भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

विषय: प्रचालन समन्वय उप-समिति की 237 वीं बैठक की अतिरिक्त कार्यसूची।

Subject: Additional Agenda of the 237th OCC meeting.

प्रचालन प्रचालन समन्वय उप-समिति की **237** वीं बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **17.11.2025** को **10:30** बजे से किया जायेगा । उक्त बैठक की अतिरिक्त कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है ।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

The **237th** meeting of Operation Co-ordination Sub-Committee is scheduled to be held through Video Conferencing on **17.11.2025** from **10:30 Hrs**. The additional agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

Kindly make it convenient to attend the meeting.

DHARMENDER KUMAR MEENA
Digitally signed by DHARMENDER KUMAR MEENA
Date: 2025.11.13 15:53:09 +05'30'

(डी. के. मीना)
अधीक्षण अभियंता (प्रचालन)

सेवा में : प्रचालन समन्वय उप समिति के सभी सदस्य।
To : All Members of OCC

List of addressee (via mail)

OCC Members for FY 2025-26			
S. No.	OCC Member	Category	E-mail
1	NLDC	National Load Despatch Centre	nomination awaited (susha@grid-india.in)
2	NRLDC	Northern Regional Load Despatch Centre	somara.lakra@grid-india.in
3	CTUIL	Central Transmission Utility	sandeepk@powergrid.in
4	PGCIL	Central Government owned Transmission Company	rtamc.nr1@powergrid.in rtamcjammu@powergrid.in cpcc.nr3@powergrid.in
5	NTPC	Central Generating Company	RAMESHSINGH@NTPC.CO.IN
6	BBMB		powerc@bbmb.nic.in
7	THDC		bhagatsingh@thdc.co.in
8	SJVN		sjvn.cso@sjvn.nic.in
9	NHPC		surendramishra@nhpc.nic.in
10	NPCIL		df@npcil.co.in
11	Delhi SLDC	State Load Despatch Centre	gmsldc@delhisldc.org
12	Haryana SLDC		cesocomml@hvpn.org.in
13	Rajasthan SLDC		ce.ld@rvpn.co.in
14	Uttar Pradesh SLDC		cepso@upsldc.org
15	Uttarakhand SLDC		se_sldc@ptcul.org
16	Punjab SLDC		ce-sldc@pstcl.org
17	Himachal Pradesh SLDC		cehpsldc@gmail.com
18	DTL	State Transmission Utility	bl.gujar@dtl.gov.in
19	HVPNL		cetspkl@hvpn.org.in
20	RRVPNL		ce.ppm@rvpn.co.in
21	UPPTCL		smart.saxena@gmail.com
22	PTCUL		ce_oandmk@ptcul.org
23	PSTCL		ce-tl@pstcl.org
24	HPPTCL		gmprojects.tcl@hpmail.in
25	IPGCL	State Generating Company	ncsharma@ipgcl-ppcl.nic.in
26	HPGCL		seom2.rgtpp@hpgcl.org.in
27	RRVUNL		ce.ppmcit@rrvun.com
28	UPRVUNL		cgm.to@uprvunl.org
29	UJVNL		gm_engg_ujvn@yahoo.co.in
30	HPPCL		gm_generation@hppcl.in
31	PSPCL	State Generating Company & State owned Distribution Company	ce-ppr@pspcl.in
32	DHBVN	State owned Distribution Company (alphabetical rotational basis/nominated by state govt.)	nomination awaited (md@dhbvn.org.in)
33	Ajmer Vidyut Vitran Nigam Ltd.		nomination awaited (md.avvnl@rajasthan.gov.in)
34	Purvanchal Vidyut Vitaran Nigam Ltd.		nomination awaited (mdpurvanchalvvnl@gmail.com)
35	UPCL		cgmupcl@yahoo.com
36	HPSEB		cesysophpsebl@gmail.com

