





DOCUMENT CATEGORY		DOCUMENT REVIEW STATUS (BY CLIENT)			
(USE "X" MARK)\ <input type="checkbox"/> APPROVAL <input checked="" type="checkbox"/> REVIEW <input type="checkbox"/> INFORMATION					
<div style="border: 1px solid black; padding: 10px; margin: 20px auto; width: 80%;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px;"> B.H.E.L. HYDERABAD- 500032 </div> <div style="border-bottom: 1px solid black; padding-bottom: 5px;"> PROJECT ENGINEERING DEPARTMENT </div> <div style="padding: 5px;"> RELEASED FOR CONSTRUCTION </div> <div style="padding: 5px;"> DATE: 17.05.2021 </div> <div style="padding: 5px;"> SIGN: Gopal </div> </div>					
1	14.05.21	PMC COMMENTS INCORPORATED & ISSUED FOR CONSTRUCTION	CSS	RDS	AS
0	12.04.21	ISSUED FOR COMMENTS	CSS	RDS	AS
REV	DATE	DETAILS OF REVISION	PREPARED	CHECKED	APPROVED
CLIENT	 IndianOil	INDIAN OIL CORPORATION LIMITED PARADIP REFINERY PROJECT PARADIP ODISHA			
CONSULTANT			TECHNIP ENERGIES		
PROJECT	525 TPD STANDBY SRU PROJECT IOCL PARADIP REFINERY, ODISHA, INDIA				
ESC	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  ENGINEERS INDIA LIMITED <small>(A Govt. of India Undertaking)</small> </div> <div style="text-align: center;"> ENGINEERS INDIA LIMITED NEW DELHI </div> </div>				
	BHEL Hyderabad	NAME DRN CHD APPD	EIL GPP EC	SIGN EIL Gopal Eshwar	DATE 14.05.21 17.05.21 17.05.21
DEPT. PE&SD.	CODE 450				
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company		TITLE: GENERAL NOTES FOR PCC & RCC WORKS			
		BHEL/EIL DRG/DOC NO. B366-088-81-41-46051			REV
		CUST. DRG/ DOC NO. : 080557C-26899053-CIV-A2011-001			1
		SHT NO. 01	NO. OF SHT. 08		

GENERAL NOTES, STANDARDS, SYMBOLS & ABBREVIATIONS PCC & RCC WORKS

सामान्य टिप्पणियाँ, मानक, प्रतीक एवं संक्षिप्तियाँ पीसीसी एवं आरसीसी कार्य

परियोजना PROJECT	: स्टैंड बाइ एसआरयू परियोजना , पारादीप रिफ़ाइनरी : STANDBY SRU PROJECT, PARADIP REFINERY
मालिक OWNER	: मे. इंडियन ऑइल कॉर्पोरेशन लिमिटेड : M/S INDIAN OIL CORPORATION LIMITED
पीएमसी PMC	: मे. टेकनिप एनेर्जीस : M/s TECHNIP ENERGIES
ग्राहक : CLIENT	: मे. भारत हेवि एलेक्ट्रिकल्स लिमिटेड : M/s BHARAT HEAVY ELECTRICALS LTD.

1	14.05.2021	PMC COMMENTS INCORPORATED & ISSUED FOR CONSTRUCTION	CSS	RDS	AS
0	12.04.2021	ISSUED FOR CONSTRUCTION	CSS	RDS	AS
A	07.04.2021	ISSUED FOR COMMENTS	CSS	RDS	AS
Rev. No	Date	Purpose	Prepared	Checked	Approved

A. GENERAL NOTES:

- THESE NOTES FORM PART OF ALL APPROVED FOR CONSTRUCTION (AFC) DRAWINGS THAT BEAR REFERENCE TO THIS DOCUMENT FOR CONCRETE CONSTRUCTION.
- THESE NOTES SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING SPECIFICATIONS OF CIVIL & STRUCTURAL WORKS.

a)	080557C-000-JSS-1700-005	:	MATERIALS
b)	080557C-000-JSS-1423-001	:	EARTH WORK
c)	080557C-000-JSS-1700-001	:	PLAIN & REINFORCED CEMENT CONCRETE
d)	080557C-000-JSS-1700-002	:	REBAR WORK
e)	080557C-000-JSS-1700-006	:	AUGMENTING EXISTING CONCRETE
f)	080557C-000-JSS-1700-011	:	WATER PROOFING WORK
g)	080557C-000-JSS-1700-013	:	BRICK & STONE MASONRY
h)	080557C-000-JSS-2000-001	:	DEMOLITION & DISMANTLING WORK
i)	080557C-000-JSS-1700-003	:	SPECIFICATION FOR CONCRETE PAVEMENTS
j)	080557C-000-JSS-1431-001	:	SPECIFICATION FOR BORED CAST- IN-SITU PILING
k)	080557C-000-JSS-1431-002	:	SPECIFICATION FOR DRIVEN CAST-IN-SITU PILES
l)	080557C-000-JSS-1700-010	:	SPECIFICATION FOR PLASTERING AND POINTING
m)	080557C-000-JSS-1700-012	:	SPECIFICATION FOR ACID PROOFING TILES
n)	080557C-000-JSS-1700-016	:	SPECIFICATION FOR ACID PROOF BRICK LINING

IN CASE OF ANY CONFLICT WITH THE ABOVE SPECIFICATIONS, IT HAS TO BE BROUGHT TO THE NOTICE OF OWNER/PMC AND DECISION OF OWNER/PMC SHALL BE BINDING.

- THE AFC DRAWING SHALL BE READ IN CONJUNCTION WITH THIS DOCUMENT AND IN CASE OF ANY CONFLICT BETWEEN THIS DOCUMENT AND THE AFC DRAWING, THE LATER SHALL GOVERN.
- ALL DIMENSIONS ARE IN **mm** AND LEVELS/ ELEVATIONS/ COORDINATES IN **M** UNLESS NOTED OTHERWISE (UNO). DRAWINGS SHALL NOT BE SCALED AND ONLY FIGURED DIMENSIONS SHALL BE FOLLOWED.
- EXCAVATION FOR FOUNDATIONS SHALL BE CARRIED UPTO THE DEPTH OF FOUNDATION AS SHOWN ON THE DRAWING. SOIL STRATUM AT FOUNDATION LEVEL SHALL BE THOROUGHLY EXAMINED. IN CASE LOOSE/ SOFT SOIL IS MET WITH, THE SAME SHALL BE IMMEDIATELY REPORTED AND REMOVED. THE POCKETS OF LOOSE/ SOFT SOIL SHALL BE REPLACED WITH CONCRETE 1:4:8 / SAND COMPACTED TO 85% RELATIVE DENSITY AS PER DIRECTIONS OF ENGINEER-IN-CHARGE. ANY EXTRA DEPTH EXCAVATED OVER THE DEPTH OF FOUNDATION SHALL BE FILLED WITH CONCRETE 1:4:8 / SAND COMPACTED TO 85% RELATIVE DENSITY AS PER DIRECTIONS OF ENGINEER-IN-CHARGE. HOWEVER, IN CASE OF FOUNDATIONS FOR THE ROTATING

- EQUIPMENTS (e.g. COMPRESSORS, PUMPS, ID/FD FANS, ETC.), THESE SHALL BE REPORTED TO BHEL / EIL DESIGN OFFICE.
6. SUB-SOIL IMPROVEMENT WHEREVER SPECIFIED IN THE DRAWING SHALL BE CARRIED OUT PRIOR TO THE CASTING OF FOUNDATION.
 7. ALL FOUNDATION SHALL REST ON FIRM STRATA. IN CASE LOOSE/ SOFT SOIL IS ENCOUNTERED, THE SAME SHALL BE REPORTED IMMEDIATELY TO BHEL / EIL, PRIOR TO PROCEEDING WITH CONSTRUCTION.
 8. **75 mm** THICK LEAN CONCRETE OF GRADE **1:4:8** SHALL BE PROVIDED UNDER ALL RCC FOUNDATIONS. EXCEPT UNDER BASE SLAB OF LIQUID RETAINING STRUCTURES WHERE **100 mm** THICK LEAN CONCRETE OF GRADE **1:3:6** (NOMINAL MIX) SHALL BE USED. THE LEAN CONCRETE SHALL EXTEND **75 mm** BEYOND THE EDGE OF THE FOUNDATION FOR NORMAL FOUNDATIONS AND **100 mm** UNDER LIQUID RETAINING STRUCTURES.
 9. A SEPARATING LAYER OF POLYETHYLENE SHEET OF MASS **1 kg/sqm** SHALL BE PROVIDED IN BETWEEN THE FLOOR SLAB & THE LAYER OF LEAN CONCRETE FOR LIQUID RETAINING STRUCTURES ONLY.
 10. PLAIN CEMENT CONCRETE (PCC) OF GRADE **M20** (NOMINAL MIX) OF MINIMUM **150 mm** THICKNESS SHALL BE PROVIDED UNDER ALL MASONRY WALL FOUNDATIONS.
 11. PLAIN CEMENT CONCRETE (PCC) OF GRADE **M20** (NOMINAL MIX) WITH 10mm & DOWN SIZE GRADED AGGREGATES OF MINIMUM **40 mm** THICKNESS SHALL BE PROVIDED AS DAMP PROOF COURSE (DPC) AT PLINTH LEVEL OF ALL MASONRY WALLS. THE CONCRETE SHALL BE MIXED WITH WATER-PROOFING COMPOUND OF APPROVED MAKE CONFORMING TO IS:2645 AND SHALL BE COATED WITH 3 mm THICK BITUMEN EMULSION.
 12. PLAIN CEMENT CONCRETE (PCC) SHALL BE OF GRADE **M20** (NOMINAL MIX) FOR SEVERE EXPOSURE CONDITION. THE MINIMUM CEMENT CONTENT SHALL BE **300 kg/CuM**, AND MAXIMUM FREE WATER-CEMENT RATIO SHALL BE **0.55**.
 13. REINFORCED CONCRETE (RCC) SHALL BE OF DESIGN MIX QUALITY CONFORMING TO GUIDELINES OF IS: 10262 AND OF GRADE **M35** (UNO ON DRAWING) WITH 20mm & DOWN SIZE GRADED AGGREGATES FOR SEVERE EXPOSURE CONDITION FOR **SUB-STRUCTURE**. THE MINIMUM CEMENT CONTENT SHALL BE **340 kg/CuM** AND MAXIMUM FREE WATER-CEMENT RATIO SHALL BE **0.45**. HOWEVER, THE MAXIMUM CEMENT CONTENT SHALL NOT EXCEED **450 kg/ CuM**.
 14. REINFORCED CONCRETE (RCC) SHALL BE OF DESIGN MIX QUALITY CONFORMING TO GUIDELINES OF IS: 10262 AND OF GRADE **M30** (UNO ON DRAWING) WITH 20mm & DOWN SIZE GRADED AGGREGATES FOR SEVERE EXPOSURE CONDITION FOR **SUPER-STRUCTURE**. THE MINIMUM CEMENT CONTENT SHALL BE **320 kg/CuM** AND MAXIMUM FREE WATER-CEMENT RATIO SHALL BE **0.45**. HOWEVER, THE MAXIMUM CEMENT CONTENT SHALL NOT EXCEED **450 kg/ CuM**.
 15. ALL UNDERGROUND STRUCTURES INCLUDING TOP SURFACE OF FOUNDATIONS SHALL BE PAINTED WITH TWO COATS OF HOT BITUMEN PAINT OF GRADE 20/30 WITH QUANTITY OF BITUMEN AT LEAST 1.2 KG/M2 PER COAT.
 16. TYPE OF CEMENT SHALL BE ONE OF THE FOLLOWING
 - 43 OR 53 GRADE ORDINARY PORTLAND CEMENT (OPC) AS PER IS:8112 / IS:12269.
 - PORTLAND SLAG CEMENT (PSC) CONFORMING TO IS:455.
 - PORTLAND POZZOLONA (FLY ASH BASED)CEMENT CONFORMING TO IS:1489 PART-1
 - PORTLAND POZZOLONA (CLACINED CLAY BASED) CONFORMING TO IS:1489 PART-2
 - * SULPHATE RESISTANT PORTLAND CEMENT (SRC) CONFORMING TO IS:12330.

* FOR SPECIFIC REQUIREMENT AS SPECIFIED IN RESPECTIVE DRAWINGS.

17. REINFORCEMENT MARKED THUS Φ INDICATES HIGH YIELD STRENGTH DEFORMED STEEL BARS OF GRADE **Fe500D** (TMT) CONFORMING TO IS:1786 SHALL BE USED FOR ALL STRUCTURES. TWO STRANDS OF **18** GAUGE SWG BLACK SOFT ANNEALED WIRE SHALL BE USED FOR BINDING REBARS.
18. CORROSION RESISTANT STEEL (CRS-REBARS) TO BE USED FOR LIQUID RETAINING STRUCTURES LIKE SUMP, RESERVOIR, COOLING TOWER CELL, ETC.
19. BAR BENDING SCHEDULES SHALL BE AS PER IS:2502 & SP:34.
20. THE FOLLOWING MINIMUM CLEAR COVER SHALL BE PROVIDED FOR RCC WORKS:

FOUNDATION SLAB, BASE SLAB, PEDESTAL, PLINTH BEAM	: 75 mm
PILE CAP:	
a) BOTTOM FACE	: 125 mm
b) TOP & SIDES	: 75 mm
RETAINING WALL, BASEMENT & PIT WALLS:	
a) FACE IN CONTACT WITH EARTH	: 50 mm
b) FREE FACE	: 45 mm
COLUMN	: 75 mm
BEAM (TIE, FLOOR, ROOF & LINTEL)	: 45 mm
SLAB (FLOOR & ROOF, CANOPY, CANTILEVER WAIST SLAB)	: 25 mm
LIQUID RETAINING STRUCTURES:	
a) FACE IN CONTACT WITH LIQUID	: 50 mm
b) FACE AWAY FROM LIQUID BUT IN CONTACT WITH EARTH	: 50 mm
c) FREE FACE	: 45 mm
21. POURING SEQUENCE SHALL BE FOLLOWED WHEREVER INDICATED ON DRAWINGS OR AS APPROVED BY THE ENGINEER-IN-CHARGE.
22. ALL CONCRETE SURFACES TO RECEIVE GROUT/ FLOOR FINISH SHALL BE FINISHED ROUGH.
23. THE MINIMUM GROUT THICKNESS SHALL BE 30 mm AND MAXIMUM THICKNESS 50 mm (UNLESS OTHERWISE REQUIRED IN EQUIPMENT DATASHEET). GROUT SHALL BE CHAMFERED AT A SLOPE OF 1:1 FROM THE EDGE OF BASE PLATE TO THE TOP OF FINISHED CONCRETE.
24. WHERE CUT LENGTHS OF BARS, AS PER APPROVED BAR BENDING SCHEDULE (BBS), ARE GREATER THAN THE AVAILABLE LENGTH, FIELD SPLICES MAY BE PROVIDED BY LAPPING BARS WITH PRIOR APPROVAL OF THE ENGINEER-IN-CHARGE. THE LAP LENGTHS SHALL BE AS PER EIL STANDARD NO. **7-68-0106** AND THE LAPS SHALL BE WELL STAGGERED AND LOCATED AS FOLLOWS:
 - a) FOR BEAM & SLAB, TOP BARS NEAR CENTRE OF SPAN, BOTTOM BARS NEAR 1/3 OF SPAN.
 - b) NOT MORE THAN 50% OF TOTAL NUMBER OF BARS SHALL BE LAPPED AT A PARTICULAR SECTION.
 - c) NOT MORE THAN ONE LAP PER SPAN SHALL BE PROVIDED FOR ANY BAR
 - d) WHEN BARS OF TWO DIFFERENT DIA ARE TO BE LAPPED, THE LAP LENGTH SHALL BE BASED ON DIA OF SMALLER BAR.
 - e) WELDING OF REINFORCEMENT SHALL BE CARRIED OUT ONLY AFTER OBTAINING THE WRITTEN APPROVAL OF ENGINEER-IN-CHARGE & CARRIED IN ACCORDANCE WITH IS:2751 & IS:9417.

25. MINIMUM & MAXIMUM BAR SPACING SHALL BE 100 & 300 mm RESPECTIVELY. BAR SPACING SHALL BE PROVIDED IN MULTIPLES OF 5mm (UNO ON DRAWING).
26. ALL ANCHOR BOLTS SHALL BE FIXED IN POSITION WITH THE HELP OF SUITABLE TEMPLATES BEFORE POURING CONCRETE AND IN NO CASE POCKETS FOR FIXING THEM SUBSEQUENTLY SHALL BE LEFT UNLESS OTHERWISE SHOWN ON AFC DRAWINGS. THE ANCHOR BOLTS SHALL BE PLACED WITH THE HELP OF SUITABLE TEMPLATE. ALL ANCHOR BOLTS SHALL BE PROVIDED WITH ADDITIONAL LOCK NUT.
27. INSERT PLATES SHALL BE OF STRUCTURAL STEEL QUALITY CONFORMING TO IS: 2062 GRADE **E250** B0/BR.
28. ALL INSERTS/ SLEEVES SHALL BE PROPERLY SECURED IN POSITION BEFORE POURING CONCRETE. ALL EXPOSED PARTS OF EMBEDDED ITEM SHALL BE GIVEN ONE COAT OF RED OXIDE PAINT.
29. MAIN BARS, LINKS OR STIRRUPS SHALL BE LOCALLY ADJUSTED BY JOGGING, OR BY CHANGING SPACINGS, WITH THE PRIOR APPROVAL OF THE ENGINEER-IN-CHARGE SO AS TO ACCOMMODATE THE ANCHOR BOLTS OR INSERT PLATES/ PIPE SLEEVES. SUCH LOCAL ADJUSTMENTS ARE NOT SHOWN ON AFC DRAWINGS.
30. EXTRA REINFORCEMENT SHALL BE PROVIDED AROUND CUTOUTS/ OPENINGS AS PER EIL STANDARD NOS. **7-68-0103 & 7-68-0104** (UNO ON DRAWING).
31. THE LOCATION OF CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE DRAWING, SHALL BE AS PER THE DIRECTIONS OF THE ENGINEER-IN-CHARGE. THE CONTRACTOR SHALL GET THE LOCATION OF CONSTRUCTION JOINTS APPROVED BY THE ENGINEER-IN-CHARGE PRIOR TO START OF THE CONSTRUCTION AND SHALL STRICTLY ADHERE TO THE APPROVED SCHEME.
32. THE CONSTRUCTION JOINTS OF LEAN CONCRETE AND THOSE OF FLOOR SLAB/ FOOTING SHALL BE STAGGERED.
33. NO PART OF ANY CONSTRUCTION SHALL BE USED FOR ERECTION OF EQUIPMENTS ETC. WITHOUT APPROVAL OF THE ENGINEER-IN-CHARGE UNLESS OTHERWISE MENTIONED ON AFC DRAWINGS.
34. ELECTRICAL CONDUITS, IN BUILDINGS, SHALL BE PROVIDED AS PER RELEVANT DRAWINGS BY ELECTRICAL ENGINEERING DEPARTMENT.
35. APPROVED BRAND OF BI-POLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE SHALL BE MIXED WITH REINFORCED CONCRETE (RCC) AS PER MANUFACTURER'S SPECIFICATION FOR PROTECTION OF REINFORCEMENT AGAINST CORROSION.
36. CRYSTALLINE INTEGRAL WATER PROOFING ADMIXTURE OF APPROVED MAKE SHALL BE MIXED WITH CONCRETE FOR ALL LIQUID RETAINING/ LEAK PROOF STRUCTURES.
37. PVC WATER BARS **230x5** SHALL BE PROVIDED AT ALL VERTICAL & HORIZONTAL CONSTRUCTION JOINTS OF ALL LIQUID RETAINING/ LEAK PROOF STRUCTURES.
38. BRICKS FOR MASONRY WORKS SHALL BE CLASS 7.5 CONFORMING TO IS: 1077 AND /OR BURNT CLAY FLY ASH BUILDING BRICKS CONFIRMING TO IS: 13757.

B. STANDARDS:

THE FOLLOWING EIL STANDARDS SHALL BE REFERED FOR THE RESPECTIVE DETAILS AS GIVEN BELOW HOWEVER THE MINIMUM GRADE OF CONCRETE SHALL BE **M30** IN PEDESTALS FOR STAIR/ LADDER:

SL. NO.	STANDARD NO.	TITLE
1.	080557C-000-LD-1790-001	CONSTRUCTION STANDARD FOR CONCRETE WORKS
2.	7-67-0010	FOUNDATION FOR SLIDING SUPPORT FOR PIPES ON GRADE
3.	7-67-0011	FLOORING DETAILS FOR BUILDINGS
4.	7-67-0012	SHORT SLIDING PIPE SUPPORT ON EXISTING RCC PAVEMENTS
5.	7-68-0051	STANDARD LIFTING HOOKS IN PRECAST SLABS & CHEQUERED PLATES
6.	7-68-0052	DETAILS OF MS RUNGS FOR CONCRETE STRUCTURES
7.	7-68-0062	TYPICAL CRANKING DETAIL OF REBAR AT BEAM AND COLUMN JUNCTIONS
8.	7-68-0068	STANDARD SECTIONS FOR REINF. DETAILS OF BEAM
9.	7-68-0101	STANDARD RE-BARS SHAPES AND CUT LENGTH COMPUTATIONS
10.	7-68-0102	ADJUSTMENT OF STIRRUPS AT BEAM CROSSING
11.	7-68-0103	REINFORCEMENT DETAILS AT CIRCULAR CUT OUT IN SLAB
12.	7-68-0104	REINFORCEMENT DETAILS AT SQUARE/ RECTANGULAR CUT OUT IN SLAB
13.	7-68-0106	STANDARD LAP LENGTH OF RE-BARS
14.	7-68-0201	STANDARD LUGS
15.	7-68-0625	CABLE TRENCH INSIDE THE BUILDINGS
16.	7-68-0626	CABLE TRENCH
17.	7-68-0627	PRECAST CABLE TRENCH AND JOINT DETAIL
18.	7-68-0631	LIQUID RETAINING STRUCTURE CONCRETE JOINTS
19.	7-68-0655	CABLE TENCH FOR CLASS-AA TRACKED VEHICLE (CRANE) APPROACH

C. SYMBOLS/ ABBREVIATIONS:

α	:	ANGLE	AFC	:	APPROVED FOR CONSTRUCTION
@	:	AT THE RATE OF	B/B	:	BACK TO BACK
BCD	:	BOLT CIRCLE DIAMETER	CL/CL	:	CENTRE LINE
C/C	:	CENTRE TO CENTRE	COL	:	COLUMN
DIA/D/Ø	:	DIAMETER	****	:	DIMENSION NOT TO SCALE
DWG/DRG	:	DRAWING	EL	:	ELEVATION
EQ	:	EQUAL	NB	:	NOMINAL BORE
FFL	:	FINISHED FLOOR LEVEL	FGL	:	FINISHED GROUND LEVEL
LVL	:	LEVEL	NGL	:	NATURAL GROUND LEVEL
RL	:	REDUCED LEVEL	HPP	:	HIGH POINT OF PAVEMENT
IP	:	INSERT PLATE	kN	:	KILONEWTON
m	:	METRE	MT/T	:	METRIC TON
MS	:	MILD STEEL	mm.	:	MILLIMETRE
NF	:	NEAR FACE	FF	:	FAR FACE
PL	:	PLATE	PCD	:	PITCH CIRCLE DIAMETER
QTY.	:	QUANTITY	R	:	RADIUS
RECT	:	RECTANGULAR	SQ	:	SQUARE
STD	:	STANDARD	∠	:	STRUCTURAL ANGLE
TH/THK	:	THICK	SYM	:	SYMMETRICAL
TOG	:	TOP OF GROUT	TOR	:	TOP OF ROAD
TOS	:	TOP OF STEEL	TYP	:	TYPICAL
U/S	:	UNDERSIDE	UNO	:	UNLESS NOTED OTHERWISE
WT	:	WEIGHT	FDN	:	FOUNDATION
ID	:	INSIDE DIAMETER	OD	:	OUTSIDE DIAMETER
TOC	:	TOP OF CONCRETE	PED	:	PEDESTAL
T & B	:	TOP AND BOTTOM	ALT	:	ALTERNATE
B/W	:	BOTH WAYS	R/F	:	REINFORCEMENT / REBARS
MB	:	MAIN BEAM	SB	:	SECONDARY BEAM
TB	:	TIE BEAM	RB	:	ROOF BEAM
PB	:	PLINTH BEAM	FB	:	FLOOR BEAM
NTS	:	NOT TO SCALE	PCC	:	PLAIN CEMENT CONCRETE
HANDRAIL	:	-----	RCC	:	REINF. CEMENT CONCRETE
BOF	:	BOTTOM OF FOOTING	BBS	:	BAR BENDING SCHEDULE

[A] NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. REINFORCEMENT AND CONCRETE GRADE SHALL BE AS PER PROJECT GENERAL NOTES.
3. DEPTH OF FOOTING SHALL BE MEASURED FROM HPP (HIGH POINT OF PAVEMENT) / FGL.
4. ANY UNDESIRABLE SOIL SHALL BE REMOVED AND REPLACED BY COMPACTED SAND.
5. ALL PEDESTALS SHALL BE PROVIDED WITH CHAMFERS AT CORNERS.
6. FOR SUPPORT TYPE 'F3' SUITABLE DOWELS SHALL BE LEFT ON ALL SIDES OF THE SLAB TO MAKE IT MONOLITHIC WITH THE PAVEMENT.
7. IN CASE OF FOULING OF TWO OR MORE FOUNDATIONS WITH EACH OTHER THESE SHALL BE CAST MONOLITHICALLY. FOR CASES WHERE FOULING OF PEDESTALS IS ENCOUNTERED, THIS STANDARD IS NOT VALID.

[B] DIVISION OF SCOPE OF WORK (FOR MULTI-CONTRACTS):

1. THE CONSTRUCTION OF THESE SUPPORTS SHALL BE IN THE SCOPE OF MECHANICAL / COMPOSITE WORK CONTRACTOR.
2. FOR TYPE F3 FOUNDATIONS SQUARE PLAN AREA OF (C+1000) SHALL BE IN THE SCOPE OF MECHANICAL CONTRACTOR (CONTRACTS OTHER THAN COMPOSITE WORKS).

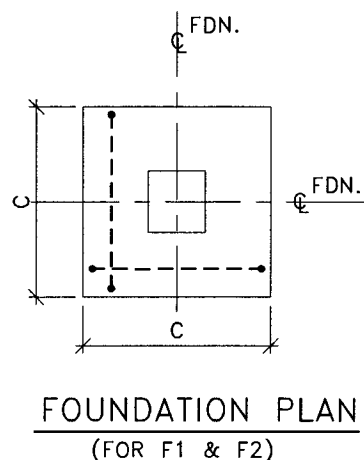
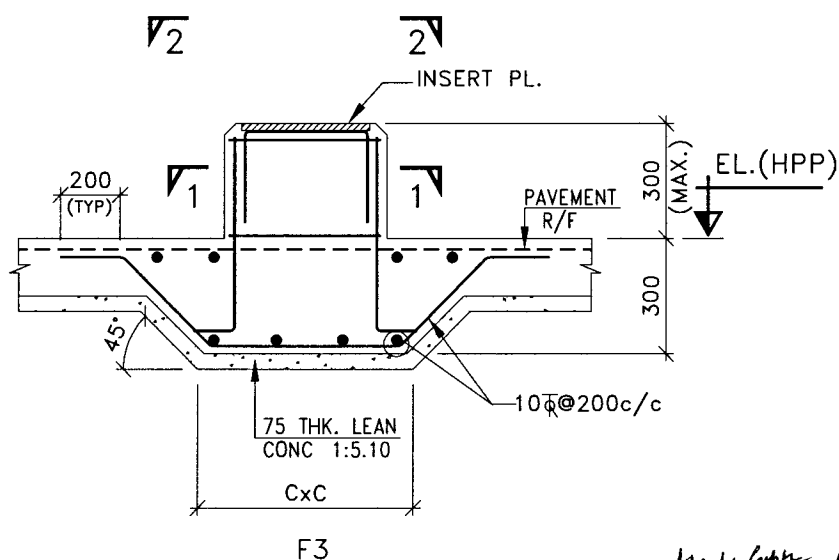
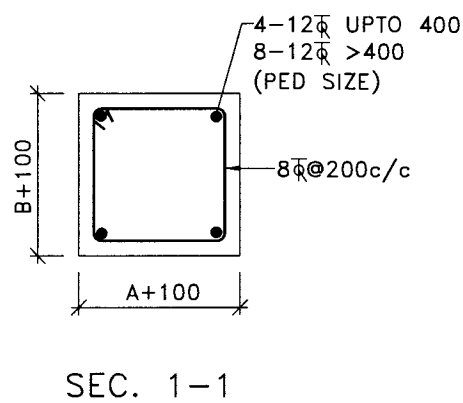
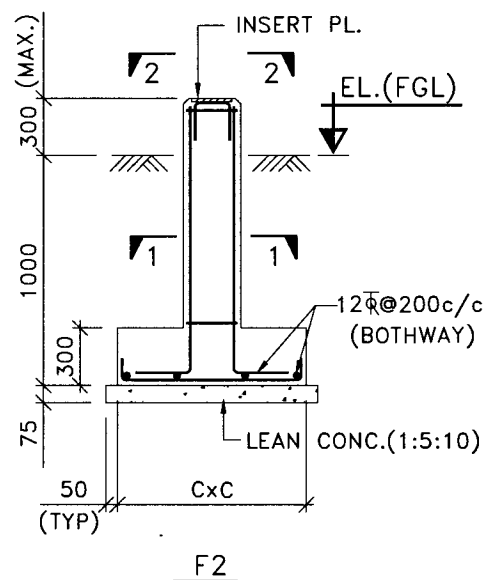
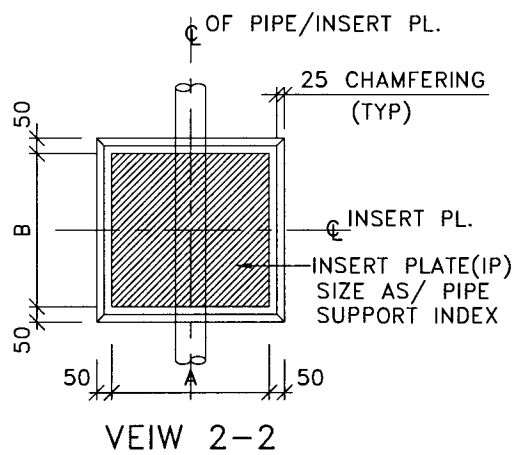
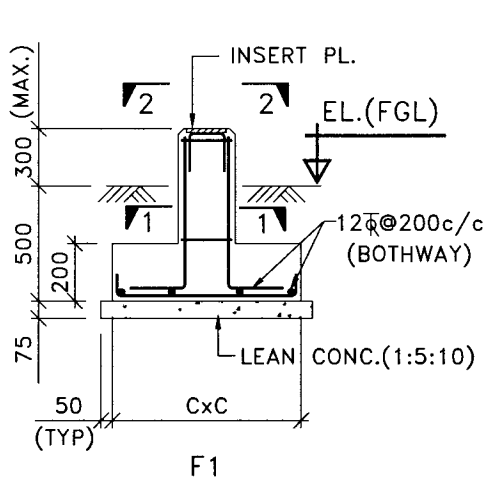
[C] FOUNDATION DESIGN CRITERIA:

1. CO-EFFICIENT OF FRICTION (μ) BETWEEN STEEL SURFACES HAS BEEN TAKEN AS 0.30 FOR DESIGNING THE SUPPORTS.
2. DESIGN BEARING PRESSURE SHALL BE AS PER RECOMMENDATION CONTAINED IN GEOTECHNICAL REPORT AND ASSUMED AT FOUNDING LEVEL OF FOUNDATION.

[D] STEPS FOR CHOOSING FOUNDATION DETAIL:

1. IDENTIFY SAFE BEARING CAPACITY OF SOIL FOR APPLICABLE VERTICAL LOAD SELECT CORRESPONDING FOUNDATION TYPE TO GET PLAN DIMENSION OF FOUNDATION SLAB.
2. FIX PEDESTAL SIZE CORRESPONDING TO INSERT PLATE SIZE FROM PIPE SUPPORT INDEX.

