848	29067	24	697.6	619.3	12	130	680	27848	29187	40	1166.7	1035.8
⑯	M2 M1 M1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1	10	–	160	27848	28134	12	337.6	208.1
⑰	M2 M1 M1	10	–	160	27848	28134	6	168.8	104.1	10	–	160	27848	28134	6	168.8	104.1	10	–	160	27848	28134	8	225.1	138.8	10	–	160	27848	28134	8	225.1	138.8
⑱	M1 M2	10	150	150	1020	2371	122	289.3	178.4	10	150	150	1150	2631	130	342.1	210.9	10	150	150	1150	2631	134	352.6	217.4	10	150	150	1150	2631	138	363.1	223.9
⑲	M1 M2 M1	10	–	160	9000	9286	16	148.6	91.6	10	–	160	9600	9886	16	158.2	97.5	10	–	160	9800	10086	16	161.4	99.5	10	–	160	10100	10386	16	166.2	102.5
⑳	M1+0.2m M1 M2 0.2m.	10	150	1350	1909	5025	122	613.1	378.0	10	150	1400	1980	5196	130	675.5	416.5	10	150	1450	2051	5367	134	719.2	443.4	10	150	1550	2192	5708	138	787.7	485.7
㉑	M1 M2 M1	12	–	200	9000	9359	20	187.2	166.2	12	–	200	9600	9959	20	199.2	176.8	12	–	200	9800	10159	20	203.2	180.4	12	–	200	10100	10459	20	209.2	185.7
TOTAL STEEL (Kgs)		60820.8								53000								57521.4								64698							
TOTAL CONCRETE (cum)		1032.22								859.18								995.71								1197.34							

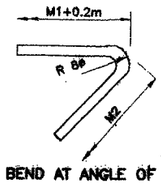
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

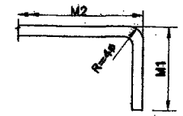
BENDING OF BARS



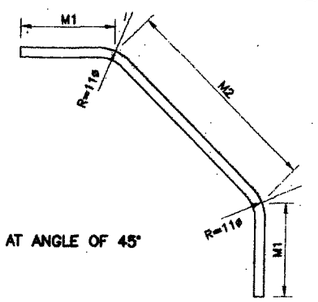
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999.
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 11 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 12 OF 16)

