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KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

CIN No. U40109KA1999SGC025521

Corporate Office
Kaveri Bhavan, K.G Road,
Bengaluru - 560 009

No. KPTCL/B19/345/85-86

Date: 25.06.2021

CIRCULAR

Sub: Standardization of Tower designs to be adopted for construction of 110kV Transmission Lines in case of Turnkey/Partial Turnkey/DCW works of KPTCL and all Self-execution works - reg.

Ref: 1) Note No. CEE(P&C)/SE(T)/EETL/AEE-9 dated 21.04.2021 of CEE(P&C), KPTCL.
2) Note approved by the Managing Director, KPTCL on 24.06.2021

The existing 110kV & 66kV DC Transmission Line Towers being used for various Transmission Line works presently are of M/s. Kalpatharu design and have been type tested as per the old code IS:802 (Part-I)-1977.

However, it is observed that these Transmission Towers are highly vulnerable to the present high wind loads especially due to whirl wind loads during monsoon season which has led to yielding of Suspension Type Towers. The major limitations of these type of Transmission Towers are space requirement (wider base-RoW issues), mechanical strength, problems faced by field staff during tower erection, repeated failure of towers during heavy winds and other technical parameters.

Hence, in order to overcome the difficulties, Corporation has taken a decision to adopt Transmission Line Towers with robust structural design and optimum space requirement as per the latest version of Indian Standards IS:802 (Part-I/Sec-I)-2015, IS:802 (Part-I/Sec-II)-2016 & CBIP Manual.

110kV DC Towers were designed as per the latest Indian Standard IS:802 (Part-I/Sec-I)-2015, IS:802 (Part-I/Sec-II)-2016 & CBIP Manual by Turnkey contractor, M/s. Kalpatharu Power Transmission Ltd., for the work of construction of 110kV DC Line for establishing 2x100MVA, 220/110/11kV Sub-station in the premises of M/s. AEQUS SEZ Pvt. Ltd, at Hattargi in Belagavi

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District and the same have been evaluated and the complete towers with +6M body extension of type 'DA', 'DB', 'DC' & 'DD' were proto-type tested successfully at the tower test bed of M/s. Kalpataru Power Transmission Ltd, Gandhinagar.

Henceforth, the following shall be scrupulously followed for construction of 110kV SC/DC Transmission Lines in case of Turnkey/Partial Turnkey/DCW works of KPTCL and all Self-execution works:

1. The existing 110kV DC tower design of M/s. Kalpataru is made obsolete and shall not be used for construction of 110kV Transmission Lines.
2. The newly designed 110kV DC towers of M/s. Kalpataru for the project work of establishing 2x100MVA, 220/110/11kV Sub-station in the premises of M/s. AEQUS SEZ Pvt. Ltd, at Hattargi in Belgavi District is standardized and shall only be used for construction of 110kV SC/DC Transmission Lines in case of Turnkey/Partial Turnkey/DCW works executed by KPTCL and all Self-execution works.
3. This design shall be named as **110kV DC Towers of M/s. Kalpataru design adopted for AEQUS project.**

The technical parameters for new designs with weight of tower structures and volumes for excavation and concreting in respect of 110kV DC Towers as annexed to this Circular shall be adopted for estimation as well as for construction of 110kV SC/DC Transmission Lines along with the works under the stage of planning/survey/estimate/DPR preparation/Tendering/at the award stage/awarded and yet to be commenced with immediate effect.

The above shall come into effect from the date of issue of this Circular.

Any clarifications on the above shall be obtained from SEE (Technical)/SEE (Civil), O/o Chief Engineer Elec, P&C, KPTCL, Kaveri Bhavan, Bengaluru.

B.R. Hk 25/06/21
General Manager (Tech)
KPTCL

To:

1. All Chief Engineers Electricity, KPTCL
2. All Financial Advisors, KPTCL
3. All Superintending Engineers, Electy., KPTCL
4. All Controllers of Accounts, KPTCL
5. All Executive Engineers, Elect., KPTCL
6. All Deputy Controller of Accounts, KPTCL
7. SPS to Managing Director / Director (Transmission) / Director (Finance) / Director (A&HR) / Company Secretary / KPTCL, Kaveri Bhavan, Bengaluru.

Copy to:

1. ✓ The Superintending Engineer (Elect.), IT & MIS, with a request to arrange to upload this Circular in KPTCL website.