6	28 01 20	REAFFIRMED & ISSUED AS STANDARD	JG	ALPANA SRIVASTAVA	RAJANJI SRIVASTAVA	R K TRIVEDI
5	21 07 14	REVISED AND ISSUED AS STANDARD	A K. SHARMA	AMARJEET	P K MITTAL	S CHANDA
Rev No.	Date	Purpose	Prepared by	Checked by	Stds Committee Convenor	Stds Bureau Chairman
Approved by						

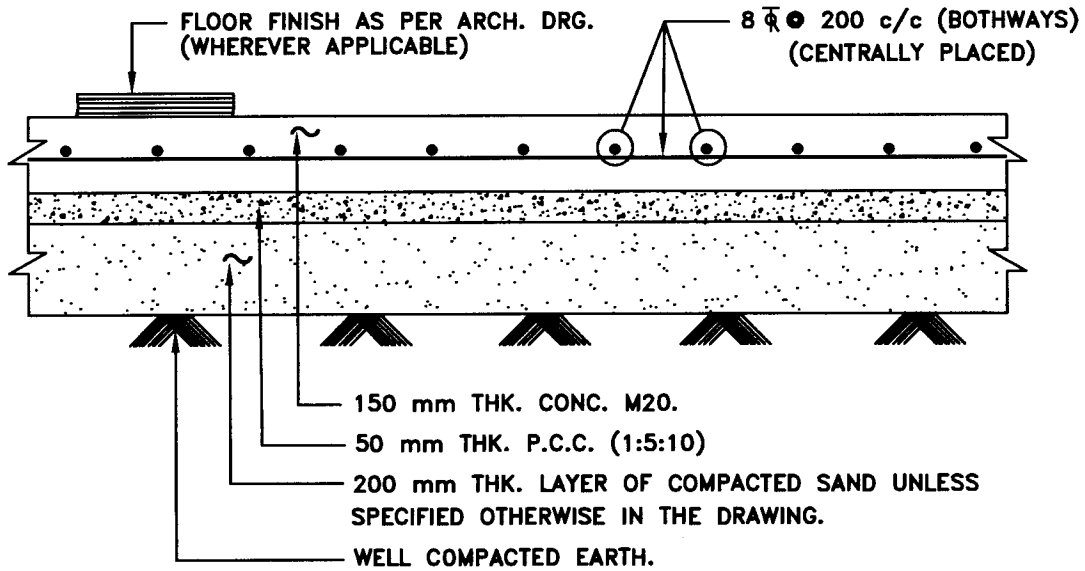


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5	21 07 14	REVISED AND ISSUED AS STANDARD	A K SHARMA	AMARJEET	P K MITTAL	S CHANDA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds Committee Convenor	Stds Bureau Chairman

FOUNDATION SIZE(CxC)

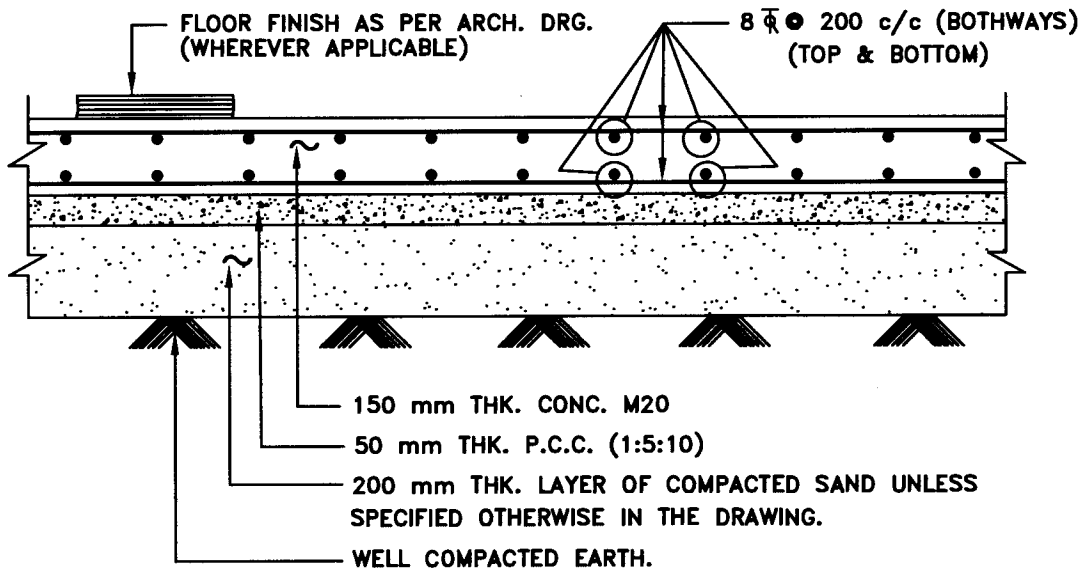
VERTICAL LOAD IN 'MT'	TYPE – F1		TYPE – F2		TYPE – F3	
	BEARING CAPACITIES OF SOIL IN T/SQ.M					
	5.0	7.5	5.0	7.5	2.5	5.0
UPTO 0.2	500	500	–	–	700	500
> 0.2 TO 0.4	650	650	–	–	850	650
> 0.4 TO 1.0	–	–	1050	900	1150	850
> 1.0 TO 2.0	–	–	1300	1150	1500	1100
> 2.0 TO 3.0	–	–	1500	1300	–	1250
> 3.0 TO 4.0	–	–	1700	1450	–	1400
> 4.0 TO 5.0	–	–	1900	1550	–	1550

6	28 01 20	REAFFIRMED & ISSUED AS STANDARD	JG	ALPANA SRIVASTAVA	RAJANJI SRIVASTAVA	R K TRIVEDI
5	21 07.14	REVISED AND ISSUED AS STANDARD	A K SHARMA	AMARJEET	P K MITTAL	S CHANDA
Rev No	Date	Purpose	Prepared by	Checked by	Stds Committee Convenor	Stds Bureau Chairman
					Approved by	



TYPE - I

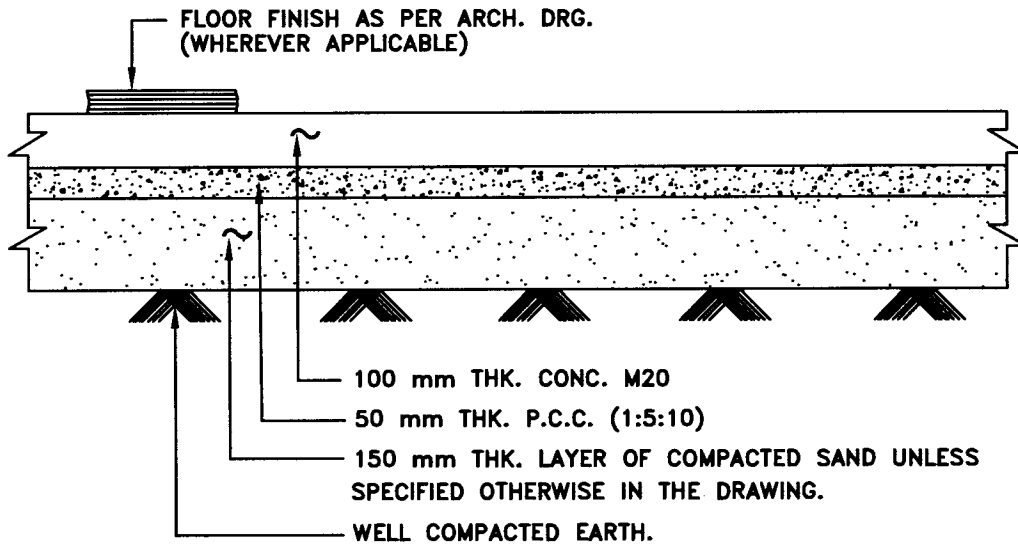
(FOR PLANT BUILDINGS, SUB-STATION, CONTROL ROOM, PUMP HOUSE,
UTILITY COMPRESSOR HOUSE, PARKING AREA, STORE & PORCH)



TYPE - II

(FOR WAREHOUSE, WORKSHOP, CEMENT GODOWN, FIRE STATION
& PROCESS COMPRESSOR HOUSE)

5	20.10.16	REAFFIRMED AND ISSUED AS STANDARD	<i>[Signature]</i> NAKSHATRA KUMAR	<i>[Signature]</i> V. GOEL	<i>[Signature]</i> R. SRIVASTAVA	<i>[Signature]</i> RAKESH NANDA
4	27.06.11	REAFFIRMED AND ISSUED AS STANDARD	SUSHMA	P.K.MITTA	S.CHATURVEDI	D.MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

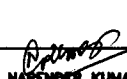





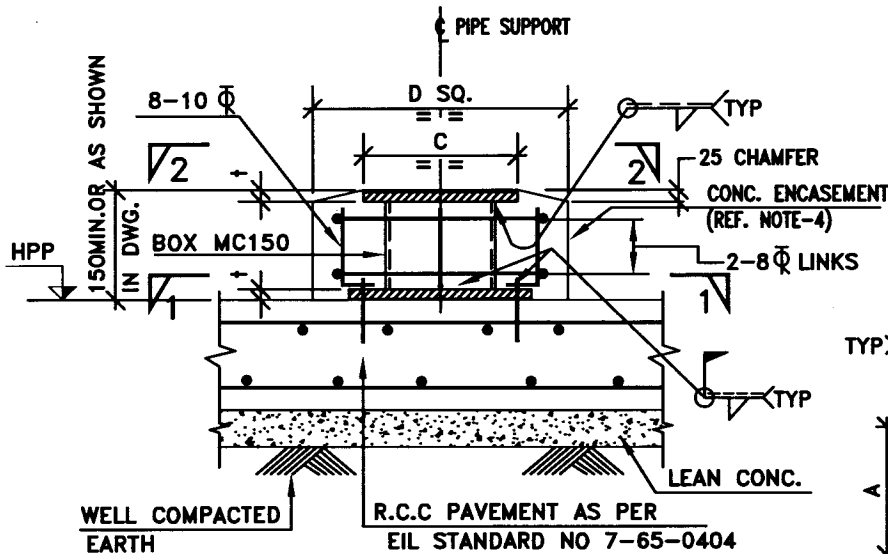
TYPE - III

(FOR NON-PLANT BUILDINGS VIZ. ADMINISTRATION, LABORATORY, CANTEEN
TIME OFFICE, GATE HOUSE, TRAINING CENTRE, GUEST HOUSE,
SITE OFFICE, RESIDENTIAL BUILDINGS ETC.)

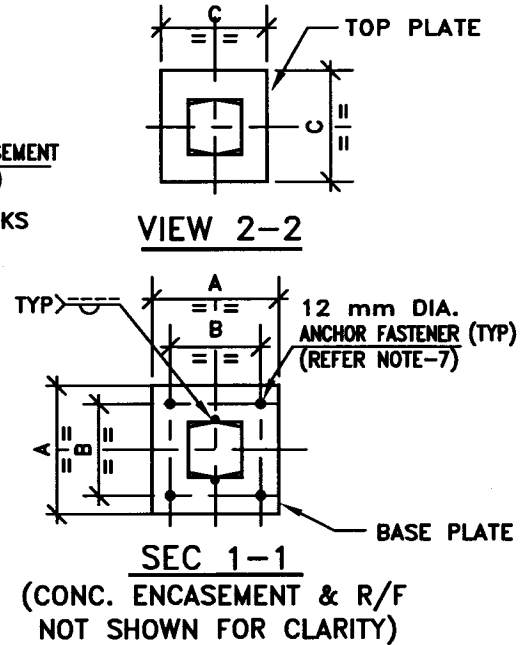
NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. STRUCTURAL CONCRETE SLAB SHALL BE CAST IN ALTERNATE PANELS AND NO DIMENSION OF THE PANEL SHALL EXCEED 4.5 m.

5	20.10.16	REAFFIRMED AND ISSUED AS STANDARD				
4	27.06.11	REAFFIRMED AND ISSUED AS STANDARD	SUSHMA	P.K.MITTAL	S.CHATURVEDI	D.MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
			Approved by			



**TYP. CROSS SECTION
OF PIPE SUPPORT**



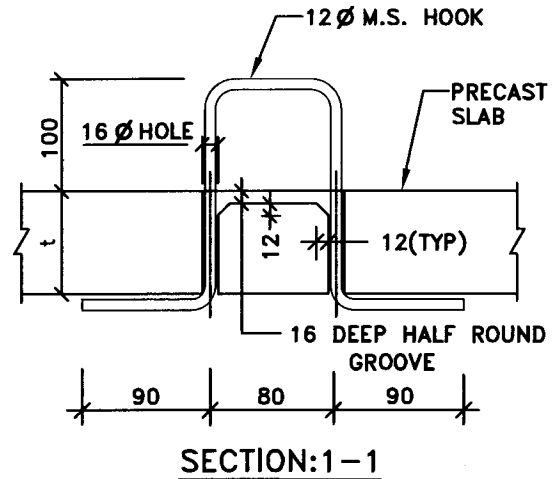
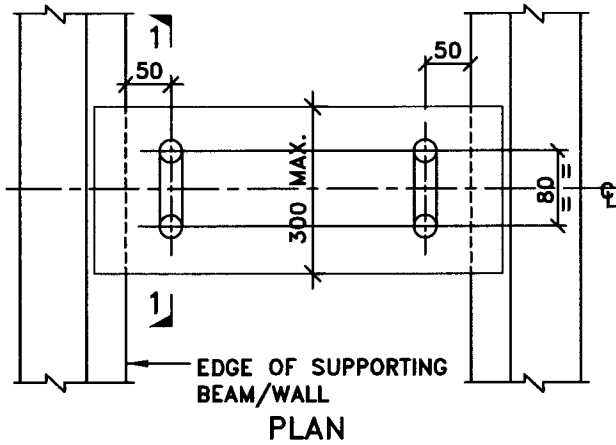
SCHEDULE OF PIPE SUPPORTS :-

SL. NO.	SUPPORT PIPE DIA. (INCH)	MAX. VERTICAL LOAD (Kg)	MAX. HORIZ. LOAD AT TOP OF PED. (Kg)	DIMENSIONS (mm)					REMARKS
				A	B	C	D	t	
1	2 & 3	UP TO 500	150	250	200	250	350	10	
2	4	501 TO 1000	300	350	300	300	450	10	
3	6	1001 TO 1500	450	350	300	300	450	12	
4	8	1501 TO 2000	600	450	400	350	550	12	
5	10	2001 TO 2500	750	500	450	350	600	12	
6	12	2501 TO 3000	900	600	550	400	700	12	
7	14 & 16	1501 TO 2000	600	450	400	400	550	12	THESE SUPPORTS TO BE USED ONLY WHEN THE PIPE (14" TO 24") SERVICE IS GASEOUS AND NOT LIQUID
8	18	2001 TO 2500	750	500	450	400	600	12	
9	20 & 24	2501 TO 3000	900	600	550	450	700	12	

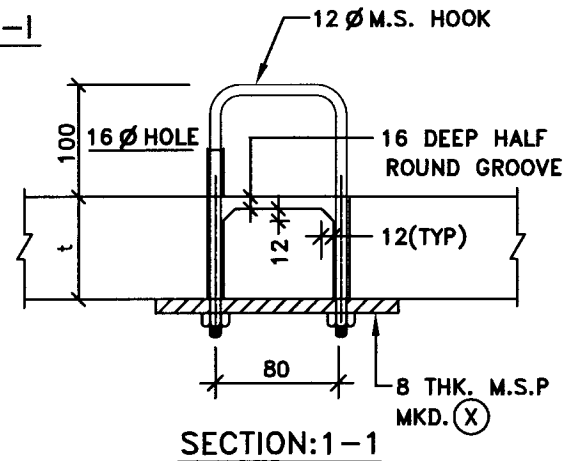
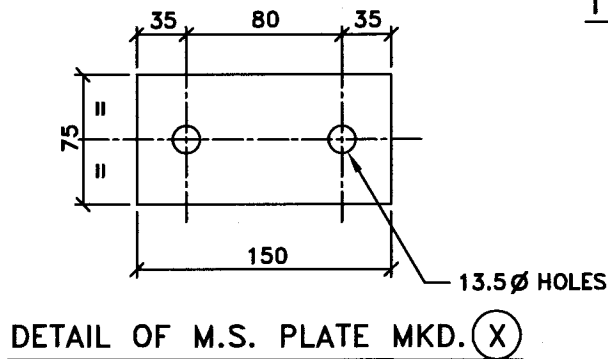
NOTES :-

1. THIS STANDARD SHALL BE READ IN CONJUNCTION WITH GENERAL NOTES OF PROJECT.
2. PAVEMENT DETAILS IN THE ZONE WHERE SUCH SUPPORTS ARE LOCATED SHALL BE AS PER RELEVANT GENERAL CIVIL LAYOUT DRAWINGS
3. MINIMUM DISTANCE BETWEEN THE ϕ OF PIPE SUPPORTS AND EDGE OF THE PAVEMENT SHALL BE KEPT AS 500mm.
4. GRADE OF CONCRETE FOR ENCASEMENT SHALL BE AS PER JOB STANDARD. BUT NOT LESS THEN M20
5. THIS STANDARD IS VALID FOR SAFE BEARING CAPACITY OF SOIL $> 3T/SQ. M$ AT U/S OF PAVEMENT.
6. THE PAVEMENT SHALL BE ROUGHENED BY CHISELLING BEFORE ENCASING THE PIPE SUPPORTS.
7. MEDIUM DUTY RUST PROOF ANCHOR FASTNERS SHALL HAVE MINIMUM ALLOWABLE TENSILE AND SHEAR CAPACITIES OF 0.7T & 0.85T RESPECTIVELY WITH A FACTOR OF SAFETY EQUAL TO 4.
8. THIS STANDARD IS VALID FOR PIPE SUPPORTS < 1650 mm HEIGHT ABOVE HPP.

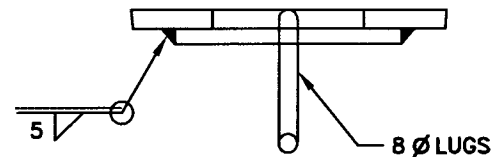
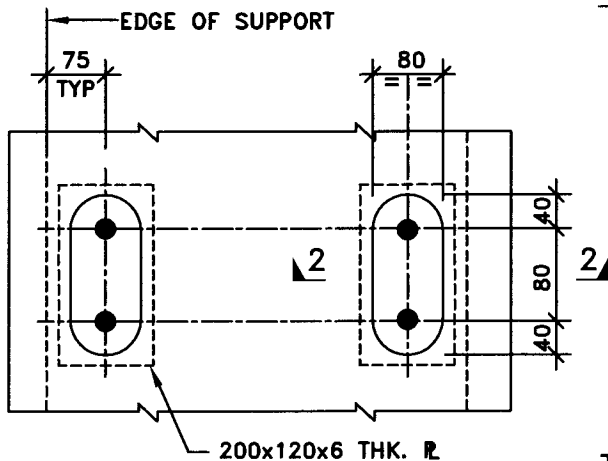
4	22-03-21	REAFFIRMED AND ISSUED AS STANDARD	SONAM	AMARJEET	ANURAG SINHA	S MAJUMDAR
3	15-01-16	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	RAJANJ SRIYASTAVA	S CHANDA
2	23-10-12	REVISED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman



TYPE-I



TYPE-II



(OTHER DETAILS SAME AS IN TYPE I ABOVE)

SECTION:2-2

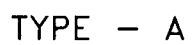
TYPE-III

(FOR CHEQ. PLATE ONLY)

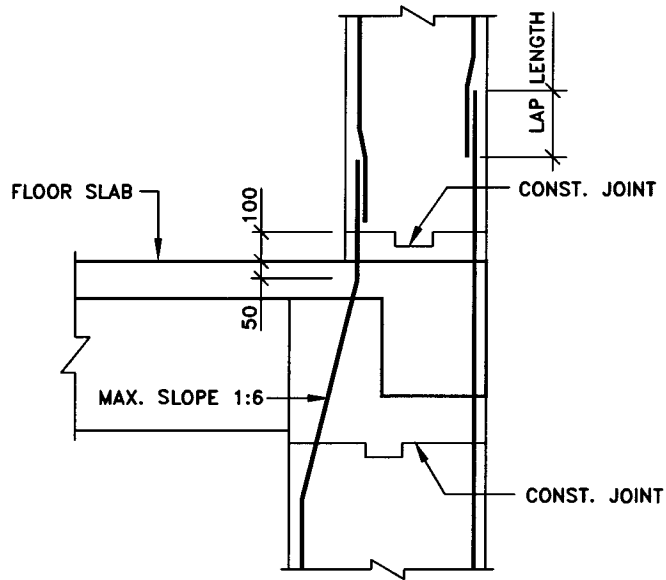
NOTES:

1. ALL DIMENSIONS ARE IN mm
2. FOR PRECAST SLABS GENERALLY LIFTING HOOK TYPE-I SHALL BE USED UNLESS TYPE-II IS SPECIFIED IN THE DRAWING.

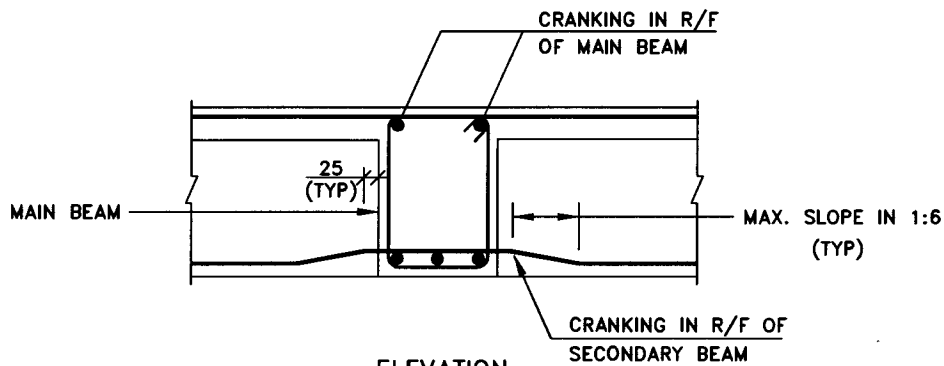
6	27.08.18	REAFFIRMED AND ISSUED AS STANDARD	KKS	A. SINHA	R. SRIVASTAVA	R. K. TRIVEDI
5	18.04.12	REAFFIRMED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Std. Committee Convenor	Std. Bureau Chairman
Approved by						Copyright File - All rights reserved



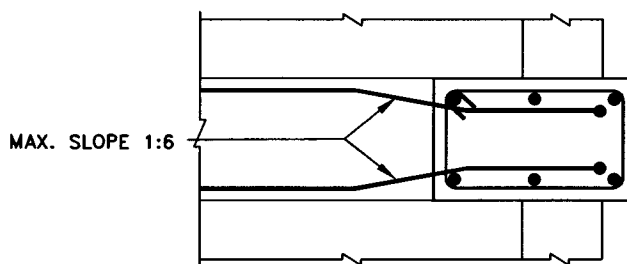
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ELEVATION
TYP. DETAIL AT BEAM COLUMN JUNCTION



ELEVATION
TYP. DETAIL AT JUNCTION OF TWO
BEAMS OF SAME DEPTH



PLAN
TYP. DETAIL AT JUNCTION OF BEAM AND
COL. OF SAME WIDTH

NOTE:

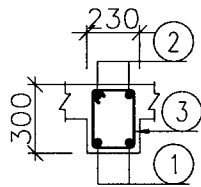
ALL DIMENSIONS ARE IN mm.

6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R. SRIVASTAVA	RK TRIVEDI
5	18.04.12	REAFFIRMED AND ISSUED AS STANDARD	VPS	P.K. MITTAL	S. CHATURVEDI	D. MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

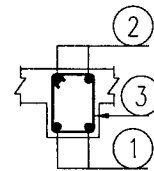
NOTES:-

1. THIS STANDARD COVERS REINFORCEMENTS ARRANGEMENT FOR DIFFERENT BEAM SIZES IN BUILDINGS AND SHALL BE READ IN CONJUNCTION WITH THE DRAWING FOR REINFORCEMENT DETAILS OF BEAMS SHOWING ELEVATION AND SPACING OF STIRRUPS ONLY.
2. THE SLAB SHOWN IS INDICATIVE AND MAY BE ON ONE SIDE/BOTH SIDE OF BEAMS AS PER THE FLOOR PLAN.
3. FOR DETAILS OF MISC ARCHITECTURAL FEATURES SUCH AS GUTTER, SUN SHADE ETC EIL STANDARD NO 7-68-0067 SHALL BE REFERRED.
4. FOR PIPERACK SECTIONS MARKED IN INDIVIDUAL DRAWING SHALL BE REFERRED.
5. BAR MARKED ① & ② ARE CONTINUOUS ALONG THE LENGTH OF BEAM.

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

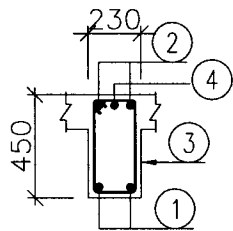


SEC AT SUPPORT

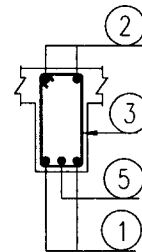


SEC AT MID SPAN

BEAM SIZE 230x300

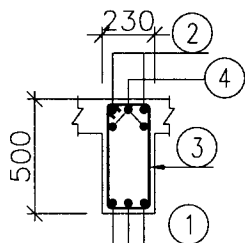


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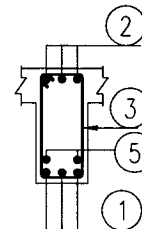


SEC AT MID SPAN

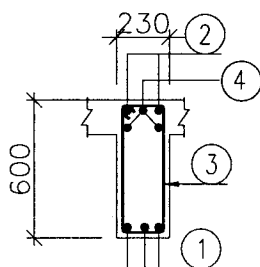
BEAM SIZE 230x450



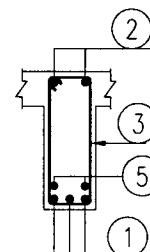
SEC AT SUPPORT

SEC AT MID SPAN

BEAM SIZE 230x500



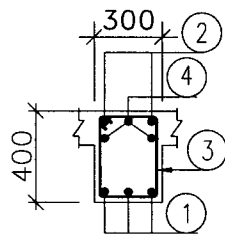
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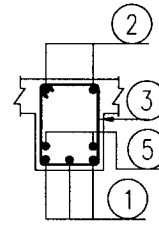
SEC AT MID SPAN

BEAM SIZE 230x600

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
Format No. 8-00-0001-F4 Rev.0					Copyright EIL - All rights reserved	

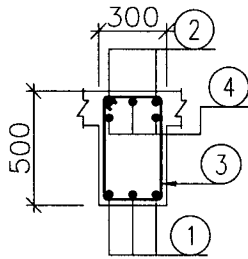


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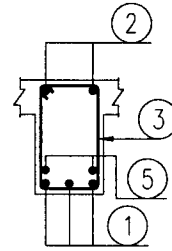


SEC AT MID SPAN

BEAM SIZE 300x400

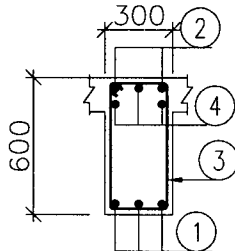


SEC AT SUPPORT

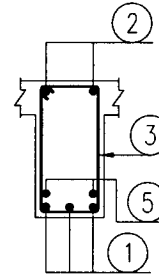


SEC AT MID SPAN

BEAM SIZE 300x500

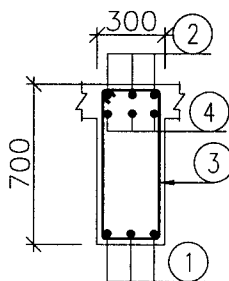


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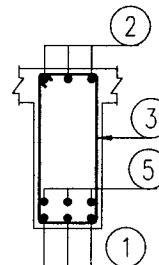


SEC AT MID SPAN

BEAM SIZE 300x600



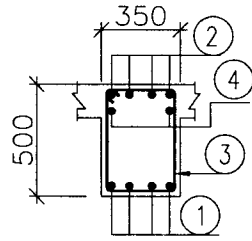
SEC AT SUPPORT



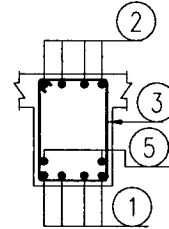
SEC AT MID SPAN

BEAM SIZE 300X700

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						Copyright EIL - All rights reserved

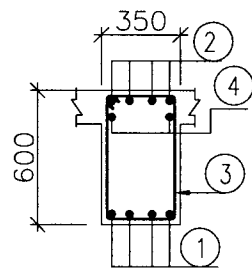


SEC AT SUPPORT

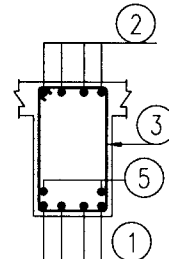


SEC AT MID SPAN

BEAM SIZE 350x500

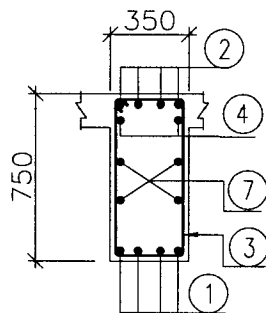


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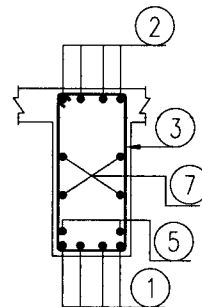


SEC AT MID SPAN

BEAM SIZE 350X600



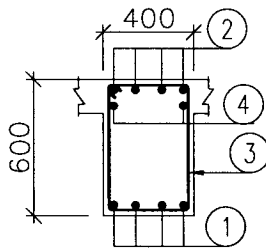
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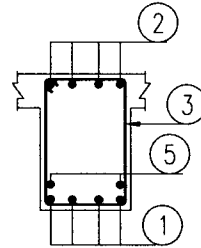
SEC AT MID SPAN

BEAM SIZE 350X750

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						Copyright EIL - All rights reserved

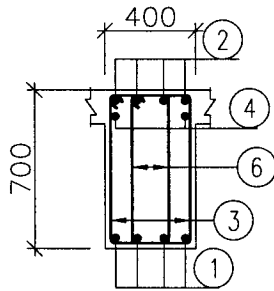


SEC AT SUPPORT

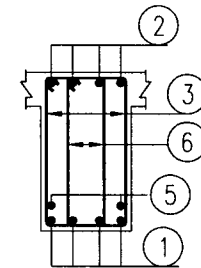


SEC AT MID SPAN

BEAM SIZE 400X600

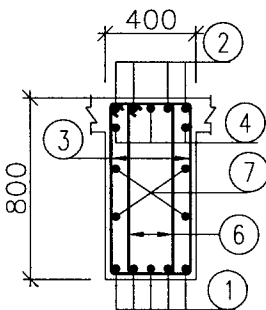


SEC AT SUPPORT

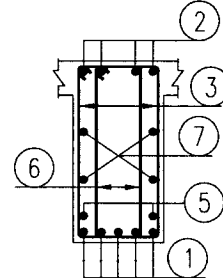


SEC AT MID SPAN

BEAM SIZE 400X700

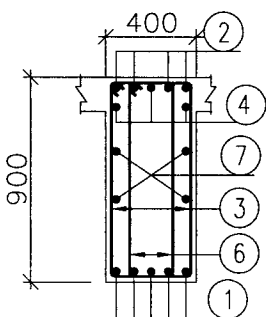


SEC AT SUPPORT

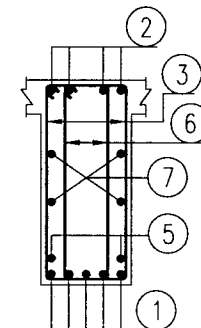


SEC AT MID SPAN

BEAM SIZE 400X800



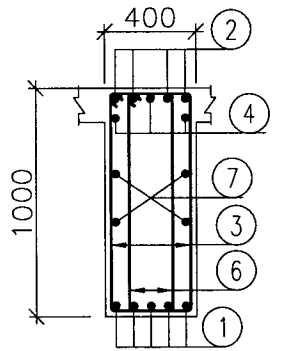
SEC AT SUPPORT



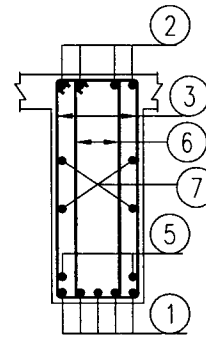
SEC AT MID SPAN

BEAM SIZE 400X900

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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SEC AT SUPPORT



SEC AT MID SPAN

BEAM SIZE 400X1000

1	15-04-2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
0	29-12-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S. Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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STANDARD RE-BAR SHAPES AND CUT LENGTH COMPUTATION

STANDARD No.
7-68-0101 Rev. 6

Page 1 of 7

METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
	A	STRAIGHT		A+B+C+D	
	A+H			A+B+2C	
	A+2H			A+B+2C+2H	
	A+B			IF ANGLE WITH HORIZONTAL IS 45° OR LESS A+B	
	A+B+C			A+B+2H	
	WHERE C IS MORE THAN 3D A+E+C				
	A+B+C			A+B+C+D+E	
	A+B+C+2H			A+B+C+D+E	
	A+B+C+2H			A+B+D+E	
	A+B+H			A+B+C	

**STANDARD RE-BAR SHAPES
AND
CUT LENGTH COMPUTATION**

STANDARD No.
7-68-0101 Rev. 6

Page 2 of 7

METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
	$A+E+2S+2H+d$			$2(A+E)+24d$	
	$A+E+3S+2d+B+H$			$2(A+E)+20d$	
	$A+E+C+2H-D-\sqrt{C^2-D^2}$			$2A+E+28d$	
	$E+2(A-D+C+H)$			$2A+E+C+12d+B$	
	$B+2C+2H$			$2A+E+C+9d+B$	
	$2C+2E+1+B+2H$			$4C+24d$	
	$2A+3D+22d$			$4C+24d$	
	$2A+3D+22d$				

WHERE P IS NOT GREATER THAN $D/5$ $N \pi (D+d)+8d$
N= NUMBER OF COMPLETE AND FRACTIONAL TURNS
D= INTERNAL DIA.
P= PITCH OF HELIX
d= SIZE OF BAR