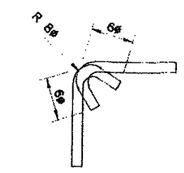
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/22/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/23/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/33/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/34/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	12	260	900	2500	4259	124	528.1	468.8	12	260	1200	2660	5019	124	622.3	552.5	16	300	1350	3740	6385	108	689.6	1088.4	16	240	1700	3940	7285	134	976.2	1540.8
②	M1 M2 M1	12	260	850	2550	4209	250	1052.2	934.2	16	260	930	3570	5375	250	1343.8	2120.9	16	300	1270	3820	6305	218	1374.5	2169.4	16	240	1370	4900	7585	272	2063.1	3256.3
③	M1 M2 M1	12	100	250	3500	3959	320	1266.8	1124.7	12	110	250	4860	5319	291	1547.8	1374.1	16	120	400	5240	5985	267	1598.0	2522.2	20	200	450	6540	7371	161	1186.8	2926.8
④	M1	BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m. M1 0.2m. M2	10	200	2550	700	3598	322	1158.7	714.4	10	200	3570	1380	5298	322	1706.1	1051.9	10	200	3820	1070	5238	322	1686.8	1040.0	10	200	4900	1720	6968	322	2243.9	1383.4
⑥	M1 M2 M1	12	120	200	2500	2859	267	763.3	677.7	12	150	200	2660	3019	214	646.0	573.5	20	280	320	3740	4311	115	495.8	1222.7	16	170	260	3940	4405	189	832.6	1314.1
⑦	M1	BAR IS NOT USED								BAR IS NOT USED								12	280	2100	–	2100	114	239.4	212.5	BAR IS NOT USED							
⑧	M2 M1 M1	12	260	850	2500	4159	124	515.7	457.8	12	260	1170	2660	4959	124	614.9	545.9	16	300	1270	3740	6225	108	672.3	1061.1	16	240	1600	3940	7085	134	949.4	1498.5
⑨	M2 M1 M	10	260	200	819	1172	248	290.6	179.2	10	260	200	961	1313	248	325.7	200.8	10	300	200	1158	1511	216	326.4	201.3	10	240	200	1342	1695	268	454.3	280.1
⑩	M1 M2 M1	10	260	200	890	1255	248	311.4	192.0	10	260	200	1003	1369	248	339.4	209.3	10	300	200	1272	1637	216	353.7	218.0	10	240	200	1484	1849	268	495.6	305.6
⑪	M2 M1 M1	10	250	160	31848	32134	16	514.1	317.0	10	250	160	31848	32134	16	514.1	317.0	10	250	210	31848	32234	24	773.6	477.0	10	250	230	31848	32274	24	774.6	477.6
⑫	M2 M1 M1	10	250	160	31848	32134	16	514.1	317.0	10	250	190	31848	32194	24	772.6	476.4	10	250	210	31848	32234	24	773.6	477.0	10	200	260	31848	32334	40	1293.3	797.4
⑬	M2 M1 M1	10	250	160	31848	32134	16	514.1	317.0	10	250	190	31848	32194	24	772.6	476.4	10	250	210	31848	32234	24	773.6	477.0	10	250	260	31848	32334	32	1034.7	637.9
⑭	M2 M1 M1	10	250	180	31848	32174	16	514.8	317.4	10	250	180	31848	32174	16	514.8	317.4	10	250	250	31848	32314	24	775.5	478.1	10	220	280	31848	32374	28	906.5	558.9
⑮	M2 M1 M1	10	250	180	31848	32174	12	386.1	238.0	10	250	180	31848	32174	24	772.2	476.1	10	250	250	31848	32314	16	517.0	318.8	10	220	280	31848	32374	28	906.5	558.9
⑯	M2 M1 M1	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7
⑰	M2 M1 M1	10	–	160	31848	32134	2	64.3	39.6	10	–	160	31848	32134	2	64.3	39.6	10	–	160	31848	32134	2	64.3	39.6	10	–	160	31848	32134	2	64.3	39.6
⑱	M1 M2	10	150	150	500	1331	36	47.9	29.5	10	150	150	520	1371	38	52.1	32.1	10	150	150	620	1571	52	81.7	50.4	10	150	150	650	1631	56	91.4	56.3
⑲	M1 M1 M2	10	–	160	2500	2786	16	44.6	27.5	10	–	160	2660	2946	16	47.1	29.1	10	–	160	3740	4026	16	64.4	39.7	10	–	160	3940	4226	16	67.6	41.7
⑳	M1 M1=0.2m M2 0.2m	10	150	1100	1556	4172	36	150.2	92.6	10	150	1100	1556	4172	38	158.5	97.7	10	150	1100	1556	4172	52	216.9	133.8	10	150	1100	1556	4172	56	233.6	144.0
㉑	M1 M2 M1	12	–	200	2500	2859	20	57.2	50.8	12	–	200	2660	3019	20	60.4	53.6	12	–	200	3740	4099	20	82.0	72.8	12	–	200	3940	4299	20	86.0	76.3
TOTAL STEEL (Kgs)		6732.9								9182.1								12537.5								16131.9							
TOTAL CONCRETE (cum)		110.86								165.70								226.56								317.71							

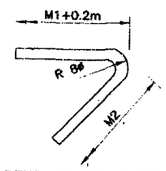
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

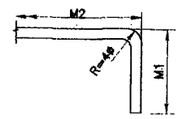
BENDING OF BARS



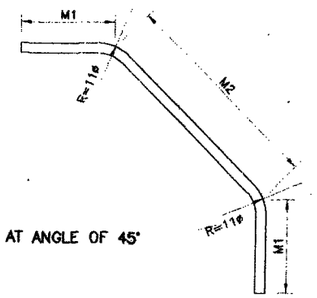
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 12 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

