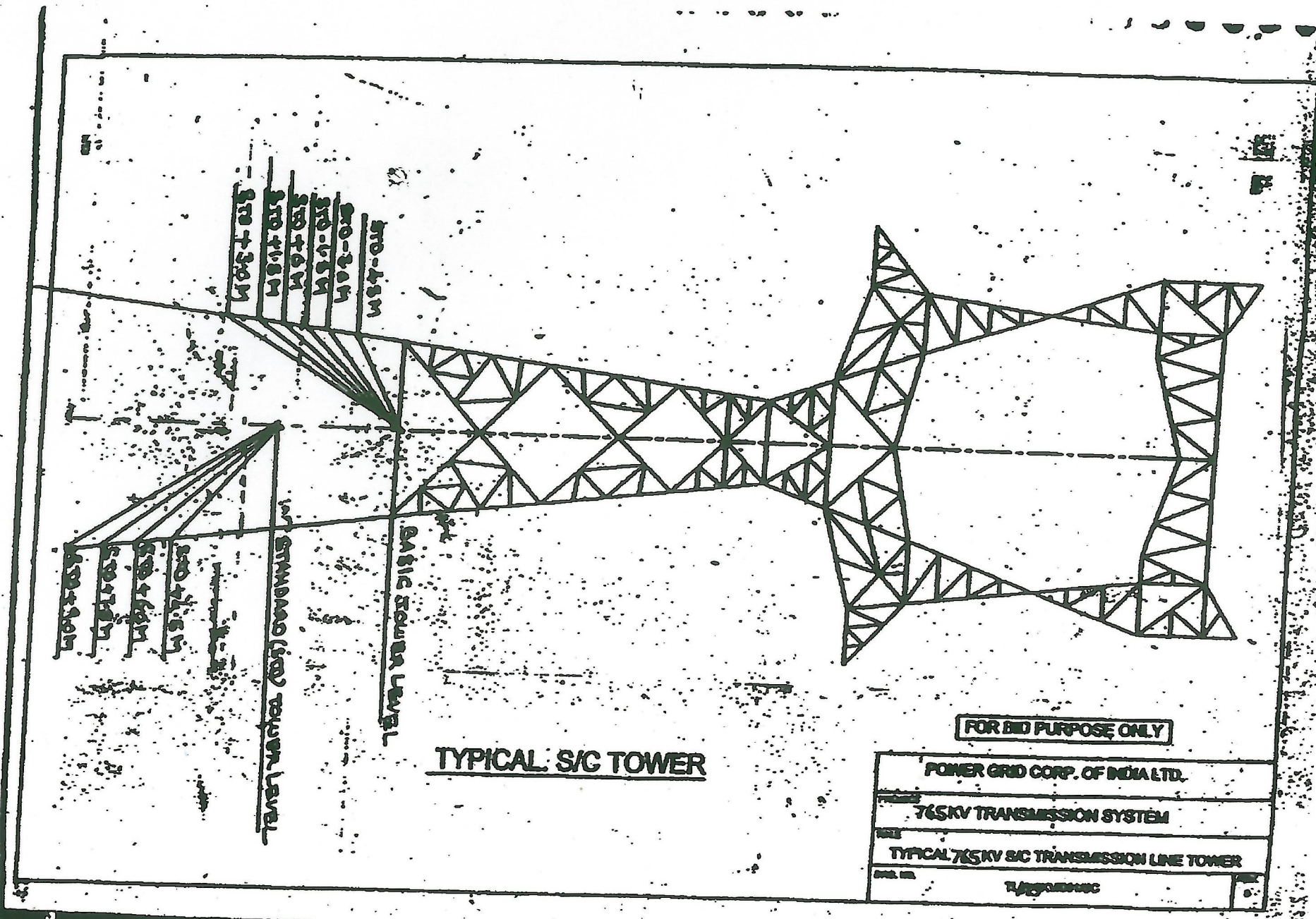


TYPICAL. D/C.TOWER

FOR BID PURPOSE ONLY

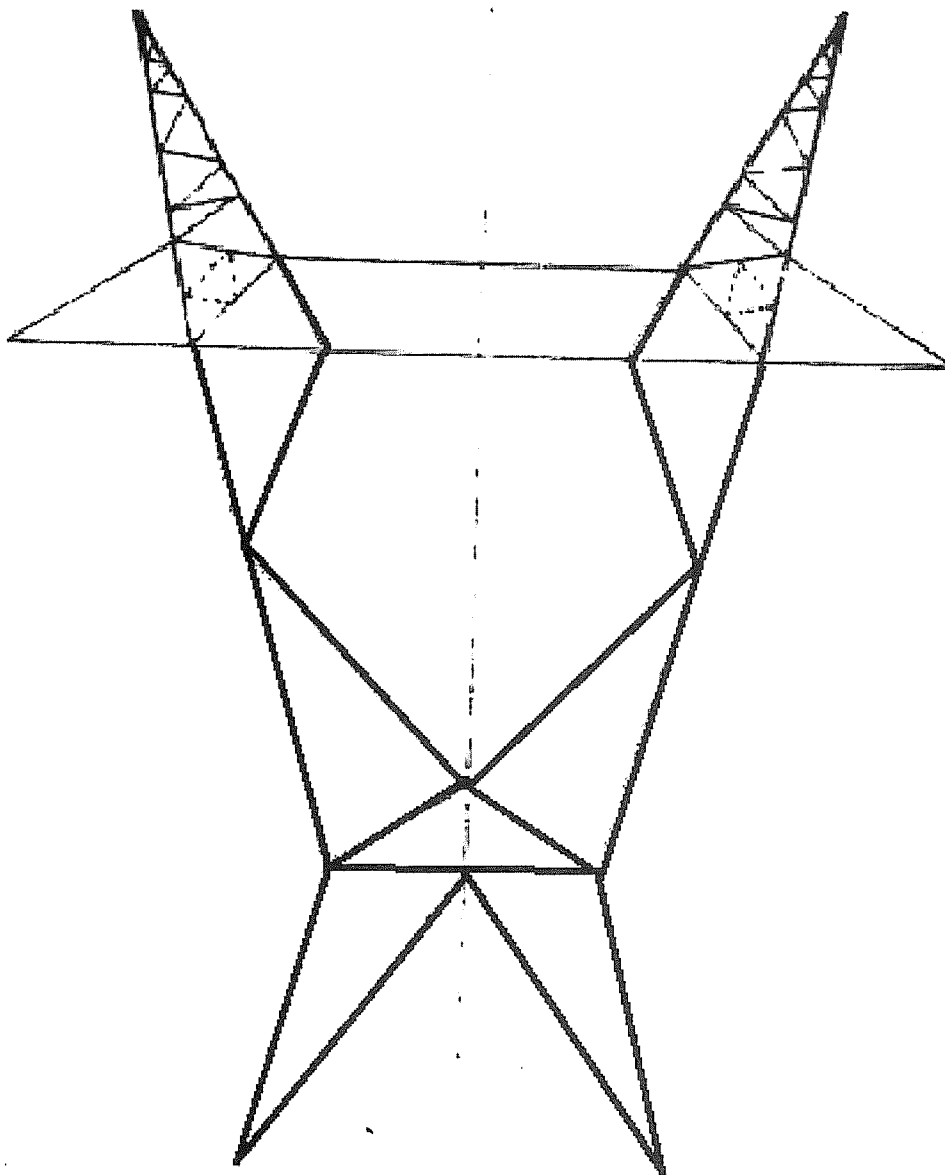
POWER GRID CORP. OF INDIA LTD.	
PROJECT	765 kv / 400 kv Transmission System
TITLE	TYPICAL 765/400KV TRANS. TOWER
DRG. NO.	TL/765/400KV/DC
REV.	0



TYPICAL S/C TOWER

FOR BID PURPOSE ONLY

POWER GRID CORP. OF INDIA LTD.	
765KV TRANSMISSION SYSTEM	
TYPICAL 765KV S/C TRANSMISSION LINE TOWER	
DATE: 08/08/2008	TA/08/08/08/08



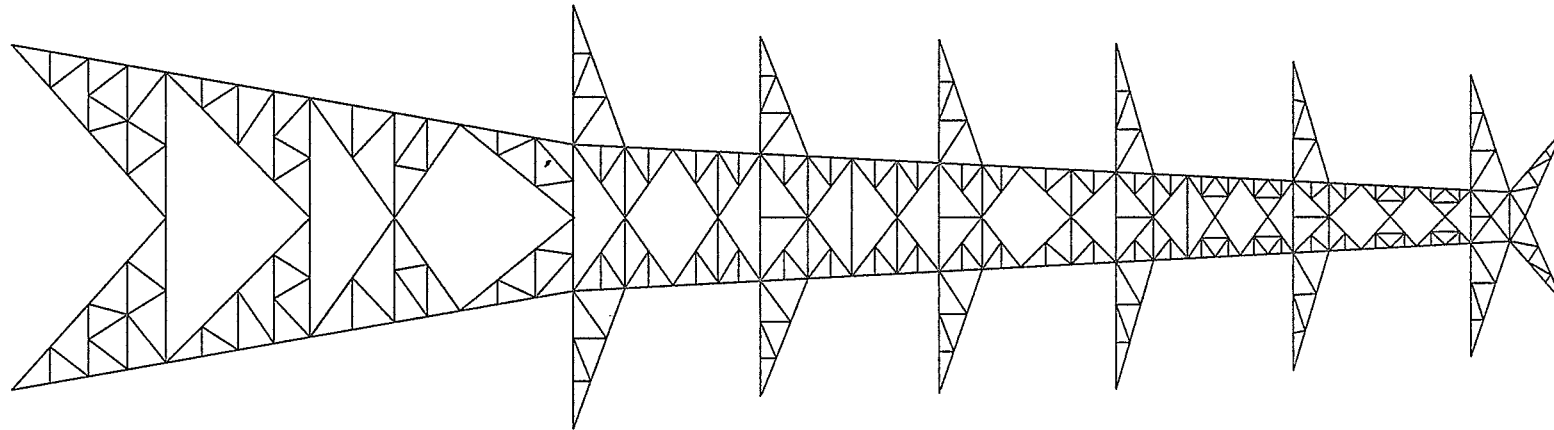
TYPICAL S/C HORIZONTAL TOWER

FOR BID PURPOSE ONLY

POWERGRID CORPORATION OF INDIA LTD.

