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CERTIFIED

পাওয়ার গ্রিড কোম্পানি অফ বাংলাদেশ লিঃ

POWER GRID COMPANY OF BANGLADESH LTD.

(An Enterprise of Bangladesh Power Development Board)

QF-DGN-01

TITLE: DOCUMENT/DRAWING APPROVAL/COMMENT TRANSMITAL

PROJECT: Design, Supply and Installation of Package-7: 132kV Rampur-Agrabad Underground Cable Transmission Line and In-Out of Halishahar-Khulshi 132kV Transmission Line to Rampur Substation through Underground Cable on Turnkey Basis. (Contract No.: PGCB/JICA/BD-P70/P7. DATE: 23.12.2015)

REF: ETERN-LS/PGCB/P-7-083; Date: 18/10/2016.

SUBJECT: Revised Monopole Drawing with Calculation .

To,
The Project Director & Chief Engineer
National Power Transmission Network Development Project
Power Grid Company of Bangladesh Limited
17 Mohakhali,
Dhaka, Bangladesh.

Copy to,

☒	Executive Director (P & D), PGCB
☒	Chief Engineer (P & D/Projects), PGCB
☒	Executive Engineer (TLD-1), PGCB
☒	ETERN-LS
☒	Master File/Office File

Dear Sir,

We are pleased to enclose the following document with relevant comment for the purpose indicated below:

In case of any modification other than those desired are carried out, the same shall be highlighted clearly in the Drawing/Document with full justification thereof and resubmitted for approval.

Approval/Comments/Information conveyed herein neither relieves the contractor of his contractual obligation and his responsibilities for correctness of dimensions, material of constructions, weight, quantities, design details, assemble fits, performance particulars and conformity of the supplies with the Statutory Laws of Bangladesh as may be applicable, nor does it limit the Employer's right under the contract."

Issued by:

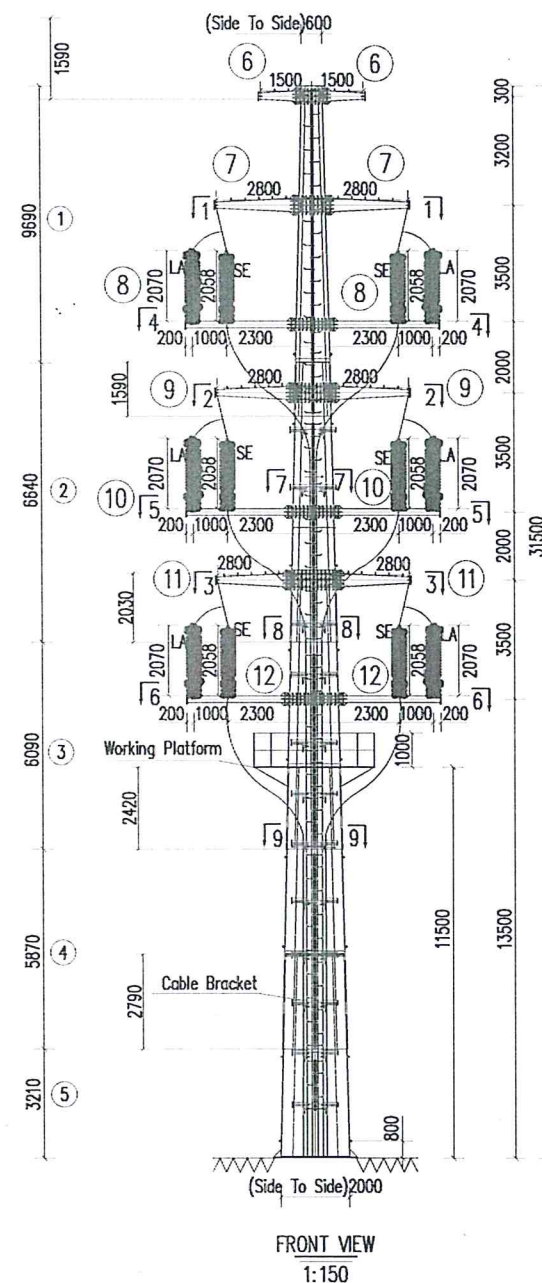
(Abdur Rashid Khan)
Superintending Engineer (TLD)
Design & QC, PGCB

Our Ref: 04/PGCB/SE (TLD), Design & QC/2016/508
Date: 06/11/2016

Item No	Description of Drawing/ Documents	Drawing / Document Number	Revision No.	Status	Enclosed
01	P7/132kV UG/MP/001	Outline drawings for tension and terminal pole 1DT6P	02	Approved (A) ☐	Yes ☒
02		Design calculation for loading 1DT6P	-	Approved with Comments (AC) ☒	
03	-	Analysis result of 1DT6P	-	Request for re-Submission (RR) ☐	No ☐
04	-	Pole weight	-	For information (FI) ☐	
				Comment (C) ☐	
Comment: This approval is subjected to the successful full scale proof test.					