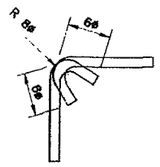
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE) / BOX – CELL DESIGNATION Nc/ab/Ec	1/43/5								1/44/5								1/45/5								1/53/5							
		BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	16	260	1520	4900	7885	124	977.7	1543.2	16	200	1800	5000	8545	161	1375.8	2171.4	20	260	2150	5300	9531	124	1181.9	2914.7	16	260	1620	6000	9185	124	1138.9	1797.6
②	MT M2 M1	16	260	1650	4140	7385	250	1846.3	2914.0	16	200	1700	5050	8395	324	2720.0	4293.1	20	260	1850	6150	9781	250	2445.3	6030.6	20	260	2000	4340	8271	250	2067.8	5099.6
③	M1 M2 M1	20	140	570	5500	6571	229	1504.8	3711.2	25	200	550	7000	8014	161	1290.3	4971.9	25	200	600	8300	9414	161	1515.7	5840.5	25	170	670	6600	7854	189	1484.4	5720.1
④	M1	BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m. M1 0.2m. M2	10	200	4140	700	5188	322	1670.7	1030.0	10	200	5050	1450	6848	322	2205.2	1359.6	10	200	6150	2100	8598	322	2768.7	1707.0	10	200	4340	750	5438	322	1751.2	1079.7
⑥	M1 M2 M1	20	160	320	4900	5471	200	1094.3	2698.6	20	220	320	5000	5571	146	813.4	2006.0	20	260	320	5300	5871	124	728.0	1795.5	25	180	400	6000	6714	178	1195.1	4605.2
⑦	M1	BAR IS NOT USED								12	220	2800	–	2800	145	406.0	360.5	12	260	2800	–	2800	123	344.4	305.8	BAR IS NOT USED							
⑧	M2 M1 M1	16	260	1420	4900	7885	124	952.9	1504.1	16	200	1650	5000	8245	161	1327.5	2095.2	16	260	2000	5300	9245	124	1146.4	1809.4	16	260	1520	6000	8985	124	1114.1	1758.5
⑨	M2 MT M1	10	260	200	1484	1836	248	455.5	280.8	10	200	200	1455	1808	322	582.2	359.0	10	260	200	1738	2091	248	518.6	319.7	10	260	200	1696	2049	248	508.1	313.2
⑩	M1 M2 M1	10	260	200	1625	1991	248	493.7	304.4	10	200	200	1668	2033	322	654.7	403.6	10	260	200	1950	2316	248	574.4	354.1	10	260	200	1837	2203	248	546.3	336.8
⑪	M2 M1 M1	10	180	290	31848	32394	44	1425.3	878.8	10	180	250	31848	32314	44	1421.8	876.6	10	200	280	31848	32374	40	1294.9	798.4	10	130	340	31848	32494	76	2469.5	1522.6
⑫	M2 M1 M1	10	200	250	31848	32314	30	969.4	597.7	10	180	280	31848	32374	44	1424.4	878.2	10	150	350	31848	32514	66	2145.9	1323.0	10	200	280	31848	32374	30	971.2	598.8
⑬	M2 M1 M1	10	250	250	31848	32314	24	775.5	478.1	10	220	280	31848	32374	36	1165.5	718.5	10	180	350	31848	32514	56	1820.8	1122.6	10	220	280	31848	32374	28	906.5	558.9
⑭	M2 M1 M1	10	180	340	31848	32494	44	1429.7	881.5	10	200	330	31848	32474	40	1298.9	800.9	10	180	350	31848	32514	44	1430.6	882.0	10	160	390	31848	32594	62	2020.8	1245.9
⑮	M2 M1 M1	10	180	340	31848	32494	12	389.9	240.4	10	200	330	31848	32474	24	779.4	480.5	10	180	350	31848	32514	40	1300.5	801.8	10	160	390	31848	32594	12	391.1	241.1
⑯	M2 M1 M1	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7
⑰	M2 M1 M1	10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	4	128.5	79.2
⑱	M1 M2	10	150	150	770	1871	68	127.3	78.5	10	150	150	700	1731	70	121.2	74.7	10	150	150	750	1831	74	135.5	83.6	10	150	150	870	2071	82	169.8	104.7
⑲	M1 M1 M2	10	–	160	4900	5186	16	83.0	51.2	10	–	160	5000	5286	16	84.6	52.1	10	–	160	5300	5586	16	89.4	55.1	10	–	160	6000	6286	16	100.6	62.0
⑳	M1 R=2.0m 45° M2 0.2m	10	150	1100	1556	4172	68	283.7	174.9	10	150	1100	1556	4172	70	292.0	180.1	10	150	1100	1556	4172	74	308.7	190.3	10	150	1100	1556	4172	82	342.1	210.9
㉑	M1 M2 M1	12	–	200	4900	5259	20	105.2	93.4	12	–	200	5000	5359	20	107.2	95.2	12	–	200	5300	5659	20	113.2	100.5	12	–	200	6000	6359	20	127.2	112.9
TOTAL STEEL (Kgs)		17777.7								22494.1								26751.5								25685.6							
TOTAL CONCRETE (cum)		316.30								380.33								517.90								412.08							