6	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK DRYEDI
5	23-10-12	REVISED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by

**STANDARD RE-BAR SHAPES
AND
CUT LENGTH COMPUTATION**

STANDARD No.
7-68-0101 Rev. 6

Page 3 of 7

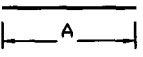
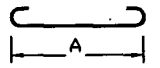
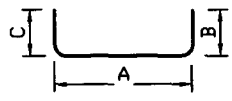
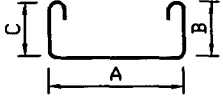
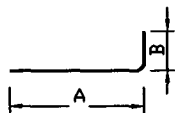
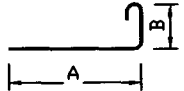
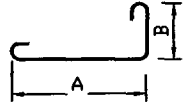
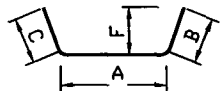
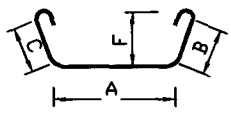
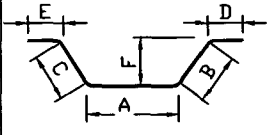
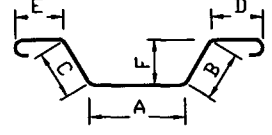
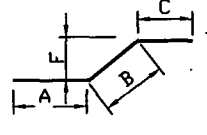
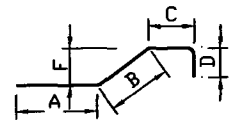
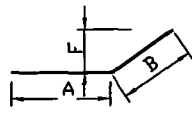
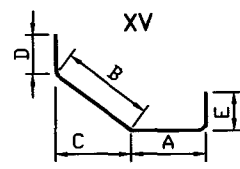
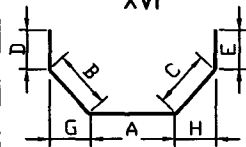
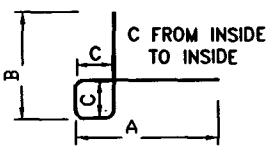
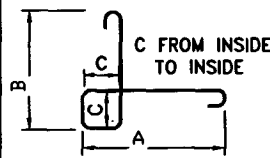
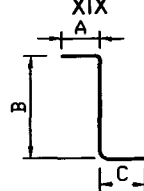
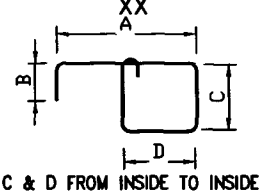
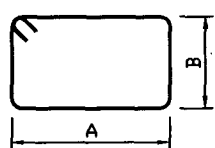
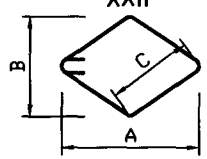
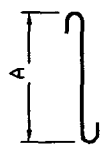
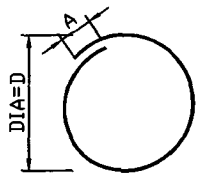
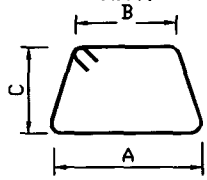
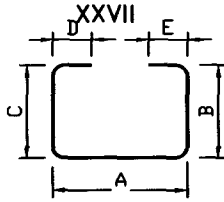
METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	APPROX. TOTAL LENGTH OF BAR (L) MEASURED ALONG ϵ	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
	$A+B+2C+D$			$A+E-1/2R-d+2B$	
	$A+2H$			$A+E-1/2R-d+2H$	
				$A+E+4/3d+2H$	
	$A+2H$			$A+2B+2C-12d$	
	$\pi D+A$			$A+E-1/2R-d$	
 IF ANGLE WITH HORIZ. IS 45° OR LESS $A+B+C+H-2(R+d)$ IF ANGLE IS GREATER THAN 45° & R EXCEEDS 12d, L TO BE CALCULATED			 IF ANGLE WITH HORIZ. IS 45° OR LESS & R IS 12d OR LESS $A+E+2H$, IF ANGLE IS GREATER THAN 45° & R EXCEEDS 12d L TO BE CALCULATED		
 IF ANGLE WITH HORIZ. IS 45° OR LESS & R IS 12d OR LESS $B+C+E+2H$ OR $A+2H+C-\sqrt{C^2-D^2}$ (IF A IS SPECIFIED B OR E IS OMITTED)			 IF ANGLE WITH HORIZ. IS 45° OR LESS & R IS 12d OR LESS $B+C+1+C_2+E+F+2H$ OR $A+C_1+C_2+2H-\sqrt{C_1^2-D_1^2}-\sqrt{C_2^2-D_2^2}$ (IF A IS SPECIFIED B, E OR F IS OMITTED) AS PER IS:2502		

6	06-06-18	REAFFIRMED AND ISSUED AS STANDARD			
5	23-10-12	REVISED AND ISSUED AS STANDARD	VPS	P.K. MITTAL	S. CHATURVEDI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor
					Stds. Bureau Chairman
					Approved by

**STANDARD RE-BAR SHAPES
AND
CUT LENGTH COMPUTATION**

STANDARD No.
7-68-0101 Rev. 6

Page 4 of 7

I 	II 	III 	IV 
V 	VI 	VII 	VIII 
IX 	X 	XI 	XII 
XIII 	XIV 	XV 	XVI 
XVII 	XVIII 	XIX 	XX 
XXI 	XXII 	XXIII 	XXIV 
XXV SEE NOTE 6	XXVI 	XXVII 	

6 06-06-18 REAFFIRMED AND ISSUED AS STANDARD

5 23-10-12 REVISED AND ISSUED AS STANDARD

Rev. No. Date Purpose

Prepared by VPS

P.K.MITTA

Checked by

S. CHATURVEDI
Stds. Committee
Convenor

D. MALHOTRA
Stds. Bureau
Chairman

Approved by

**STANDARD RE-BAR SHAPES
AND
CUT LENGTH COMPUTATION**

STANDARD No.
7-68-0101 Rev. 6

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**CUT LENGTH CALCULATION
FOR BARS OF DIAMETER ≤ 25 MM**

BAR TYPE (REFER 7-68-0101 SHT. 4)	HIGH YIELD DEFORMED BARS	REMARKS
I	A	
II	$A+13d+13d$	
III	$A+B+C-(3d+3d)$	
IV	$A+B+C+13d+13d-(3d+3d)$	
V	$A+B-3d$	
VI	$A+B+13d-3d$	
VII	$A+B+13d+13d-3d$	
VIII	$A+B+C$	*
IX	$A+B+C+13d+13d$	*
X	$A+B+C+D+E$	*
XI	$A+B+C+D+E+13d+13d$	*
XII	$A+B+C$	*
XIII	$A+B+C+D-3d$	*
XIV	$A+B$	*
XV	$A+B+D+E-3d$	*
XVI	$A+B+C+D+E$	*
XVII	$A+B+C+C+d$	
XVIII	$A+B+C+C+13d+13d+d$	
XIX	$A+B+C-6d$	
XX	$A+B+C+C+D+13d-12d$	
XXI	$2(A+B)+10d+10d$	SEE NOTE 4
XXII	$4C+20d$	SEE NOTE 5
XXIII	$A+13d+13d$	
XXIV	$\pi D+A$	
XXV	LUMPSUM	SEE NOTE 6
XXVI	$A+B+2\left[\{(A-B)/2\}^2+C^2\}^{1/2}+13d$	
XXVII	$A+B+C+D+E-12d$	

6	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R. SRIVASTAVA	RK TOSVEDI
5	23-10-12	REVISED AND ISSUED AS STANDARD	VPS	P.K. MITTAL	S. CHATURVEDI	D. MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

**STANDARD RE-BAR SHAPES
AND
CUT LENGTH COMPUTATION**

STANDARD No.
7-68-0101 Rev.6

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**CUT LENGTH CALCULATION
FOR BARS OF DIAMETER > 25 MM**

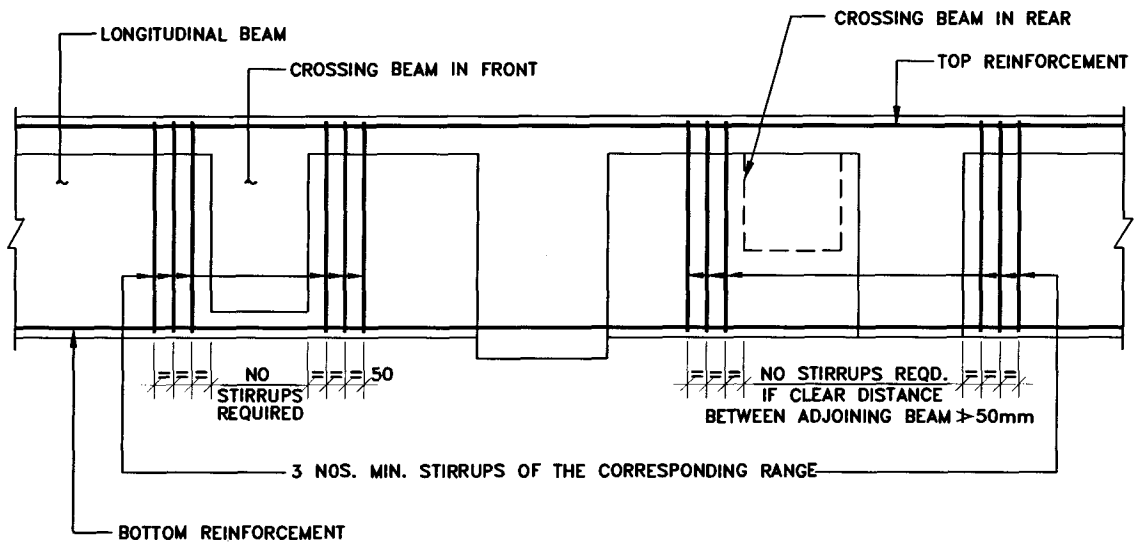
BAR TYPE	HIGH YIELD DEFORMED BARS	REMARKS
I	A	
II	A+17d+17d	
III	A+B+C-(4d+4d)	
IV	A+B+C+17d+17d-(4d+4d)	
V	A+B-4d	
VI	A+B+17d-4d	
VII	A+B+17d+17d-4d	
VIII	A+B+C	*
IX	A+B+C+17d+17d	*
X	A+B+C+D+E	*
XI	A+B+C+D+E+17d+17d	*
XII	A+B+C	*
XIII	A+B+C+D-4d	*
XIV	A+B	*
XV	A+B+D+E-4d	*
XVI	A+B+C+D+E	*
XVII	A+B+C+C+d	
XVIII	A+B+C+C+17d+17d+d	
XIX	A+B+C-4d-4d	
XX	A+B+C+C+D+17d-16d	
XXI	2(A+B)+10d+10d	SEE NOTE 4
XXII	4C+20d	SEE NOTE 5
XXIII	A+17d+17d	
XXIV	$\pi D+A$	
XXV	LUMPSUM	SEE NOTE 6
XXVI	$A+B+2\left[\frac{(A-B)}{2}\right]^2+C^2\right]^{1/2}+17d$	
XXVII	A+B+C+D+E-16d	

6	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIPATHY
5	23-10-12	REVISED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

NOTES:-

1. READ SHEETS 4 TO 7 IN CONJUNCTION.
2. THE COMPUTATIONS OF CUT LENGTH ARE BASED ON IS:2502 EXCEPT THAT THESE SHALL BE IN MULTIPLES OF 10mm.
3. WHERE MARKED * ON SHEETS 5 & 6, IT IS ASSUMED THAT ANGLE OR BEND WITH HORIZONTAL IS 45° OR LESS.
4. HOOKS INDICATED IN SHT. 4 OF 7 FOR TYPES II, IV, VI, VII, IX, XI, XVIII, XXI, XXIII, XXVI ARE FOR DRAFTING PURPOSE ONLY. FOR 90° BEND, HOOKS ARE NOT REQUIRED, ONLY HOOK ALLOWANCE SHALL BE ADOPTED AS PER SHT. 5 & 6.
5. FOR TYPE XXII STIRRUPS IN HYD BARS, HOOKS ARE NOT REQUIRED, ONLY HOOK ALLOWANCE SHALL BE ADOPTED AS PER SHT. 5 & 6.
6. BAR TYPE XXV IS NON-STANDARD AND DETAILS IF ANY SHALL BE GIVEN IN THE R.C.C DRAWING.
7. ALL DIMENSIONS ON SHT. 4 ARE FROM OUTSIDE EDGES OF BARS UNLESS OTHERWISE MENTIONED.

6	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRVASTAVA	RK TRIVEDI
5	23-10-12	REVISED AND ISSUED AS STANDARD	YPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	



NOTE:

ALL DIMENSIONS ARE IN mm.

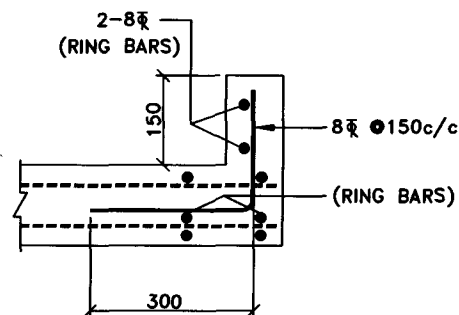
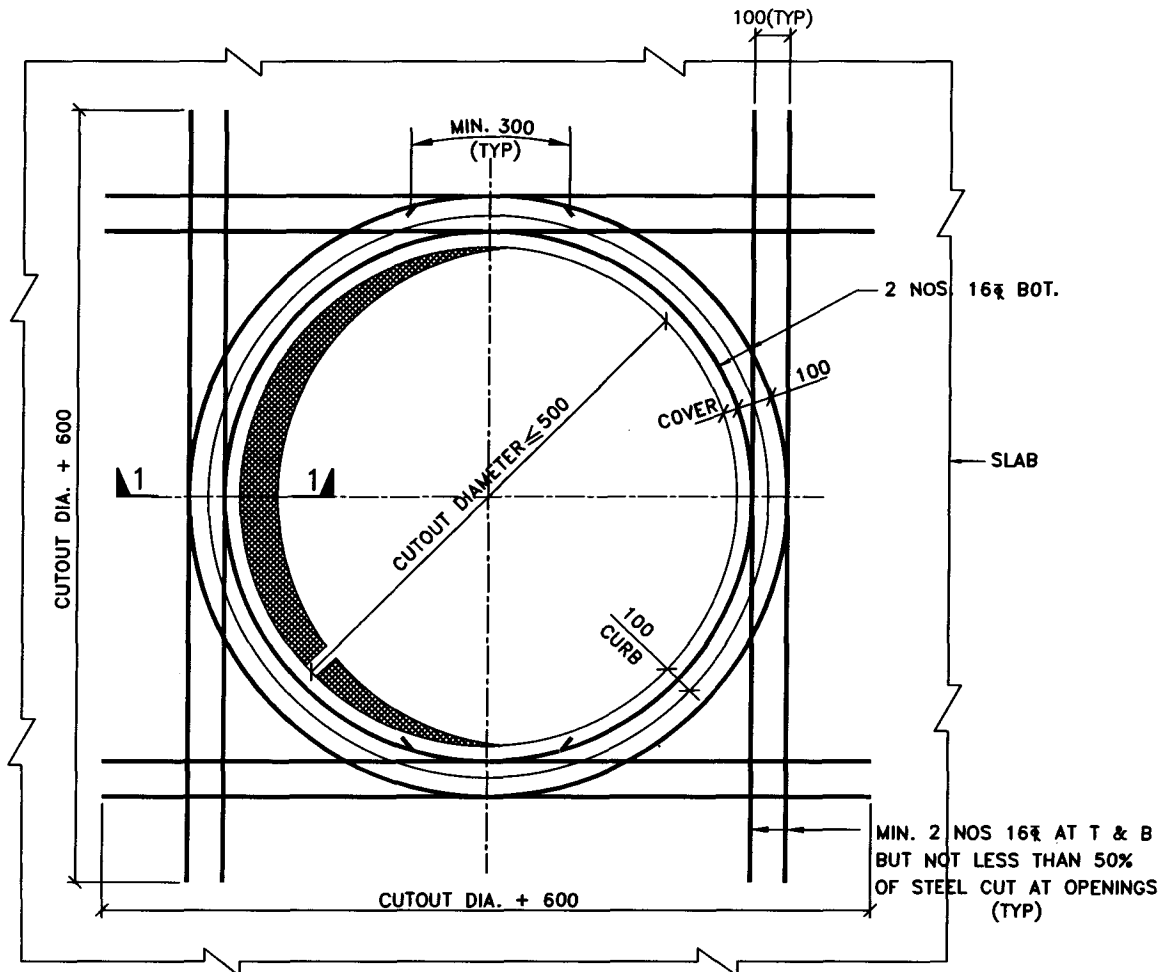
5	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI
4	23.10.12	REAFFIRMED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

**REINFORCEMENT DETAILS
AT CIRCULAR
CUT-OUT IN SLAB**

STANDARD No.

7-68-0103 Rev. 6

Page 1 of 1



NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. ALL THE BARS SHALL BE EFFECTIVELY TIED WITH THE MAIN REINFORCEMENT BARS CUT OR SPLAYED NEAR THE OPENING AS PER THE DIRECTION OF THE ENGINEER-IN-CHARGE.
3. THIS DETAIL APPLIES TO SLABS UPTO 200 THK.
4. OMIT CURB WHERE SPECIFICALLY STATED ON DRAWINGS.

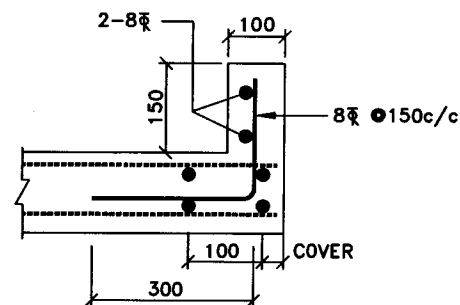
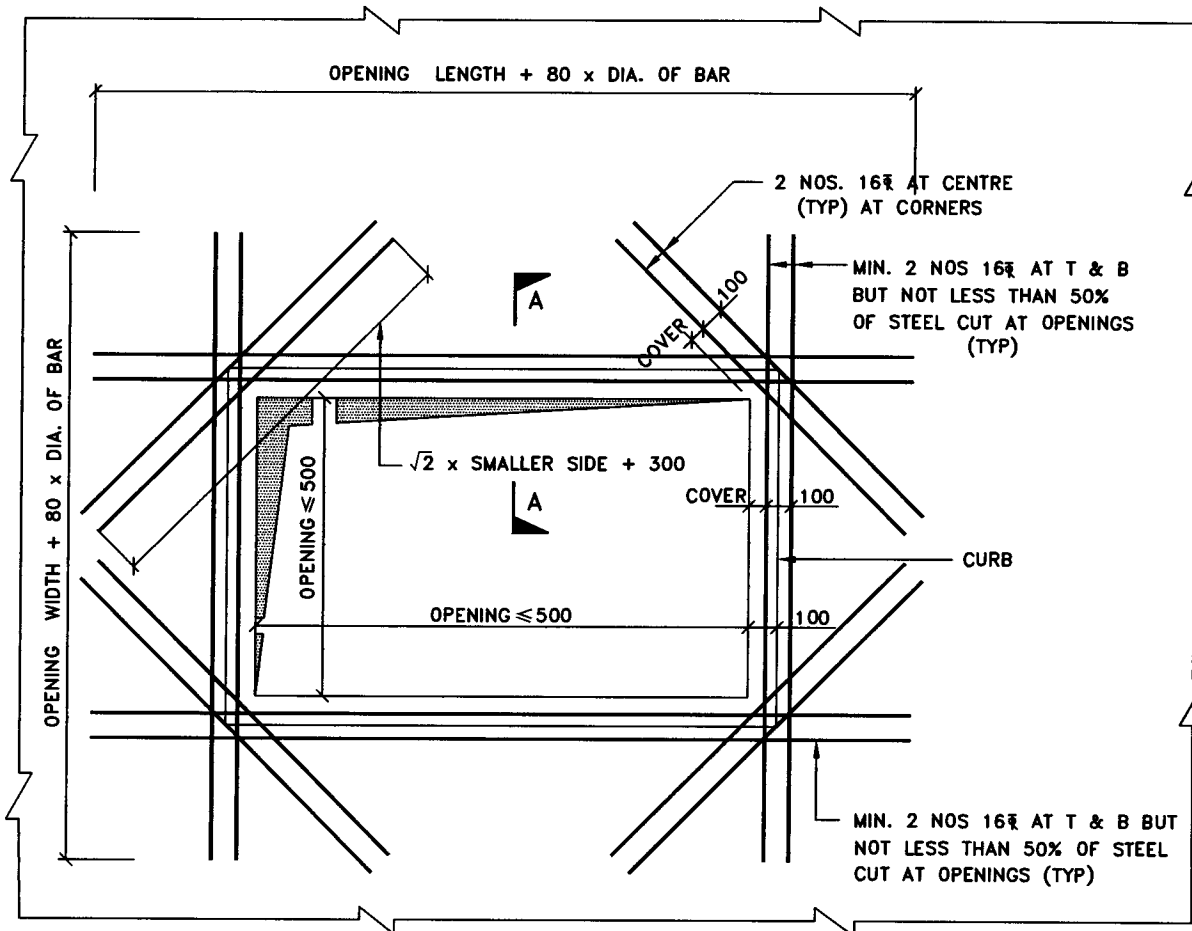
6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R. SRIVASTAVA	RK TRIVEDI
5	23.10.12	REVISED AND ISSUED AS STANDARD	VPS	P.K. MITTAL	S. CHATURVEDI	D. MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

**REINFORCEMENT DETAILS
AT SQ./RECT.
CUT-OUT IN SLAB**

STANDARD No.

7-68-0104 Rev. 6

Page 1 of 1



SECTION: A-A

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. EXTRA BARS MAY BE OMITTED IF A BEAM IS PROVIDED AT THE RELEVANT EDGE.
3. CORNER BAR MAY BE OMITTED IF TWO BEAMS MEET AT THE RELEVANT CORNER.
4. ALL THE BARS MENTIONED ABOVE SHALL BE EFFECTIVELY TIED WITH THE MAIN REINFORCEMENT BARS CUT OR SPLAYED NEAR OPENING AS DIRECTED BY ENGINEER-IN-CHARGE.
5. OMIT CURB WHERE SPECIFICALLY STATED ON DRAWING.
6. THIS DETAIL APPLIES TO SLABS UPTO 200 THK.

6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI
5	18.04.12	REAFFIRMED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

LAP LENGTH FOR REBARS

TYPE OF REBARS	TYPE OF STRUCTURE	LAP LENGTH				TENSILE STRESS (σ_s) IN (N / mm ²)	DESIGN METHOD	REMARKS
		GRADE OF CONCRETE						
		M20	M25	M30	M35			
HIGH STRENGTH DEFORMED BARS CONFORMING TO IS:1786 AS PER GENERAL NOTES OF THE PROJECT	GENERAL R.C.C STRUCTURES	57 D	50 D	50 D	40 D	435	LIMIT STATE	'D' DENOTES DIAMETER OF REBARS
	LIQUID RETAINING STRUCTURES	37 D	33 D	30 D	27 D	190	WORKING STRESS	
	CHIMNEY AND STORAGE BINS	54 D	48 D	44 D	40 D	275	WORKING STRESS	

NOTES :-

- LAP LENGTHS FOR REBARS, FULLY STRESSED TO TENSILE STRESS AT DESIGN LOAD / WORKING LOAD, HAS BEEN DERIVED FROM THE BASIC FORMULA GIVEN BELOW (REFER CLAUSE 26.2.1, IS: 456)

$$L_d = \frac{D\sigma_s}{4\tau_{bd}}$$

WHERE D = NOMINAL DIAMETER OF THE BARS ; L_d = LAP LENGTH

σ_s = TENSILE STRESS IN BARS AT DESIGN LOAD / WORKING LOAD

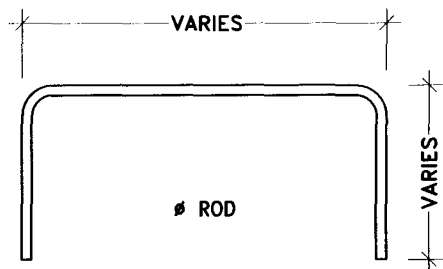
τ_{bd} = DESIGN BOND STRESS AS PER CLAUSE 26.2.1.1 FOR LIMIT STATE AND TABLE 21 FOR WORKING STRESS DESIGN.

- IS CODE REFERENCES :

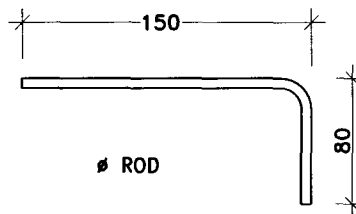
LIQUID RETAINING STRUCTURE	IS: 3370
R.C.C CHIMNEYS	IS: 4998
STORAGE BINS	IS: 4995
GENERAL R.C.C STRUCTURES	IS: 456

- FOR LIMIT STATE DESIGN, TENSILE STRESS AT DESIGN LOAD IN REBARS HAS BEEN ADOPTED AS $0.87f_y$, WHERE $f_y = 500 \text{ N/mm}^2$ FOR Fe500 ETC.
- LAP LENGTH SHALL BE ROUNDED OFF TO NEAREST FIGURE (MULTIPLE OF 10 mm).
- LAP LENGTH FOR LIMIT STATE DESIGN HAS BEEN ROUNDED OFF TO 50D FOR GRADE M25/M30 CONCRETE.

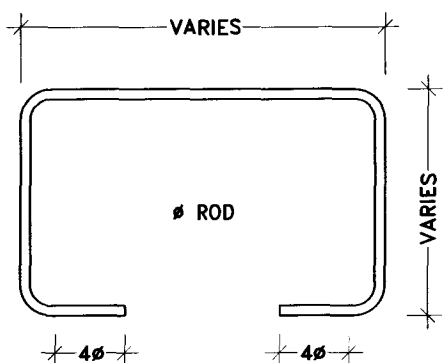
7	28.09.20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
6	21.07.14	REVISED AND ISSUED AS STANDARD	A.K. SHARMA	AMARJEET	P.K.MITTA	S.CHANDA
Rev. No.	Date	Purpose	Prepared by	Checked by	Sds. Committee Convenor	Sds. Bureau Chairman
Approved by						



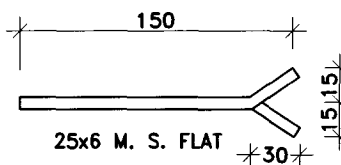
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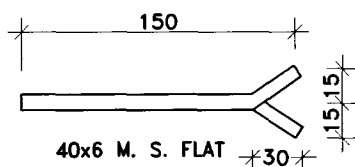
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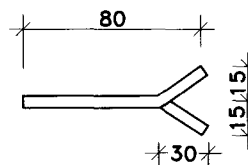
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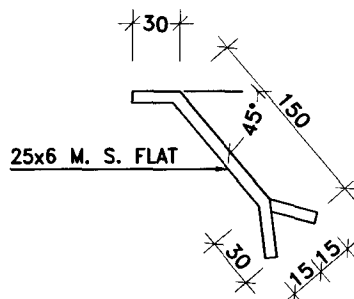
TYPE-'C1'



TYPE-'C2'



TYPE-'C3'







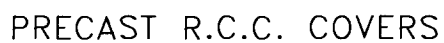
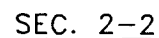
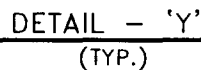
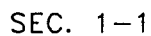
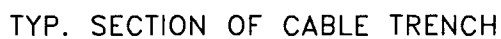
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6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI
5	18.04.12	REAFFIRMED AND ISSUED AS STANDARD	VPS	P.K.MITTAL	S CHATURVEDI	D MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

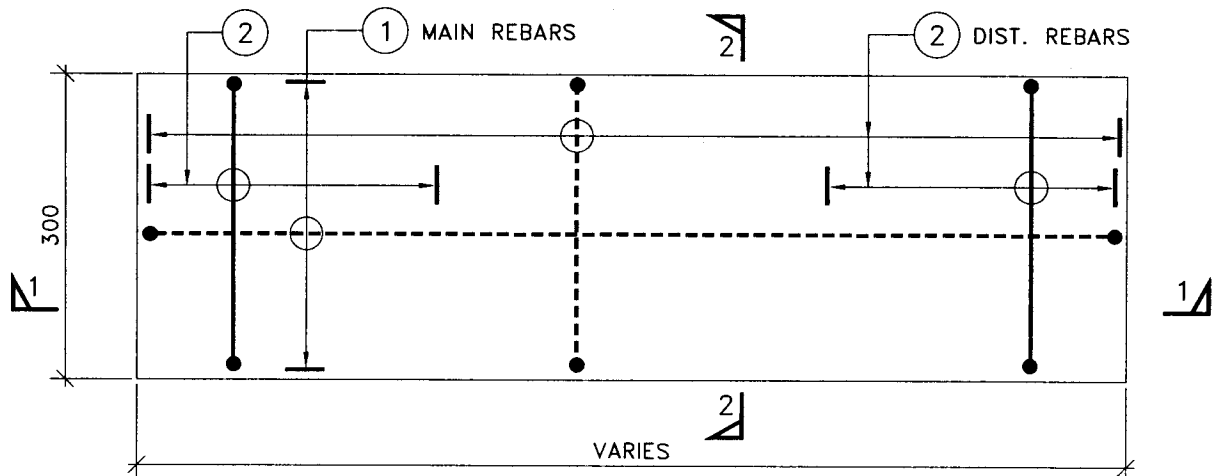
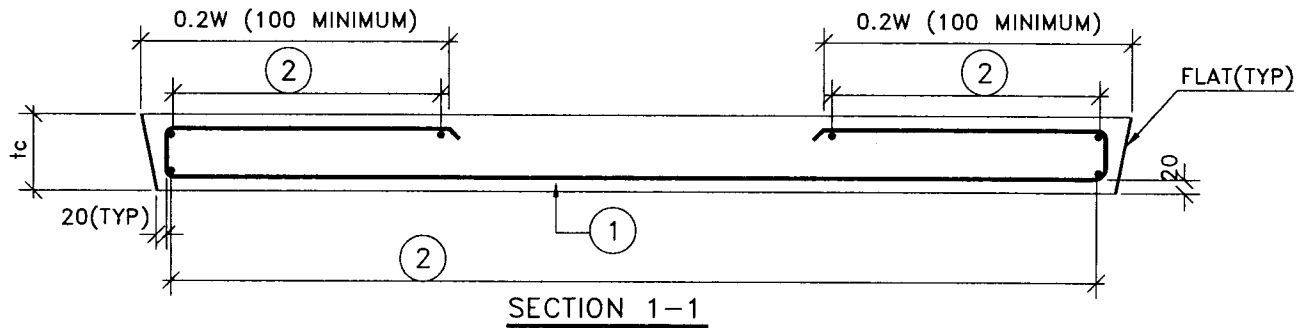
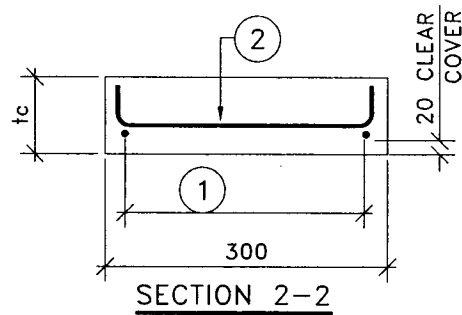
NOTES :-

1. ELECTRICAL DEPTT. & INSTRUMENTATION DEPTT. WILL PROVIDE FOLLOWING INFORMATION ON THEIR DRAWINGS WHICH WILL BE ISSUED FOR CONSTRUCTION:
 - a) LAYOUT AND SIZE OF THE CABLE TRENCH.
 - b) TYPE OF COVER REQUIRED i.e. PRECAST RCC / CHEQUERED PLATE.
 - c) LIVE LOAD ON THE COVERS IF MORE THAN AS DEFINED IN TABLE 1.
 - d) INSERT PLATE REQUIREMENT AND ITS SPACING.
 - e) LAYOUT AND SIZE OF OPENING FOR PANELS. (SHEET 15 OF 16)
2. CONCRETE FOR PRECAST COVER AND CABLE TRENCH SHALL BE AS PER GRADE OF CONCRETE FOR THE PROJECT BUT NOT LESS THAN M20.
3. STRUCTURAL STEEL FOR PRECAST COVER SUPPORTS INCLUDING INSERT PLATES IS ALSO IN THE SCOPE OF CIVIL CONTRACTOR.
4. ALL OTHER STRUCTURAL STEEL WORKS INCLUDING CHEQUERED PLATE SHALL BE UNDER THE SCOPE OF ELECTRICAL CONTRACTOR.