Project: 765kV S/C Horizontal Towers

Drg no. TL/765/SC/HORI



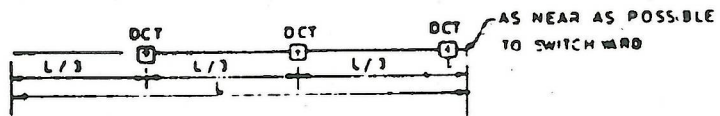
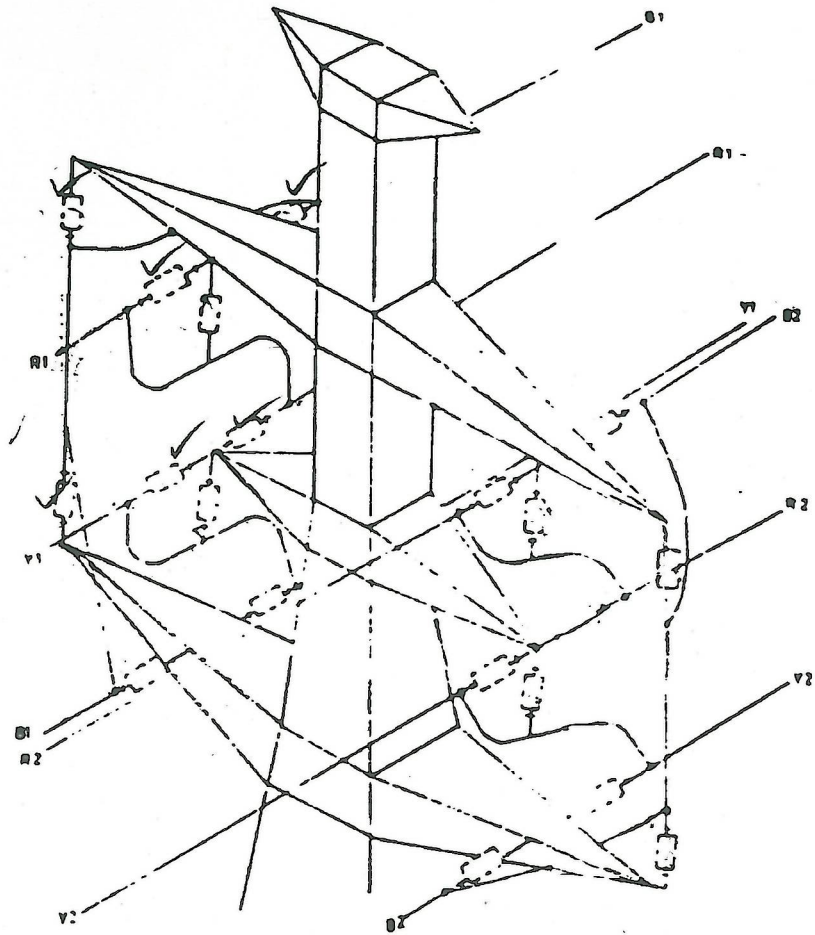
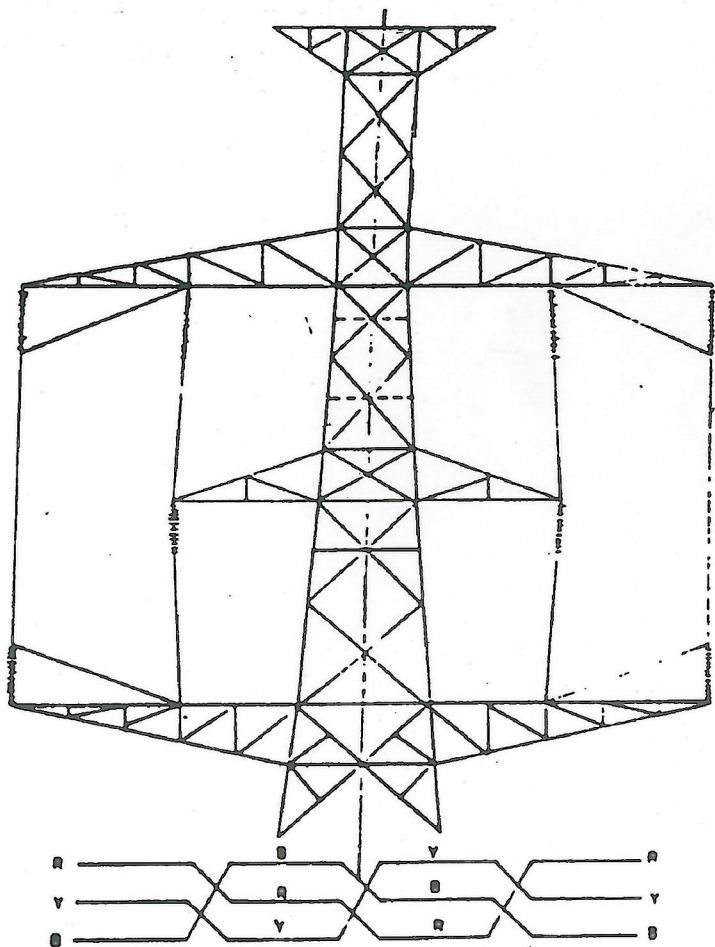
TYPICAL MULTI CIRCUIT TOWER.

FOR BID PURPOSE ONLY.

POWER GRID CORPORATION
OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

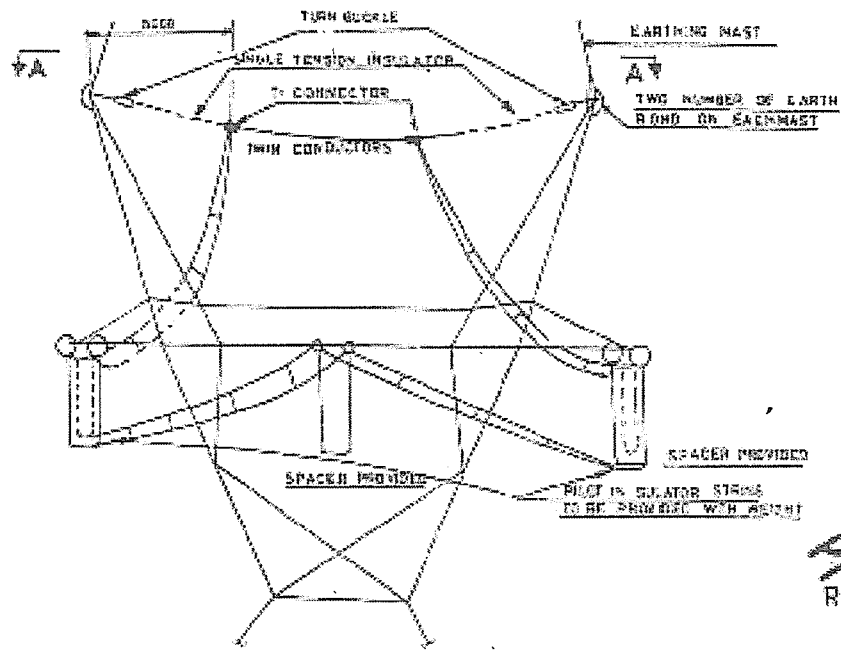


					<p>PROJECT: <i>TRANSMISSION LINE TOWER</i></p>		
					<p>TITLE: <i>TYPICAL MULTICIRCUIT TOWER SKETCH</i></p>		
					<p>SCALE N.T.S.</p>		
					<p>DRAWING NO: <i>CC:ENGG:TL:MC</i></p>		
					<p>REV. 0</p>		
REVISION					CLEARED BY		
REV. No	DESCRIPTION	CHKD	REVWD	APPD	CHECKED	REVIEWED	APPROVED

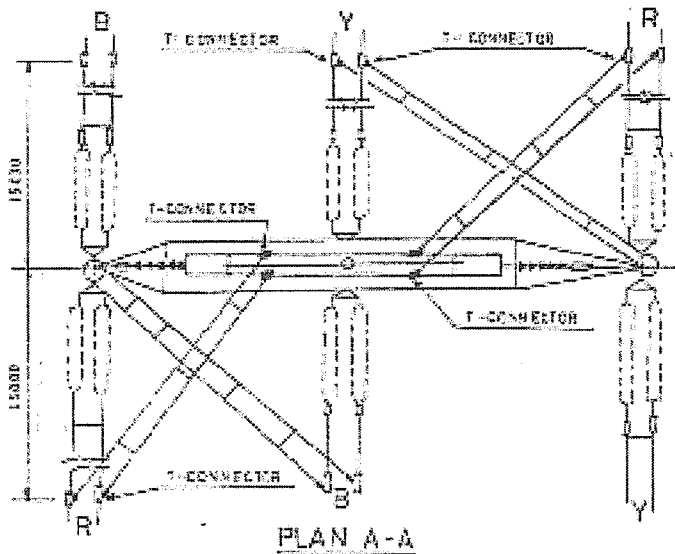
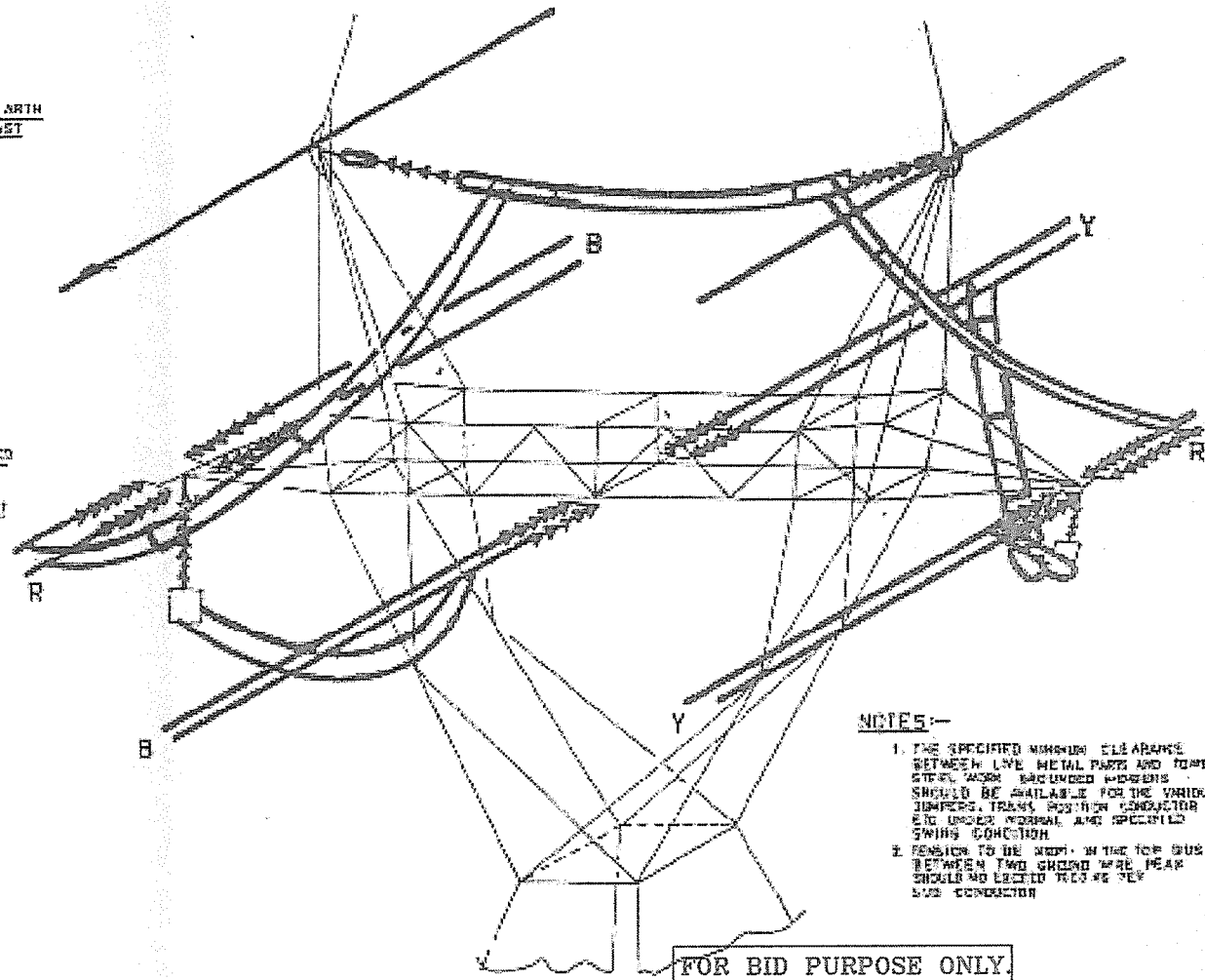