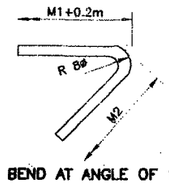
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

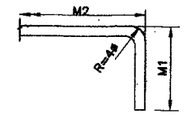
BENDING OF BARS



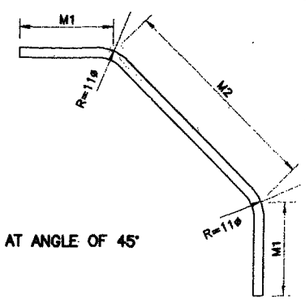
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)

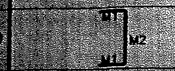
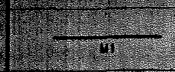
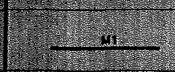
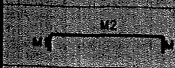
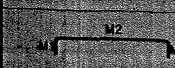
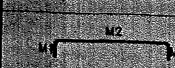
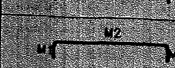
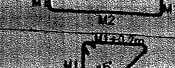
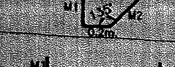
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED BY	DRG. NO.
(A.R.GHOSH) CES (I) LTD			SD/109 (SHEET 13 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 14 OF 16)

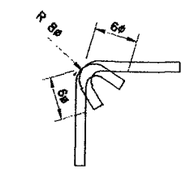
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/54/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/55/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/63/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.	1/64/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in metres	WEIGHT in kgs.
①		16	240	1950	6100	9945	134	1332.6	2103.4	20	240	2270	6360	10831	134	1451.4	3579.4	16	220	1750	7240	10685	146	1560.0	2462.2	20	260	2100	7300	11431	124	1417.5	3495.7
③		20	240	2050	5350	9381	272	2551.7	6292.9	20	240	2180	6370	10661	272	2899.9	7151.6	20	220	2420	4620	9391	296	2779.8	6855.5	20	260	2450	5650	10481	250	2620.3	6462.1
④		25	160	700	7300	8614	200	1722.8	6638.7	28	200	720	8760	10104	161	1626.7	7863.0	32	280	800	7840	9330	115	1073.0	6774.0	25	140	850	7900	9514	229	2178.7	8395.5
⑤		BAR IS NOT USED								BAR IS NOT USED								16	280	4200	–	4200	114	478.8	755.7	BAR IS NOT USED							
⑥		10	200	5350	1100	6798	322	2189.1	1349.7	10	200	6370	1830	8548	322	2752.6	1697.1	12	200	4620	870	5828	322	1876.7	1666.1	12	200	5650	900	6888	322	2218.0	1969.2
⑦		25	260	400	6100	6814	124	845.0	3255.9	25	260	400	6360	7074	124	877.2	3380.2	28	250	450	7240	8044	129	1037.7	5015.7	28	260	450	7300	8104	124	1004.9	4857.2
⑧		16	260	3500	–	3500	123	430.5	679.5	12	260	3500	–	3500	123	430.5	382.2	16	250	4200	–	4200	128	537.6	848.5	16	260	4200	–	4200	123	516.6	815.4
⑨		20	240	1800	6100	9631	134	1290.6	3182.8	20	240	2100	6360	10491	134	1405.8	3467.0	16	220	1670	7240	10525	146	1536.7	2425.4	20	260	1950	7300	11131	124	1380.3	3404.0