37	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	sanjay.bhargava@tatapower.com
38	Aravali Power Company Pvt. Ltd		amit.hooda01@apcpl.co.in
39	Apraave Energy Ltd.,		niraj.gupta@apraava.com
40	Talwandi Sabo Power Ltd.		ravinder.thakur@vedanta.co.in
41	Nabha Power Limited		Durvesh.Yadav@larsentoubro.com
42	MEIL Anpara Energy Limited		arun.tholia@meilanparapower.com
43	Rosa Power Supply Company Ltd		Suvendu.Dey@relianceada.com
44	Lalitpur Power Generation Company Ltd		avinashkumar.ltp@lpgcl.com
45	MEJA Urja Nigam Ltd.		rsjuneja@ntpc.co.in
46	Adani Power Rajasthan Limited		manoj.taunk@adani.com
47	JSW Energy Ltd. (KWHEP)		roshan.zipta@jsw.in
48	Transition Cleantech Services Private Limited	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	nomination awaited (kswamidoss@evrenenergy.com)
49	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the Union Territory concerned out of the entities engaged in generation/ transmission/ distribution of electricity in the Union Territory.	sojpdd@gmail.com
50	UT of Ladakh		cepdladakh@gmail.com
51	UT of Chandigarh		seelo-chd@nic.in
52	NVVN	Nodal Agency appointed by the Government of India for coordinating cross-border power transactions	
53	Tata Power Delhi Distribution Limited	Private Distribution Company in region (alphabetical rotational basis)	nomination awaited (sandeep.k@tatapower-ddl.com)
54	Gurgaon Palwal Transmission Limited	Private transmission licensee (nominated by central govt.)	(samriddhi.gogoi@indigrid.com)
55	PTC India Limited	Electricity Trader (nominated by central govt.)	nomination awaited (bibhuti.prakash@ptcindia.com)
56	ReNew Power Private Limited	RE Generating Company	sumant@renew.com

57	NTPC Green Energy Limited	having more than 1000 MW installed capacity	rajivgupta@ntpc.co.in
58	Azure Power India Pvt. Limited		sunil.gupta@azurepower.com
59	Avaada Energy Private Limited		kishor.nair@avaada.com
60	Adani Green Energy Limited		chaitanya.sahoo@adani.com

Contents

खण्ड-क: उ.क्षे.वि.स. Part-A: NRPC

AA.1 Action Taken Report with respect to the past recommendations of the Standing Committee of Experts on EHV Tower Failures (Agenda by NRPC Secretariat)

AA.1.1 CEA has a Standing Committee of Experts in the field of design and operation of EHV transmission line towers from CEA, various transmission utilities and research/academic institutes to investigate the failure of 220 kV and above voltage class transmission line towers and recommend measures to avert recurrence of such failures in future.

AA.1.2 The objective of the Standing Committee is to investigate the causes of failures, deliberate the failures of transmission line towers of various Power utilities, suggest remedial measures to prevent recurrence of such events in future and prepare a report which would serve as a repository of case studies of failures and suggested remedial measures for future.

AA.1.3 In this regard, minutes of the meeting of Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025 is enclosed (**Annexure-I**). Details of events, pertaining to Northern Region is attached as **Annexure-II**. List of events since July, 2025 is also attached as **Annexure-III**.

AA.1.4 Further, Central and State transmission utilities of Northern region were requested vide email dated 07.11.2025 to furnish the action taken on the past recommendations of the Standing Committee of Experts on EHV Transmission Line Tower Failures. However, response is still awaited (except AESL).

AA.1.5 In view of above, all concerned are requested to furnish the action taken on the past recommendations of the Standing Committee of Experts on EHV Transmission Line Tower Failures.

Forum may kindly deliberate and direct utilities to furnish the requisite information.

AA.2 Maintaining reserves and implementation of Automatic Generation Control for improving the grid frequency profile (Agenda by NRPC Secretariat)

AA.2.1 A meeting was taken by Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary services. (copy of MoM attached at **Annexure-IV**)

AA.2.2 In the meeting, following action point was decided:

“SLDCs and Intra-state generating stations shall be pursued to maintain adequate reserves and implement Automatic Generation Control for balancing and improving the grid frequency profile.”

***Forum may kindly deliberate*.**

Annexure-I

भारत सरकार/**Government of India**
विद्युत मंत्रालय/**Ministry of Power**
केन्द्रीय विद्युत प्राधिकरण/**Central Electricity Authority**
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division

दिनांक: 15.10.2025

सेवा में,

<As per attached list>

विषय: Minutes of the meeting of Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025-reg.

महोदया/महोदय,

You are kindly aware that a Standing Committee of Experts was constituted vide CEA Letter No -41/98/Secy/CEA/809 dated 24.09.1999 and reconstituted vide CEA letter no. CEA/5-41(18)/Secy-2012/166 dated 08.08.2012 under Section 73, Clause (I) of the Electricity Act, 2003 to investigate the failure of 220 kV and above voltage class transmission line towers and recommend remedial measures to avert failures in future.

2. In this connection, a meeting of the Standing Committee of the Experts was held under the chairmanship of Chief Engineer (PSE&TD), CEA on 08.09.2025 at CEA HQ, New Delhi to discuss the cause of failures of the transmission line towers reported by various utilities to CEA that had failed during the period from January 2025 to June 2025.