Please acknowledge receipt of documents:

Received by	Date



SECTIONAL DIMENSIONS OF THE ARM			
TYPE	BASE DIA (mm)	TOP DIA (mm)	THICKNESS (mm)
GROUND WIRE CROSS ARM	300	180	8
CONDUCTOR CROSS ARM	400	180	10
BRACKET CROSS ARM	200	200	10

SECTIONAL DIMENSIONS OF THE POLE					
SECTION	LENGTH OF SECTION (mm)	OVER LAPPING (mm)	THICKNESS OF THE SECTION (mm)	OUTER DIAMETER TOP (mm)	OUTER DIAMETER BOTTOM (mm)
TUBE 1	9690	1590	12	600	1070
TUBE 2	8230	2030	14	970	1388
TUBE 3	8120	2420	18	1242	1635
TUBE 4	8290	2790	20	1482	1886
TUBE 5	6000	0	22	1710	2000

POWER GRID COMPANY OF BANGLADESH
APPROVED WITH COMMENT

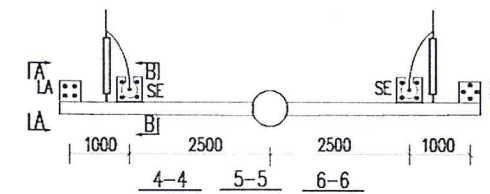
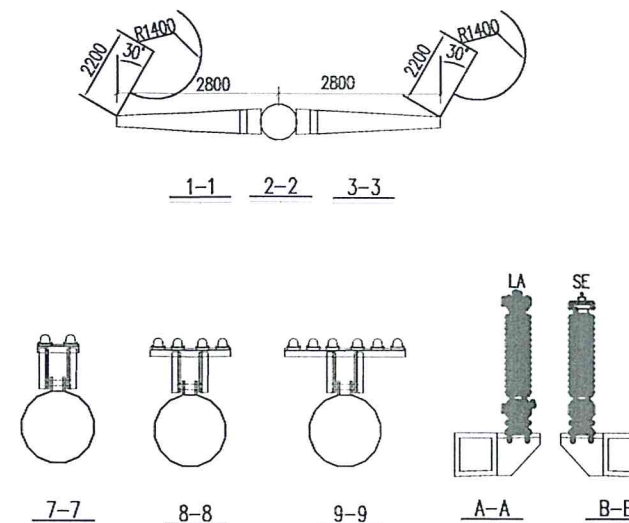
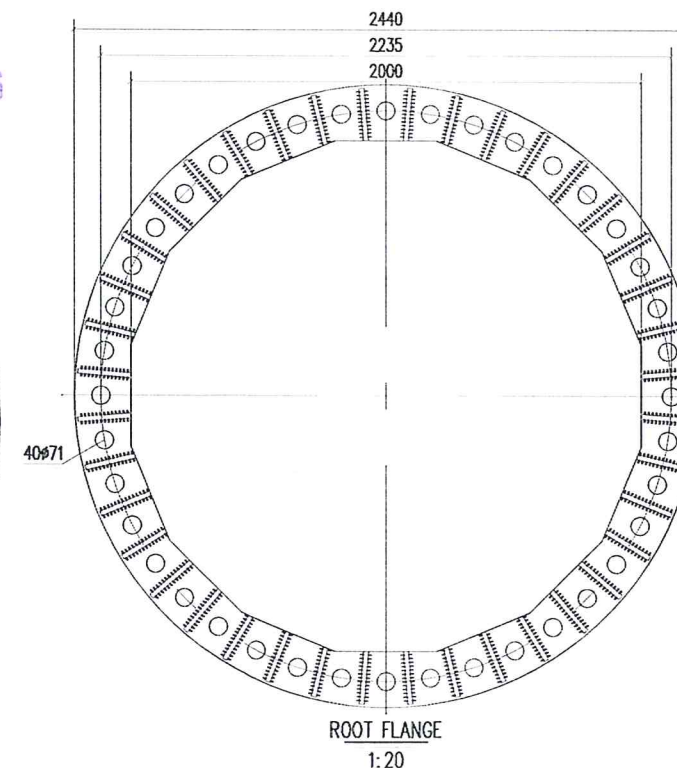
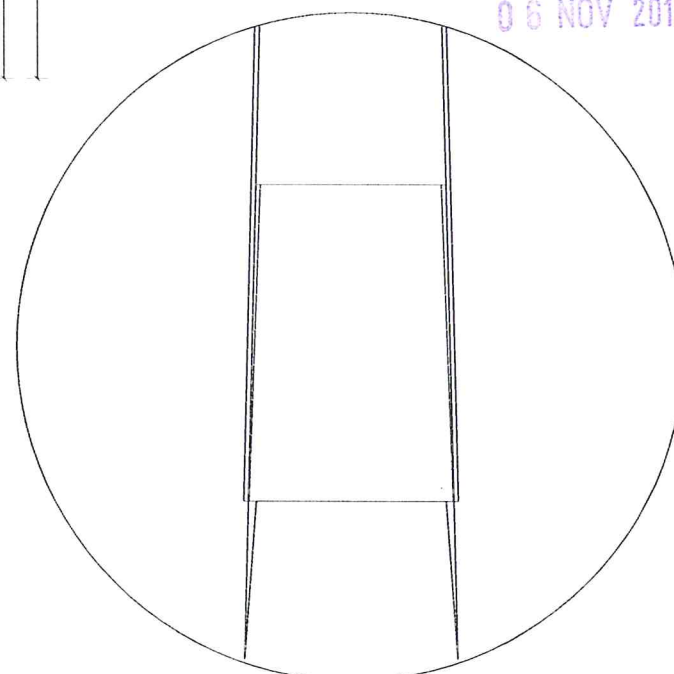
This approval is general only and does not
Release the manufacturer/contractor/supplier
From compliance with specification and
Standards for Design workmanship and
Performance as stipulated in the contract