⑩		10	240	200	1738	2091	268	560.4	345.5	10	240	200	1922	2275	268	609.7	375.9	10	220	200	2078	2430	292	709.7	437.5	10	260	200	2092	2445	248	606.2	373.8
⑪		10	240	200	1950	2316	268	620.7	382.7	10	240	200	2162	2528	268	677.5	417.7	10	220	200	2191	2556	292	746.5	460.2	10	260	200	2304	2669	248	662.0	408.2
⑫		12	200	330	31848	32467	50	1623.3	1441.2	10	150	330	31848	32474	66	2143.3	1321.4	12	160	410	31848	32627	74	2414.4	2143.5	12	160	400	31848	32607	74	2412.9	2142.2
⑬		10	160	300	31848	32414	50	1620.7	998.2	10	140	370	31848	32554	70	2278.8	1404.9	12	220	340	31848	32487	28	909.6	807.6	12	220	350	31848	32507	36	1170.2	1039.0
⑭		10	200	300	31848	32414	40	1296.5	799.4	10	180	370	31848	32554	56	1823.0	1124.0	10	180	340	31848	32494	32	1039.8	641.1	10	180	350	31848	32514	44	1430.6	882.0
⑮		10	160	400	31848	32614	62	2022.0	1246.7	10	150	410	31848	32634	66	2153.8	1327.9	12	200	450	31848	32707	60	1962.4	1742.3	12	180	480	31848	32767	66	2162.6	1920.0
⑯		10	160	400	31848	32614	20	652.3	402.2	10	150	410	31848	32634	36	1174.8	724.3	12	200	450	31848	32707	12	392.5	348.5	12	180	480	31848	32767	12	393.2	349.1
⑰		10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	12	–	200	31848	32207	12	386.5	343.1	12	–	200	31848	32207	12	386.5	343.1
⑱		10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	4	128.5	79.2	10	–	160	31848	32134	6	192.8	118.9
⑲		10	150	150	850	2031	84	170.6	105.2	10	150	150	850	2031	88	178.8	110.2	10	150	150	1020	2371	100	237.1	146.2	10	150	150	1000	2331	100	233.1	143.7
⑳		10	–	160	6100	6386	16	102.2	63.0	10	–	160	6360	6646	16	106.3	65.6	10	–	160	7240	7526	16	120.4	74.2	10	–	160	7300	7586	16	121.4	74.8
㉑		10	150	1100	1556	4172	84	350.4	216.1	10	150	1100	1556	4172	88	367.1	226.3	10	150	1100	1556	4172	100	417.2	257.2	10	150	1150	1626	4343	100	434.3	267.7
		12	–	200	6100	6459	20	129.2	114.7	12	–	200	6360	6719	20	134.4	119.3	12	–	200	7240	7599	20	152.0	134.9	12	–	200	7300	7659	20	153.2	136.0
TOTAL STEEL (Kgs)		29935.6								35055.0								34418.8								37597.7							
TOTAL CONCRETE (cum)		482.70								611.85								562.31								624.30							

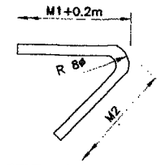
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

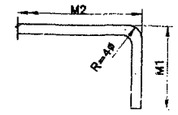
BENDING OF BARS



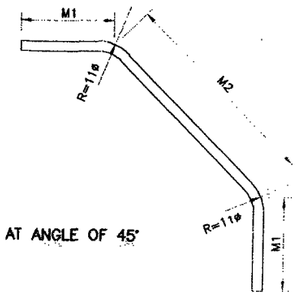
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 14 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 15 OF 16)