Details of Approved tower weights for 110KV D/C Transmission line towers to be adopted as per circular (M/s. KALPATARU DESIGN for AEQUS line)

Type of Tower		Base width (B/B) in Mtrs.	Tower weight in Kgs		Bolts, Nuts & Washers in kgs	Stub weight in kgs		Bolts, Nuts & Washers in kgs
			HT	MS		HT	MS	
DA (0 - 2deg)	NT	3.50	942.96	1911.00	135.45	147.00	-	3.24
	3 ME	3.95	169.44	332.88	20.28			
	6 ME	4.41	366.24	689.80	40.19			
DB (0 - 15deg)	NT	4.50	1587.90	2058.68	181.35	210.44	-	4.86
	3 ME	5.12	257.12	435.08	28.07			
	6 ME	5.75	594.00	849.88	55.87			
DC (15 - 30deg)	NT	5.00	2044.90	1862.02	203.68	236.88	-	4.86
	3 ME	5.71	310.68	450.08	31.46			
	6 ME	6.43	688.12	917.80	62.64			
DD (30 - 60deg) & DE: (0 - 15deg)	NT	5.50	2969.89	1649.00	204.10	301.56	-	6.86
	3 ME	6.27	414.24	463.64	32.13			
	6 ME	7.04	861.80	982.68	64.54			

DESIGN PARAMETERS:

1. The Towers are designed for:

Wind Zone - 2 (39 m/s)

Reliability Level - 1

Terrain category - 2

Normal Span Length : 320M

Lynx ACSR conductor & 7/3.15mm size earth wire

Weight Span details:

Particulars		DA	DB	DC	DD	DE
NC	Max.	640	640	640	640	256
	Min.	160	-640	-640	-640	-256
BWC	Max.	384	384	384	384	154
	Min.	80	-384	-384	-384	-154

Maximum Conductor Temperature : 85°C

Maximum Ground wire Temperature : 53°C

Tension at 32°C & FW : 3535Kgs

Tension at 32°C & NW : 1988Kgs

Maximum Sag at 85°C & NW : 7.373Mts

Bottom cross arm height from G.L : 14.1M



Superintending Engineer (Elect.) (Tech)
Technical Section
C/o the Chief Engineer (Elect.)
(Planning & Co-Ordination)
KPTCL, Kaveri Bhavan, Bangalore


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**BOO AS PER THE APPROVED DESIGN FOR 110KV DC TOWERS ADOPTED IN THE PROJECT OF ESTABLISHING 220KV SUBSTATION AT
AEQUS SEZ, HATTARGI VILLAGE, BELAGAVI DISTRICT- (KALPATHARU-NEW DESIGN)**

Tower Type	NDS	WBC	FSS	PSS	WET	DFR	SFR	PSFR	WFR	HR	1:03:06 Cmtr	M20 Cmtr	Steel Kgs
DA (NT,+3m,+6m)	34.68										0.39	3.42	161.00
		137.90									1.90	11.65	461.00
			84.91								1.11	7.87	308.00
				84.91							1.11	7.87	308.00
					50.92						0.62	5.50	222.00
						16.56					0.42	3.56	164.00
							65.35				1.36	9.06	355.00
											10.00	0.00	4.88
DB(NT,+3m,+6m)	49.45										0.60	5.02	318.00
		231.27									3.35	21.57	1223.00
			162.51								2.28	15.44	868.00
				162.51							2.28	15.44	868.00
					97.47						1.30	9.79	512.00
						38.59					0.86	6.46	381.00
							134.07				2.62	17.37	966.43
											11.03	0.00	5.45
DC(NT,+3m,+6m)	61.29										0.77	5.95	380.00
		261.71									3.82	24.55	1571.00
			187.23								2.66	17.85	1064.00
				187.23							2.66	17.85	1064.00
					115.32						1.57	11.54	651.00
						48.63					1.05	7.53	477.00
							157.46				3.04	20.03	1293.00
											11.03	0.00	5.45

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AEIOUS SEZ, HATTARGI VILLAGE, BELAGAVI DISTRICT- (KALPATHARU-NEW DESIGN)**

Tower Type	NDS	WBC	FSS	PSS	WET	DFR	SFR	PSFR	WFR	HR	1:03:06 Cmtr	M20 Cmtr	Steel Kgs
DD/DE(NT,+3m,+6m)	93.41										1.24	10.37	495.00
		342.19									5.08	32.58	2399.00
			257.24								3.75	24.82	1698.00
				257.24							3.75	24.82	1698.00
					164.28						2.31	16.49	1007.00
						75.17					1.55	12.11	589.00
							221.09				4.18	27.31	1934.00
											12.10	0.00	6.23



 07/06/2024

ಆಧೀನ ಅಧಿಕಾರಿಯರ (ಸಿಎಲ್)
ಮುಖ್ಯ ಇಂಜಿನಿಯರ (ವಿದ್ಯುತ್)
(ಯೋ. ಮತ್ತು ಸಂ.) ರವರ ಕಛೇರಿ
ಕೆ.ವಿ.ಪ್ರ.ಸಿ.ನಿ ಕಾವೇರಿ ಭವನ ಬೆಂಗಳೂರು