3. Minutes of the meeting of the Standing Committee are enclosed herewith kind reference and necessary action by all concerned.

Encl: as above

भवदीय,
Signed by Bhanwar Singh Meena
Date: 15-10-2025 17:30:25
(भंवर सिंह मीना /Bhanwar Singh Meena)
Director (PSE&TD) & Member Secretary of the Committee

Copy to:

1. SA to Chairperson, CEA
2. SA to Member (PS), CEA
3. PA to Chief Engineer, PSE&TD, CEA

Address List:

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Minutes of the meeting of Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025

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2. Background

Under Section 73, Clause (l) of the Electricity Act, 2003, CEA vide office order no: 5-41/98/Secy/CEA/809 dated 24.09.1999 **(Annexure-IV)** constituted a Standing Committee of Experts in the field of design and operation of EHV transmission line towers from CEA, various transmission utilities and research/academic institutes to investigate the failure of 220 kV and above voltage class transmission line towers and recommend measures to avert recurrence of such failures in future. The Committee was reconstituted vide CEA office order no: CEA/5-41(18)/Secy-2012/166 dated 08.08.2012.

The objective of the Standing Committee is to investigate the causes of failures, deliberate the failures of transmission line towers of various Power utilities, suggest remedial measures to prevent recurrence of such events in future and prepare a report which would serve as a repository of case studies of failures and suggested remedial measures for future.

As per CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, all utilities are required to report any event of failure of 220 kV & above voltage class transmission line towers within 48 hrs, and submit a detailed report to CEA as per stipulated format (available on CEA website and is enclosed at **Annexure-III**) covering reasons for failure and measures taken/ to be taken to avoid recurrence of such failures. As part of this activity, CEA has been receiving reports of failures of various Towers of 220 kV and above voltage class transmission lines from power utilities.

In this connection, a meeting of the Standing Committee of Experts to investigate the failure of 220 kV and above voltage class Transmission Line Towers period that occurred during the period from January, 2025 to June, 2025 was held on 08.09.2025 at CEA HQ, New Delhi under the Chairmanship of Chief Engineer (PSE&TD), CEA and Chairman of the Standing Committee. List of participants is given at **Annexure-I.**

3. Introduction

Sh. N.R.L.K. Prasad, Chief Engineer (PSE&TD), CEA and Chairperson of the Standing Committee, extended warm welcome to all the Members and Participants, and gave a brief background on the formation and mandate of the Standing Committee. He stated that to enable Standing Committee carry out its work, it is important that Utilities report the instances of tower failures in their network/ system well within time as per regulatory provisions and facilitate proper analysis of their respective events by the Committee by undertaking site visits, if required, in time.

It was informed that as per Regulation 48 (8) of CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, failures of any 220 kV and above voltage level transmission line tower shall be reported by the owner utility within 48 hours of occurrence of the failure, to the Authority, and the reasons for failure and measures to be taken to avoid recurrence of failure shall be sent to the Authority within one month of the occurrence as per stipulated formats, along with all the additional information (images, duly filled CEA Proforma, wind speed data, coordinates of failed towers, patrolling data, material test reports) with the approval of the HoD. He further requested all the utilities to furnish the closure report for the event within 3 months including all the details and records. All the utilities were requested to adhere to these timelines strictly.

He expressed concern that many utilities are not intimating/ notifying failure cases within 48 hours and are also failing to submit detailed failure reports within one month. He further highlighted the issue of tower failures occurring within 10 to 15 years of commissioning, whereas the design life of a tower is 35 years. It was noted that, out of 22 failure incidents, 16 were reported within 10 to 15 years of commissioning. Representatives from AEGCL, DVC and MSETCL informed that there have been no failures in their respective utilities for the period from January, 2025 to June, 2025. No representative from NRPC, SRPC, WRPC, ERPC and Delhi Technical University had attended the meeting.

He advised all utilities to develop in-house teams equipped with relevant tower design software to simulate, analyze, and address design issues in failed towers. He further informed that, in most tower failure incidents, the reasons reported by the utilities were high wind speeds, cyclonic winds, or heavy rainfall. Accordingly, while designing towers, due consideration must be given to terrain type, wind speed in the respective terrain, and areas prone to high wind activity to ensure longevity. Moreover, when citing wind speed as the cause of failure, utilities must substantiate the claim with supporting wind speed data.