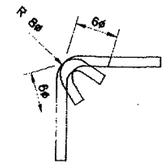
SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE) — BOX – CELL DESIGNATION Nc/ab/Ec	1/65/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/66/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/75/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/76/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	25	260	2450	7400	12214	124	1514.6	5836.1	20	240	2800	7800	13331	134	1786.4	4405.5	20	260	2600	8500	13631	124	1690.3	4168.5	20	240	2900	8700	14431	134	1933.8	4769.0
②	M1 M2 M1	20	260	2500	6670	11601	250	2900.3	7152.7	25	240	2700	7700	13014	272	3539.9	13640.4	25	260	2850	6970	12584	250	3146.0	12122.1	25	240	2950	7920	13734	272	3735.7	14395.0
③	M1 M2 M1	32	220	900	9100	10790	146	1575.4	9945.8	28	150	950	10300	12104	214	2590.2	12520.3	28	140	1050	9300	11304	229	2588.6	12512.3	28	140	1050	10900	12904	229	2955.0	14283.4
④	M1	BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m M1 0.2m M2	10	200	6670	1500	8518	322	2743.0	1691.1	10	200	7700	2100	10148	322	3267.8	2014.7	12	150	6970	1100	8408	428	3598.7	3195.0	12	150	7920	1900	10158	428	4347.7	3860.0
⑥	M1 M2 M1	25	260	450	7400	8204	124	1017.3	4917.2	25	240	400	7800	8514	134	1140.9	4396.3	28	220	450	8500	9304	146	1358.4	6565.9	28	220	450	8700	9504	146	1387.6	6707.0
⑦	M1	16	260	4200	–	4200	123	516.6	815.4	16	240	4200	–	4200	133	558.6	881.7	16	220	4900	–	4900	145	710.5	1121.4	16	220	4900	–	4900	145	710.5	1121.4
⑧	M2 M1 M1	20	260	2220	7400	11771	124	1459.6	3599.7	20	240	2500	7800	12731	134	1706.0	4207.3	20	260	2370	8500	13171	124	1633.2	4027.8	20	240	2620	8700	13871	134	1858.8	4584.0
⑨	M2 M1 M1	10	260	200	2120	2473	248	613.3	378.1	10	240	200	2375	2727	268	730.9	450.6	10	260	200	2403	2756	248	683.4	421.3	10	240	200	2474	2826	268	757.4	467.0
⑩	M1 M2 M1	10	260	200	2445	2811	248	697.1	429.8	10	240	200	2799	3164	268	848.1	522.9	10	260	200	2728	3094	248	767.2	473.0	10	240	200	2869	3235	268	867.0	534.5
⑪	M2 M1 M1	12	160	390	31848	32587	74	2411.4	2140.9	12	180	380	31848	32567	66	2149.4	1908.3	12	140	460	31848	32727	98	3207.2	2847.4	12	140	440	31848	32687	98	3203.3	2843.9
⑫	M2 M1 M1	12	200	380	31848	32567	50	1628.3	1445.7	12	150	480	31848	32767	78	2555.8	2269.1	12	160	400	31848	32607	62	2021.6	1794.8	12	150	450	31848	32707	78	2551.1	2264.9
⑬	M2 M1 M1	10	170	380	31848	32574	58	1889.3	1164.8	12	180	480	31848	32767	66	2162.6	1920.0	10	160	400	31848	32614	62	2022.0	1246.7	12	200	450	31848	32707	60	1962.4	1742.3
⑭	M2 M1 M1	12	180	500	31848	32807	66	2165.2	1922.3	12	170	530	31848	32867	70	2300.7	2042.6	12	160	580	31848	32967	86	2835.1	2517.1	12	160	580	31848	32967	86	2835.1	2517.1
⑮	M2 M1 M1	12	180	500	31848	32807	24	787.4	699.0	12	170	530	31848	32867	36	1183.2	1050.5	12	160	580	31848	32967	16	527.5	468.3	12	160	580	31848	32967	32	1054.9	936.6
⑯	M2 M1 M1	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7
⑰	M2 M1 M1	10	–	160	31848	32134	6	192.8	118.9	10	–	160	31848	32134	6	192.8	118.9	10	–	160	31848	32134	6	192.8	118.9	10	–	160	31848	32134	6	192.8	118.9
⑱	M1 M2	10	150	150	970	2271	102	231.7	142.8	10	150	150	950	2231	106	236.5	145.8	10	150	150	1120	2571	116	298.3	183.9	10	150	150	1070	2471	118	291.6	179.8
⑲	M1 M2 M1	10	–	160	7400	7686	16	123.0	75.8	10	–	160	7800	8086	16	129.4	79.8	10	–	160	8500	8786	16	140.6	86.7	10	–	160	8700	8986	16	143.8	88.6
⑳	M1 0.2m M2 0.2m	10	150	1200	1697	4513	102	460.4	283.8	10	150	1250	1768	4684	106	496.5	306.1	10	150	1350	1909	5025	116	583.0	359.4	10	150	1350	1909	5025	118	593.0	365.6
㉑	M1 M2 M1	12	–	200	7400	7759	20	155.2	137.8	12	–	200	7800	8159	20	163.2	144.9	12	–	200	8500	8859	20	177.2	157.3	12	–	200	8700	9059	20	181.2	160.9
TOTAL STEEL (Kgs)		43135.5								53263.2								54626.4								62177.7							
TOTAL CONCRETE (cum)		732.06								917.77								870.79								1011.87							