FOR BID PURPOSE ONLY

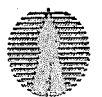
POWER GRID CORPORATION OF INDIA LTD (A GOVT OF INDIA ENTERPRISE)						
PROJECT TRANSMISSION LINE						
TITLE DETAIL OF TRANSPOSITION ARRANGEMENT ON DC TYPE TOWER						
DATE	DRN	CHKD	APPD	SCALE	DRG NO	REV
28-1-96	Raj	Har	0-0000-68-T-E-A-010	0



TRANSPOSITION ON ARRAGEMENT



POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



REVISION					PROJECT:			TITLE:		
REV. No	DESCRIPTION	CRD	INTD	APPD	CHECKED	REVIEWED	APPROVED	SCALE	DRAWING NO:	REV.
								N.T.S.	CG-ENGG-TLS/C TRANSPOSITIONIC	0

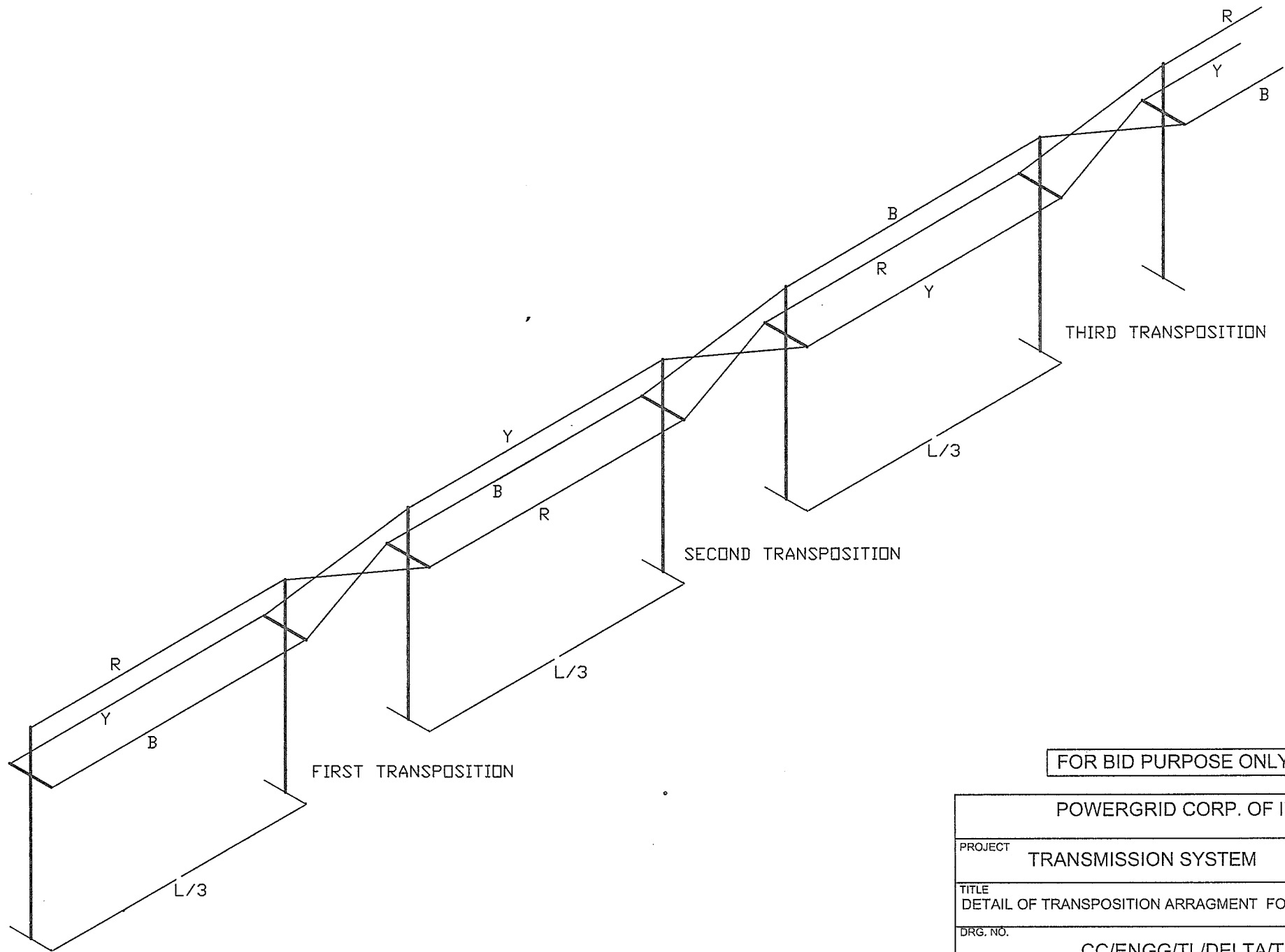
PROJECT: TRANSMISSION LINE TOWER

TITLE: DETAIL OF TRANSPOSITION ARRANGEMENT ON S/C(HORZINTAL) CONFIGURATION.

CHECKED BY: _____

REVIEWED BY: _____

APPROVED BY: _____

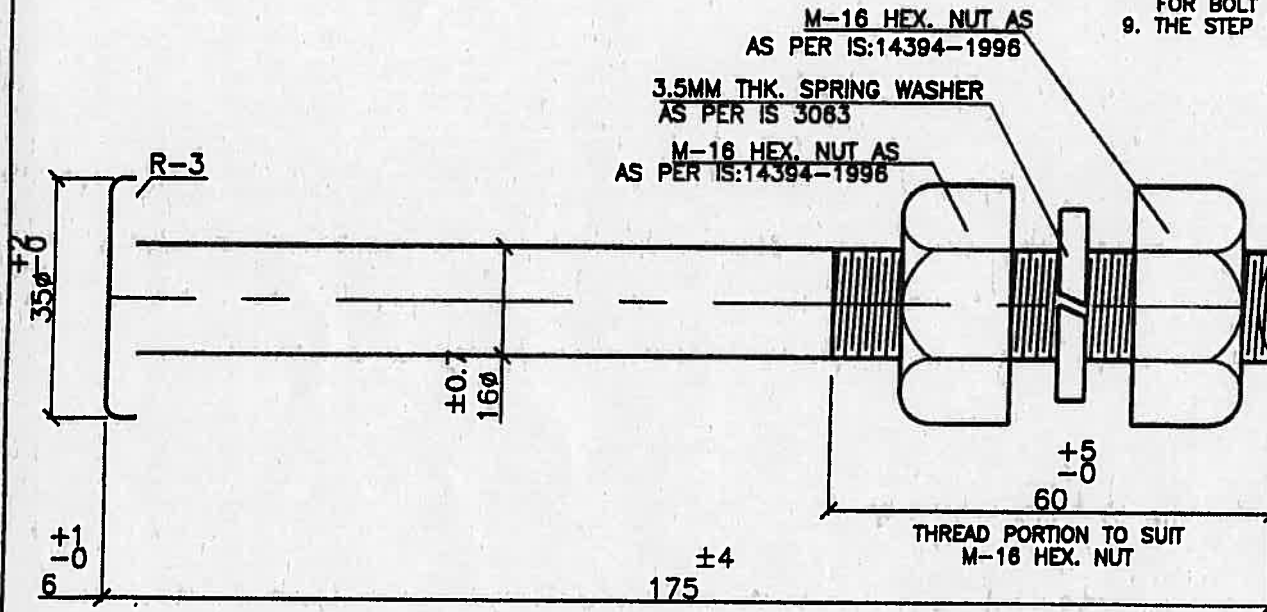


FOR BID PURPOSE ONLY

POWERGRID CORP. OF INDIA LTD.	
PROJECT	TRANSMISSION SYSTEM
TITLE	DETAIL OF TRANSPOSITION ARRANGMENT FOR DELTA CONFIG.
DRG. NO.	CC/ENGG/TL/DELTA/TRANS
REV.	0

NOTE :-

1. ALL DIMENSIONS ARE IN MM.
2. STEP-BOLT SHALL BE HOT-DIP GALVANISED AS PER IS:1367(P.13)-1983.
3. WEIGHT/PIECE WITH TWO NUTS AND ONE SPRING WASHER=0.374 Kg
4. THREADS TO BE UNDER CUT BY 0.3MM.
5. THE STEP-BOLT SHALL BE CAPABLE OF WITHSTANDING A VERTICAL LOAD NOT LESS THAN 1.5KN.
6. SPRING WASHER SHALL CONFORM TO IS:3063 & ELECTRO GALVANIZED AS PER IS: 1573 SERVICE CONDITION 4.
7. GENERAL REQUIREMENT SHALL CONFORM TO IS 10238.
8. MECHANICAL PROPERTIES SHALL CONFORM TO CLASS 4.6 AS PER IS:1367(PART- 3) FOR BOLT & CLASS 5 AS PER IS:1367 (P-VI) FOR NUT.
9. THE STEP BOLT SHALL WITH STAND CANTILEVER TEST AS PER IS:10238

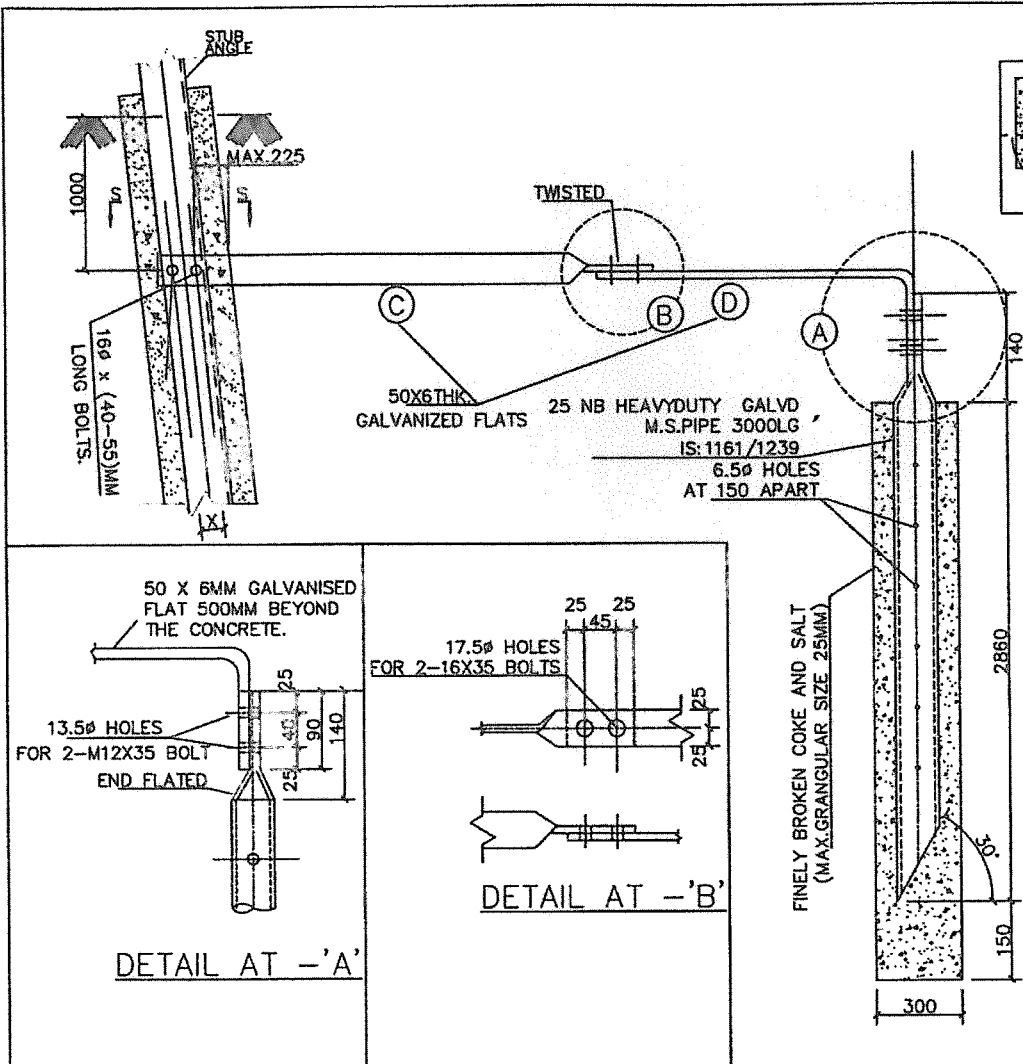


STANDARD DRAWING

**POWER GRID CORPORATION
OF INDIA LIMITED**
(A GOVERNMENT OF INDIA ENTERPRISE)



REVISION				PROJECT:		TITLE:	
				765/400/230KV TRANSMISSION SYSTEM		STEP BOLT	
DRAWN BY				CHECKED BY			
DESIGNED BY				APPROVED BY			
REL. NO.	DESCRIPTION	DATE	BY	DATE	BY	DATE	BY
DRAWS NO. CONFORM/CLAC/08						REV. 0	