1	13.04.2017	REVISED AND ISSUED AS STANDARD	 JITENDER	 ALPNA	 RAJANJI SRIVASTAVA	 R. NANDA
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(STANDARD PRECAST COVER)

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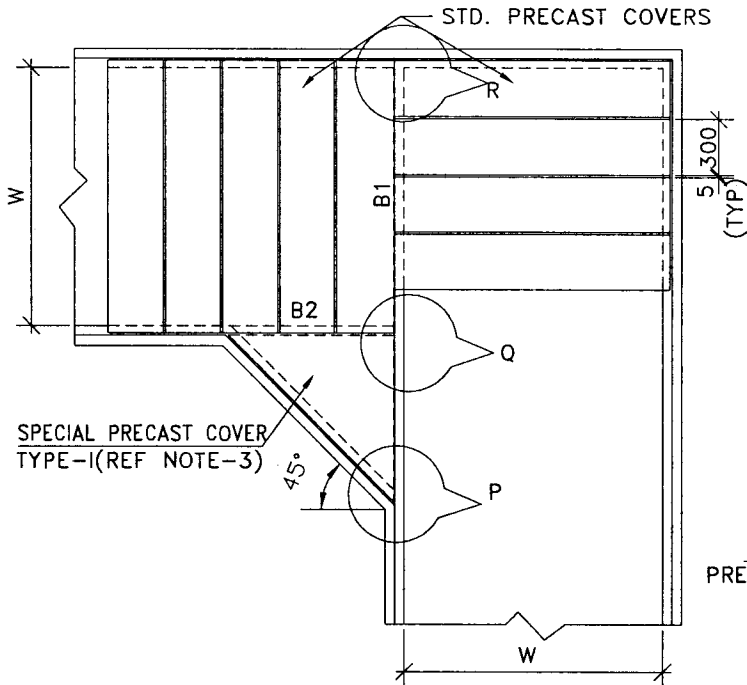
TABLE-1: DETAIL OF STANDARD PRECAST COVERS

S.NO.	TYPE	WORKING DIMENSIONS			DESIGN LOAD ON EACH COVER		FOR ONE UNIT OF WIDTH 300 mm			
		CLEAR WIDTH OF TRENCH W (mm)	BEARING OF COVER bw (mm)	TOTAL LENGTH OF COVER W+2bw (mm)	THICKNESS OF COVER tc (mm)	TOTAL U.D.L. (kgs)	EQUIV. CONCEN. LOAD AT CENTRE OF SPAN (kgs)	REINFORCEMENT CONFORMING TO GRADE Fe-500(TMT) OF IS:1786		SELF WEIGHT (kgs)
								BAR MKD. (1)	BAR MKD. (2)	
1.	PC-1	300	50	400	80	≤2000	≤1000	3-8ϕ	3-8ϕ	24
2.	PC-2	500	50	600	80	≤2000	≤1000	3-8ϕ	3-8ϕ	36
3.	PC-3A	750	50	850	80	≤1500	≤750	3-8ϕ	4-8ϕ	51
4.	PC-3B				80	>1500 ≤2000	>750 ≤1000	4-8ϕ	4-8ϕ	51
5.	PC-4A	1000	50	1100	80	≤1500	≤750	4-8ϕ	5-8ϕ	66
6.	PC-4B				100	>1500 ≤2000	>750 ≤1000	4-8ϕ	5-8ϕ	83
7.	PC-5A	1250	50	1350	100	≤1500	≤750	4-8ϕ	5-8ϕ	101
8.	PC-5B				100	>1500 ≤2000	>750 ≤1000	4-10ϕ	5-8ϕ	101
9.	PC-6A	1500	75	1650	100	≤1500	≤750	3-10ϕ	6-8ϕ	124
10.	PC-6B				110	>1500 ≤2000	>750 ≤1000	4-10ϕ	6-8ϕ	136
11.	PC-7A	2000	75	2150	110	≤1500	≤750	4-10ϕ	7-8ϕ	177
12.	PC-7B				120	>1500 ≤2000	>750 ≤1000	4-12ϕ	7-8ϕ	194
13.	PC-8A	2250	75	2400	120	≤1500	≤750	4-10ϕ	8-8ϕ	216
14.	PC-8B				130	>1500 ≤2000	>750 ≤1000	4-12ϕ	8-8ϕ	234

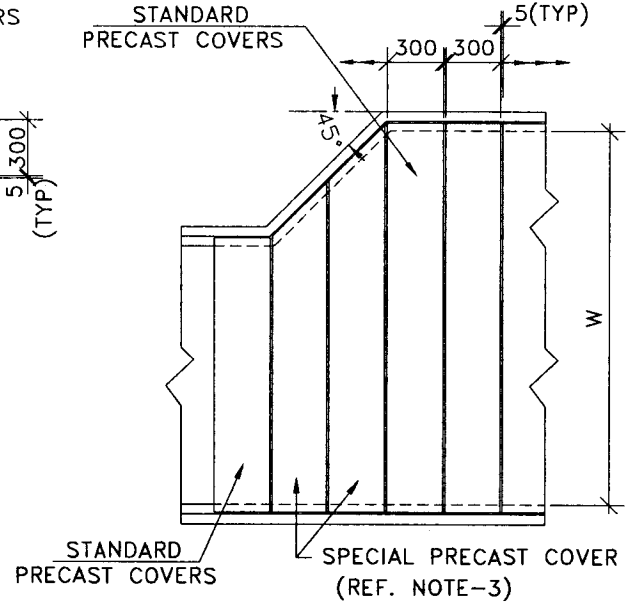
NOTES :-

1. FOR LOCATION OF BARS MKD. (1) AND (2) REFER SHT. 3 OF 16.
2. ALL PRECAST COVERS SHALL BE MARKED (T) ON THE TOP FOR PROPER PLACEMENT.
3. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.
4. DESIGN IS VALID FOR EITHER TOTAL UDL OR EQUIV. POINT LOAD AT CENTRE OF SPAN.

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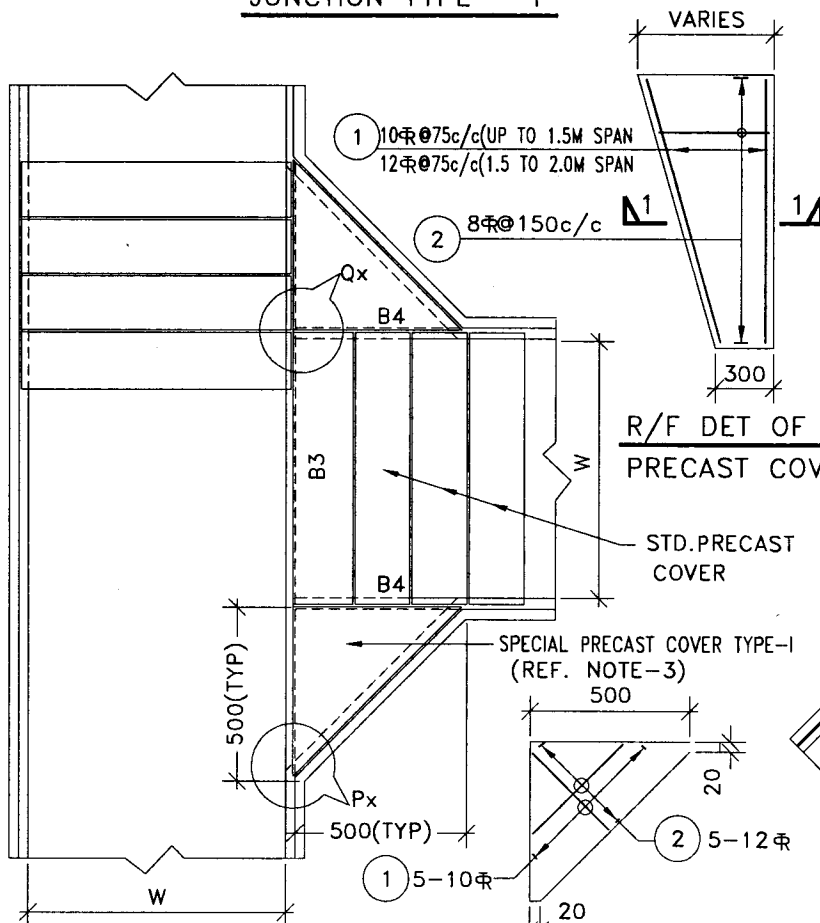
JUNCTION TYPE - I



JUNCTION TYPE - III

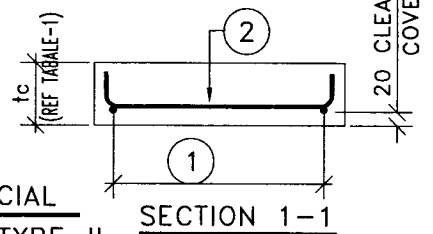
NOTES :

1. FOR DETAILS P, Q, Px, Qx & R REFER SHT. 6 OF 16.
2. FOR DETAIL OF BEAMS B1 TO B4 REFER. TABLE 2 SHT 7 OF 16.
3. SPECIAL PRECAST COVER AT JUNCTION OF CABLE TRENCH PREFERABLY BE IN CAST-IN-SITU (REF SHT 8 OF 16)



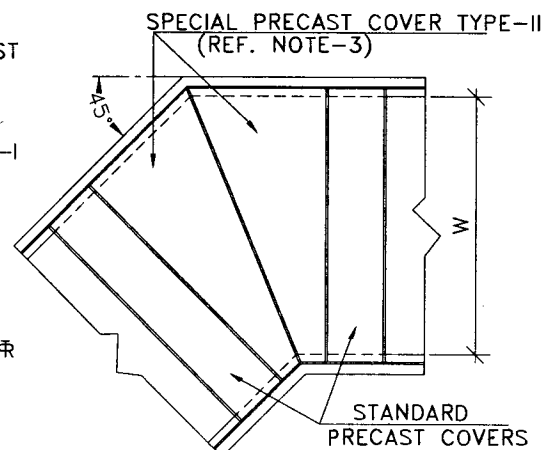
JUNCTION TYPE - II

**R/F DET OF SPECIAL
PRECAST COVER TYPE-II**



SECTION 1-1

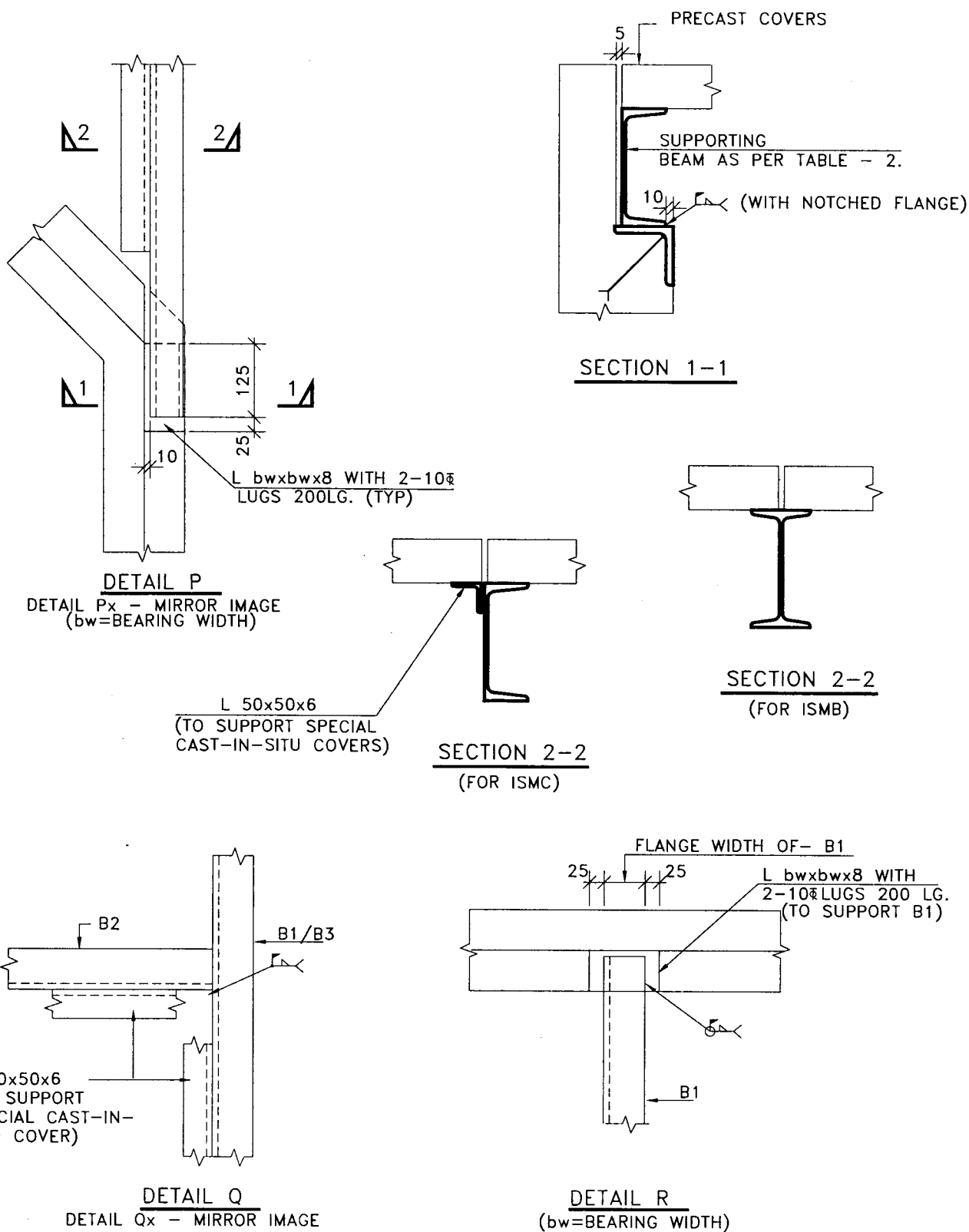
**R/F DET OF SPECIAL
PRECAST COVER TYPE-I**



JUNCTION TYPE - IV

SPECIAL PRECAST COVERS

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SUPPORTING MEMBERS

(FOR LOCATION OF DET. P, Q, Px, Qx & R REF. SHT. 5 OF 16)

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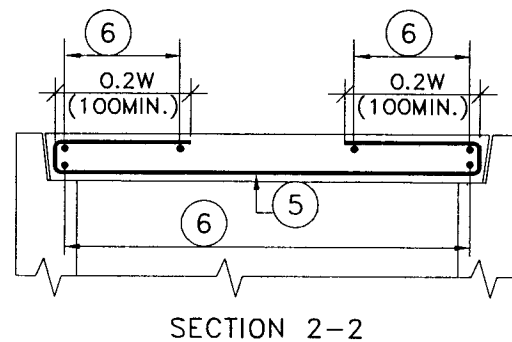
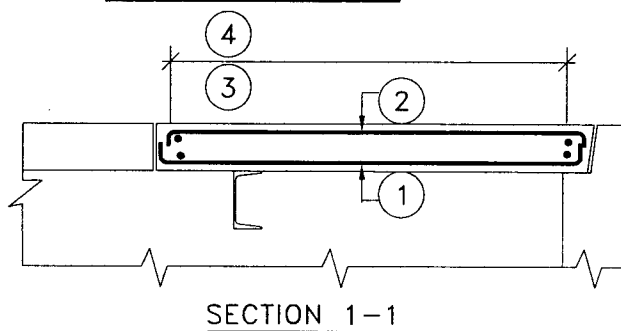
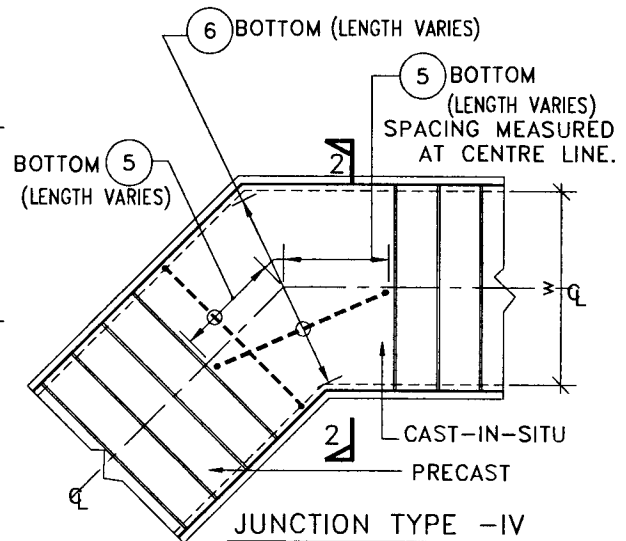
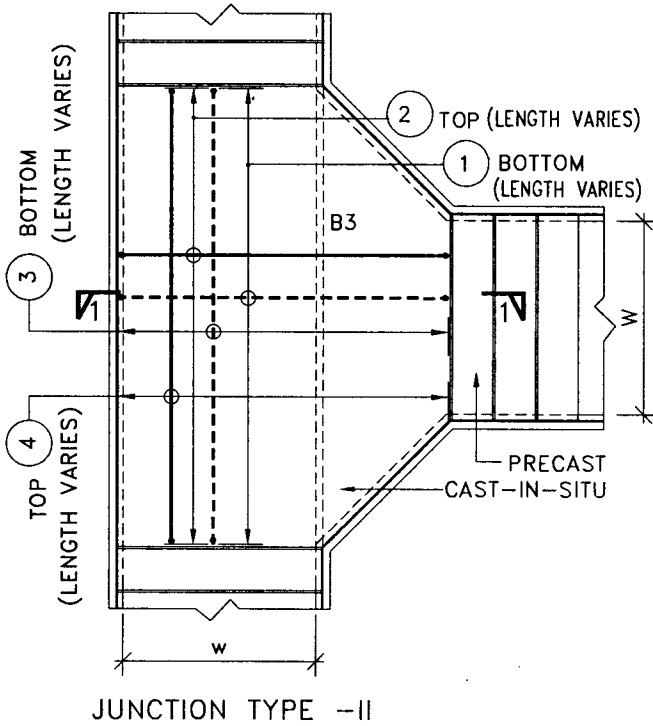
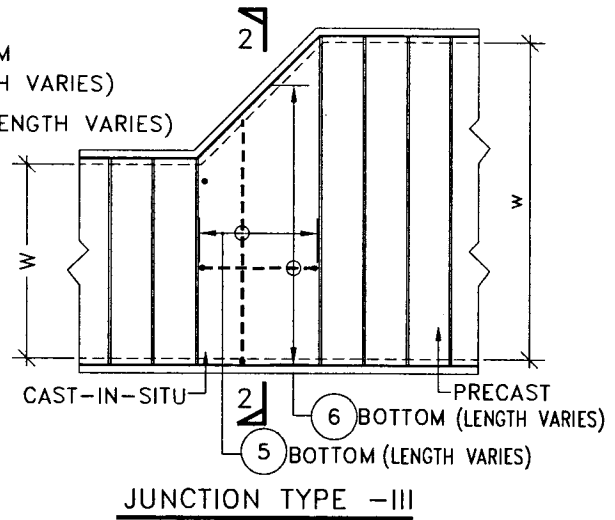
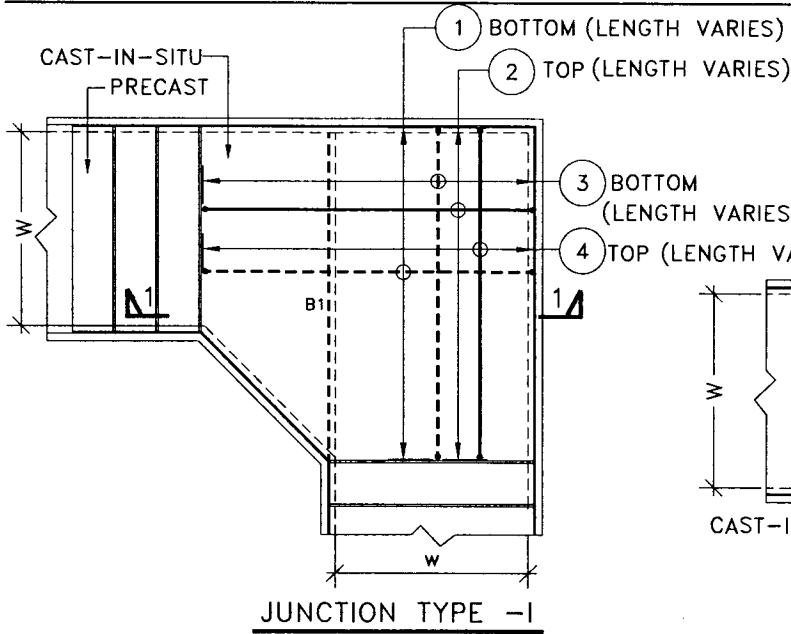
TABLE-2: DETAIL OF SUPPORTING MEMBERS AT JUNCTIONS

S.NO.	WIDTH OF MAIN TRENCH W	JUNCTION TYPE - I				JUNCTION TYPE - II			
		SUPPORTING MEMBER B1		SUPPORTING MEMBER B2		SUPPORTING MEMBER B3		SUPPORTING MEMBER B4	
		SIZE	LENGTH	SIZE	LENGTH	SIZE	LENGTH	SIZE	LENGTH
1.	300	MC 100	1020	MC 100	625	MC 100	1650	MC 100	625
2.	500	MC 100	1220	MC 100	625	MC 150	1850	MC 100	625
3.	750	MC 100	1470	MC 100	625	MC 150	2100	MC 100	625
4.	1000	MC 100	1720	MC 100	625	MC 150	2350	MC 100	625
5.	1250	MC 150	1970	MC 100	625	MC 150	2600	MC 100	625
6.	1500	MC 150	2270	MC 100	625	MC 150	2900	MC 100	625
7.	2000	MC 150	2770	MC 100	625	MC 200	3400	MC 100	625
8.	2250	MC 150	3020	MC 100	625	MC 200	3650	MC 100	625

NOTE

THE SUPPORTING MEMBERS ARE DESIGNED FOR COVER WT. PLUS A POINT LOAD OF 1000 kg. AT MID SPAN.

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DETAIL OF CAST-IN-SITU COVERS

(FOR DETS OF R/F BARS ① TO ⑥ REFER TABLE-3 SHT 9 OF 16)

1	13.04.2017	REVISED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R.NANDA
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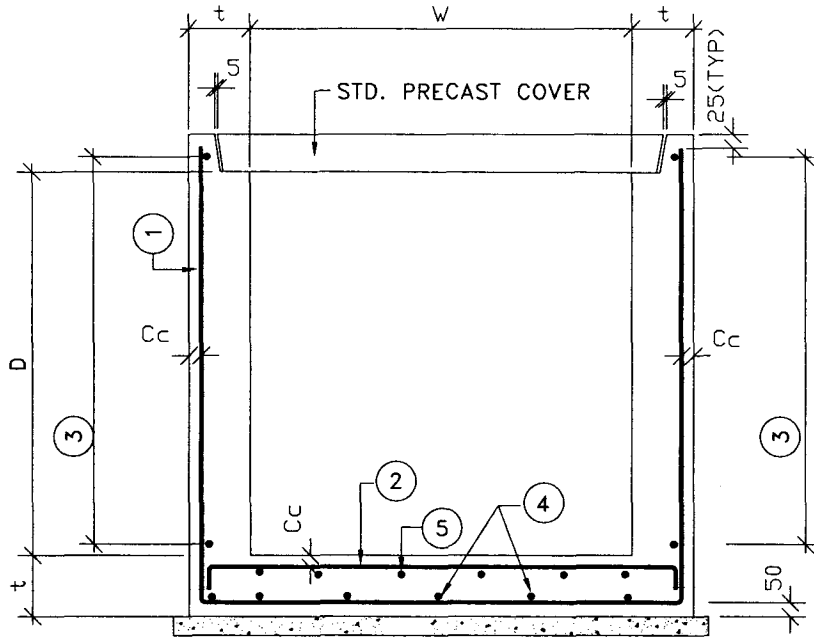
TABLE-3:

S.NO.	W (mm)	tc (mm)	REINFORCEMENT DETAIL FOR CAST-IN-SITU COVERS					
			JUNCTION TYPE I & II				JUNCTION TYPE III & IV	
			BAR MARK ①	BAR MARK ②	BAR MARK ③	BAR MARK ④	BAR MARK ⑤	BAR MARK ⑥
1.	300	80	8 ϕ 120c/c	—	8 ϕ 150c/c	—	8 ϕ 150c/c	8 ϕ 200c/c
2.	500	80	8 ϕ 120c/c	—	8 ϕ 150c/c	—	8 ϕ 150c/c	8 ϕ 200c/c
3.	750	80	8 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 200c/c	8 ϕ 200c/c	8 ϕ 150c/c	8 ϕ 200c/c
4.	1000	100	8 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 300c/c	8 ϕ 300c/c	8 ϕ 150c/c	8 ϕ 300c/c
5.	1250	100	10 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 300c/c	8 ϕ 300c/c	10 ϕ 150c/c	8 ϕ 300c/c
6.	1500	110	10 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 300c/c	8 ϕ 300c/c	10 ϕ 150c/c	8 ϕ 300c/c
7.	2000	120	12 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 300c/c	8 ϕ 300c/c	12 ϕ 150c/c	8 ϕ 300c/c
8.	2250	130	12 ϕ 120c/c	8 ϕ 200c/c	8 ϕ 300c/c	8 ϕ 300c/c	12 ϕ 150c/c	8 ϕ 300c/c

NOTES :-

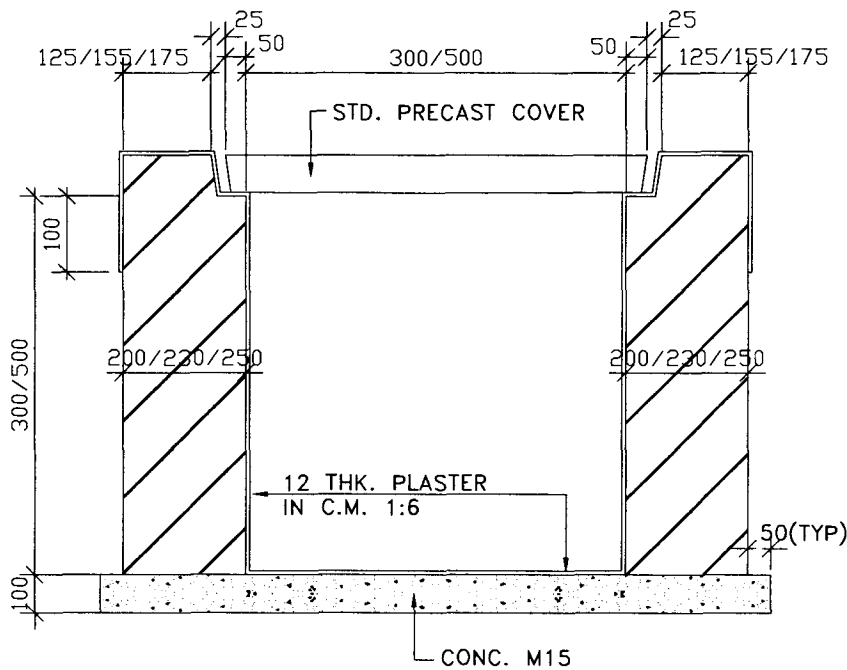
1. THE CAST-IN-SITU COVERS ARE DESIGNED FOR TOTAL UDL OF 2000 kg. OR AN EQUIVALENT POINT LOAD OF 1000 kg ACTING AT MID SPAN.
2. FOR CONNECTION DETAIL AND SIZES OF B1 & B3 REFER SHT. 6 OF 16 & 7 OF 16.
3. REINFORCEMENT BARS SHALL CONFORM TO GRADE Fe-500D(TMT) OF IS:1786.
4. GRADE OF CONC. SHALL BE MINIMUM M20 OR AS PER GENERAL NOTES OF THE PROJECT.
5. FOR LOCATION OF BAR MARKS ① TO ⑥ REFER SHT. 8 OF 16.

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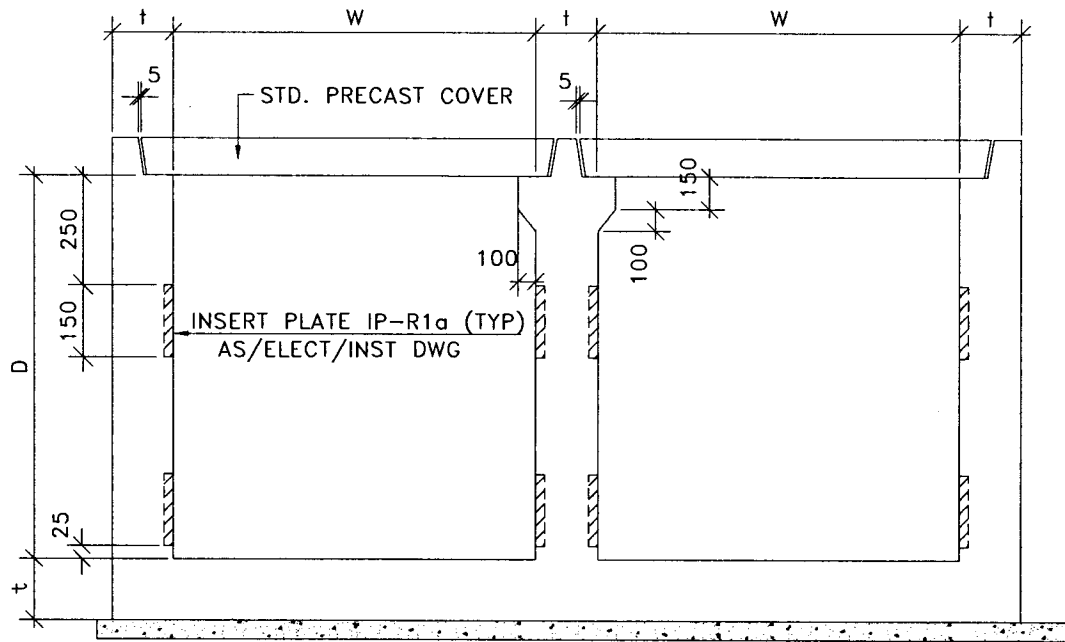
CABLE TRENCH SECTION WITH R.C.C.