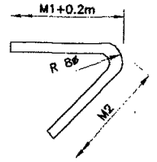
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

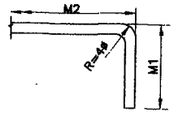
BENDING OF BARS



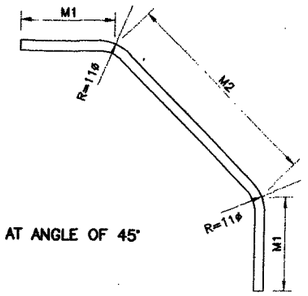
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)

BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 15 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com

DRG.NO. SD/109 (SHEET 16 OF 16)

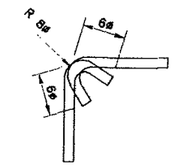
SCHEDULE OF REINFORCEMENT

BAR MARK	BOX – CELL DESIGNATION Nc/ab/Ec / SHAPE OF BARS (NOT TO SCALE)	1/77/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/85/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/86/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.	1/87/5 BAR DIA. in mm.	SPACING in mm.	M1 in mm.	M2 in mm.	LENGTH in mm.	NO. OF BARS	TOTAL LENGTH in meters	WEIGHT in kgs.
①	M1 M2 M1	25	250	3250	9100	15514	129	2001.3	7711.8	20	250	2750	9700	15131	129	1951.9	4813.8	20	220	3050	9900	15931	146	2326.0	5736.2	25	250	3450	10200	17014	129	2194.8	8457.5
②	M1 M2 M1	25	250	3150	9000	15214	260	3955.7	15242.7	25	250	3250	7300	13714	260	3565.7	13739.9	25	220	3350	8250	14864	296	4399.8	16954.0	25	250	3500	9350	16264	260	4228.7	16294.7
③	M1 M2 M1	28	140	1100	12100	14204	229	3252.7	15722.4	32	160	1200	10300	12590	200	2518.0	15897.2	32	160	1200	11100	13390	200	2678.0	16907.3	28	120	1300	12400	14904	267	3979.3	19234.8
④	M1	BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED								BAR IS NOT USED							
⑤	0.2m M1 0.2m M2	12	150	9000	2500	11838	428	5066.7	4498.3	12	150	7300	1100	8738	428	3739.9	3320.4	12	150	8250	1500	10088	428	4317.7	3833.4	12	150	9350	2150	11838	428	5066.7	4498.3
⑥	M1 M2 M1	28	250	450	9100	9904	129	1277.6	6175.5	32	240	520	9700	10630	134	1424.4	8993.0	32	260	520	9900	10830	124	1342.9	8478.4	32	280	520	10200	11130	115	1280.0	8080.9
⑦	M1	16	250	4900	–	4900	128	627.2	989.9	20	240	5600	–	5600	133	744.8	1836.8	20	260	5600	–	5600	123	688.8	1698.7	20	280	5600	–	5600	114	638.4	1574.4
⑧	M2 M1 M1	25	250	2950	9100	14914	129	1923.9	7413.6	20	250	2550	9700	14731	129	1900.3	4686.5	20	220	2800	9900	15431	146	2253.0	5556.2	25	250	3100	10200	16314	129	2104.5	8109.5
⑨	M2 M1 M1	10	250	200	2799	3152	258	813.1	501.3	10	250	200	2799	3152	258	813.1	501.3	10	220	200	2869	3222	292	940.9	580.1	10	250	200	3082	3434	258	886.1	546.3
⑩	M1 M2 M1	10	250	200	3223	3589	258	925.9	570.8	10	250	200	3082	3447	258	889.4	548.3	10	220	200	3223	3589	292	1047.9	646.1	10	250	200	3576	3942	258	1017.1	627.1
⑪	M2 M1 M1	12	160	450	31848	32707	86	2812.8	2497.2	12	120	550	31848	32907	132	4343.7	3856.4	12	120	530	31848	32867	132	4338.4	3851.7	12	130	530	31848	32867	122	4009.7	3559.9
⑫	M2 M1 M1	12	130	550	31848	32907	106	3488.1	3096.8	12	150	450	31848	32707	66	2158.6	1916.5	12	140	500	31848	32807	84	2755.8	2446.6	12	130	580	31848	32967	106	3494.5	3102.5
⑬	M2 M1 M1	12	160	550	31848	32907	86	2830.0	2512.5	12	200	450	31848	32707	50	1635.3	1451.9	12	180	500	31848	32807	66	2165.2	1922.3	12	160	580	31848	32967	86	2835.1	2517.1
⑭	M2 M1 M1	12	150	600	31848	33007	92	3036.6	2696.0	12	140	650	31848	33107	112	3708.0	3292.0	12	140	650	31848	33107	112	3708.0	3292.0	12	130	700	31848	33207	122	4051.2	3596.7
⑮	M2 M1 M1	12	150	600	31848	33007	44	1452.3	1289.4	12	140	650	31848	33107	12	397.3	352.7	12	140	650	31848	33107	20	662.1	587.9	12	130	700	31848	33207	40	1328.3	1179.3
⑯	M2 M1 M1	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7	10	–	160	31848	32134	12	385.6	237.7
⑰	M2 M1 M1	10	–	160	31848	32134	8	192.8	118.9	10	–	160	31848	32134	8	257.1	158.5	10	–	160	31848	32134	8	257.1	158.5	10	–	160	31848	32134	8	257.1	158.5
⑱	M1 M2	10	[illegible]	150	1100	2531	124	313.9	193.5	10	150	150	1300	2931	132	386.9	238.6	10	150	150	1250	2831	134	379.4	233.9	10	150	150	1250	2831	138	390.7	240.9
⑲	M1 M2 M1	10	–	160	9100	[illegible]	[illegible]	150.2	92.6	10	–	160	9700	9986	16	159.8	98.5	10	–	160	9900	10186	16	163.0	100.5	10	–	160	10200	10486	16	167.8	103.4
⑳	M1 135° M2 0.2m	10	150	1400	1980	[illegible]	[illegible]	397.1	[illegible]	10	150	1500	2121	5538	132	731.0	450.7	10	150	1500	2121	5538	134	742.0	457.5	10	150	1600	2263	5879	138	811.3	500.2
㉑	M1 M2 M1	12	–	200	9100	[illegible]	[illegible]	169.[illegible]	[illegible]	12	–	200	9700	10059	20	201.2	178.6	12	–	200	9900	10259	20	205.2	182.2	12	–	200	10200	10559	20	211.2	187.5
TOTAL STEEL (Kgs)		72126.2								66569.3								73861.2								82807.1							
TOTAL CONCRETE (cum)		1243.8[illegible]								1084.93								1205.93								1442.27							