Mulamil
(Shafi Hasan Jamil)
Assistant Engineer
Design & Quality Control
PGCB Ltd.

Banor
(Engr. S.M. Zafrul Hasan)
Executive Engineer (TL-1)
Design & Quality Control
PGCB

mm
(Abdur Rashid Khan)
Superintending Engineer (TLD)
Design & Quality Control
PGCB Ltd.

06 NOV 2016



COMMENT:- THIS APPROVAL IS
SUBJECTED TO THE
SUCCESSFUL PROOF
TEST.

NOTE:

THE STANDARDS FOR MATERIAL, FABRICATION, WORKMANSHIP, GALVANIZING, WELDING, INSPECTION, ETC

1. MATERIAL SPECIFICATION:

2. THE MATERIAL MARKED WITH "Q345" SHOULD BE HIGH STRENGTH STEEL GRADE "Q345" IN ACCORDANCE WITH GB/T 1591. OTHERS SHOULD BE MILD STEEL GRADE "Q235" IN ACCORDANCE WITH GB/T 700.

2. ANCHOR BOLT IS 45# GRADE;
CROSS ARM CONNECTION BOLT GRADE 8.8,
OTHER CONNECTION BOLT GRADE 6.8,

3. ISO 680, ISO 4016, ISO 4034, AND ISO 7092 FOR BOLT, NUTS AND WASHER.

4. ISO 1461 FOR GALVANIZING, THE EQUIVALENT THICKNESS OF GALVANIZING, EQUAL TO 85 MICRON, 610 gm/sq. mm

5. BS EN 61011-1 AND 2, PROCESS OF ARC WELDING OF CARBON AND CARBON MANGANESE STEEL.

6. ALL MEMBERS SHALL BE HOT DIP GALVANIZED AND PASSIVATED.

PASSIVATION BY DICHROMATE CONVERSION PLIM PROCESS AS PER ASTM B-117-90, ASTM B-201-89.