- NOTE :-**
1. "C" STRIP IS TO BE PROVIDED ON ONE LEG OF EACH TOWER. WHICH WILL BE SUPPLIED WITH STUB .
 2. "D" STRIP WITH PIPE EARTHING ARRANGEMENT IS TO BE PROVIDED ON ONLY ONE LEG.
 3. 17.5 ϕ HOLES SUITABLE FOR 16MM ϕ BOLT CONFIRMING TO IS:12427-2001, CLASS 5.6 & IS:14394-1996, Gr. 5 FOR HEX NUT UNLESS OTHERWISE SPECIFIED.
 4. FOR COUNTERPOISE EARTHING STRIP 'C' SHALL BE CONNECTED WITH COUNTERPOISE WIRE THROUGH 'A' LUG.
 5. ALL DIMENSIONS ARE IN MM.
 6. 12 & 16MM DIA SPIRING WASHER SHALL CONFIRM TO IS:3063-1994 TYPE B AND ELECTRO GALVANIZED AS PER IS:1573-1986.
 7. HDG BOLT/NUTS TO BE GALVANIZED AS PER IS:1367(P-13)-1983.
 8. C & D FLATS TO BE HOT DIP GALVANIZED AS PER IS:2629-1985.
 9. MATERIAL FOR C & D FLAT AS PER IS:2062 GRADE "A".
 10. X TO BE COMPATIBLE WITH STUB

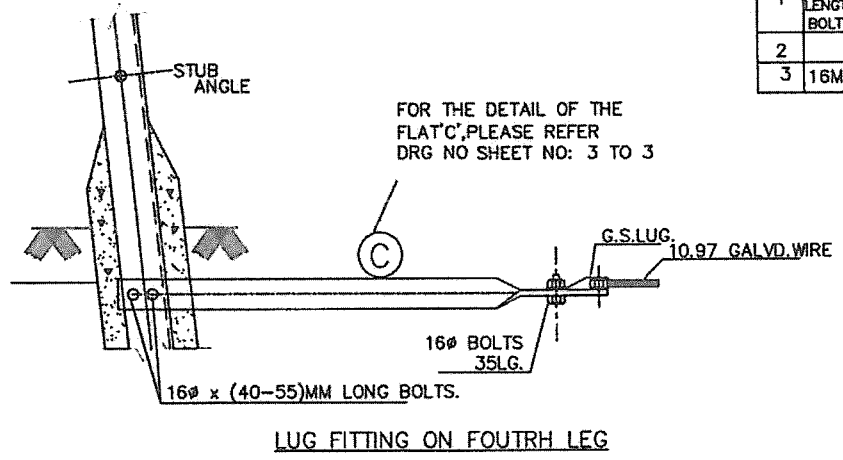
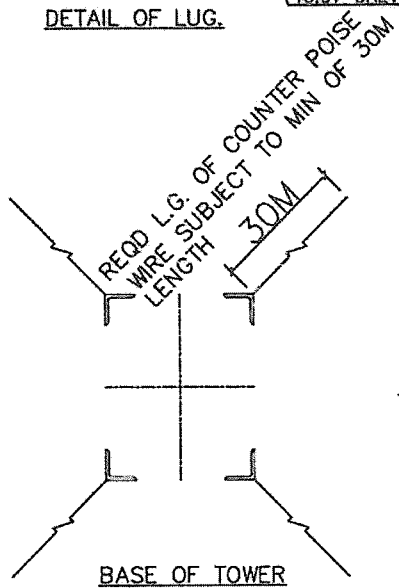
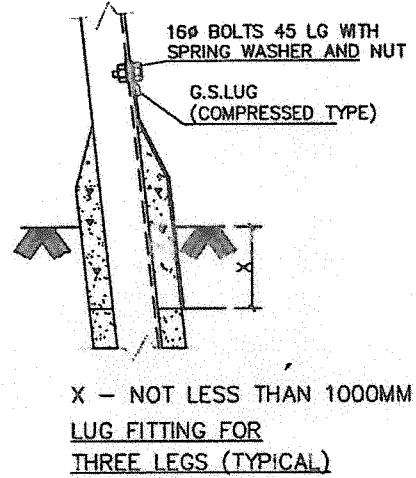
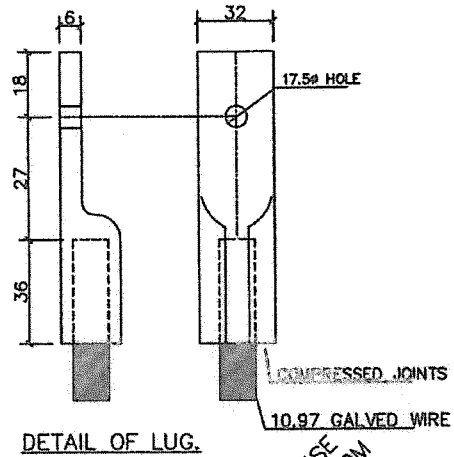
LIST OF BOLTS & NUTS / TOWER.						
S.NO	SIZE				QTY	
1	STUB THICK.(mm)	7-11	12-16	17-21	22-25	2
	LENGTH OF M16 BOLT (mm)	40	45	50	55	
2	M-16 x 35LG				2	
3	M-12 x 35LG				2	
4	16MM DIA 3.5MM THK.SP.WASHER				4	
5	12MM DIA 2.5MM THK.SP.WASHER				2	

STANDARD DRAWING

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



REVISION					PROJECT:		DRAWING NO:	REV.
					765/400 KV TRANSMISSION SYSTEM			
					TITLE:		sheet 1/3	
					CLEARED BY			SCALE
					APPROVED			
REV. No	DESCRIPTION	CHG	REV'D	APP'D				



NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. 10.97MM GALVANISED WIRE WITH G.S. LUG FORGED AT ONE END AND FREE FOR A REQUIRED LENGTH OF COUNTER POISE WIRE.
3. FOUR G.S LUG WILL BE REQUIRED PER TOWER THREE LUGS WILL BE CONNECTED ON THREE LEGS AND FOURTH LUGS WILL BE CONNECTED WITH FLAT TYPE 'C' PROVIDED FOR PIPE TYPE EARTHING.
4. 10.97MM WIRE SHALL BE OUTSIDE COPPING.
5. ONE SET COMPRISING OF 4NOS OF REQUIRED LENGTH OF COUNTER POISE WIRE.
6. FOR SOIL RESISTIVITY LESS THAN 1500 OHMS-METER, 4 LENGTHS OF 30M WIRE SHALL BE PROVIDED, AND FOR SOIL RESISTIVITY GREATER THAN 1500 OHMS-METER, 4 LENGTH OF 70M WIRE SHALL BE PROVIDED.

LIST OF BOLTS & NUTS / TOWER.						
S.NO	SIZE				QTY	
1	STUB THICK.(mm)	7-11	12-16	17-21	22-28	5
	LENGTH OF M16 BOLT (mm)	40	45	50	55	
2	M-16 x 35LG				1	
3	16MM DIA 3.5MM THK.SP.WASHER				6	

STANDARD DRAWING

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



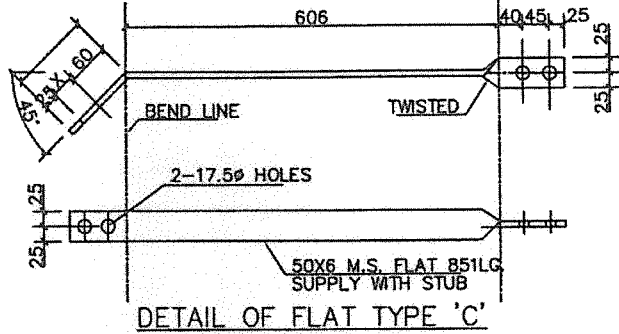
PROJECT:
765/400 KV TRANSMISSION SYSTEM

TITLE:
COUNTERPOISE EARTHING

REVISION					CHECKED	REVIEWED	APPROVED
REV. No	DESCRIPTION	CHG	BY	DATE			

SCALE: H.T.D.
DRAWING NO: CC/ENGG/TL/ACC/ERTH/PP-765/400
sheet 2/3

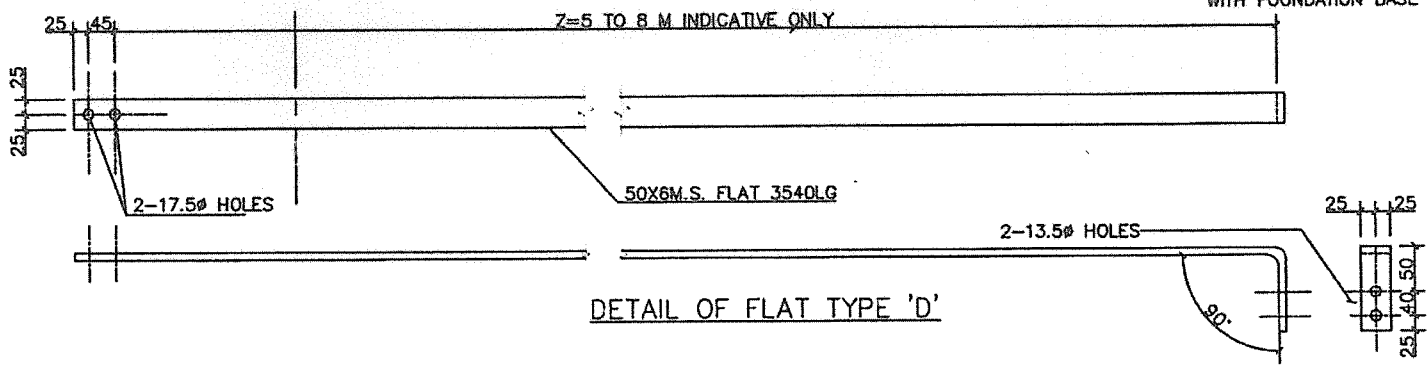
REV. 0



DETAIL OF FLAT TYPE 'C'

NOTE :-

1. ALL DIMENSIONS ARE IN MM.
2. AFTER FABRICATION BOTH FLATS TO BE HOT-DIP GALVANISED AS PER IS:2629.
3. FLAT TYPE 'C' IS TO BE PROVIDED ON ONE LEG OF EACH TOWER.
4. FLAT TYPE 'D' IS TO BE PROVIDED WITH PIPE TYPE EARTHING ARRANGEMENT AND TO BE CONNECTED WITH FLAT 'C' FOR THE LOCATION WHERE TOWER FOOTING RESISTANCE IS MORE THAN 10 OHMS.
5. X TO BE COMPATIBLE WITH STUB
6. VALUE OF Z MAY VARY AS PER SITE REQUIREMENT SO AS TO AVOID FOULING WITH FOUNDATION BASE SLAB.