(FOR DETS OF R/F BARS ① TO ⑥ REFER TABLE-4 SHT 12 OF 16)

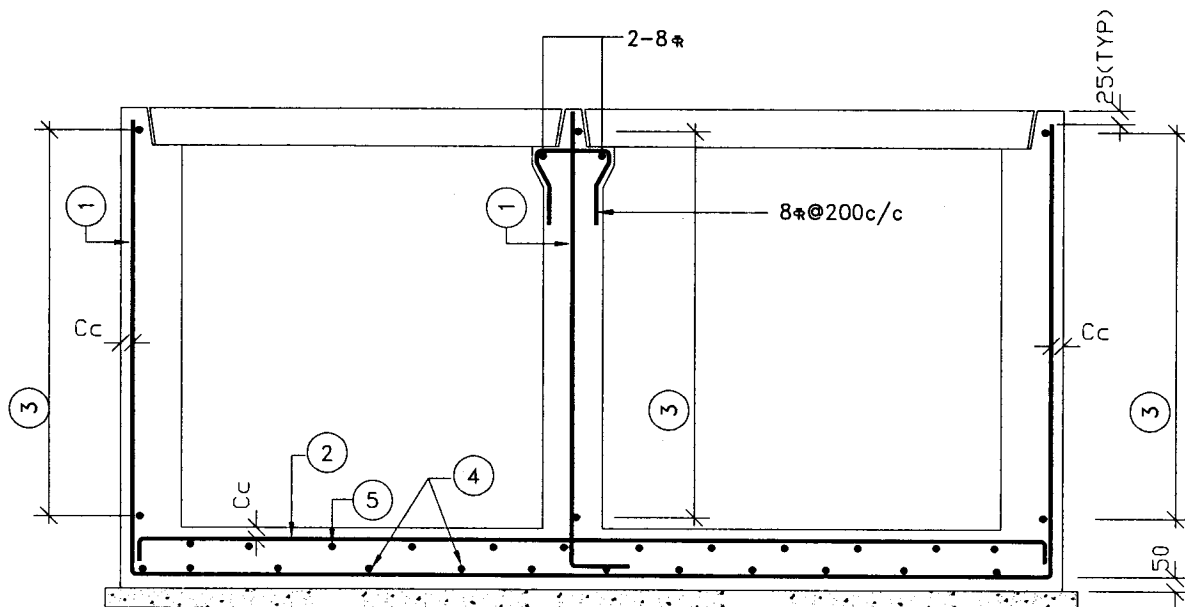


CABLE TRENCH SECTION WITH BRICK MASONRY
(IN C.M. 1:6)

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CABLE TRENCH SECTION WITH PARTITION



CABLE TRENCH SECTION WITH PARTITION

(FOR DETS OF R/F BARS ① TO ⑤ REFER TABLE-4 SHT 12 OF 16)

1	13.04.2017	REVISED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R.NANDA
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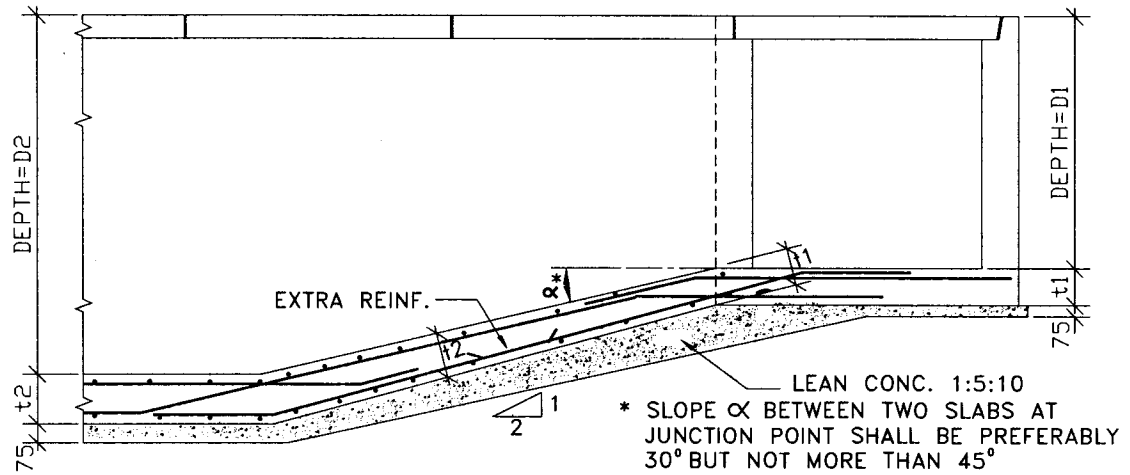
TABLE-4 DETAIL OF CABLE TRENCH REINFORCEMENT

S.NO.	WORKING DIMENSIONS				R/F CONFORMING TO GRADE Fe-500D(TMT) OF IS:1786.					APPROX. QUANTITIES PER METRE LENGTH.			
	DEPTH	WIDTH	THICK- NESS	CLEAR COVER	BAR MARK (REF. SHT. 10 & 11 OF 16)					LEAN CONC. 1:5:10 (m ³)	CONC. (m ³)	REBARS (kg)	SHUTTERING (m ²)
	D (mm)	W (mm)	t (mm)	Cc (mm)	(1)	(2)	(3)	(4)	(5)				
1.	2200	2250	200	25	12 ६-175C/C.	12 ६-150C/C.	8 ६-200C/C.	8 ६-250C/C.	8 ६-250C/C.	0.206	1.45	86.0	9.2
2.	1500	2000	150	25	12 ६-200C/C.	12 ६-175C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.180	0.80	56.0	6.3
3.		1500	150	25	12 ६-200C/C.	10 ६-175C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.143	0.72	44.0	6.3
4.		1250	150	25	12 ६-200C/C.	8 ६-175C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.124	0.68	40.0	6.3
5.		1000	150	25	12 ६-200C/C.	8 ६-250C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.105	0.65	36.0	6.3
6.	1250	2000	150	25	10 ६-175C/C.	12 ६-150C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.180	0.72	49.0	5.3
7.		1500	125	25	10 ६-150C/C.	12 ६-150C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.139	0.53	43.0	5.25
8.		1250	125	25	10 ६-150C/C.	10 ६-150C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.120	0.50	37.0	5.25
9.		1000	125	25	10 ६-150C/C.	10 ६-200C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.101	0.47	32.0	5.25
10.	1000	750	125	25	10 ६-150C/C.	8 ६-200C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.08	0.44	29.5	5.25
11.		500	125	25	10 ६-150C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.063	0.38	27.1	5.25
12.		2000	150	25	10 ६-200C/C.	12 ६-150C/C.	8 ६-250C/C.	8 ६-300C/C.	8 ६-300C/C.	0.180	0.65	49.0	4.3
13.		1500	125	25	10 ६-200C/C.	12 ६-150C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.139	0.47	36.0	4.25
14.	750	1250	100	25	10 ६-150C/C.	8 ६-150C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.116	0.35	29.0	4.2
15.		1000	100	25	10 ६-150C/C.	8 ६-200C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.098	0.32	26.0	4.2
16.		750	100	25	8 ६-200C/C.	10 ६-150C/C.	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.079	0.25	19.0	3.2
17.		500	100	25	8 ६-200C/C.	—	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.060	0.15	5.60	2.2
18.	300	500	100	25	8 ६-200C/C.	—	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.048	0.11	4.70	1.4
19.	300	300	100	25	8 ६-200C/C.	—	8 ६-300C/C.	8 ६-300C/C.	8 ६-300C/C.	0.045	0.09	3.80	1.4

NOTES-

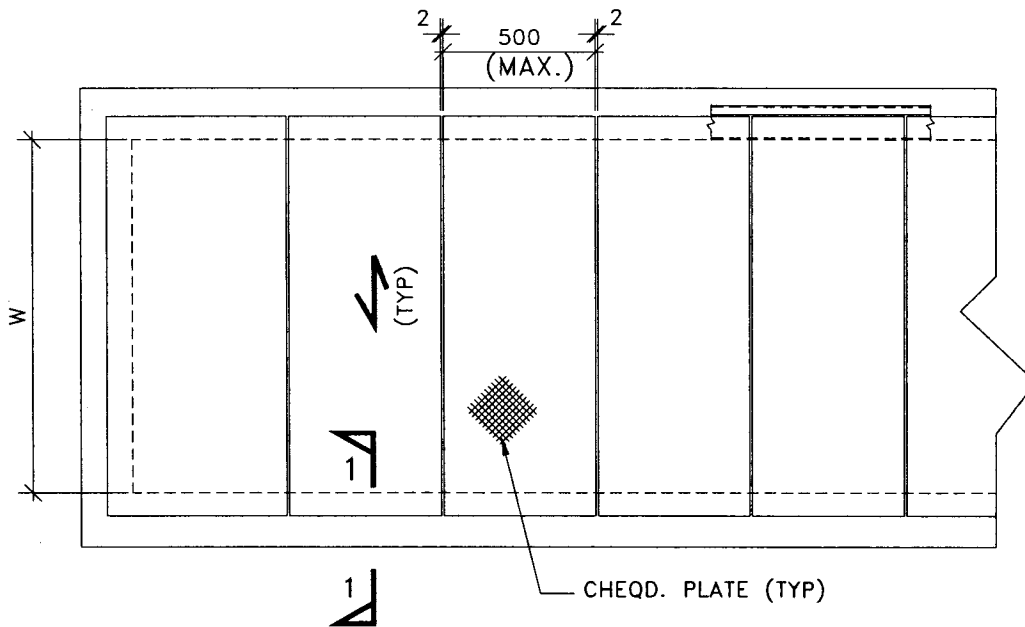
1. R.C.C. CABLE TRENCHES ARE DESIGNED FOR A SURCHARGE LOAD OF 1 T/m².
2. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.
3. PREFERABLY THE DEPTH OF CABLE TRENCH SHALL NOT BE MORE THAN THE WIDTH.
4. TRENCHES OF DEPTH 300 & 500mm IN BRICK MASONRY WHEREVER SPECIFIED.

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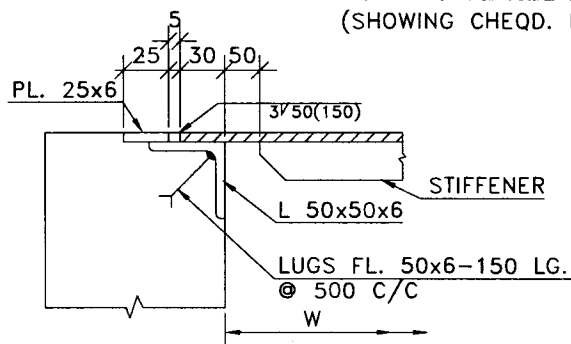


TYPICAL DETAIL AT JUNCTION FOR
DIFFERENT DEPTHS OF TRENCH.
(R/F DETAIL OF TRENCH IN SLOPE SHALL BE BASED ON DEPTH D2).

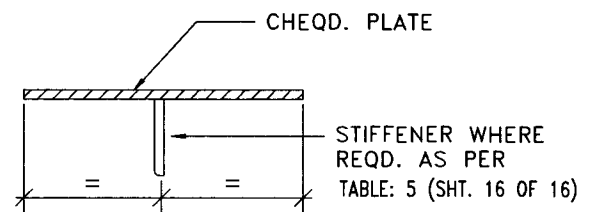
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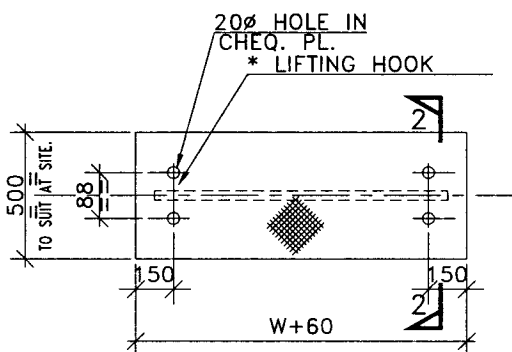
TYPICAL TRENCH PLAN
(SHOWING CHEQD. PLATE)



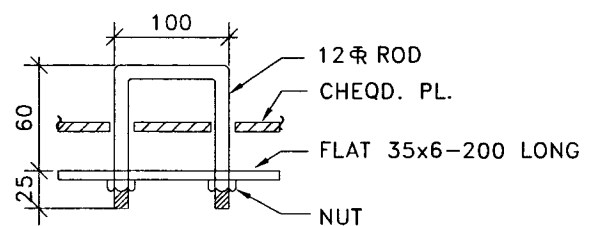
SECTION 1-1



SECTION 2-2



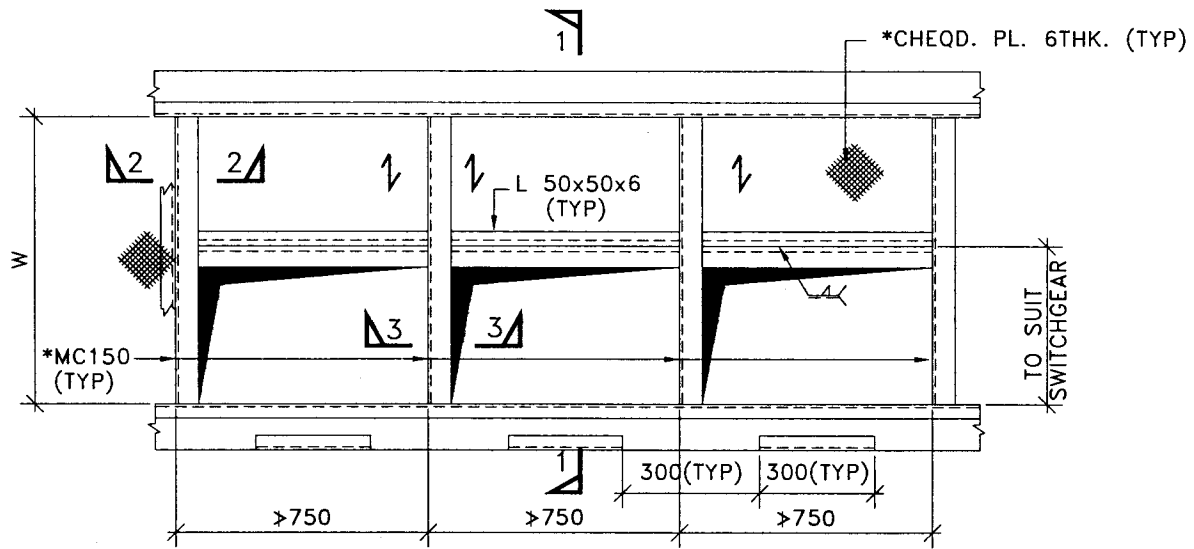
TYP. CHEQD. PLATE DETAIL
(SHOWING CHEQD. PLATE)



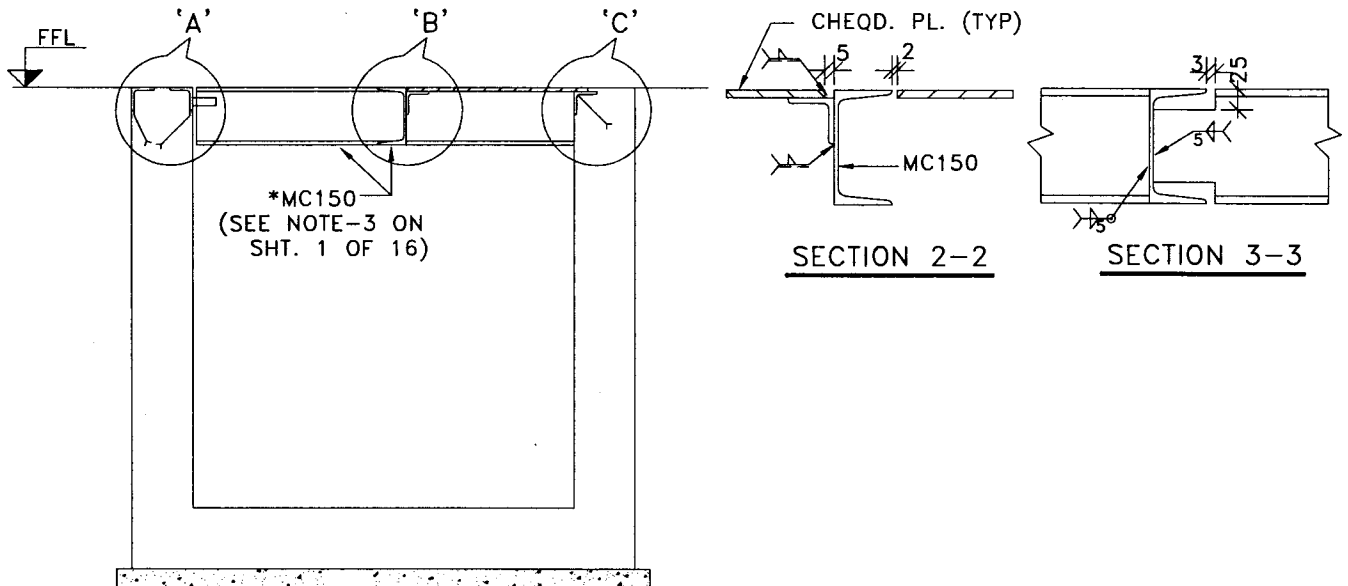
TYP. LIFTING HOOK DETAIL

* ONE HOOK FOR SPAN UPTO 500
TWO HOOKS FOR SPAN ABOVE 500.

1	13.04.2017	REVISED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R.NANDA
0	21.10.2011	ISSUED AS STANDARD	VPSINGH	PKMITTAL	S. CHATURVEDI	D.MALHOTRA
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman



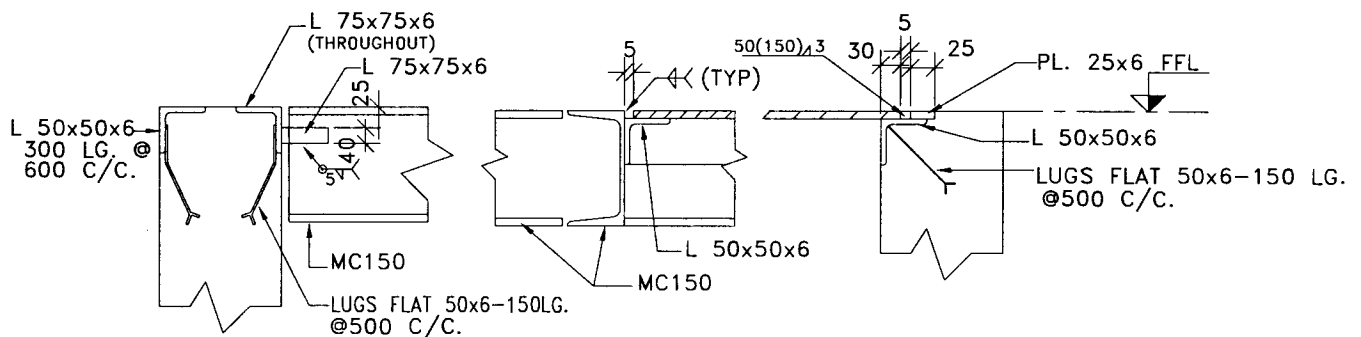
TYPICAL TRENCH PLAN
(AT SWITCH GEARS)



SECTION 1-1

SECTION 2-2

SECTION 3-3



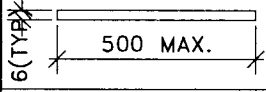
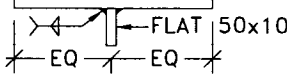
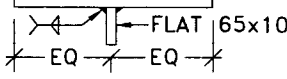
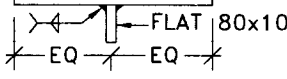
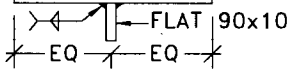
DETAIL A

DETAIL B

DETAIL C

1	13.04.2017	REVISED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R.NANDA
0	21.10.2011	ISSUED AS STANDARD	VPSINGH	PKMITTAL	S CHATURVEDI	D.MALHOTRA
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TABLE- 5: DETAIL OF CHEQUERED PLATE COVER

S.NO.	TYPE	SECTION	SECTION PROPERTIES FOR 500mm WIDE PLATE			RECOMMENDED SPAN (W) mm
			WT. kg/m	I=cm ⁴	Zmin =cm ³	
1.	I		23.55	0.90	3.00	W < 500
2.	II		27.45	44.90	9.16	500 < W ≤ 1250
3.	III		28.62	91.00	14.76	1250 < W ≤ 1500
4.	IV		29.79	160.30	21.66	1500 < W ≤ 2000
5.	V		30.62	221.16	26.97	2000 < W ≤ 2250

NOTE-

THE DESIGN IS BASED ON A LIVE LOAD OF 500 Kg/m² AND
MAXIMUM ALLOWABLE DEFLECTION = W/200 (W = SPAN)

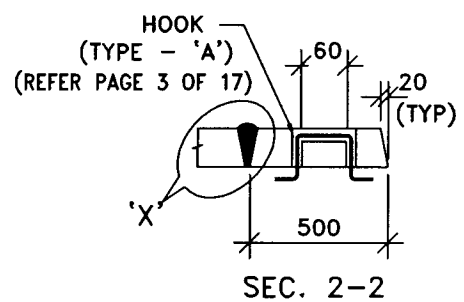
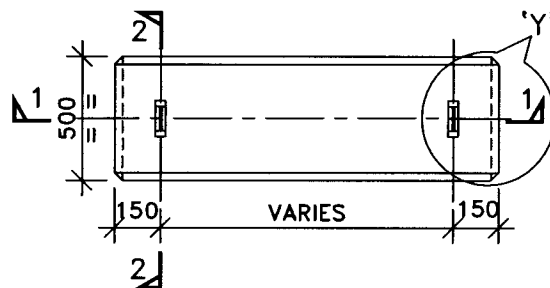
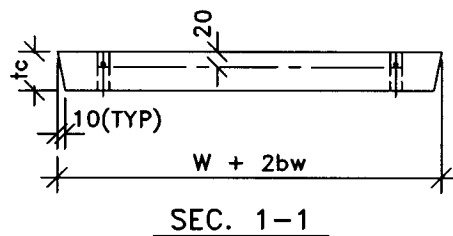
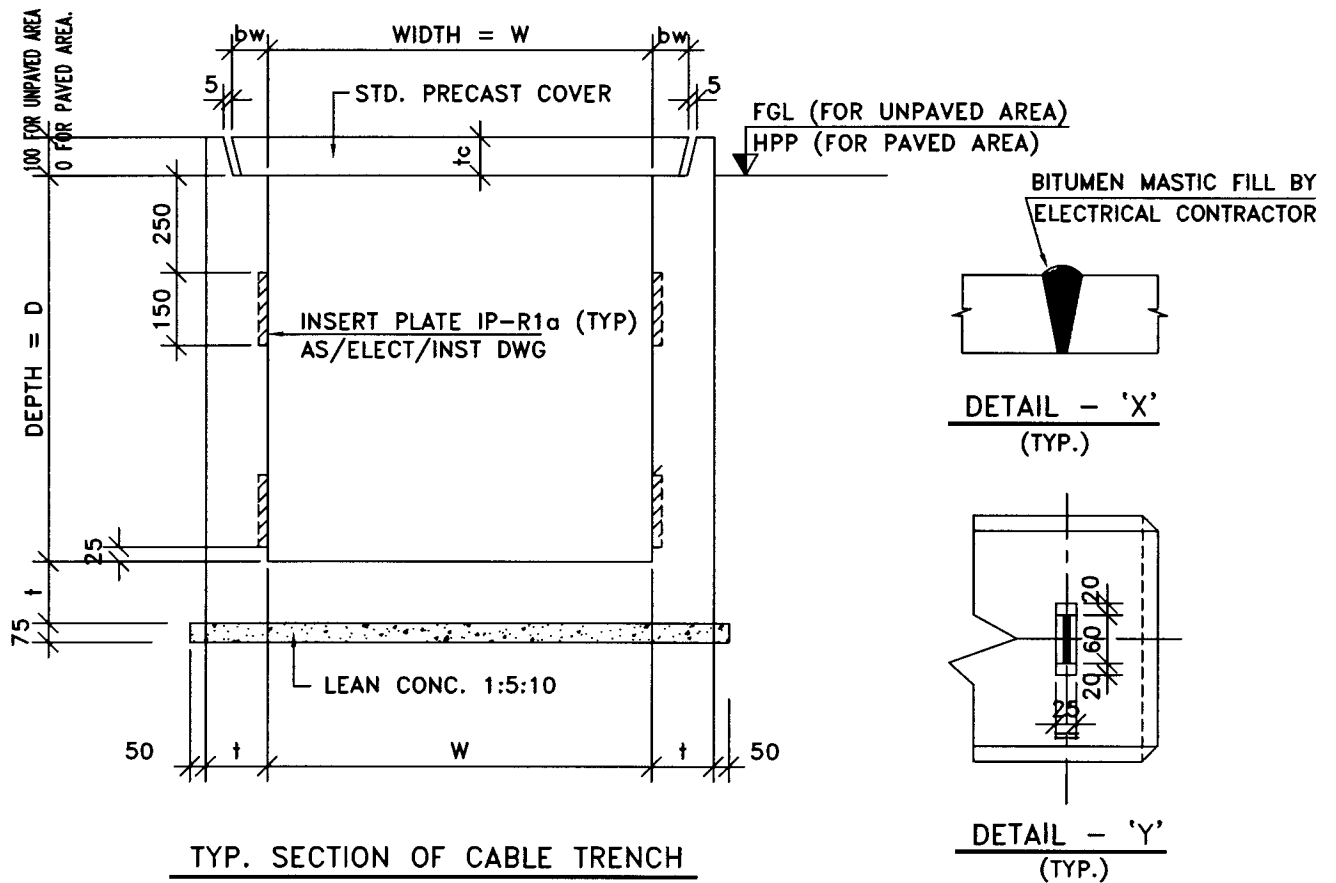
1	13.04.2017	REVISED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R.NANDA
0	21.10.2011	ISSUED AS STANDARD	VPSINGH	PKMITTAL	S CHATURVEDI	D.MALHOTRA
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NOTES :-

1. THIS STANDARD IS BASED ON FOLLOWING PRINCIPLES OF LAYING CABLES IN THE PLANT AREA
 - a) UNIT AREA – CABLES IN RCC TRENCH/BRICK MASONRY TO BE FILLED WITH SAND AND COVERED WITH PRECAST RCC SLABS.
 - b) INSIDE BUILDING – CABLES IN RCC TRENCH TO BE COVERED WITH CHEQUERED PLATE/RCC COVERS.
 - c) OFFSITE AREA – AS PER PROJECT SPECIFIC REQUIREMENT.
2. RELEVANT DRAWINGS WHICH WILL BE ISSUED FOR CONSTRUCTION SHALL BE REFERRED FOR, THE FOLLOWING IN BUILDINGS :
 - a) LAYOUT AND SIZE OF THE CABLE TRENCH BY ELECTRICAL/INSTRUMENTATION DEPTS.
 - b) TYPE OF COVER REQUIRED i.e. PRECAST RCC/CHEQD PLATE ELECTRICAL/INSTRUMENTATION.
 - c) INSERT PLATE REQUIREMENT BY ELECTRICAL/INSTRUMENTATION DEPTS.
 - d) LAYOUT AND SIZE OF OPENING FOR PANELS (SHEET 15 OF 17) AS PER ELECTRICAL EQUIPMENT LAYOUT DRAWING FOR BUILDINGS ONLY.
3. RELEVANT GENERAL CIVIL DRAWINGS SHALL BE REFERRED FOR THE TRENCHES IN UNIT & OFFSITE AREA.
4. CONCRETE FOR PRECAST COVER AND CABLE TRENCH SHALL BE AS PER GRADE OF CONCRETE FOR THE PROJECT BUT NOT LESS THAN M20.
5. THIS STANDARD IS NOT APPLICABLE FOR CABLE TRENCH / COVERS AT ROAD CROSSING.
6. STRUCTURAL STEEL FOR CABLE SUPPORTS INCLUDING INSERT PLATES IS IN SCOPE OF CIVIL CONTRACTOR.
7. ALL OTHER STRUCTURAL STEEL WORKS SHALL BE UNDER THE SCOPE OF ELECTRICAL CONTRACTOR INCLUDING CHEQUERED PLATE.

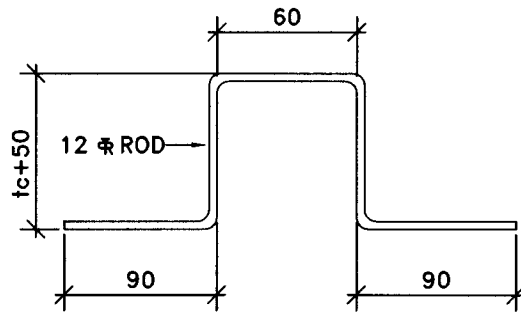
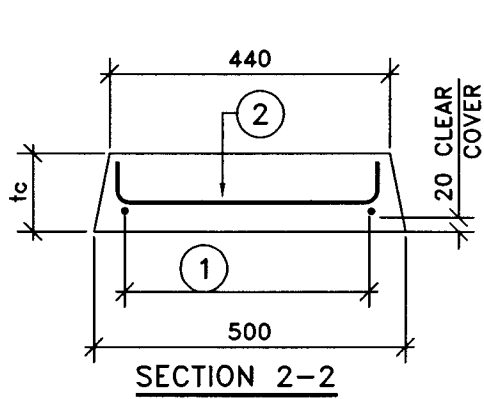
PRECAST COVERS DESIGNED FOR 10 T. HYDRA

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Std. Committee Convenor	Std. Bureau Chairman
					Approved by	



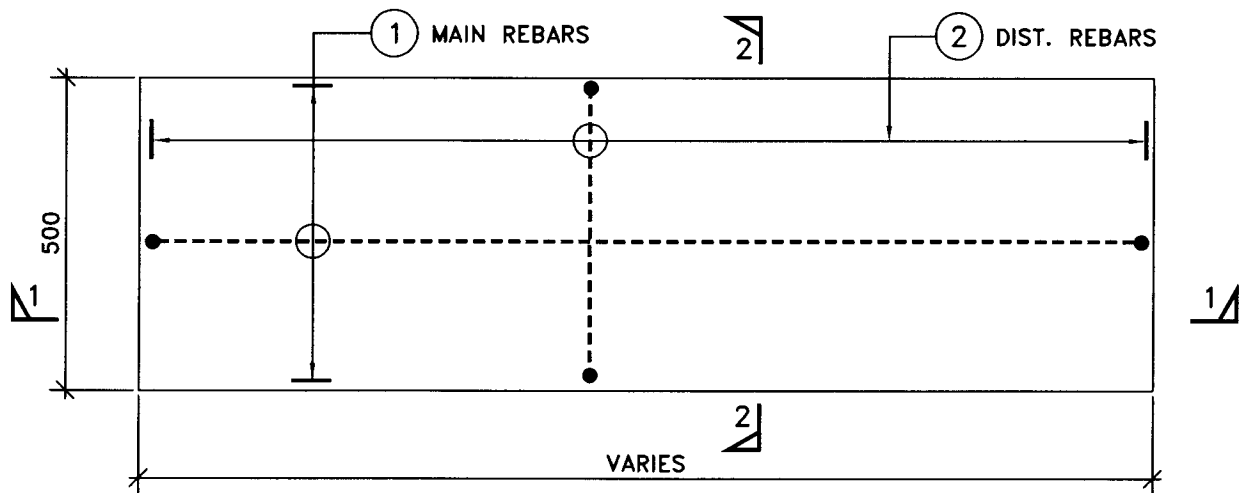
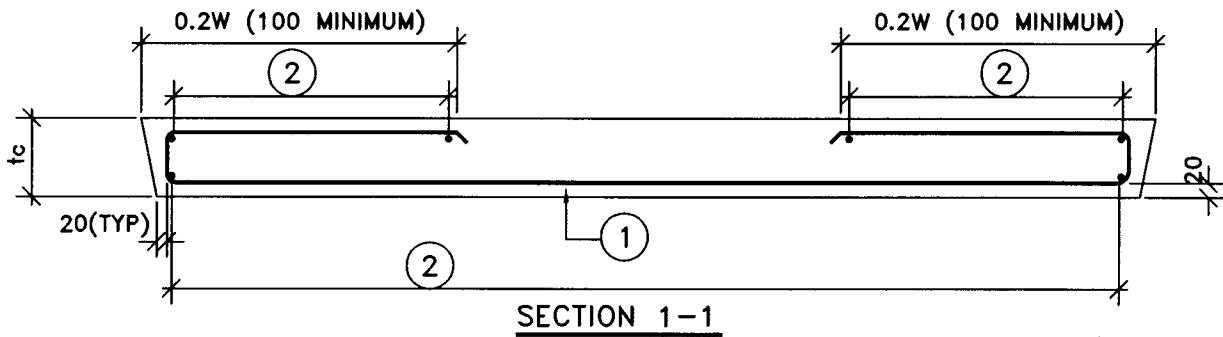
PRECAST R.C.C. COVERS

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V. P. SINGH	P. K. MITTAL	S. CHATURVEDI	N. DUARI
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					Approved by	



(REFER SHT.2 OF 17)

TYP. DETAIL OF HOOK

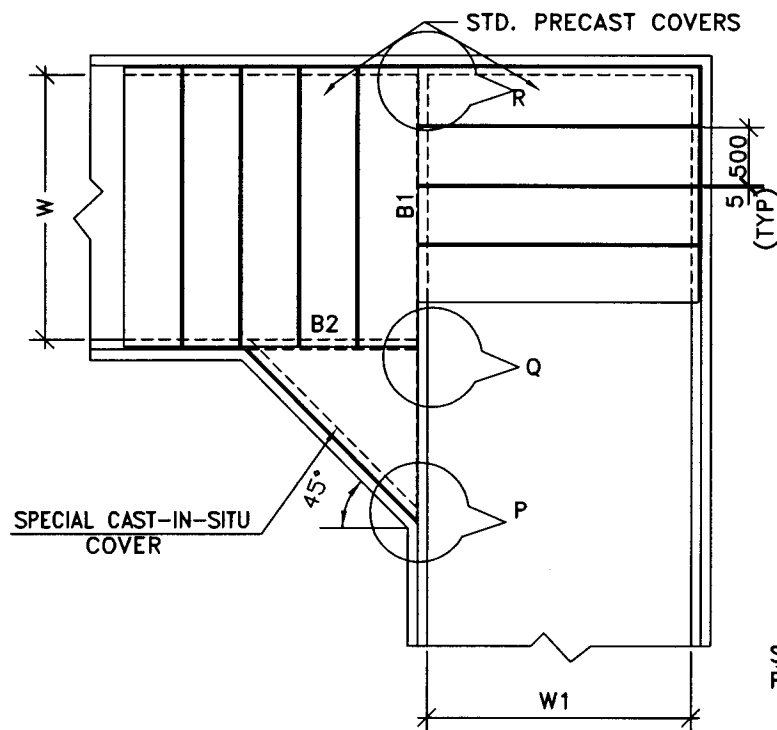


(STANDARD PRECAST COVER)

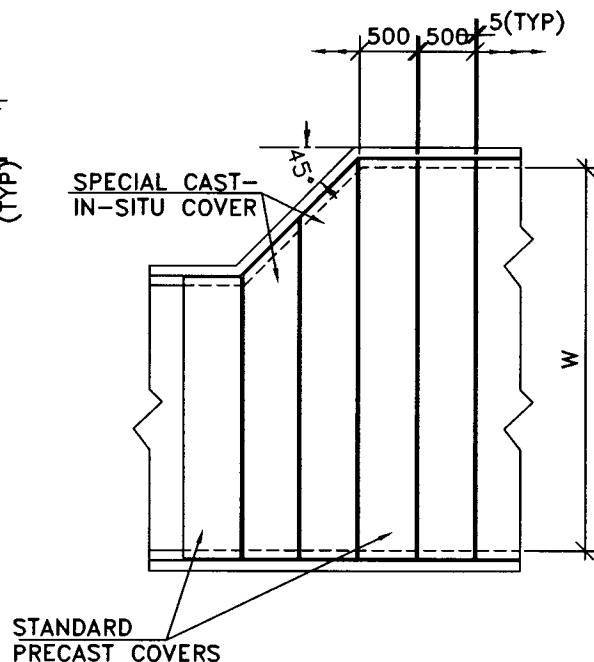
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

1. FOR LOCATION OF BARS MKD. 1 AND 2 REFER SHT. 3 OF 17.
2. ALL PRECAST COVERS SHALL BE MARKED (T) ON THE TOP FOR PROPER PLACEMENT.
3. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.
4. DESIGN IS VALID FOR POINT LOAD AT CENTRE OF SPAN.