7. ALL UNITS ARE mm.

WEIGHT SUMMARY

Name of Section	Weight of Members (kg)	Weight of Bolts (kg)	Subtotal (kg)
Tube 1	3264.1	0.0	3264.1
Tube 2	4148.7	9.2	4157.9
Tube 3	6226.5	18.4	6244.9
Working Platform	614.1	22.4	636.5
Tube 4	8036.2	7.4	8043.6
Tube 5	7549.2	4.9	7554.1
Ground Wire Cross Arm	215.2	46.6	261.8
Top Conductor Cross Arm	557.1	46.6	603.7
TOP Bracket	415.0	35.0	450.0
Middle Conductor Cross Arm	543.4	46.9	590.3
Middle Bracket	402.1	35.0	437.1
Bottom Conductor Cross Arm	516.9	46.9	563.8
Bottom Bracket	389.5	35.0	424.5
Single Ladders	312.1	4.4	316.5
Anchor Bolts	868.3	222.4	3088.7
Total			36637.5 kg

DESIGN PARAMETERS

Type	1DTBP
Standard Height	17m
Voltage Level	132KV
Type	Terminal
Line Angle	0° - 30°
Wind Span	185m
Max Weight Span	263m
Min Weight Span	0m
Max Wind (conductor)	52.7 m/s
Max Wind (OPGW)	57.97 m/s
Ice Thickness	0 mm
Type	24C OPGW
Diameter	10.8 mm
U.T.S.	81440 N
Type	HS GSW
Diameter	10.8mm
U.T.S.	81440N
Type	Grobsack
Diameter	25.15 mm
U.T.S.	114000 N
Bundle	1



02	Design	Approved	Mono Pole	17/10/2016
01	Design	Approved	Mono Pole	25/09/2016
Revision	Designed by	Approved by	Content	Date
Employer	Power Grid Company of Bangladesh Limited (PGCB)			
Contractor	ETERN-LS Consortium			
Project	Design, Supply and Installation of Package-7: 132KV Rampur-Agrabad. Underground Transmission Line and In-Out of Halishahar-Kulshi 132KV Transmission Line to Rampur S/S Through Underground Cable on Turnkey Basis.			
Designer	ETERN-LS Consortium			
Contract No.	Contract No: PGCB/JICA/BD-P70/P7			
Title	OUTLINE DRAWINGS FOR TENSION & TERMINAL POLE "1DTBP (25-60° & 0-60°)"			
Drawn	Designed by	Checked by	Approved by	Date
Scale		Dwg. No.	P7/132KV UG/M/P7000	Rev. 02

1. Summary Results For 1DT6P

Project Name : 132kV Rampur-Agrabad Underground Cable Transmission Line
 Project Notes: 1DT6P
 Project File : D:\2016\132kV Rampur-Agrabad Underground Cable Transmission Line\1DT6P\1DT6P.pol
 Date run : 9:11:14 2016年10月14日
 by : PLS-POLE Version 12.50
 Licensed to : Chongqing Home Engineering Design Consulting Co Ltd - China

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: d:\2016\132kv rampur-agrabad underground cable transmission line\1dt6p\1dt6p\20161012.lca