DETAIL OF FLAT TYPE 'D'

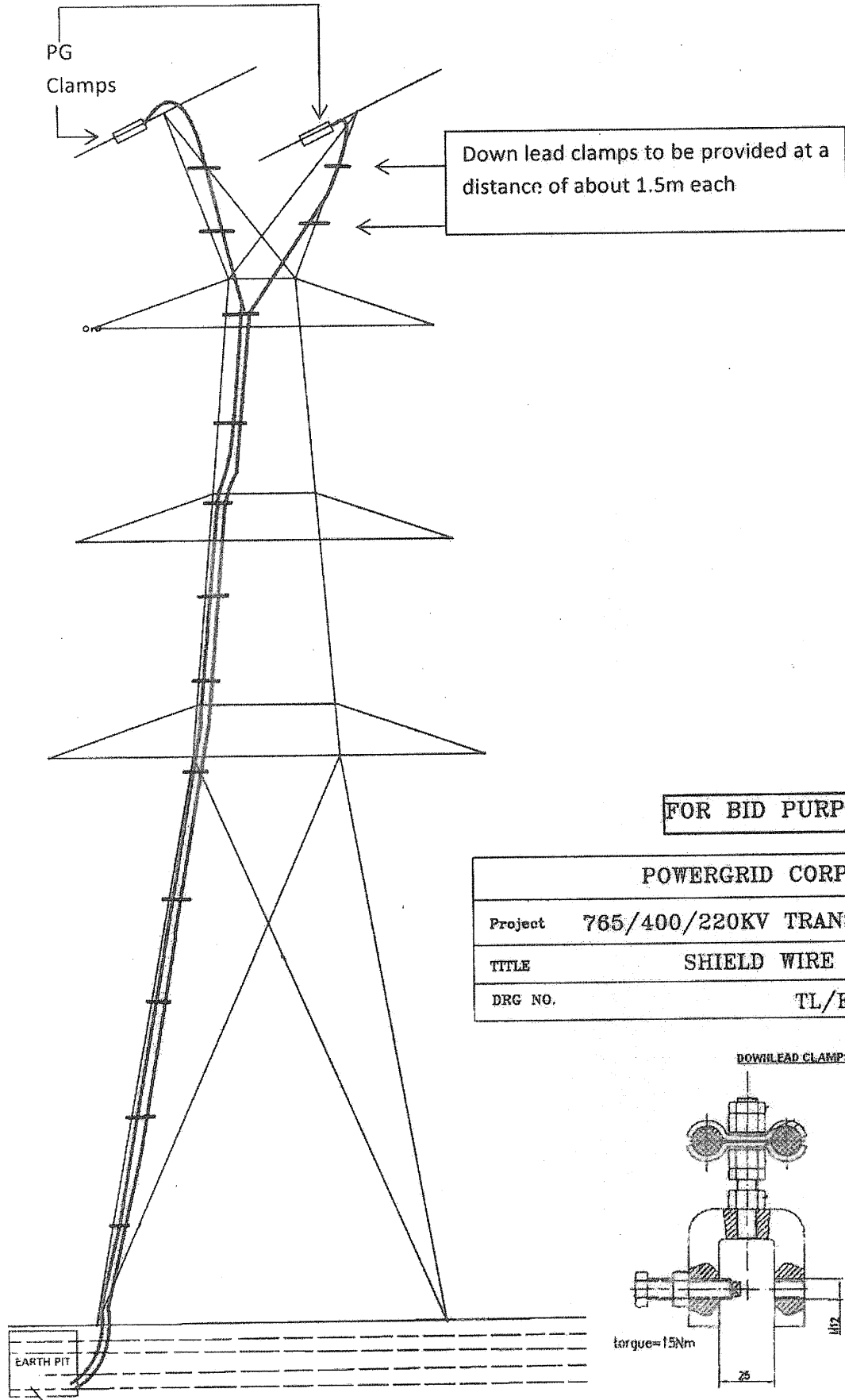
STANDARD DRAWING

POWER GRID CORPORATION
OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



REVISION					PROJECT:			REV.
					765/400 KV TRANSMISSION SYSTEM			
					TITLE:			
					FLATS FOR EARTHING			
REV. No	DESCRIPTION	CHD	REV'D	APP'D	SCALE	DRAWING NO:	CC:ENGG:TL&CC:KHTL:PP:765/400	
					H.T.B.	sheet 3/3		

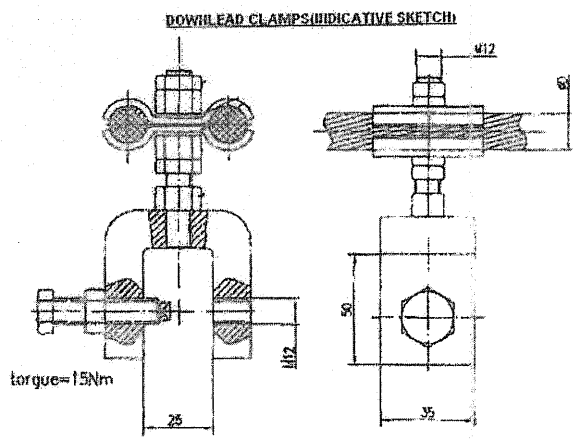
CLEARED BY



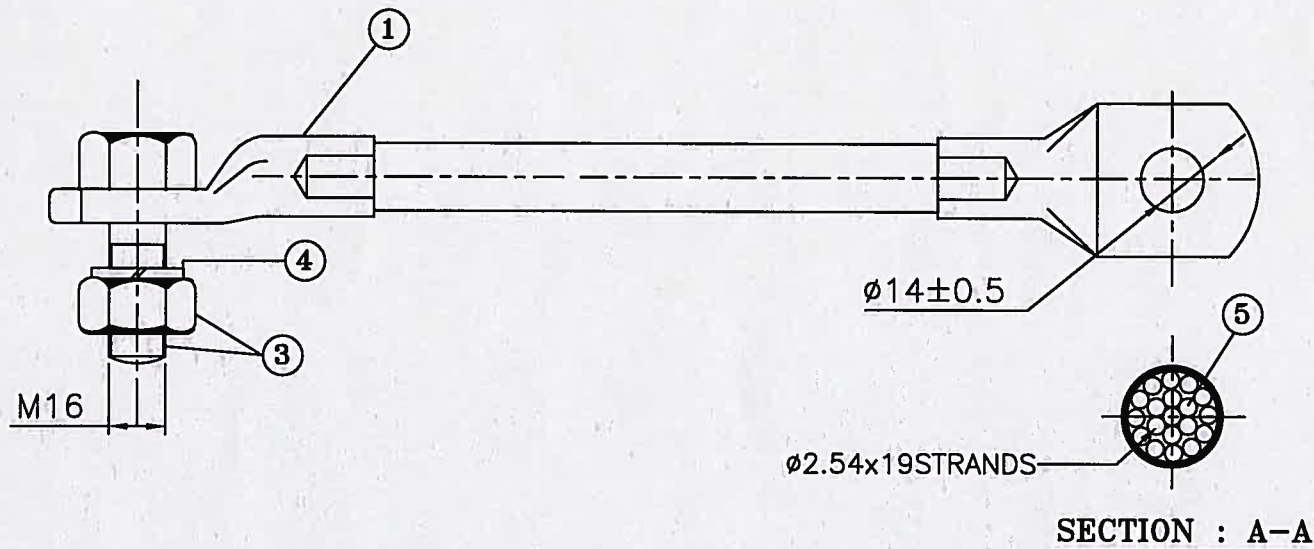
Down lead clamps to be provided at a distance of about 1.5m each

FOR BID PURPOSE ONLY

POWERGRID CORP. OF INDIA LTD.	
Project	765/400/220KV TRANSMISSION SYSTEM
TITLE	SHIELD WIRE EARTHING
DRG NO.	TL/EARTH/SW

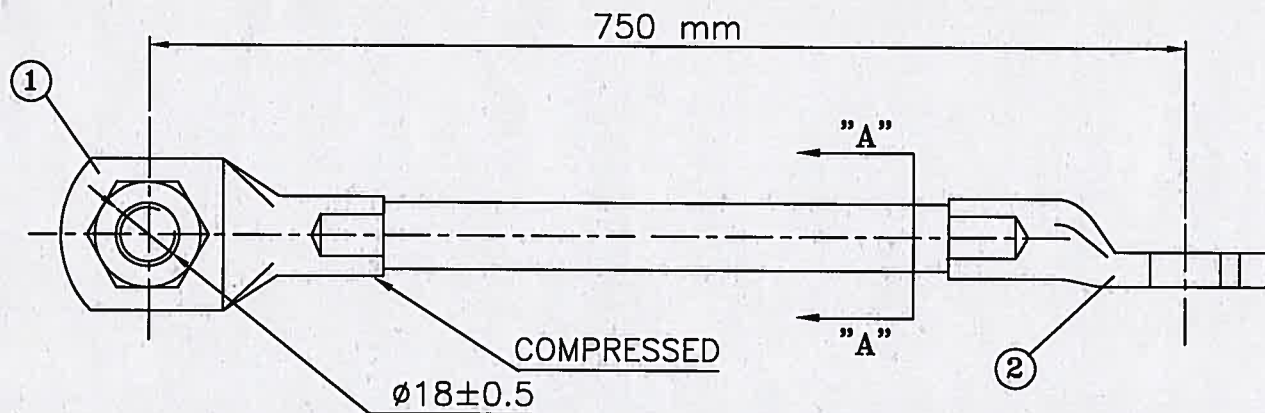


PIPE TYPE /COUNTER POISE EARTHING DEPENDING ON SOIL RESISTIVITY



TECHNICAL DETAILS:

- 1) ALL DIMENSIONS ARE IN MILLIMETER
- 2) GENERAL TOLERANCES $\pm 3\%$
- 3) ALL FERROUS PARTS ARE HOT DIP GALVANISED AS PER PGCB SPECIFICATION
- 4) TOTAL MASS: 0.48 kg (APPROX.)
- 5) SLIP STRENGTH 3 KN (MIN)