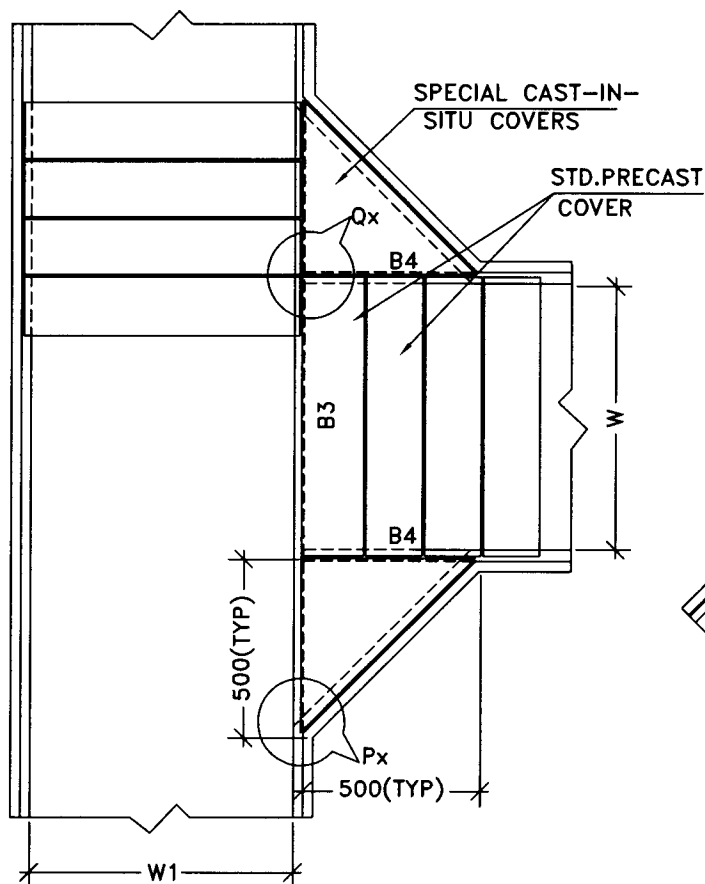
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JUNCTION TYPE - I



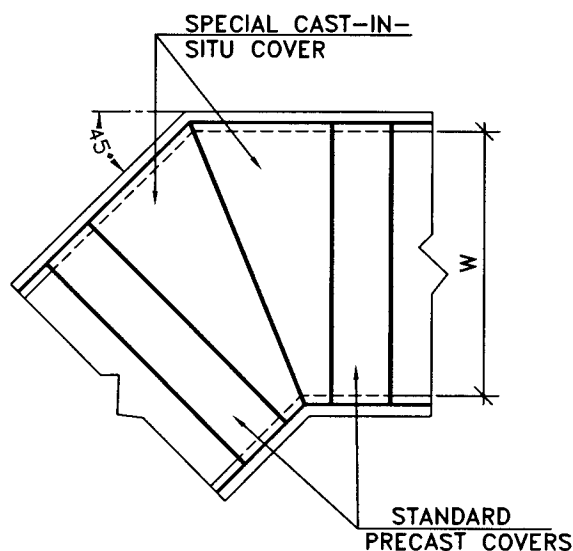
JUNCTION TYPE - III



JUNCTION TYPE - II

NOTES :

1. FOR DETAILS P, Q, Px, Qx & R REFER SHT. 6 OF 17.
2. FOR DETAIL OF BEAMS B1 TO B4 REF. TABLE 2.

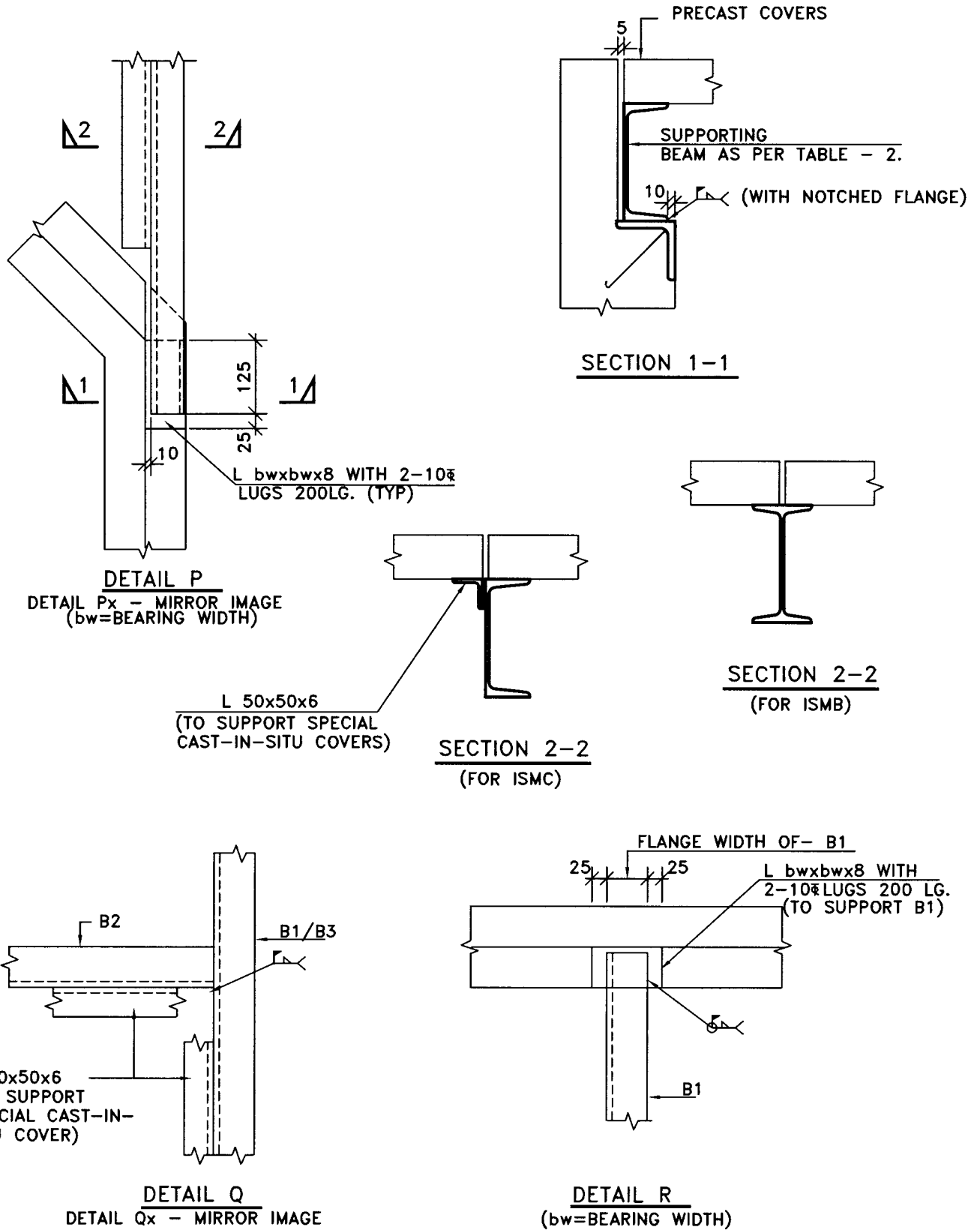


JUNCTION TYPE - IV

SPECIAL CAST-IN-SITU COVERS

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM. PRKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V. P. SINGH	P. K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman

Approved by



SUPPORTING MEMBERS

(FOR LOCATION OF DET. P, Q, Px, Qx & R REF. SHT. 5 OF 17)

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM. PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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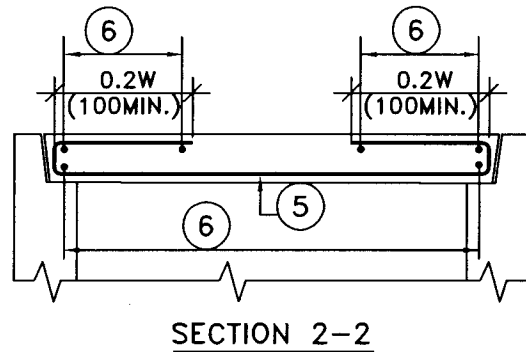
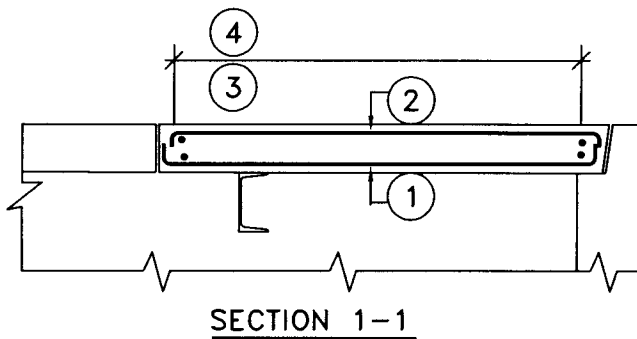
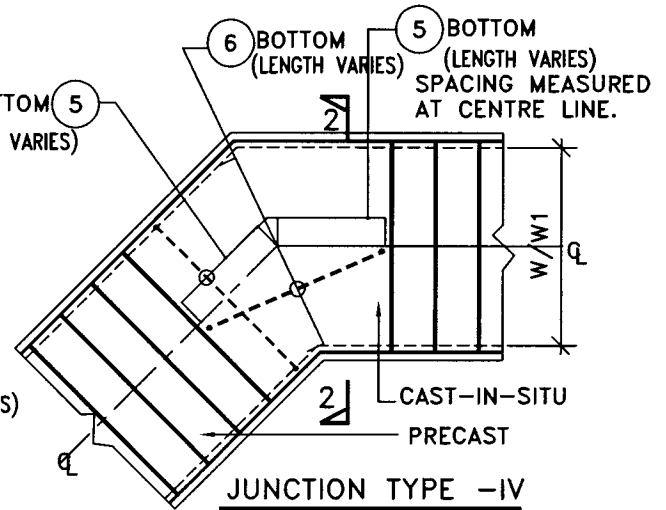
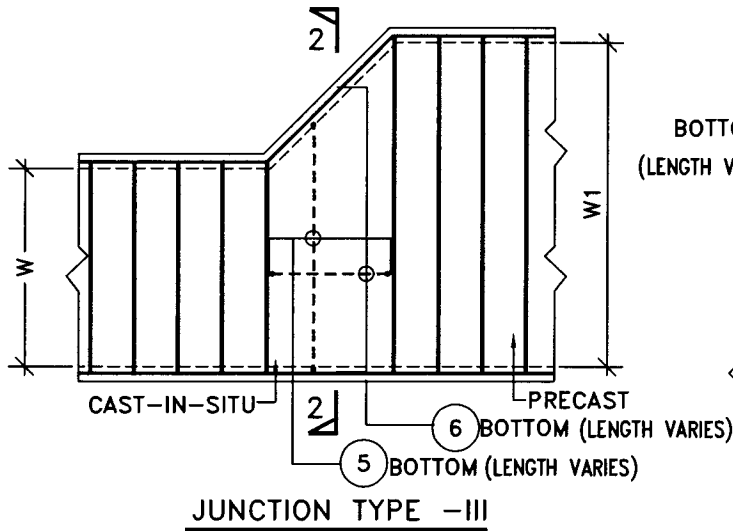
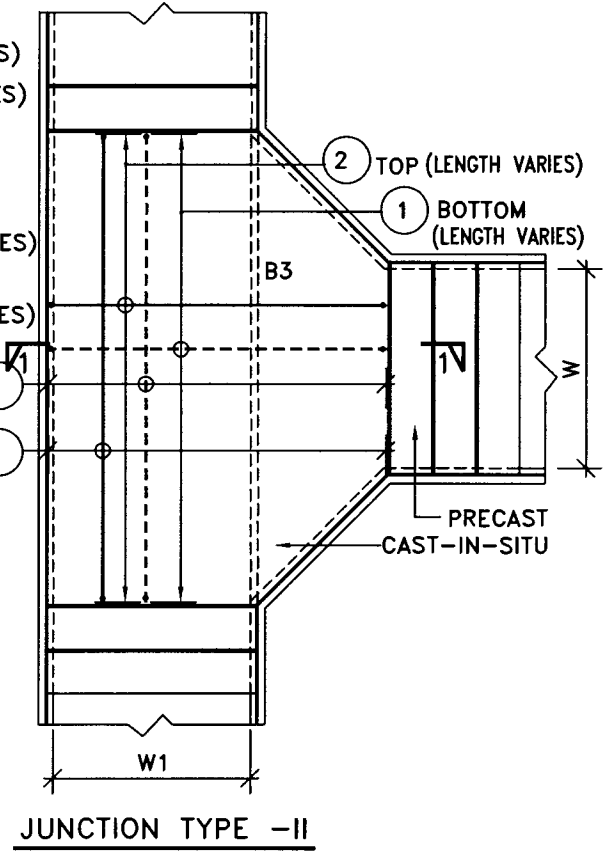
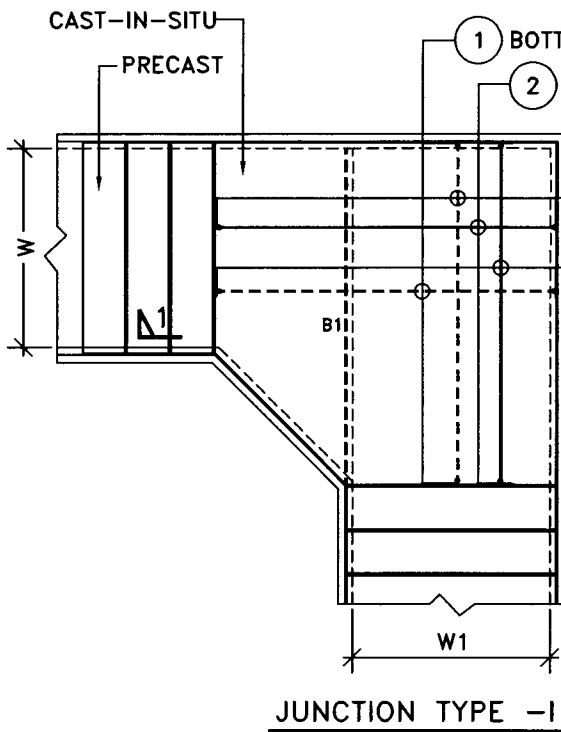
TABLE-2: DETAIL OF SUPPORTING MEMBERS B1, B2, B3 & B4 AT JUNCTIONS

S.NO.	CLEAR WIDTH OF MAIN TRENCH W	JUNCTION TYPE - I				JUNCTION TYPE - II			
		SUPPORTING MEMBER B1		SUPPORTING MEMBER B2		SUPPORTING MEMBER B3		SUPPORTING MEMBER B4	
		SIZE	LENGTH	SIZE	LENGTH	SIZE	LENGTH	SIZE	LENGTH
1.	300	MC 150	1020	MC 125	625	MC 200	1650	MC 125	625
2.	500	MC 150	1220	MC 125	625	MC 200	1850	MC 125	625
3.	750	MC 200	1470	MC 125	625	MC 250	2100	MC 125	625
4.	1000	MC 200	1720	MC 125	625	MC 250	2350	MC 125	625
5.	1250	MC 250	1970	MC 125	625	MC 300	2600	MC 125	625
6.	1500	MC 250	2270	MC 125	625	MC 300	2900	MC 125	625
7.	2000	MB 250	2770	MC 125	625	MC 300	3400	MC 125	625

NOTE

THE SUPPORTING MEMBERS ARE DESIGNED FOR COVER WT. PLUS A POINT LOAD OF 5000 kg. AT MID SPAN.

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R.MAHANTA	RAJANJI SRIVASTAVA	S.CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P.SINGH	P.K.MITTAL	S.CHATURVEDI	N DUARI
Rev. No.	Date	Purpose	Prepared by	Std. Committee Convenor	Std. Bureau Chairman	Approved by



DETAIL OF CAST-IN-SITU COVERS

(FOR DETS OF R/F BARS ① TO ⑥ REFER TABLE-3 SHT 9 OF 17)

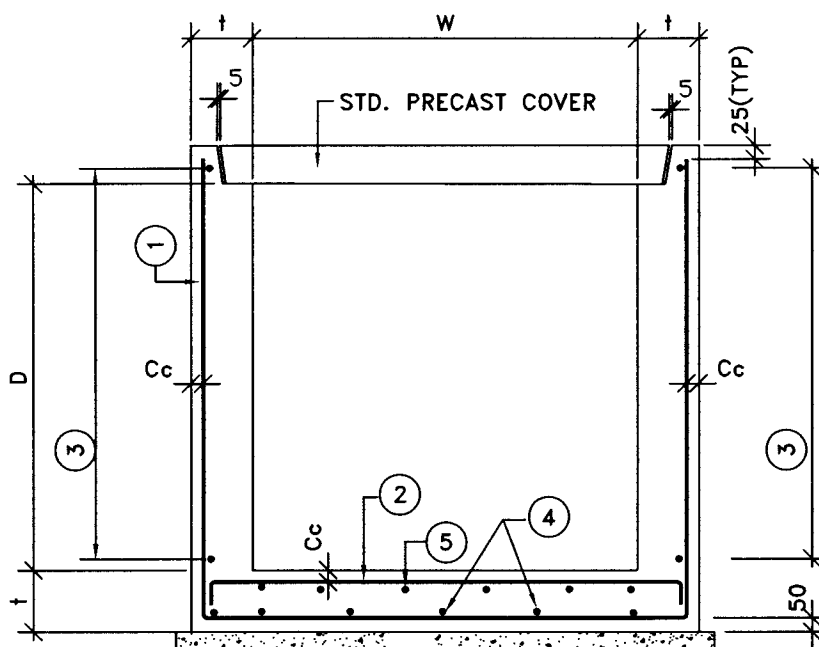
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R.MAHANTA	RAJANJJI SRIVASTAVA	S.CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P.SINGH	P.K.MITTAL	S.CHATURVEDI	N DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

TABLE-3:

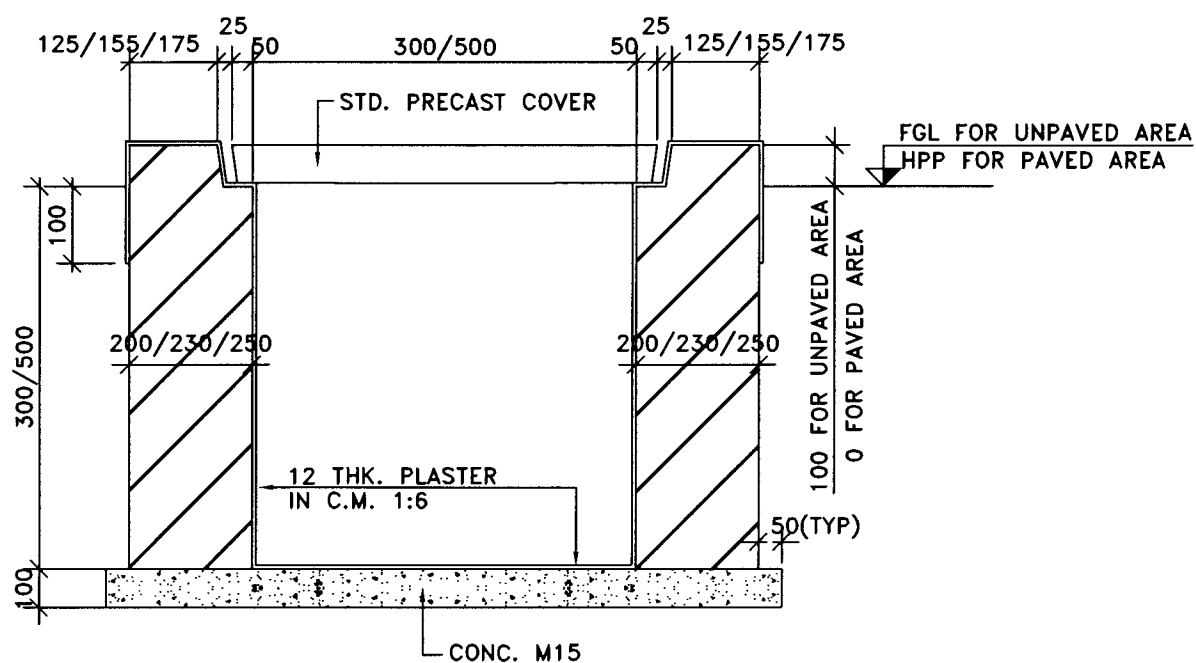
S.NO.	CLEAR WIDTH OF TRENCH W1 (mm)	t _c (mm)	REINFORCEMENT DETAIL FOR CAST-IN-SITU COVERS					
			JUNCTION TYPE I & II				JUNCTION TYPE III & IV	
			BAR MARK ①	BAR MARK ②	BAR MARK ③	BAR MARK ④	BAR MARK ⑤	BAR MARK ⑥
1.	300	150	8 Φ 120c/c	—	8 Φ 150c/c	—	8 Φ 120c/c	8 Φ 150c/c
2.	500	150	8 Φ 100c/c	—	8 Φ 150c/c	—	8 Φ 120c/c	8 Φ 150c/c
3.	750	200	10 Φ 150c/c	8 Φ 150c/c	8 Φ 150c/c	8 Φ 150c/c	10 Φ 200c/c	8 Φ 150c/c
4.	1000	200	12 Φ 120c/c	8 Φ 150c/c	8 Φ 200c/c	8 Φ 200c/c	10 Φ 200c/c	8 Φ 200c/c
5.	1250	250	12 Φ 150c/c	8 Φ 150c/c	8 Φ 200c/c	8 Φ 200c/c	12 Φ 200c/c	8 Φ 200c/c
6.	1500	250	12 Φ 200c/c	8 Φ 150c/c	8 Φ 200c/c	8 Φ 200c/c	12 Φ 200c/c	8 Φ 200c/c
7.	2000	250	16 Φ 200c/c	8 Φ 150c/c	8 Φ 200c/c	8 Φ 200c/c	12 Φ 150c/c	8 Φ 200c/c

- NOTES :-**
1. THE CAST-IN-SITU COVERS ARE DESIGNED FOR POINT LOAD OF 5000 kg ACTING AT MID SPAN.
 2. FOR CONNECTION DETAIL AND SIZES OF B1 & B3 REFER SHT. 6 OF 17 AND 7 OF 17.
 3. REINFORCEMENT BARS SHALL CONFORM TO IS: 1786 OF GRADE Fe-500 TMT.
 4. GRADE OF CONC. SHALL BE MINIMUM M20 OR AS PER GENERAL NOTES OF THE PROJECT.
 5. FOR LOCATION OF BAR MARKS ① TO ⑥ REFER SHT. 8 OF 17.

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.1D	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
Approved by						

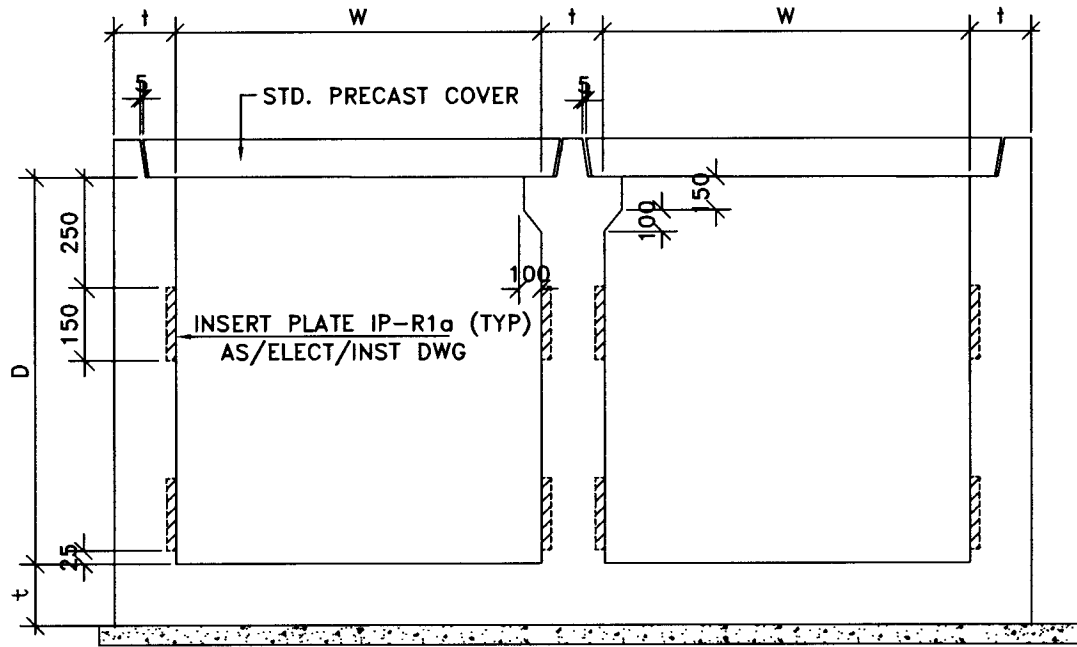


CABLE TRENCH SECTION WITH R.C.C.
(FOR DETS OF R/F BARS ① TO ⑥ REFER TABLE-4 SHT 12 OF 17)

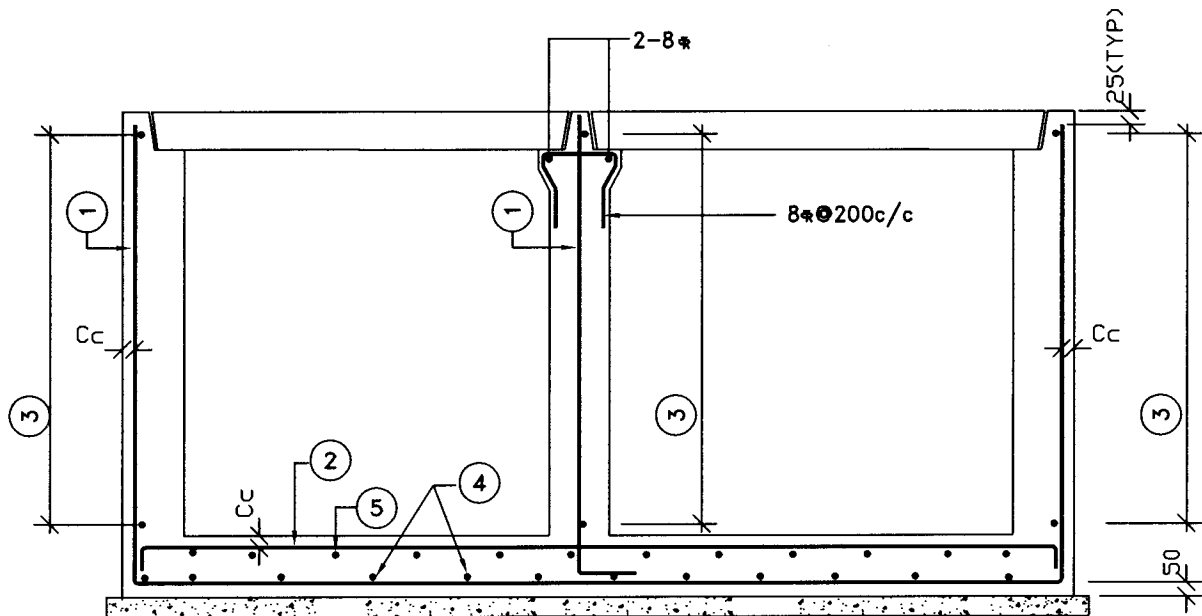


CABLE TRENCH SECTION WITH BRICK MASONRY
(IN C.M. 1:6)

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R.MAHANTA	RAJANJI SRIVASTAVA	S.CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P.SINGH	P.K.MITTAL	S.CHATURVEDI	N DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman



CABLE TRENCH SECTION WITH PARTITION



CABLE TRENCH SECTION WITH PARTITION

(FOR DETS OF R/F BARS ① TO ⑤ REFER TABLE-4 SHT 12 OF 17)

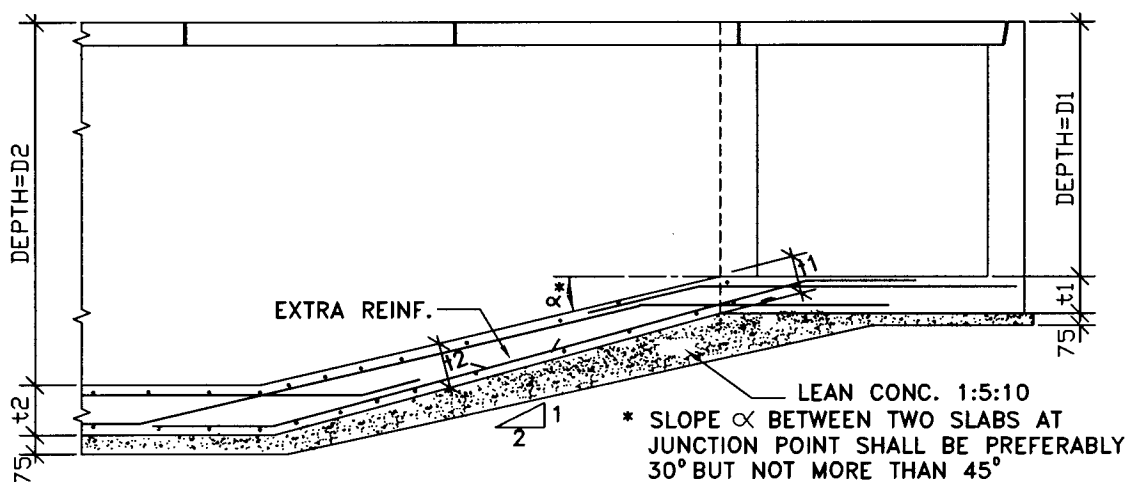
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJEE SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Std. Committee Convenor	Std. Bureau Chairman
Approved by						

TABLE- 4: DETAIL OF CABLE TRENCH REINFORCEMENT

WORKING DIMENSIONS					R/F CONFORMING TO IS: 1786 GRADE Fe-500(TMT).					APPROX. QUANTITIES PER METRE LENGTH.			
S.NO.	DEPTH D (mm)	WIDTH W (mm)	THICK- NESS t (mm)	CLEAR COVER Cc (mm)	BAR MARK (REF. SHT. 10 OF 17)					LEAN CONC. 1:5:10 (m ³)	CONC. (m ³)	REBAR'S (kg)	SHUTTERING (m ²)
					①	②	③	④	⑤				
1.	1500	2000	200	40	12#-200C/C.	12#-175C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.180	1.08	56.0	6.3
2.		1500	200	40	12#-200C/C.	10#-175C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.143	0.98	44.0	6.3
3.		1250	200	40	12#-200C/C.	8#-175C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.124	0.93	40.0	6.3
4.		1000	200	40	12#-200C/C.	8#-250C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.105	0.88	36.0	6.3
5.	1250	2000	150	40	10#-150C/C.	12#-150C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.180	0.72	49.0	5.3
6.		1500	150	40	10#-150C/C.	12#-150C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.139	0.65	43.0	5.25
7.		1250	150	40	10#-150C/C.	10#-150C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.120	0.61	37.0	5.25
8.		1000	150	40	10#-150C/C.	10#-200C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.101	0.57	32.0	5.25
9.	1000	2000	150	40	10#-150C/C.	12#-150C/C.	8#-250C/C.	8#-300C/C.	8#-300C/C.	0.180	0.65	49.0	4.3
10.		1500	125	40	10#-150C/C.	12#-150C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.139	0.47	36.0	4.25
11.		1250	125	40	10#-150C/C.	8#-150C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.116	0.44	29.0	4.2
12.		1000	125	40	10#-150C/C.	8#-200C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.098	0.41	26.0	4.2
13.	750	750	100	40	8#-200C/C.	8#-150C/C.	8#-300C/C.	8#-300C/C.	8#-300C/C.	0.079	0.25	19.0	3.2
14.	500	500	100	40	8#-200C/C.		8#-300C/C.	8#-300C/C.		0.060	0.15	5.60	2.2
15.	300	500	100	40	8#-200C/C.		8#-300C/C.	8#-300C/C.		0.048	0.11	4.70	1.4
16.	300	300	100	40	8#-200C/C.		8#-300C/C.	8#-300C/C.		0.045	0.09	3.80	1.4

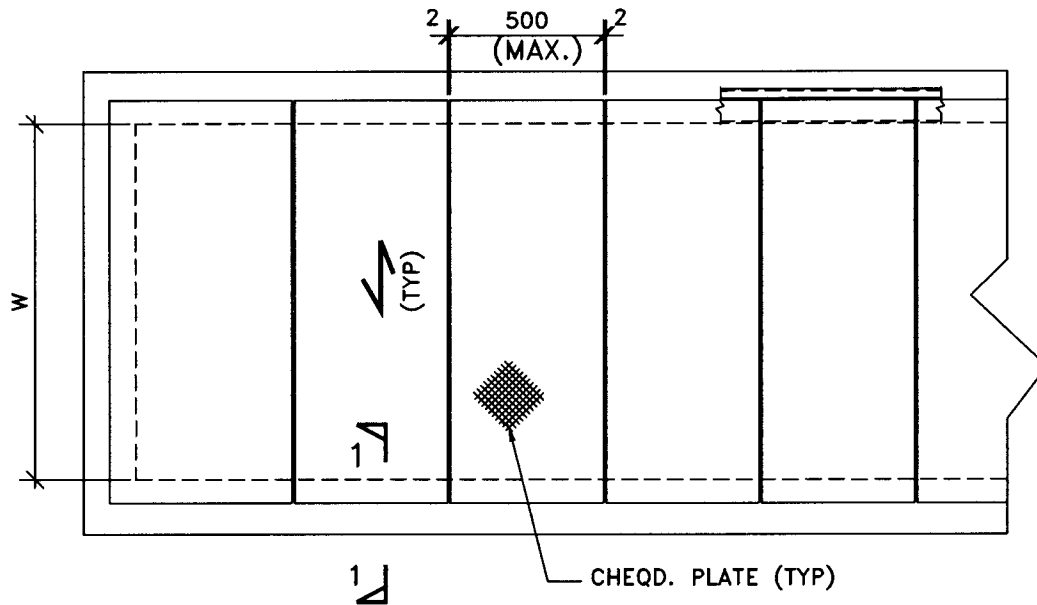
- NOTES- 1. R.C.C. CABLE TRENCHES ARE DESIGNED FOR A SURCHARGE LOAD OF 10.0 T HYDRA.
2. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.
3. PREFERABLY THE DEPTH OF CABLE TRENCH SHALL NOT BE MORE THAN THE WIDTH.
4. TRENCH OF DEPTH 300 & 500MM IN BRICK MASONRY WHEREVER SPECIFIED

4	D3.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R.MAHANTA	RAJANJJI SRIVASTAVA	S.CHANDA
3	16.D4.1D	REVISED AND ISSUED AS STANDARD	V.P.SINGH	P.K.MITTAL	S.CHATURVEDI	N DUARI
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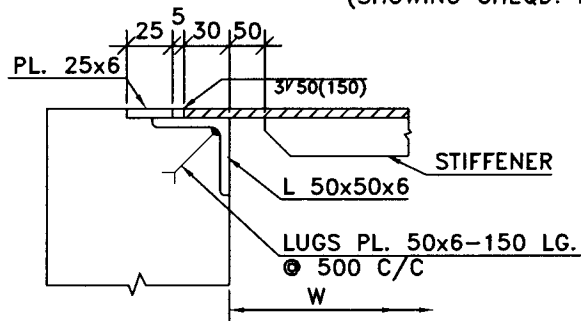


**TYPICAL DETAIL AT JUNCTION FOR
DIFFERENT DEPTHS OF TRENCH.**
(R/F DETAIL OF TRENCH IN SLOPE SHALL BE BASED ON DEPTH D2).