*** Analysis Results:

Maximum element usage is 98.22% for Steel Pole "S" in load case "5. Normal condition wind 30o (Max angle and max wt. span)"
 Maximum insulator usage is 0.00% for Clamp "3" in load case "9. Normal condition wind 0o (Max angle and max wt. span)"
 Maximum pole deflection usage is 78.74% for "S" in load case "5. Normal condition wind 30o (Max angle and max wt. span)No Factor"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kN)	Tran. Force (kN)	Vert. Force (kN)	Shear Force (kN)	Tran. Moment (kN-m)	Long. Moment (kN-m)	Bending Moment (kN-m)	Vert. Moment (kN-m)	Found. Usage %
1. Normal condition wind 45o (Max angle and max wt. span)	S:g	-803.59	-579.11	-399.81	990.52	12217.86	-17698.77	21506.34	-3.51	0.00
2. Normal condition wind 45o (Max angle and min wt. span)	S:g	-803.59	-579.11	-353.66	990.52	12203.54	-17677.16	21480.42	-3.51	0.00
3. Normal condition wind 45o (Min angle and max wt. span)	S:g	-803.62	-282.79	-398.87	851.93	5015.90	-17701.15	18398.10	-1.26	0.00
4. Normal condition wind 45o (Min angle and min wt. span)	S:g	-803.63	-282.79	-352.72	851.93	5010.55	-17679.53	18375.84	-1.26	0.00
5. Normal condition wind 30o (Max angle and max wt. span)	S:g	-735.84	-657.92	-399.56	987.07	13712.49	-16602.13	21532.84	-3.71	0.00
6. Normal condition wind 30o (Max angle and min wt. span)	S:g	-735.84	-657.92	-353.41	987.08	13696.52	-16581.63	21506.86	-3.70	0.00
7. Normal condition wind 30o (Min angle and max wt. span)	S:g	-735.88	-361.62	-398.24	819.93	6511.36	-16604.63	17835.68	-1.47	0.00
8. Normal condition wind 30o (Min angle and min wt. span)	S:g	-735.88	-361.62	-352.09	819.93	6504.35	-16584.12	17814.03	-1.46	0.00
9. Normal condition wind 0o (Max angle and max wt. span)	S:g	-592.71	-730.36	-398.79	940.60	15115.63	-14407.02	20881.68	-3.67	0.00
10. Normal condition wind 0o (Max angle and min wt. span)	S:g	-592.71	-730.36	-352.64	940.60	15098.08	-14388.68	20856.32	-3.66	0.00
11. Normal condition wind 0o (Min angle and max wt. span)	S:g	-592.76	-434.07	-396.84	734.70	7914.75	-14409.91	16440.47	-1.43	0.00
12. Normal condition wind 0o (Min angle and min wt. span)	S:g	-592.77	-434.07	-350.69	734.70	7906.16	-14391.56	16420.25	-1.43	0.00
1. Normal condition wind 45o (Max angle and max wt. span)No Factor	S:g	-401.87	-289.62	-324.93	495.36	6101.83	-8838.38	10740.08	-0.88	0.00
2. Normal condition wind 45o (Max angle and min wt. span)No Factor	S:g	-401.87	-289.62	-301.86	495.36	6098.26	-8832.99	10733.61	-0.88	0.00
3. Normal condition wind 45o (Min angle and max wt. span)No Factor	S:g	-401.88	-141.42	-324.70	426.03	2505.22	-8838.67	9186.85	-0.32	0.00
4. Normal condition wind 45o (Min angle and min wt. span)No Factor	S:g	-401.88	-141.42	-301.63	426.03	2503.89	-8833.28	9181.30	-0.32	0.00
5. Normal condition wind 30o (Max angle and max wt. span)No Factor	S:g	-367.97	-329.03	-324.87	493.63	6818.51	-8290.23	10753.14	-0.93	0.00
6. Normal condition wind 30o (Max angle and min wt. span)No Factor	S:g	-367.97	-329.03	-301.80	493.63	6844.52	-8285.12	10746.66	-0.93	0.00
7. Normal condition wind 30o (Min angle and max wt. span)No Factor	S:g	-367.98	-180.84	-324.54	410.01	3252.00	-8290.55	8905.54	-0.37	0.00
8. Normal condition wind 30o (Min angle and min wt. span)No Factor	S:g	-367.98	-180.84	-301.47	410.01	3250.26	-8285.43	8900.14	-0.37	0.00
9. Normal condition wind 0o (Max angle and max wt. span)No Factor	S:g	-296.39	-365.24	-324.68	470.37	7548.76	-7193.71	10427.52	-0.92	0.00
10. Normal condition wind 0o (Max angle and min wt. span)No Factor	S:g	-296.39	-365.24	-301.62	470.37	7544.38	-7189.14	10421.20	-0.92	0.00
11. Normal condition wind 0o (Min angle and max wt. span)No Factor	S:g	-296.40	-217.05	-324.19	367.37	3952.28	-7194.08	8208.24	-0.36	0.00
12. Normal condition wind 0o (Min angle and min wt. span)No Factor	S:g	-296.40	-217.05	-301.12	367.37	3950.14	-7189.50	8203.20	-0.36	0.00

Summary of Tip Deflections For All Load Cases:

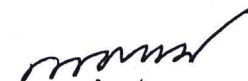
Note: positive tip load results in positive deflection

POWER GRID COMPANY OF BANGLADESH
 APPROVED

This approval is general only and does not
 Release the manufacturer/contractor/supplier
 From compliance with specification and
 Standards for Design workmanship and
 Performance as stipulated in the contract


 (Shahi Hasan Jamil)
 Assistant Engineer
 Design & Quality Control
 PGCB Ltd.


 (Engr. S.M. Zafrul Hasan)
 Executive Engineer (TL-1)
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 Superintending Engineer(TLD)
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06 NOV 2016