**POWER GRID CORPORATION
OF INDIA LIMITED**
(A. GOVERNMENT OF INDIA ENTERPRISE)

SCALE : NOT TO SCALE	
DRAWN	NK
CHECKED	SK
APPROVED	AKV
DATE	30.9.2015

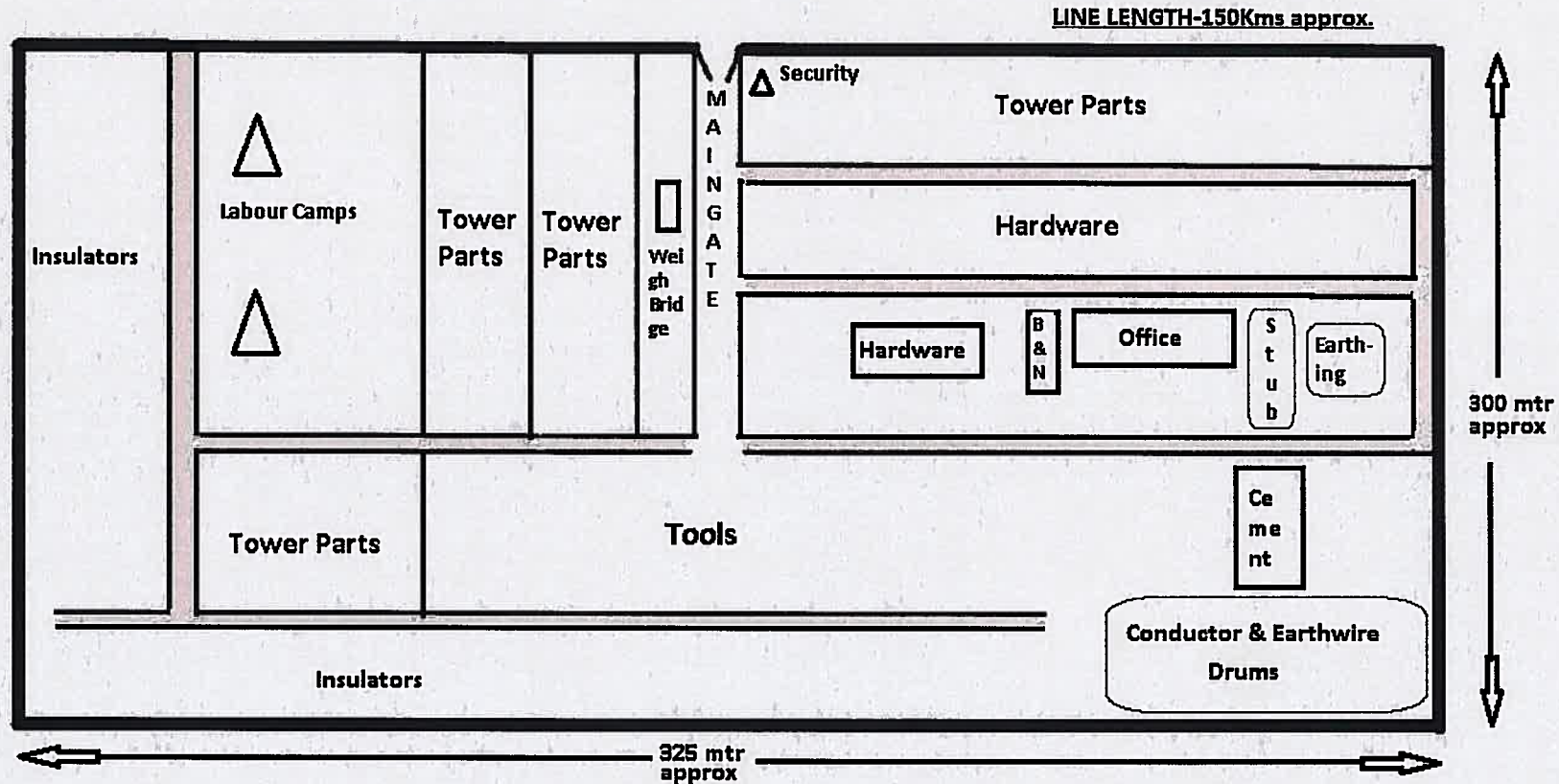
TITLE :
ALUMINIUM BOND FOR EARTHWIRE

NO.	DESCRIPTION	MATERIAL	GRADE	QTY.
5	FLEXIBLE BOND WIRE (100mm ²)	ALUMINIUM ALLOY	TYPE B, IEC 60104	1
4	SPRING WASHER	SPRING STEEL	IS 4072 & IS 3083	1
3	HEX BOLT & NUT (M16 X 40 MM)	MILD STEEL	IS 1367 CL 5.6/5.0	1
2	CONNECTING LUG	ALUMINIUM ALLOY	19500/IS 733 CL 5.6/5.0	1
1	CONNECTING LUG	ALUMINIUM ALLOY	ALUMINIUM ALLOY	1

DRG. NO : CC:ENGG:TL:AL BOND:EW

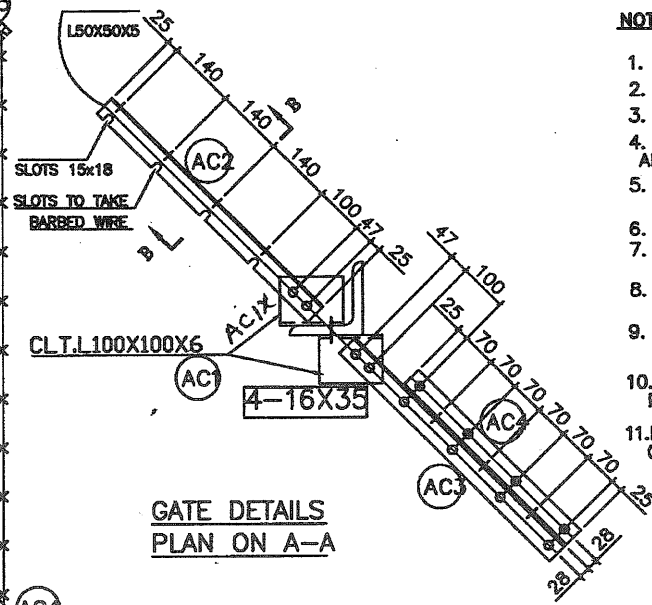
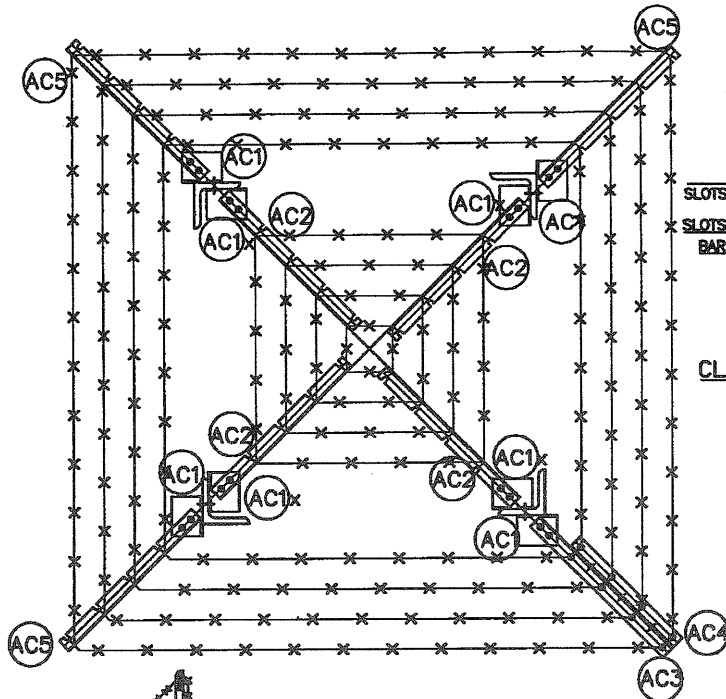
REVISION

TYPICAL DRAWING FOR STORAGE OF MATERIAL UNDER TRANSMISSION LINE PACKAGES



Note:

1. Cement bags shall be stored and stacked off the floor on wooden planks having 150mm to 200mm clearance from the ground in a covered building or shed
2. Structural steel shall be stored above ground level at least 150mm and shall be kept at an inclination to facilitate easy drainage of any water collected. Also, in order to prevent white rust formation, sufficient care shall be taken.
3. All the Conductor & Earthwire Drums shall be stored at a proper hard platform above ground.
4. All the Hardware fittings, accessories and Insulators shall be stored at raised platform above ground. All the aluminium parts shall be stored under a covered shed.
5. Reinforcement bars shall be stacked above ground level by atleast 150mm.
6. Detail description of storage may be referred in Clause 1.11 of Section-II of Technical Specification.
7. The above drawing is indicative only and may be moderated depending on the site condition.



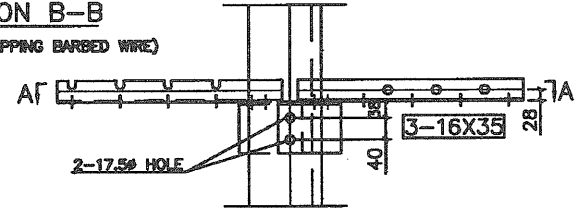
GATE DETAILS
PLAN ON A-A

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL HOLES ARE 17.5MMØ FOR 16MMØ BOLTS.
3. BLANK HOLES AT GATE ARE TO RECEIVE BARBED WIRE.
4. STD. SPRING WASHER TO BE SUPPLIED WITH EACH BOLT AND SHALL CONFORM TO IS : 3063(type B)&1573 SERVICE GRADE-4.
5. ALL STEEL SHALL BE HOT-DIP GALVANISED. AS PER IS : 2629.
6. ALL STEEL SHALL CONFORM TO IS : 2062 GRADE A
7. GALVANISED STEEL BARBED WIRE SHALL CONFORM TO A-1, IS : 278.
8. BOLT TO BE CONFORMING TO IS:12427-2001 Gr. 5.6 & NUT CONFORMING TO IS:14394-1996 (Gr. 5)
9. BOLT / NUT TO BE HOT DIP GALVANIZED AS PER IS:1367 (P-13) - 1983.
11. NOMINAL LENGTH OF BARBED WIRE SHALL BE WORKED OUT AS PER FOLLOWING FORMULAE:
 $L = B + (X - 3.5) \times 2 \times \tan \theta \times N$
 B= B/B Width at CL for Normal Tower in Mtrs.
 X= Height of Body Extn If any in Mtrs.
 N= NUMBER OF BARBED WIRE TURNS
 θ = TOWER SLOPE

VIEW ON B-B

(METHOD OF WRAPPING BARBED WIRE)



BILL OF MATERIAL

MARK NO	SECTION	LENGTH (mm)	QTY NOS
AC1/AC1X	L 100x100x6	128	4+4=8
AC2	L 50x50x5	617	4
AC3	L 50x50x5	617	1
AC4	L 50x50x5	470	1
AC5	L 50x50x5	617	3

S.NO	SIZE	QTY
1	STUB THICK.(mm) 7-11 12-16 17-21 22-26 LENGTH OF M16 BOLT (mm) 45 50 55 60	8
2	M-16 x 35LG	19
3	16MM DIA 3.5MM THK.SP.WASHER	27