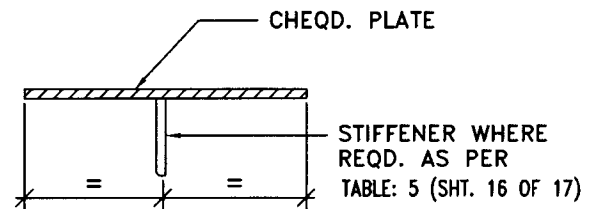
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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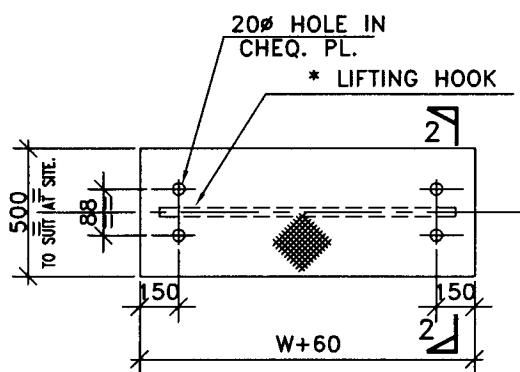
TYPICAL TRENCH PLAN
(SHOWING CHEQD. PLATE)



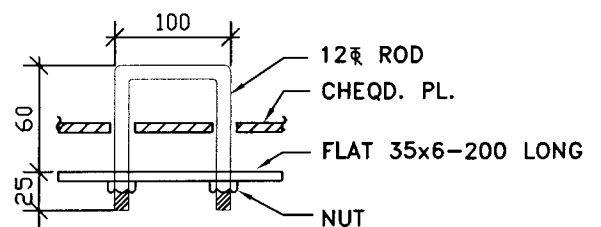
SECTION 1-1



SECTION 2-2



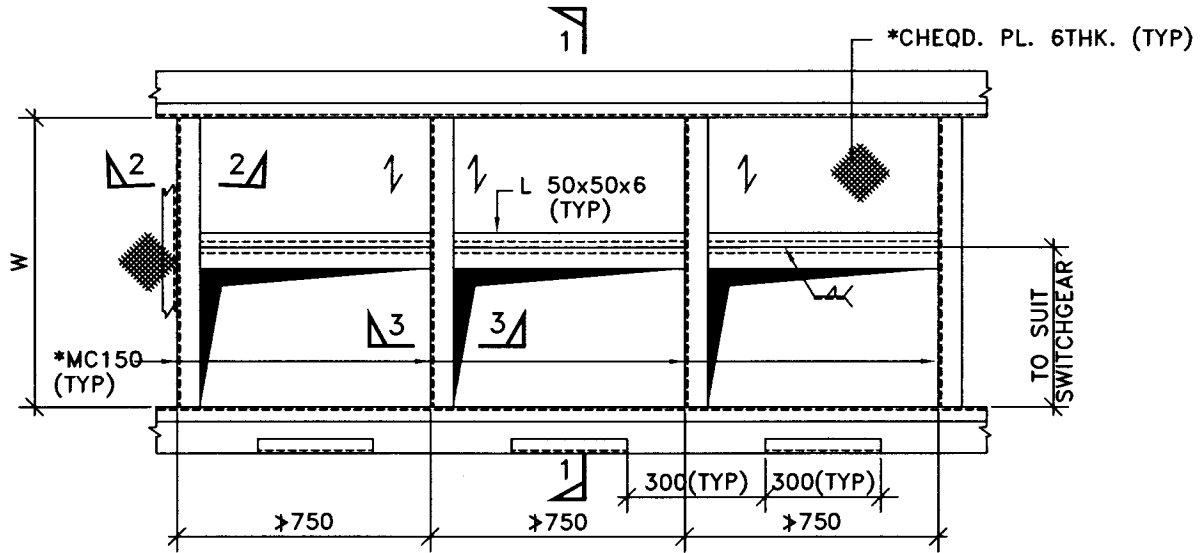
TYP. CHEQD. PLATE DETAIL
(SHOWING CHEQD. PLATE)



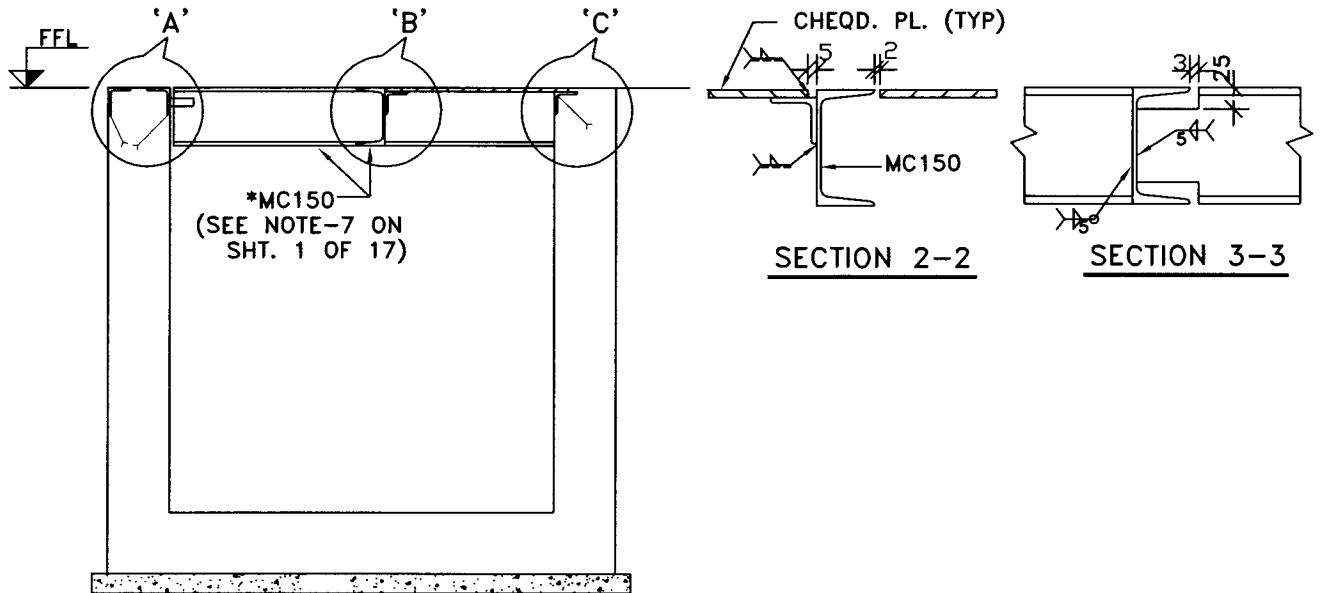
TYP. LIFTING HOOK DETAIL

* ONE HOOK FOR SPAN UP TO 500
TWO HOOKS FOR SPAN ABOVE 500.

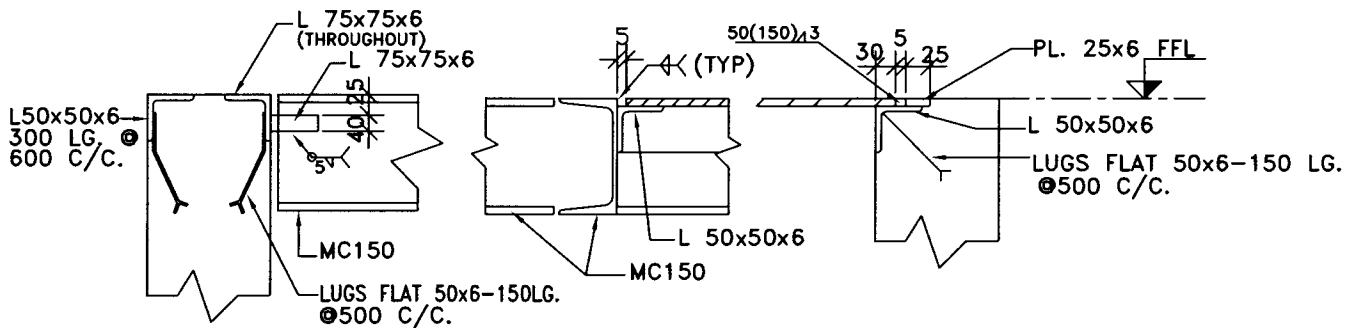
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
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TYPICAL TRENCH PLAN
(AT SWITCH GEARS)



SECTION 1-1



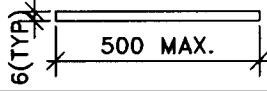
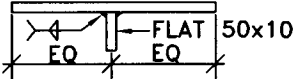
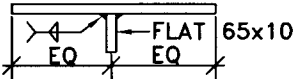
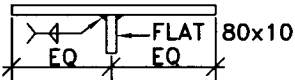
DETAIL A

DETAIL B

DETAIL C





4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
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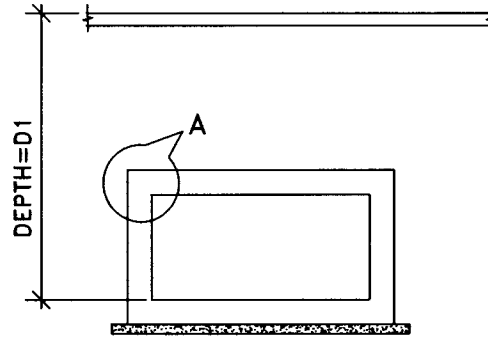
TABLE- 5: DETAIL OF CHEQUERED PLATE COVER

S.NO.	TYPE	SECTION	SECTION PROPERTIES FOR 500mm WIDE PLATE			RECOMMENDED SPAN (W) mm
			WT. kg/m	$I = \text{cm}^4$	$Z_{\text{min}} = \text{cm}^3$	
1.	I		23.55	0.90	3.00	$W < 500$
2.	II		27.45	44.90	9.16	$500 < W \leq 1250$
3.	III		28.62	91.00	14.76	$1250 < W \leq 1500$
4.	IV		29.79	160.30	21.66	$1500 < W \leq 2000$

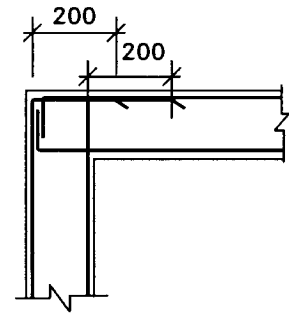
NOTE-

THE DESIGN IS BASED ON A LIVE LOAD OF 500 Kg/m² AND
 MAXIMUM ALLOWABLE DEFLECTION = $W/200$ (W = SPAN)

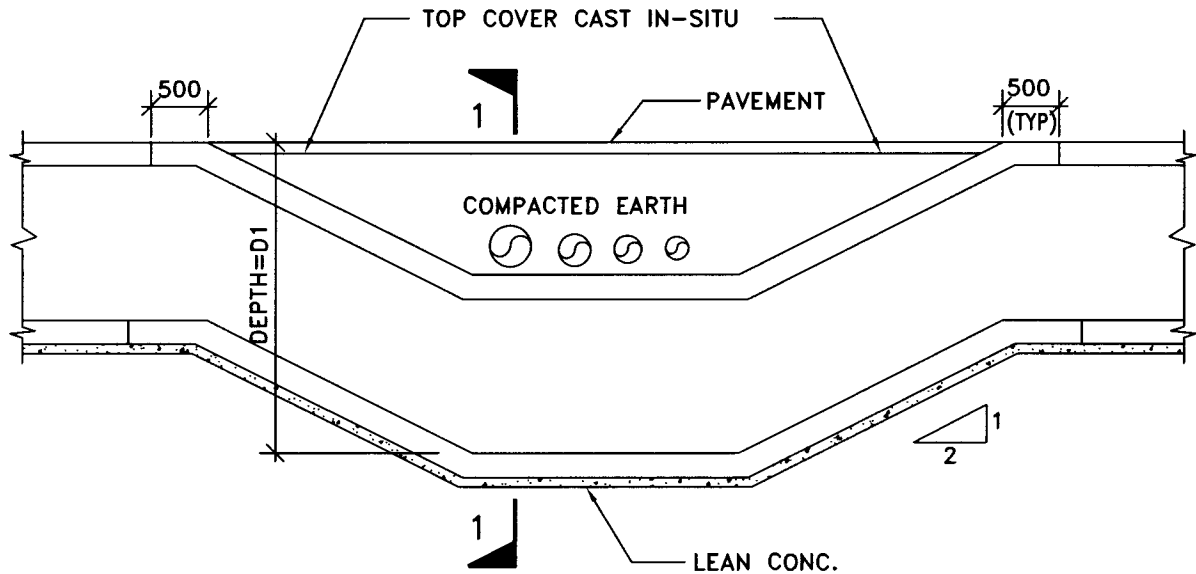
4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	 OM PRAKASH	 R. MAHANTA	 RAJANJI SRIVASTAVA	 S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
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SECTION 1-1



DET. A



TYPICAL DETAIL AT JUNCTION FOR
DIFFERENT DEPTHS OF TRENCH.

NOTES : -

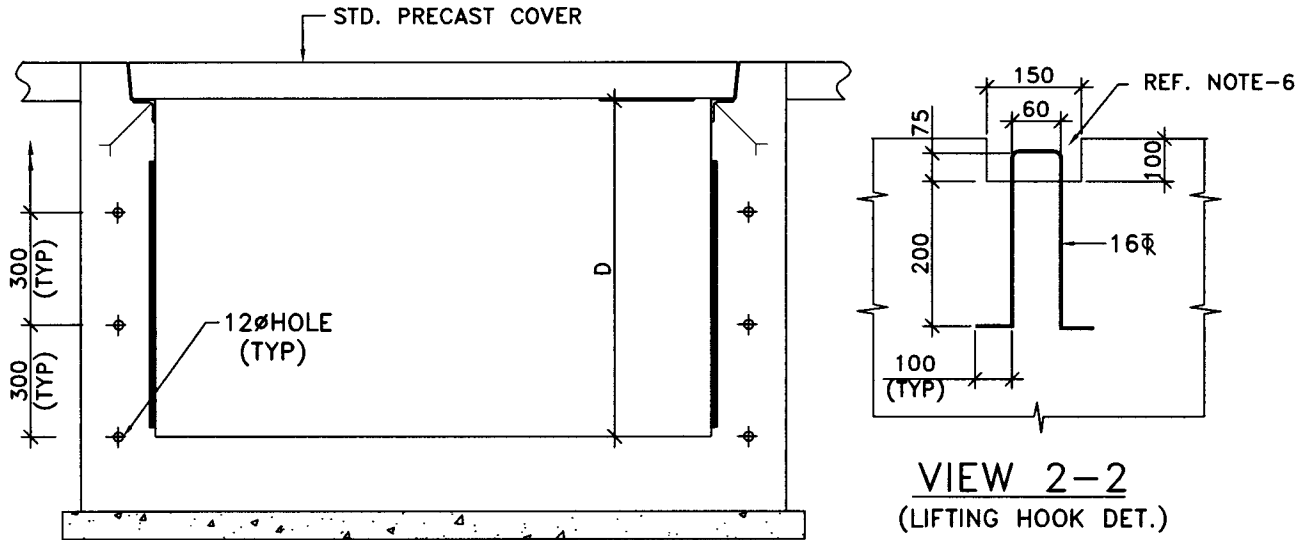
- (1) TOP COVER FOR THE INDICATED PORTION SHALL BE CAST IN SITU. RC DET'S FOR THE COVER SLAB SHALL BE SAME AS THE PRECAST COVERS OF SAME SPAN. EXCEPT THE CORNER DETAIL WHICH IS SHOWN HERE.
- (2) RC DETAILS FOR THE TRENCH WALL / BASE SHALL BE BASED ON DEPTH "D1".

4	03.12.15	REAFFIRMED AND ISSUED AS STANDARD	OM PRAKASH	R. MAHANTA	RAJANJI SRIVASTAVA	S. CHANDA
3	16.04.10	REVISED AND ISSUED AS STANDARD	V.P. SINGH	P.K. MITTAL	S. CHATURVEDI	N. DUARI
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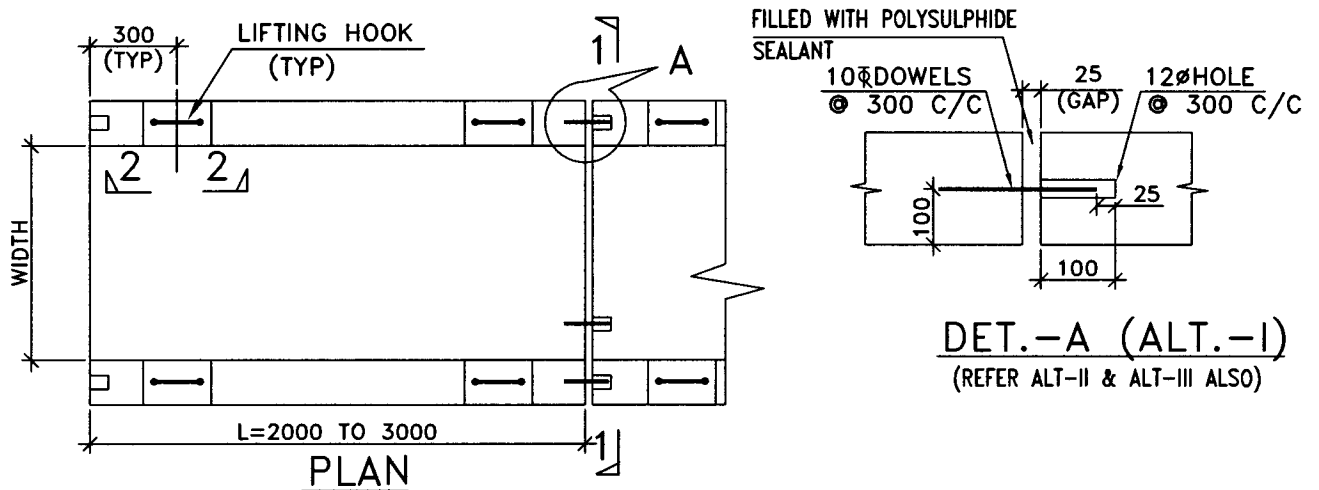
NOTES :

1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRES.
2. MAX. WEIGHT OF EACH PRECAST TRENCH IS 5T.
3. THIS STANDARD IS SHOWING JOINT DETAILS AND LIFTING LUG OF PRECAST ELEMENTS ONLY.
4. FOR THICKNESS, R/F DETAILS OF WALL AND PRECAST COVER REFER STD.NO. 7-68-0625, 7-68-0626 & 7-68-0655.
5. LEAN CONCRETE TO BE SUITABLY ALIGNED/LEVEL TO ENSURE MATCHING OF WALL WITH FGL/HPP.
6. LIFTING POCKET SHALL BE FILLED WITH CONCRETE AFTER ERECTION/ALIGNMENT.

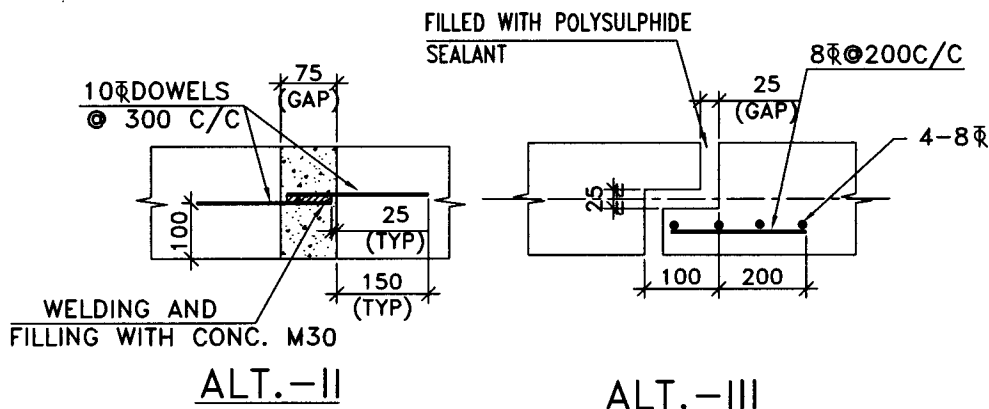
1	29-09-2016	REAFFIRMED AND ISSUED AS STANDARD	Jitender	Alpana	Rajanji srivastava	R.Nanda
0	02-11-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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SECTION 1-1



DET.-A (ALT.-I)
(REFER ALT.-II & ALT.-III ALSO)



ALT.-II

ALT.-III

1	29-09-2016	REAFFIRMED AND ISSUED AS STANDARD	Jitender	Alpana	Rajanji srivastava	R.Nanda
0	02-11-2011	ISSUED AS STANDARD	VP Singh	PK Mittal	S Chaturvedi	D.Malhotra
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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1.0 SCOPE

- 1.1 THIS STANDARD DEFINES THE TYPES AND DETAILS OF JOINTS REQUIRED TO BE PROVIDED IN REINFORCED CEMENT CONCRETE LIQUID RETAINING STRUCTURES. THIS STANDARD DOES NOT COVER THE REQUIREMENT OF PROTECTIVE LINING FOR CONCRETE IN CASE OF STORAGE OF LIQUIDS HARMFUL TO CONCRETE.
- 1.2 THIS STANDARD IS BASED ON IS:3370 (PART-I)-CODE OF PRACTICE FOR CONCRETE STRUCTURES FOR THE STORAGE OF LIQUIDS. FOR FURTHER DETAILS REFERENCE MAY BE MADE TO THE SAME.
- 1.3 THIS STANDARD SHALL BE READ IN CONJUNCTION WITH SPECIFICATION NO.6-68-0005.

2.0 TYPES OF JOINTS

- 2.1 CONSTRUCTION JOINT : A CONSTRUCTION JOINT IS A JOINT IN THE CONCRETE INTRODUCED FOR CONVENIENCE IN CONSTRUCTION AT WHICH SPECIAL MEASURES ARE TAKEN TO ACHIEVE SUBSEQUENT CONTINUITY WITHOUT PROVISION FOR FURTHER RELATIVE MOVEMENT.
- 2.2 MOVEMENT JOINT : A MOVEMENT JOINT IS A SPECIALLY FORMED JOINT INTENDED TO ACCOMMODATE RELATIVE MOVEMENT BETWEEN ADJOINING PARTS OF A STRUCTURE WITH SPECIAL PROVISION BEING MADE FOR MAINTAINING THE WATER TIGHTNESS OF THE JOINT BY USING JOINTING MATERIAL. MOVEMENT JOINTS ARE OF THE FOLLOWING TYPES:-
- (a) CONTRACTION JOINT : THIS IS A MOVEMENT JOINT WHICH HAS A DELIBERATE DISCONTINUITY BUT NO INITIAL GAP BETWEEN THE CONCRETE ON EITHER SIDE OF THE JOINT. THIS JOINT IS INTENDED TO ACCOMMODATE CONTRACTION OF THE CONCRETE. THERE ARE TWO TYPES OF CONTRACTION JOINTS.
- (i) PARTIAL CONTRACTION JOINT:
IN THIS JOINT, ONLY THE CONCRETE IS INTERRUPTED WHILE THE REINFORCEMENT IS CONTINUED THROUGH THE JOINT.
- (ii) COMPLETE CONTRACTION JOINT:
IN THIS JOINT BOTH THE CONCRETE AND REINFORCEMENT ARE INTERRUPTED.
- (b) EXPANSION JOINT : THIS IS A MOVEMENT JOINT WHICH HAS COMPLETE DISCONTINUITY IN BOTH REINFORCEMENT AND CONCRETE WITH AN INITIAL GAP AND IS INTENDED TO ACCOMMODATE EITHER EXPANSION OR CONTRACTION OF THE STRUCTURE.

3.0 JOINTING MATERIALS

JOINTING MATERIALS ARE CLASSIFIED AS FOLLOWS:-

- (a) JOINT FILLERS
- (b) WATER BARS / STOPS
- (c) JOINT SEALING COMPOUNDS (INCLUDING PRIMERS WHEREVER REQUIRED)
- 3.1 JOINT FILLERS : JOINT FILLERS ARE COMPRESSIBLE SHEET OR STRIP MATERIALS FIXED TO THE FACE OF THE FIRST PLACED CONCRETE AND AGAINST WHICH THE SECOND PLACED CONCRETE IS CAST. JOINT FILLERS, MAY THEMSELVES FUNCTION AS WATER-TIGHT EXPANSION JOINTS. THESE MAY BE USED AS SUPPORT FOR AN EFFECTIVE JOINT SEALING COMPOUND IN FLOOR AND ROOF JOINTS. BUT THEY CAN ONLY BE RELIED UPON AS SPACERS TO PROVIDE THE GAP IN AN EXPANSION JOINT, THE GAP BEING BRIDGED BY A WATER BAR.

6	24-09-20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
5	24-09-14	REVISED AND ISSUED AS STANDARD	AKS	AJS	P.K.MITTAL	S.CHANDA
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3.2 WATER BARS / STOPS

- 3.2.1 WATER BARS ARE GENERALLY PRE-FORMED STRIPS RESISTANT TO HYDROSTATIC HEAD MADE OF DURABLE IMPERMEABLE PVC MATERIAL CONFORMING TO BS-2571 WHICH ARE WHOLLY OR PARTIALLY EMBEDDED IN THE CONCRETE DURING CONSTRUCTION SO AS TO SPAN ACROSS THE JOINT AND PROVIDE A PERMANENT WATER TIGHT SEAL DURING THE WHOLE RANGE OF JOINT MOVEMENT. FOR TEMPERATURE HIGHER THAN 70°C, SPECIAL HEAT RESISTANT WATER BAR SHALL BE USED.
- 3.2.2 THE CONTINUITY OF THE WATER BAR SYSTEM ACROSS ALL INTERSECTIONS PARTICULARLY BETWEEN FLOOR AND WALL SYSTEM IS ACHIEVED BY USING PREFABRICATED SPECIAL JUNCTION PIECES.
- 3.2.3 THE FIELD SPLICING OF PVC WATER BAR IS DONE BY USING HEAT FUSED BUTT JOINTS AS PER MANUFACTURER'S SPECIFICATIONS.
- 3.2.4 CENTRALLY PLACED WATER BAR SHALL BE RIBBED/PLANE TYPE WITH CENTRAL BULB AT THE CENTRE AND EXTERNALLY PLACED WATER BARS SHALL BE KICKER TYPE WITH CENTRAL BULB TO WITHSTAND THE HYDROSTATIC HEAD. THE WIDTH OF WATER BARS SHALL BE 150mm FOR CONCRETE MEMBER UPTO 300mm THICK AND 230mm FOR CONCRETE MEMBER MORE THAN 300mm THICK. THE THICKNESS OF PVC WATER BARS SHALL BE MINIMUM 5mm.
- 3.2.5 IN ORDER TO PREVENT THE EDGES OF THE WATER BAR MOVING DURING CONCRETING IN WALL JOINTS, THE WINGS OR END BULBS SHALL HAVE MOULDED PVS ROPES OR 3mm DIA. HOLES ON EITHER SIDE AT 500mm FOR TYING TO ADJACENT REINFORCEMENT. PUNCHING OF WINGS OF PVC WATER BARS FOR TYING PURPOSE SHALL NOT BE ALLOWED.
- 3.3 JOINT SEALING COMPOUNDS:
- 3.3.1 JOINT SEALING COMPOUND ARE IMPERMEABLE DUCTILE MATERIAL WHICH ARE REQUIRED TO PROVIDE A WATER TIGHT SEAL BY ADHESION TO THE CONCRETE THROUGHOUT THE RANGE OF JOINT MOVEMENT.
- 3.3.2 MATERIAL TO BE USED FOR THIS PURPOSE SHALL BE TWO COMPONENT LIQUID POLYSULPHIDE RUBBER BASED SEALANT CONFORMING TO BS : 4254. THESE ARE APPLIED IN A CHASE FORMED IN THE SURFACE OF THE CONCRETE ALONG THE LINE OF THE JOINT AS PER MANUFACTURER'S INSTRUCTIONS.

4.0 SPACING OF JOINTS

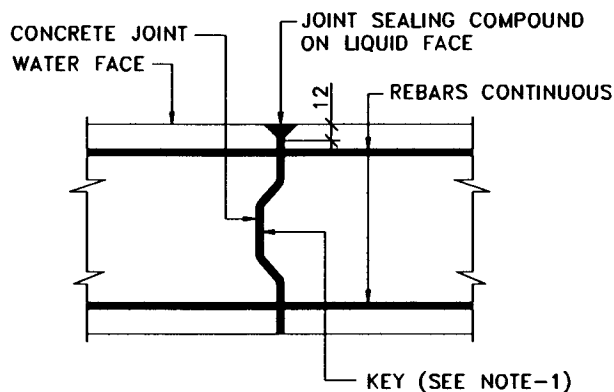
4.1 CONSTRUCTION JOINTS

- 4.1.1 CONSTRUCTION JOINTS ARE NOT INTENDED TO ACCOMMODATE MOVEMENT ACROSS THE JOINT BUT DUE TO THE DISCONTINUITY OF THE CONCRETE SOME SLIGHT SHRINKAGE MAY OCCUR.
- 4.1.2 THE DESIGNER SHALL SPECIFY THE LOCATION OF CONSTRUCTION JOINTS ON DRAWINGS BASED ON CONVENIENT BREAKS IN PLACING CONCRETE.
- 4.1.3 AT THE JUNCTION BETWEEN A BASE SLAB AND A WALL, A SHORT KICKER OF MINIMUM HEIGHT 150mm SHALL BE PROVIDED TO ENABLE THE FORM WORK FOR THE WALLS TO BE PLACED ACCURATELY AND EASILY.

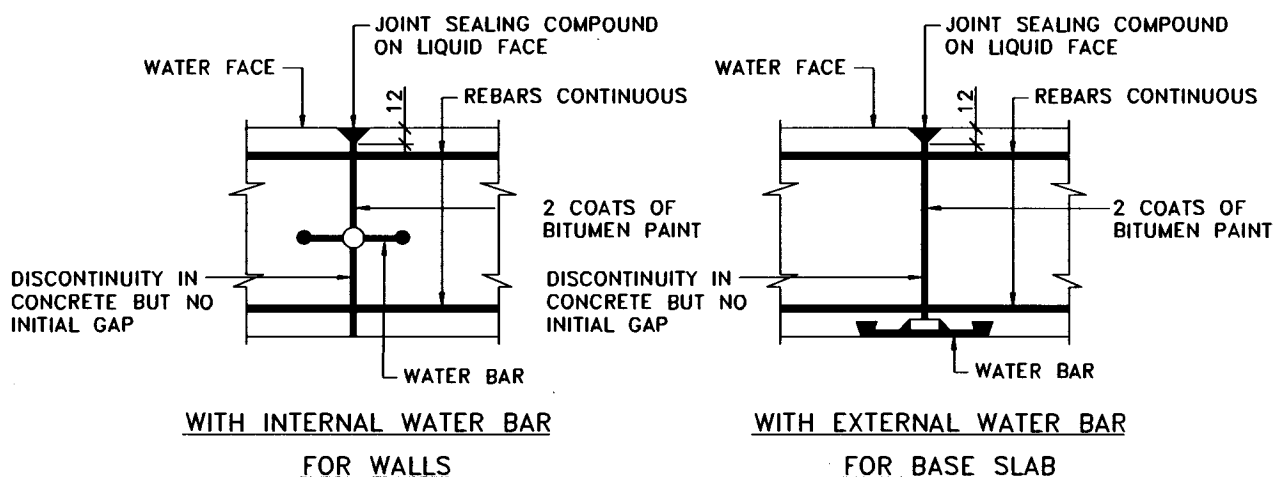
6	24-09-20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
5	24-09-14	REVISED AND ISSUED AS STANDARD	AKS	AJS	P.K.MITTA	S.CHANDA
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- 4.1.4 ALL CONSTRUCTION JOINTS SHALL BE TREATED AS SPECIFIED IN SPECIFICATION NO. 6-68-0005 BEFORE STARTING FRESH CONCRETING SO AS TO FORM A LEAK PROOF JOINT.
- 4.2 MOVEMENT JOINTS:
- 4.2.1 MOVEMENT JOINTS ARE DESIGNED TO PROVIDE A BREAK IN THE CONTINUITY OF THE STRUCTURE, SO THAT RELATIVE MOVEMENT MAY OCCUR ACROSS THE JOINT IN THE LONGITUDINAL DIRECTION.
- 4.2.2 THE MAXIMUM SPACING BETWEEN PARTIAL CONTRACTION JOINTS SHALL BE GENERALLY ABOUT 7.5m. WHERE COMPLETE CONTRACTION JOINT IS PROVIDED THE SPACING BETWEEN TWO SUCCESSIVE JOINTS SHALL BE NOT MORE THAN 15.0m.
- 4.2.3 THE MAXIMUM SPACING BETWEEN TWO SUCCESSIVE EXPANSION JOINTS SHALL BE NOT MORE THAN 30.0m. THE WALL AND FLOOR JOINTS SHALL BE IN LINE WITH EACH OTHER.