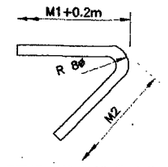
NOTES:

1. FOR ALL NOTES REFER DRG. NO. SD/109 (SHEET 2 OF 16).

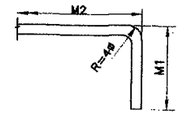
BENDING OF BARS



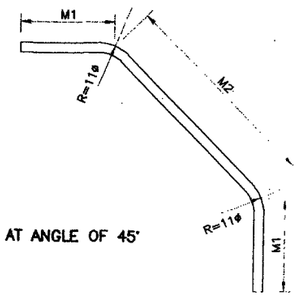
BEND WITH CLOSE HOOKS



BEND AT ANGLE OF 135°



BEND AT RIGHT ANGLE



BEND AT ANGLE OF 45°

LEGEND : ø SHOWS DIA. OF BAR

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

STANDARD DRAWINGS FOR BOX CELL STRUCTURES

SINGLE CELL BOX CULVERT
2m x 2m TO 8m x 7m
(WITH EARTH CUSHION)
BAR BENDING SCHEDULE

DESIGNED BY	CHECKED BY	APPROVED FOR ISSUE BY	1999
(A.R.GHOSH) CES (I) LTD	(M.C.TANDON) TCPL	(C.C.BHATTACHARYA) C.E (R) S&R MOST	DRG. NO. SD/109 (SHEET 16 OF 16)

Source: MoST Standard Drawings for Box Cell Culverts (2000) - older reference, verify with current IRC / MoRTH. Scan cleaned by helptheengineer.com