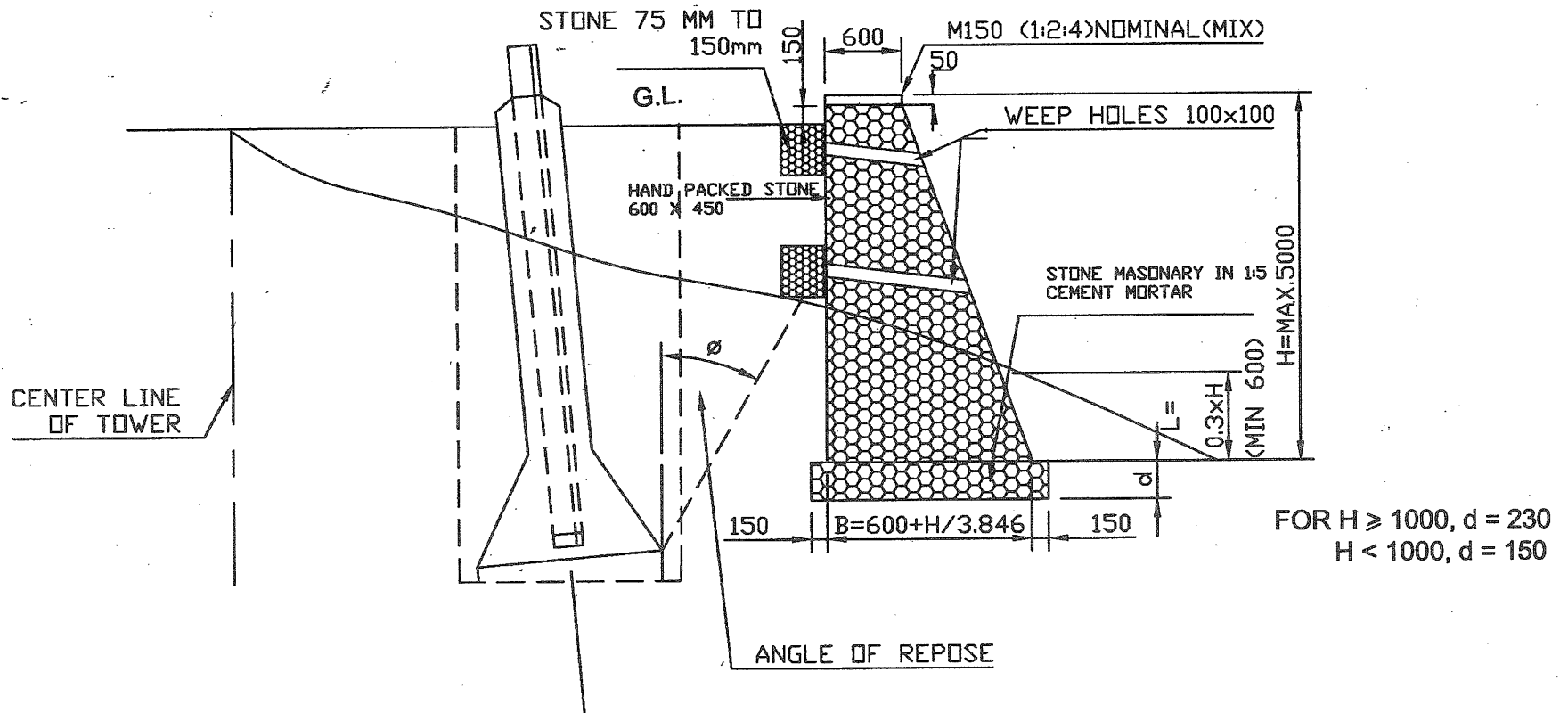
STANDARD DRAWING

POWER GRID CORPORATION
OF INDIA LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)



REVISION					PROJECT:	
					765/400/220KV TRANSMISSION SYSTEM	
					TITLE:	
					ANTICLEIMBING DEVICE	
					CLEARED BY	
REV. No	DESCRIPTION	CHG	DATE	APPROVED	DATE	REV.
DRAWING NO.-CGE/POC/TL/ACC/ACD						REV. 0
sheet 1/1						

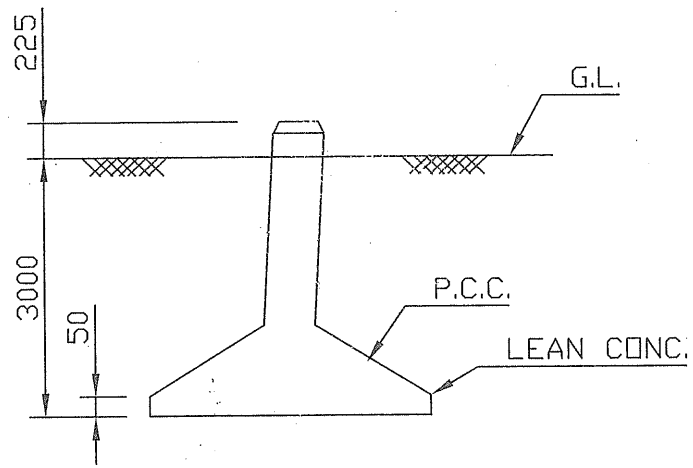


NOTES

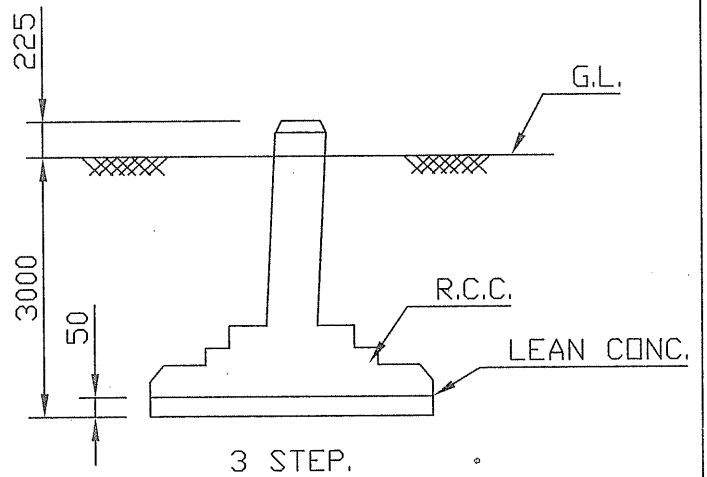
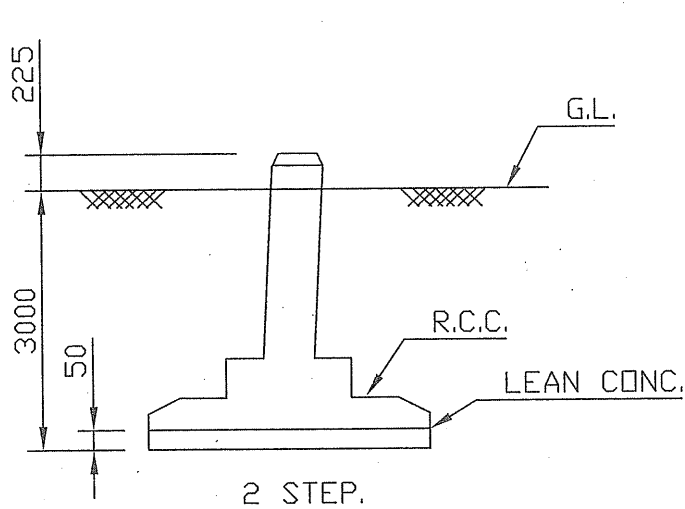
- 1 : ALL DIM. ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 : WEEP HOLES SHOULD BE OF SIZE 100mm x 100mm OR 150mm x 150mm INCASE OF LARGE SIZE REVETMENT.
- 3 : WEEP HOLES SHOULD BE 2.5m C-C APART HORIZONTAL
- 4 : CENTER OF TOP MOST WEEP HOLES TO BE NOT LESS THAN 300 mm BELOW TOP
- 5 : THE MIN. DEPTH OF REVETMENT WALL BELOW G.L. WILL BE 600mm
- 6 : DIM. 'B' ARE VALID ONLY FOR 'H' NOT EXCEEDING 5.00 METER
- 7 : SIZE OF STONE FOR MASONRY WORK. 300 x 150 x 150 & BELOW
- 8 : THE MASONRY WORK SHOULD BE CARRIED OUT IN 1:5 CEMENT MORTAR
- 9 : SIZE OF STONE PACKING AT WEEP HOLE 75 mm TO 150mm

FOR BID PURPOSE ONLY

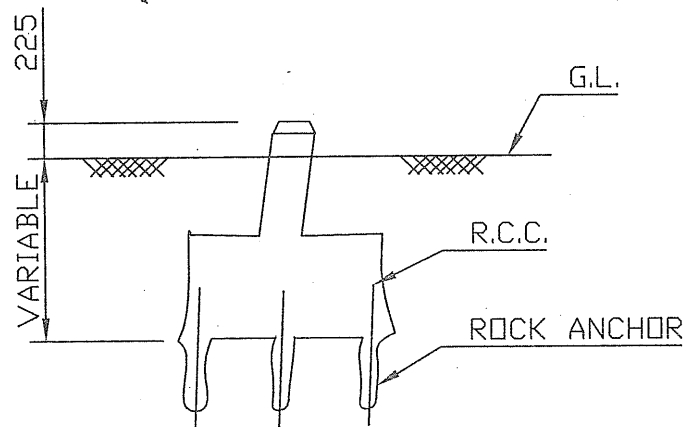
POWER GRID CORP. OF INDIA LTD.	
PROJECT	XV TRANSMISSION SYSTEM
TITLE	PROTECTION OF TOWER FOOTING (DOWN/UP HILL)
DRG. NO.	TL/STD/PTF
REV.	0