6	24-09-20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
5	24-09-14	REVISED AND ISSUED AS STANDARD	AKS	AJS	P.K.MITTAL	S.CHANDA
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A - CONSTRUCTION JOINT

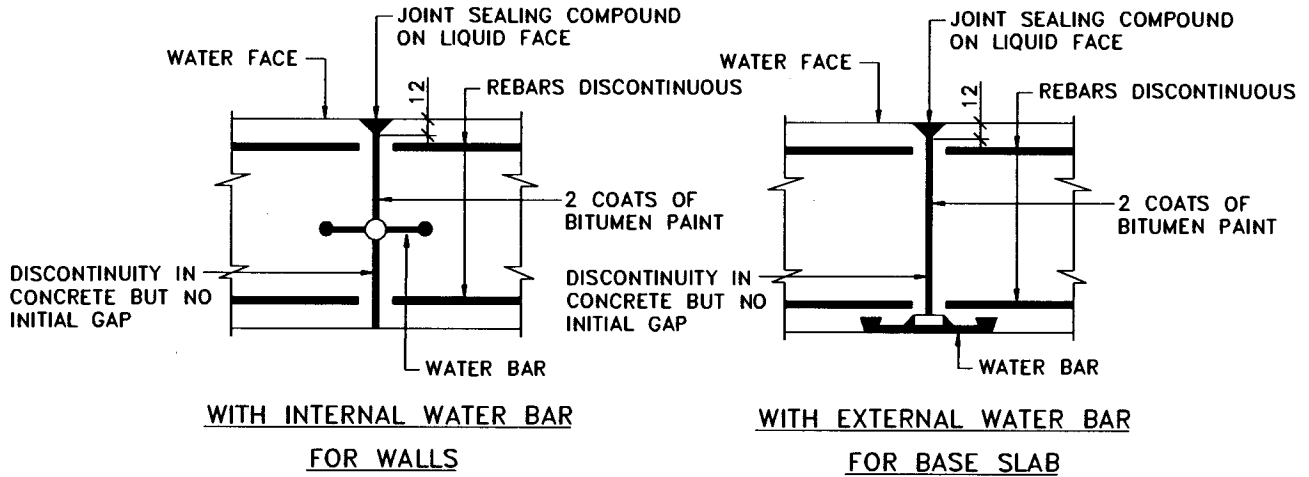


B (i) - PARTIAL CONTRACTION JOINT

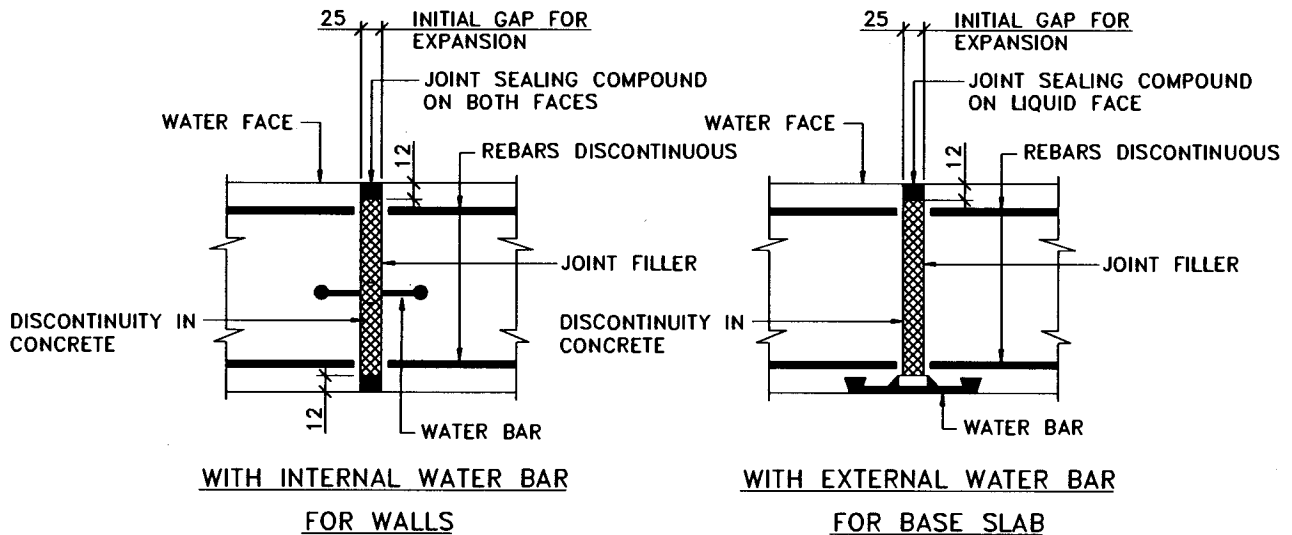
NOTES:-

1. THE CONCRETE JOINT SURFACE SHALL BE PREPARED BY REMOVING LAITANCE IN ORDER TO EXPOSE SHARP ANGULAR FACES OF LARGE AGGREGATES FOR SUBSEQUENT CONTINUITY. A KEY SHALL ALSO BE PROVIDED FOR SECTIONS THICKER THAN 250mm.
2. FOR TYPES AND DETAILS OF JOINTS REFER PAGES 1 TO 3 OF 5.

6	24-09-20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SF
5	24-09-14	REVISED AND ISSUED AS STANDARD	AKS	AJS	P.K.MITTAL	S.CHANDA
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B (ii) – COMPLETE CONTRACTION JOINT



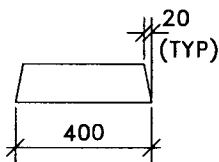
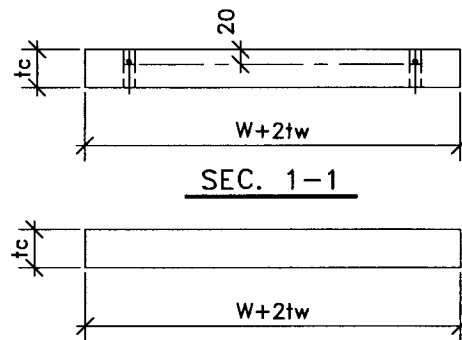
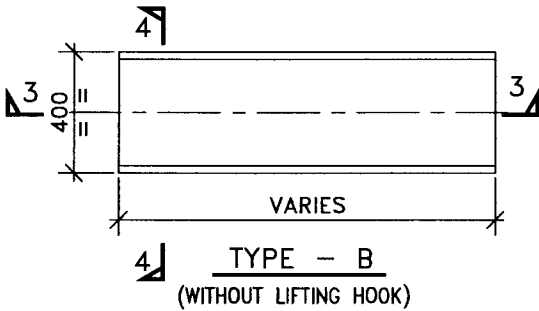
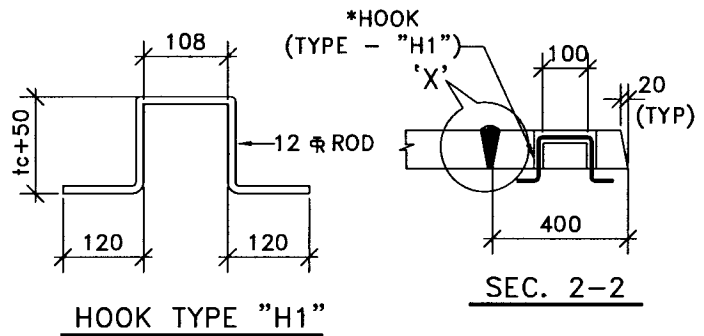
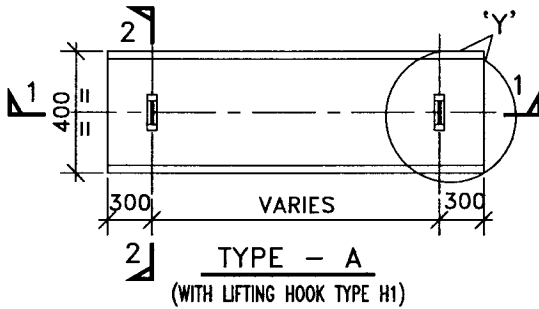
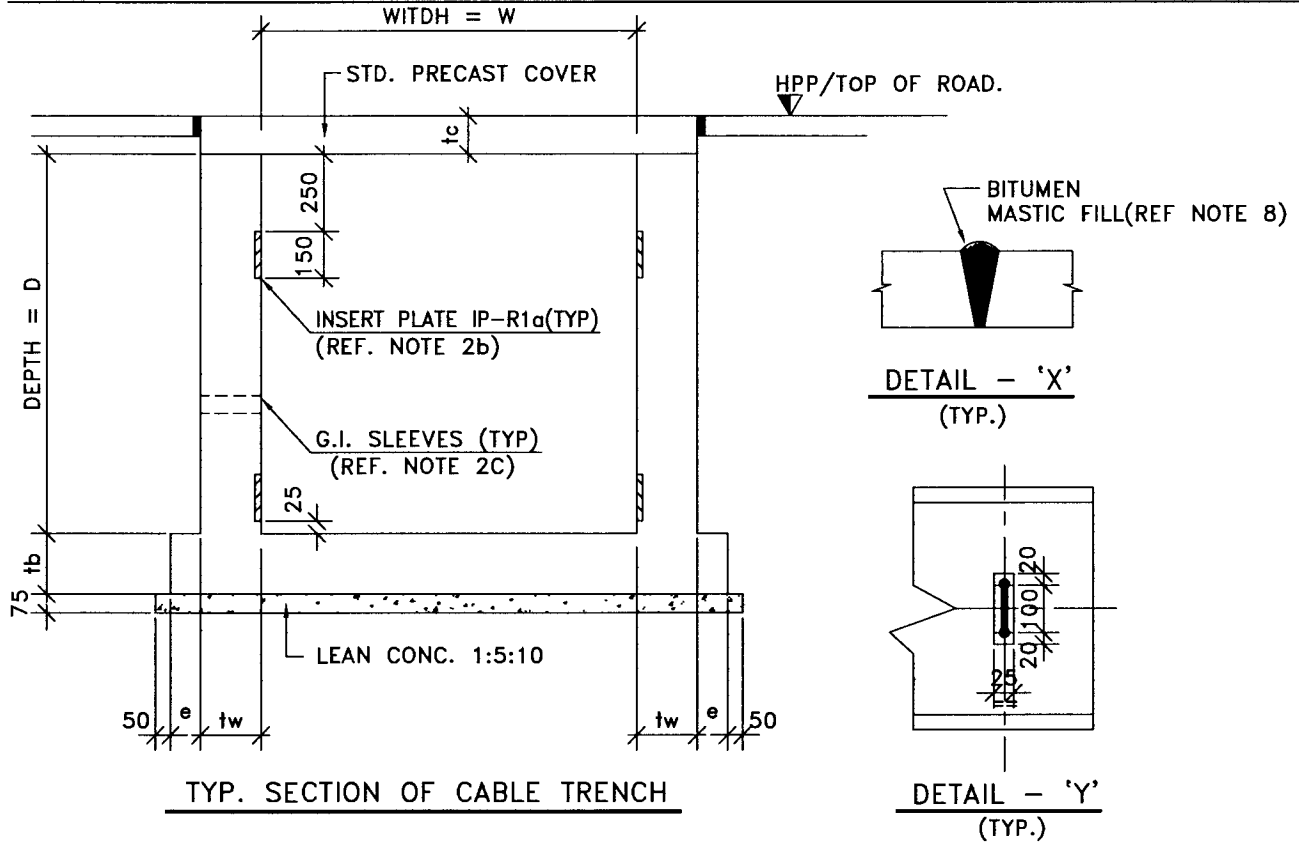
C – EXPANSION JOINT

6	24-09-20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	
5	24-09-14	REVISED AND ISSUED AS STANDARD	AKS	AJS	P.K.MITTAL	S.CHANDRA
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NOTES :-

1. FOR LOCATION OF TRENCHES SUBJECTED TO CRANE LOADING, REFERENCE SHALL BE MADE TO RELEVANT GENERAL CIVIL DRAWINGS.
2. REFERENCE SHALL BE MADE TO ELECTRICAL AND INSTRUMENTATION DRAWINGS FOR FOLLOWING INFORMATION :-
 - a) LAYOUT AND SIZE OF CABLE TRENCH.
 - b) INSERT PLATE REQUIREMENT AND ITS SPACING.
 - c) LOCATION & SIZE OF G.I. CONDUIT SLEEVES.
3. GRADE OF CONCRETE AND REBARS FOR CABLE TRENCH & PRECAST COVER SHALL BE AS PER GENERAL NOTES OF THE PROJECT.
4. CABLE TRENCHES ARE DESIGNED FOR THE FOLLOWING CONSIDERATIONS:
 - a). CLASS AA TRACKED VEHICULAR LOADS AS GIVEN IN IRC 6 (i.e UDL OF 11.40T/SQ.m.)
 - b). SURCHARGE LOADS FOR VEHICLES CALCULATED AS PER SPANGLER'S EQUATION.
 - c). NET SAFE BEARING CAPACITY OF SOIL IS 5 MT/SQ.m AT FOUNDATION LEVEL.
 - d). WATER TABLE AT ANY DEPTH.
5. CABLE TRENCHES FOR JUNCTIONS WHEREVER REQUIRED SHALL BE DESIGNED & DETAILED SPECIFICALLY BASED ON THE AVAILABLE LAYOUT.
6. EVERY FIFTH COVER SHALL HAVE LIFTING HOOK OF TYPE H1 (REF. SHT. 2 OF 7).
7. CABLE TRENCHES IN UNIT AREAS (CLASSIFIED) SHALL BE FILLED WITH SAND.
8. JOINTS BETWEEN PRECAST COVERS TO BE FILLED AFTER CABLE LAYING.
9. IN CASE CLEAR COVER IS MORE FOR A PROJECT, THE ELEMENT THICKNESS SHALL BE INCREASED ACCORDINGLY.

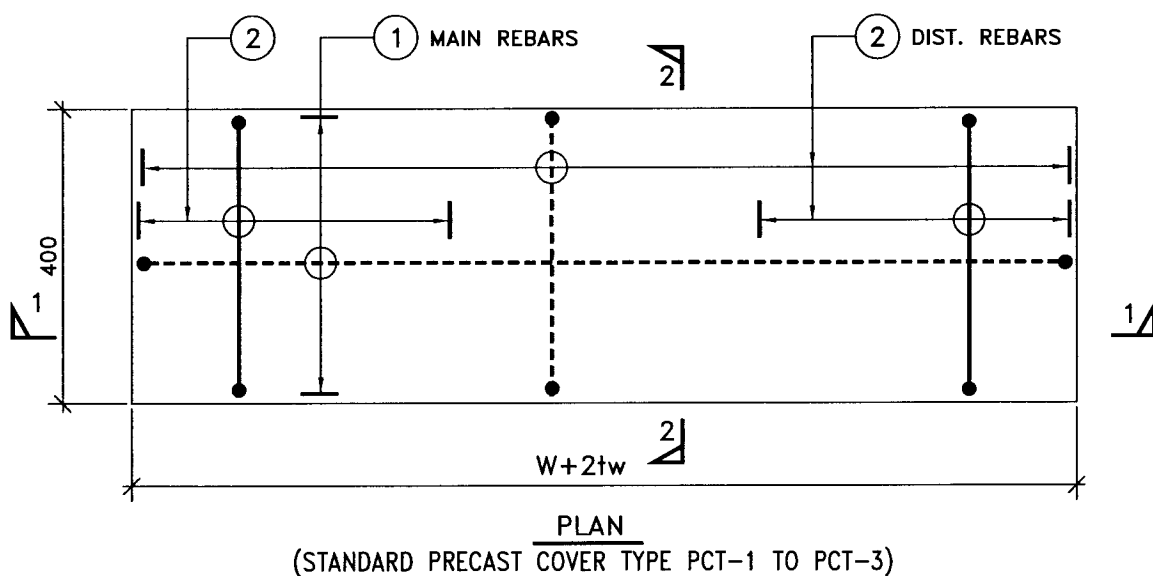
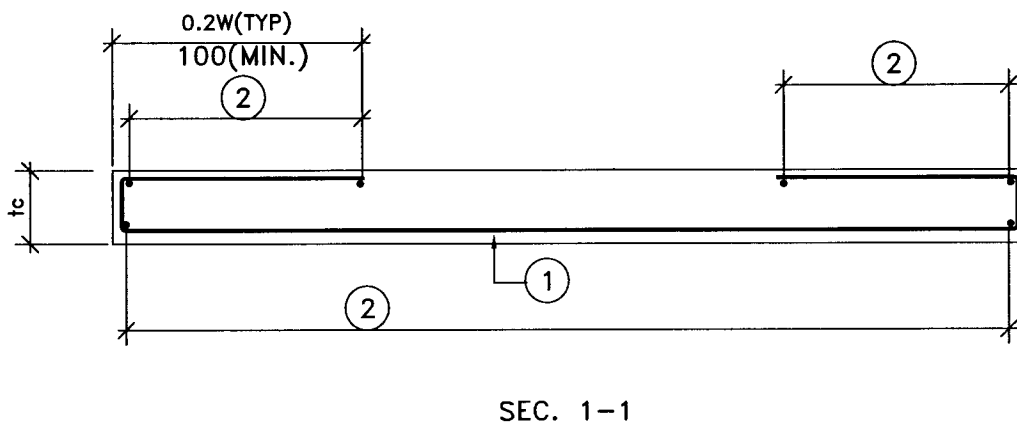
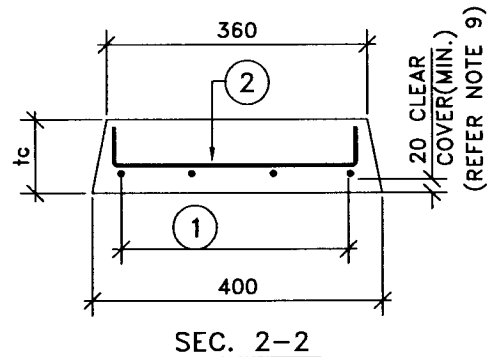
4	28 03 19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R K TRIVEDI
3	28 03 13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K MITTAL	D MALHOTRA
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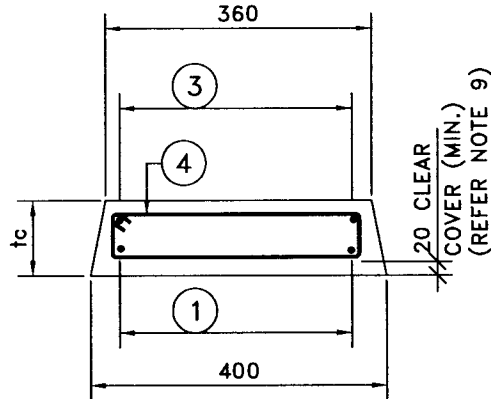
* ONE HOOK IN THE MIDDLE FOR TRENCH WIDTH UPTO 500
TWO HOOKS AS SHOWN FOR TRENCH WIDTH ABOVE 500

PRECAST R.C.C. COVERS

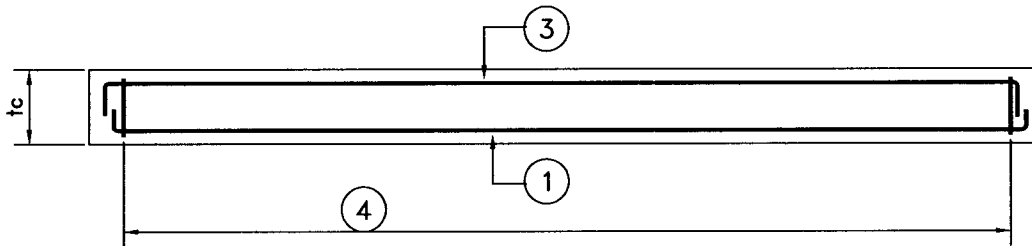
4	28.03.19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R K TRIVEDI
3	28.03.13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K MITTAL	D MALHOTRA
Rev No	Date	Purpose	Prepared	Checked	Stds Committee Convenor	Stds Bureau Chairman



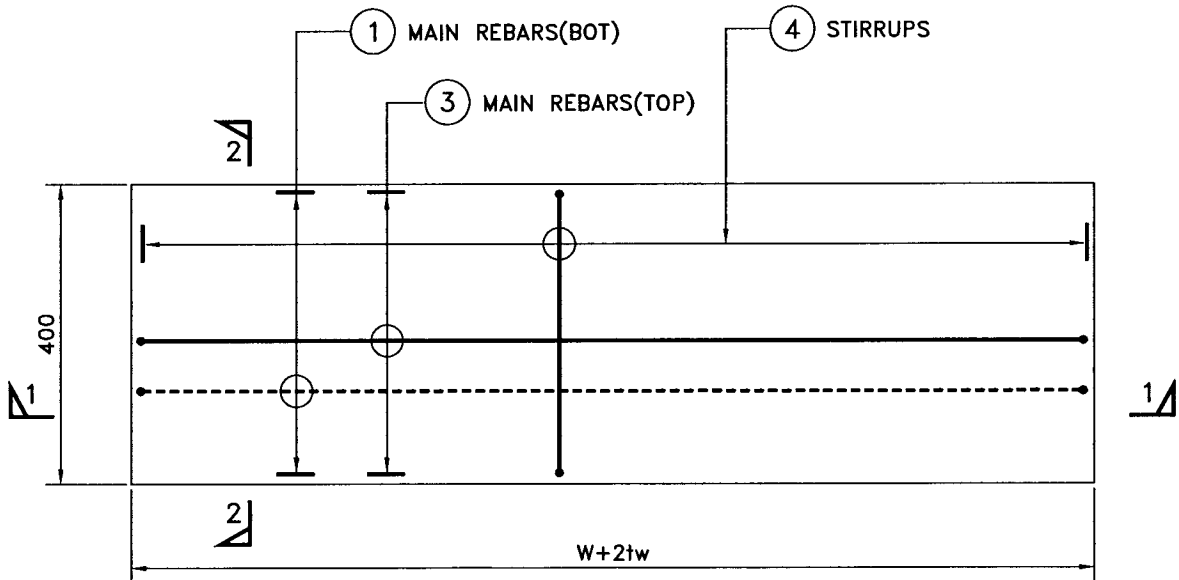
4	28.03.19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R K. TRIVEDI
3	28.03.13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K MITTAL	D.MALHOTRA
Rev. No.	Date	Purpose	Prepared	Checked	Stds Committee Convenor	Stds Bureau Chairman
Approved by						



SEC. 2-2



SEC. 1-1



PLAN

(STANDARD PRECAST COVER SLAB TYPE PCT-4 TO PCT-7)

4	28 03 19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R.K. TRIVEDI
3	28 03 13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K MITTAL	D MALHOTRA
Rev No.	Date	Purpose	Prepared	Checked	Stds Committee Convenor	Stds. Bureau Chairman

Approved by

TABLE 1: DETAILS OF STANDARD PRECAST COVER SLAB

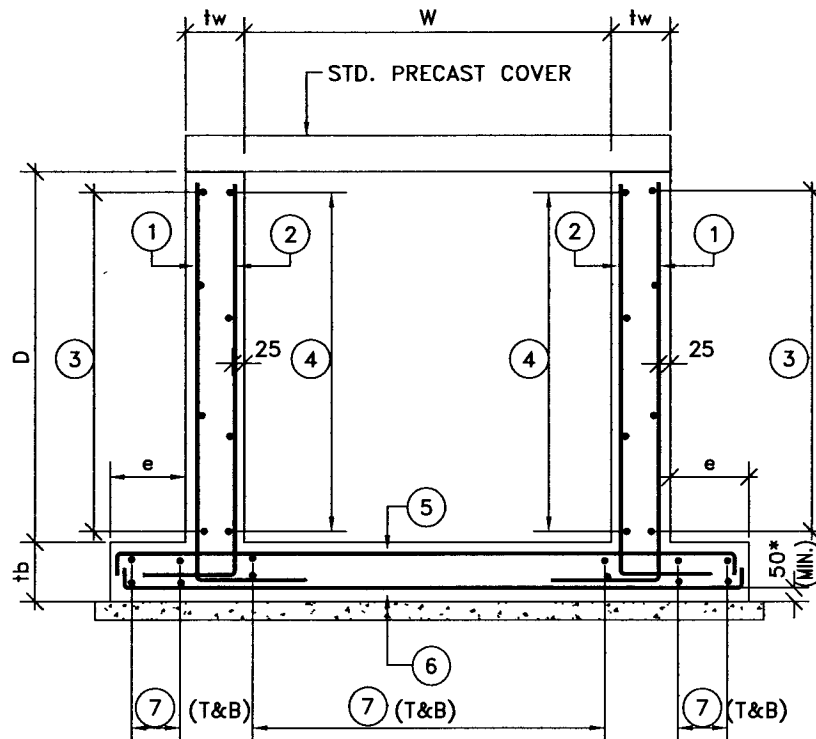
S.NO.	TYPE	WORKING DIMENSIONS				FOR ONE UNIT OF WIDTH 400 mm					SELF WEIGHT (kg)	
		CLEAR WIDTH OF TRENCH W (mm)	BEARING OF COVER SLAB tw (mm)	TOTAL LENGTH OF COVER SLAB W+2tw (mm)	THICKNESS OF COVER SLAB tc (mm)	REINFORCEMENT CONFORMING TO IS:1786						
						BAR MKD. ①	BAR MKD. ②	BAR MKD. ③	BAR MKD. ④	CONCRETE (m ³)		REINF. (kg)
1.	PCT-1	300	150	600	150	4-8 ϕ	8-8 ϕ	-	-	0.036	2.60	90.0
2.	PCT-2	500	150	800	150	4-8 ϕ	8-8 ϕ	-	-	0.048	3.00	120.0
3.	PCT-3	750	200	1150	150	4-8 ϕ	9-8 ϕ	-	-	0.069	3.80	173.0
4.	PCT-4	1000	200	1400	150	4-10 ϕ	-	3-8 ϕ	12-8 ϕ	0.084	10.30	210.0
			250	1500					13-8 ϕ	0.090	11.10	225.0
			200	1650					19-8 ϕ	0.099	15.30	248.0
5.	PCT-5	1250	250	1750	150	5-10 ϕ	-	3-8 ϕ	20-8 ϕ	0.105	16.10	263.0
			200	1900					21-8 ϕ	0.152	18.00	380.0
6.	PCT-6	1500	250	2000	200	5-10 ϕ	-	3-8 ϕ	22-8 ϕ	0.160	18.90	400.0
			200	2400					26-8 ϕ	0.192	25.80	480.0
			250	2500					27-8 ϕ	0.200	26.80	500.0

NOTES :-

1. FOR LOCATION OF BARS MKD. ① TO ④ REFER SHT. 3 OF 7 & SHT. 4 OF 7.
2. ALL PRECAST COVER SLABS SHALL BE MARKED (T) ON THE TOP FOR PROPER PLACEMENT.
3. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.
4. COVER SLABS ARE DESIGNED FOR LOADS SPECIFIED IN NOTE 4 (SHT. 1 OF 7).

4	28.03.19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R K TRIVEDI
3	28.03.13	REVISED & REISSUED AS STANDARD	VPS	R.SRVASTAVA	P K MITTAL	D MALHOTRA
Rev No	Date	Purpose	Prepared	Checked	Stds Committee Convenor	Stds Bureau Chairman

Approved by



TYPICAL CABLE TRENCH SECTION
(SHOWING REINFORCEMENT)

* REFER NOTE-9

4	28 03.19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R.K. TRIVEDI
3	28 03.13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K.MITTAL	D MALHOTRA
Rev No.	Date	Purpose	Prepared	Checked	Stds Committee Convenor	Stds. Bureau Chairman
Approved by						

TABLE :2- DETAIL OF CABLE TRENCH REINFORCEMENT

WORKING DIMENSIONS		R/F CONFORMING TO IS: 1786							APPROX. QUANTITIES PER METRE LENGTH.						
S.NO.	DEPTH D (mm)	WIDTH W (mm)	WALL THICK- NESS t _w (mm)	BASE THICK- NESS t _b (mm)	PROJEC- TION e (mm)	BAR MARK							LEAN CONC. 1:5:10 (m ³)	CONC. (m ³)	REINF. (kg)
						①	②	③	④	⑤	⑥	⑦			
1.	300	300	150	150	300	10¢-150C/C.	8¢-150C/C.	8¢-300C/C.	8¢-300C/C.	10¢-175C/C.	10¢-175C/C.	8¢-300C/C.	0.10	0.31	32.10
2.		500	150	150	300	10¢-150C/C.	8¢-150C/C.	8¢-300C/C.	8¢-300C/C.	10¢-175C/C.	10¢-175C/C.	8¢-300C/C.	0.12	0.34	33.80
3.	500	500	150	200	300	10¢-150C/C.	8¢-150C/C.	8¢-300C/C.	8¢-300C/C.	10¢-175C/C.	10¢-175C/C.	8¢-250C/C.	0.12	0.40	41.50
4.	750	750	200	200	400	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	10¢-175C/C.	10¢-175C/C.	8¢-250C/C.	0.16	0.72	60.70
5.	1000	750	200	200	400	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-175C/C.	12¢-175C/C.	8¢-250C/C.	0.16	0.82	74.10
6.		1000	200	200	500	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-175C/C.	12¢-175C/C.	8¢-250C/C.	0.19	0.92	83.50
7.		1250	200	200	450	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-175C/C.	12¢-175C/C.	8¢-250C/C.	0.20	0.95	90.30
8.	1250	1500	200	200	450	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-175C/C.	12¢-175C/C.	8¢-250C/C.	0.22	1.00	90.50
9.		2000	200	200	500	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-175C/C.	12¢-175C/C.	8¢-250C/C.	0.27	1.12	100.00
10.	1250	1000	200	200	500	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-125C/C.	12¢-125C/C.	8¢-250C/C.	0.19	1.00	129.40
11.		1250	200	200	450	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-125C/C.	12¢-125C/C.	8¢-250C/C.	0.20	1.05	132.80
12.		1500	200	200	450	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-125C/C.	12¢-125C/C.	8¢-250C/C.	0.22	1.10	137.90
13.	1500	2000	200	200	500	12¢-150C/C.	10¢-250C/C.	8¢-250C/C.	8¢-250C/C.	12¢-125C/C.	12¢-125C/C.	8¢-250C/C.	0.27	1.20	147.80
14.		1000	250	200	500	12¢-150C/C.	10¢-250C/C.	8¢-200C/C.	8¢-200C/C.	12¢-150C/C.	12¢-150C/C.	8¢-250C/C.	0.19	1.30	109.30
15.		1250	250	250	450	12¢-150C/C.	10¢-250C/C.	8¢-200C/C.	8¢-200C/C.	12¢-150C/C.	12¢-150C/C.	8¢-200C/C.	0.20	1.45	114.80
16.	1500	1500	250	250	450	12¢-150C/C.	10¢-250C/C.	8¢-200C/C.	8¢-200C/C.	12¢-150C/C.	12¢-150C/C.	8¢-200C/C.	0.22	1.50	120.30
17.		2000	250	250	500	12¢-150C/C.	10¢-250C/C.	8¢-200C/C.	8¢-200C/C.	12¢-150C/C.	12¢-150C/C.	8¢-200C/C.	0.27	1.70	128.50

NOTES- 1. FOR LOCATION OF BAR MKD. ① TO ⑦ REFER SHT. 6 OF 7 .
2. TRENCH IS DESIGNED FOR LOADS AND CONDITIONS SPECIFIED IN NOTE 4 (SHT.1 OF 7).
3. THE QUANTITIES GIVEN IN THIS TABLE ARE FOR ESTIMATION PURPOSE ONLY.

4	28.03.19	REVISED & REISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R K TRIVEDI
3	28.03.13	REVISED & REISSUED AS STANDARD	VPS	R SRIVASTAVA	P K MITTAL	D. MALHOTRA
Rev No	Date	Purpose	Prepared	Checked	Std's Committee Convenor	Std's Bureau Chairman

Approved by