TYP. FOUNDATION SHAPE FOR P.C.C. TYPE



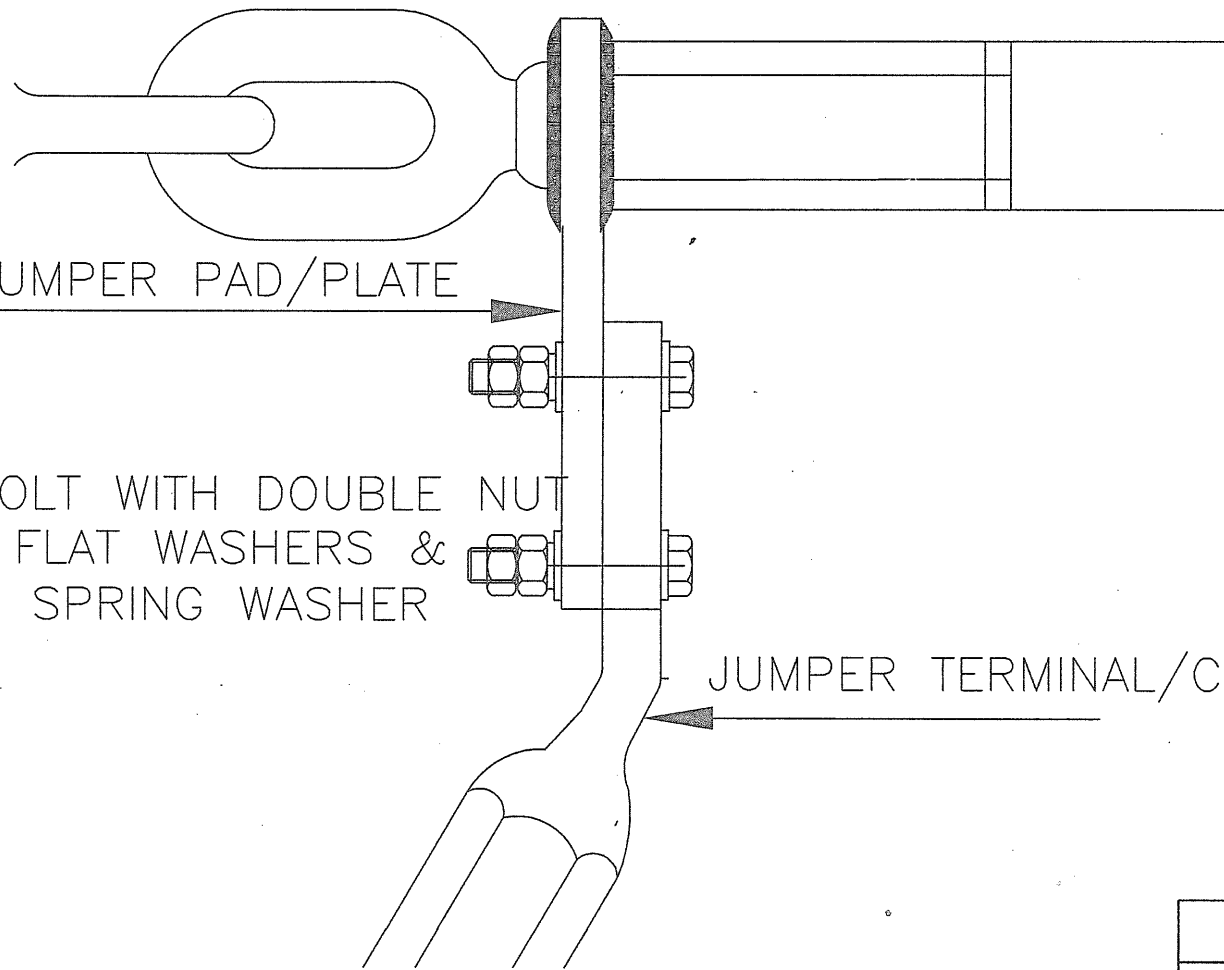
TYP. FOUNDATION SHAPE FOR R.C.C. TYPE



TYP. FOUNDATION SHAPE FOR HARD ROCK

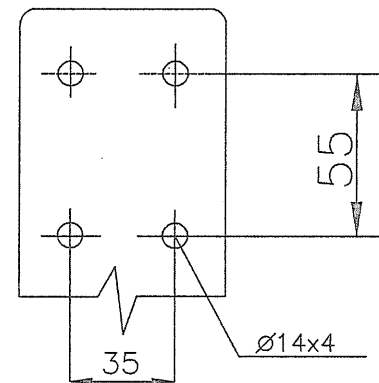
FOR BID PURPOSE ONLY

POWERGRID CORP. OF INDIA LTD.	
PROJECT	TRANSMISSION SYSTEM
TITLE	TENTATIVE SHAPE OF TOWER FOOTINGS
DRG. NO.	TL/STD/TF
REV.	0



NOTES

1. ALL DIMENSION ARE IN MM.



M12 BOLT WITH DOUBLE NUT
, 2 FLAT WASHERS &
1 SPRING WASHER

JUMPER TERMINAL/CONE

FOR BID PURPOSE ONLY

JUMPER BOLTING ARRANGEMENT

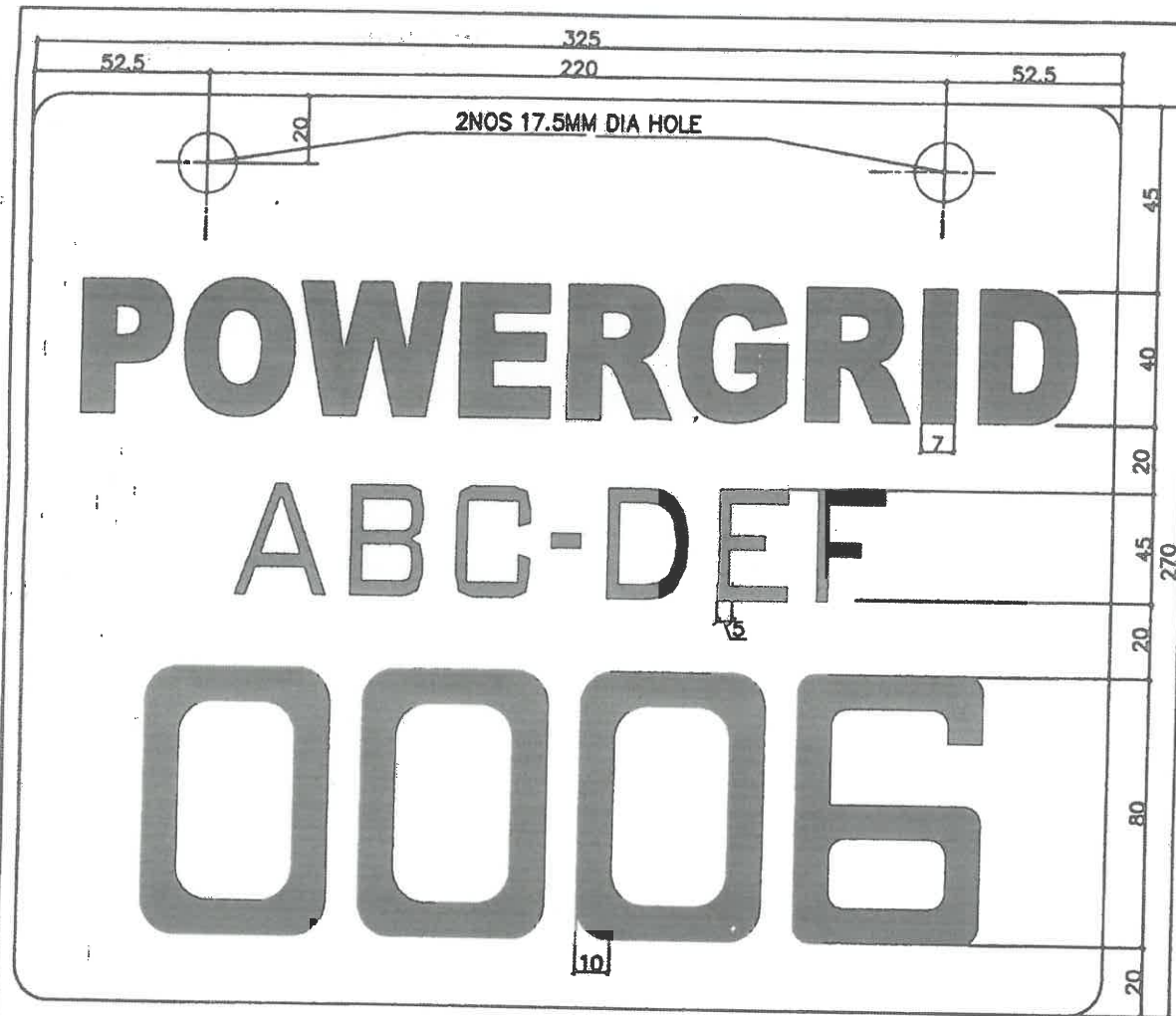
POWERGRID CORP. OF INDIA LTD.

Project 765/400 KV. TRANSMISSION SYSTEM

TITLE DEAD END ASSEMBLY
JUMPER BOLTING ARRANGEMENT

DRG NO. TL/STD/DRG/JUMPER BOLTING

Rev
0



NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. LETTERING: RED ENAMELLED.
3. BACKGROUND: WHITE VITREOUS ENAMELLED.
4. BACK: BLACK VITREOUS ENAMELLED.
5. MINIMUM 1.6THK. M.S. PLATE AS PER IS:1079-2017 (Grade-HR1) / IS 513-2016 (Grade-Gr1)
6. EACH NUMBER WILL HAVE FOUR DIGITS AS SHOWN. NUMBERS TO BE STARTED FROM '0001' ONWARDS.
7. GENERAL TOLERANCE $\pm 3\%$ UNLESS OTHERWISE SPECIFIED.
8. THE CORNERS OF THE PLATES SHOULD BE ROUNDED OFF.
9. ALL LETTERS SHOULD BE CENTRALLY SPACED.
10. BOLT / NUT TO BE GALVANIZED AS PER IS:1367 (P-13) - 1933.

ABC CODE FOR SENDING END AND DEF CODE FOR RECEIVING END.
TO BE FURNISHED BY SITE IN-CHARGE.

LIST OF 16mm BOLTS, NUTS & WASHER
TO BE SUPPLIED WITH EACH PLATE

DETAILS	QTY
M-16x35MM LONG HRH BOLT AS PER IS:12427-2001 CLASS 5.6 AND NUT AS PER IS:14394-1996 CLASS 5	2
2MM THK. LEAD WASHER	4

STANDARD DRAWING

**POWER GRID CORPORATION
OF INDIA LIMITED**
(A GOVERNMENT OF INDIA ENTERPRISE)



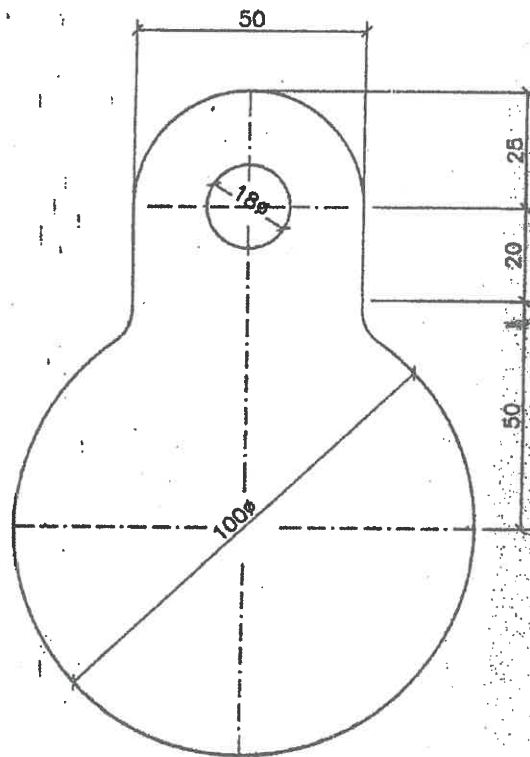
PROJECT: 765/400/220KV TRANSMISSION SYSTEM / 1/12/16

TITLE: TOWER NUMBER PLATE

REVISION						CLEARED BY		SCALE	DRAWING NO:	REV.
1	Refer Note B					Checked	Initialed	N/A	06ENG06/TLACC/THP	1
REV. NO.	DESCRIPTION	CHKD	REVISED	APPR	APPROVED	CHKD	INITIALED	N/A		

MGR(ENGG-TL)

DGM(ENGG-TL)



TOWER PHASE PLATE

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. \triangle M.S. PLATE-1.6MM THK.(MIN) AS PER IS:1079 - 2017 (Grade-HR1) / 513-2016 (Grade-CR1)
3. PHASE PLATE TO BE ENAMLED RED, YELLOW AND BLUE ON FRONT AND BACK.
4. GENERAL TOLERANCE $\pm 3\%$ UNLESS OTHERWISE SPECIFIED.
5. PHASE PLATE SHALL BE AS PER IS:5613 (PART-2).
6. BOLT / NUT TO BE GALVANIZED AS PER IS:1367 (P-13) - 1983.
7. QUANTITY PER SET: ONE PLATE EACH OF RED, YELLOW & BLUE.
8. ONE SET FOR EACH CIRCUIT IS TO BE SUPPLIED.

**LIST OF 16mm ϕ BOLTS, NUTS & WASHER
TO BE SUPPLIED WITH EACH SET**

DETAILS	QTY
M-16x35MM LONG HRH BOLT AS PER IS:12427-2001 CLASS 5.6 AND NUT AS PER IS:14394-1996 CLASS 5	3
2MM THK. LEAD WASHER	6

STANDARD DRAWING

**POWER GRID CORPORATION
OF INDIA LIMITED**
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PROJECT: 765/400/220KV / 132 KV
TRANSMISSION SYSTEM

TITLE: PHASE PLATE

REVISION					CLEARED BY			SCALE	DRAWING NO:	REV.
1	Refer to Note-2				CHECKED	REVIEWED	APPROVED	K.T.S.	CC:ENGG-TLACC:PP	1

MGR(ENGG-TL) DGM(ENGG-TL)