It was highlighted in the meeting that IMD has already established a network of wind sensors at approximately 700 locations across India, each capable of capturing wind parameters, including speed, within a radius of 10 km. The website for accessing this data is **aws.imd.gov.in**. He further advised utilities to coordinate with the Indian Meteorological Department (IMD), Airports Authority of India (AAI), nearest wind farms, or the State Irrigation Department to obtain wind speed data at failure locations, as wind has been reported as a major contributing factor to tower collapses by the utilities.

He further suggested that all utilities must ensure that new towers erected in replacement of failed ones, as well as spare towers procured, conform to the prevailing regulations, applicable standards, and the wind speed conditions of the respective area.

Specific mention was made to the following points:

- Amendment to CEA (Technical Standards for Construction of Technical Standards for Construction of Electrical Plants and Electric Lines Regulations), 2022 is being brought out to specify RoW requirements for combinations of various towers and various conductors.
- The existing Type Test Guidelines and Model Quality Assurance Plan (MQAP) issued in March, 2022 are being revised, and a draft in this regard has been kept on CEA website on 18.08.2025 for

stake-holders comments by 17.09.2025. All Utilities were requested to furnish comments on the same so that their views are properly factored in.

- Digitization of Spares and Inventory Management of transmission system assets using suitable software like SAP shall be taken up on priority basis.
- Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal area [Report brought out in May, 2021) for appropriate adoption by the Utilities concerned.
- Guidelines for planning, deployment and procurement of ERS infrastructure [issued in December, 2015] and the Standard operating Procedure (SOP) for restoration of the transmission system including the Transmission Line [issued in May 2025) may be complied with.
- Operation and maintenance practices may be strengthened.

He then requested Sh. Bhanwar Singh Meena, Director (PSE&TD), CEA and Convener of the Standing Committee to take up the Agenda**.**

Director (PSE&TD), CEA welcomed all participants and urged all utilities to promptly report tower failure incidents to facilitate timely site visits by the committee. He stressed on the importance of analyzing and identifying the root causes of these failures while submitting detailed reports. He also advised utilities to coordinate with the Indian Meteorological Department (IMD), Airport Authority of India (AAI) nearest wind farms, or the State Irrigation Department to obtain wind speed data at the failure locations, as wind has been reported as a major factor in tower collapses. Obtaining wind speed data from an authentic observatory is crucial to determining whether wind speed exceeded the design specifications of the towers. Such data can inform necessary modifications in design parameters to prevent future failures. He encouraged active participation in the deliberations to determine the causes of these failures and to propose remedial measures to prevent future occurrences.

He informed that for the period of January 2025 to June 2025, a total of 22 incidents of failure of EHV transmission line towers were reported to CEA by 11 Utilities (PGCIL, RVPN, THDCIL, GETCO, MPPTCL, UPPTCL, RENEW, KPTCL, NTPC, NRSSXXXVI and ADANI) which included failure of 58 Nos. of Suspension Type Towers and 17 Nos. of Tension Type Towers. It was also added that failure of only Three (3) Nos. of Transmission Lines of Two (2) Nos. of utilities had been intimated within 48 hours and detailed failure report of only Ten (10) Nos. of Transmission Lines of Six (6) utilities had been submitted within one month.

He further clarified that for Tower failures, STUs and TSPs shall report the incidents to CEA. However, any tripping events shall be intimated to the SLDC.

Thereafter presentations by Utilities for their respective failure incidents were held. The failure incidents and their subsequent findings were deliberated upon by the members of the committee

4. Deliberations held during Standing Committee Meeting

1. A total of 22 Nos. of EHV Transmission Line tower failure incidences consisting 59 Nos. are of Suspension Type Tower and 16 Nos. are of Tension Type Towers between 1st January 2025 and 30th June 2025 were reported by 11 Utilities (PGCIL, RVPN, THDCIL, GETCO, MPPTCL, UPPTCL, RENEW, KPTCL, NTPC, NRSSXXXVI and ADANI). Complete details of all the reported EHV Transmission Line Tower failures are given at **Annexure-II**. The details of the deliberations of the standing committee meeting are presented in the ensuing paragraphs.

2. The Representative of **PGCIL** presented failures of 2 nos. of transmission lines covering total 2 nos. of Towers (1 no. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

   (i) **220 kV D/C Samba- Chowadhi-I/ Samba-Hiranagar-I Line (within 10 years):** In 220 kV D/C Samba- Chowadhi-I/ Smba-Hiranagar-I Transmission Line, 1 no. of tension type tower (DD+18) collapsed at tower location number 26. The line was commissioned in the year 2016 and the line length is 14.043 km. The reported cause of the failure is high speed localized cyclonic wind.

   PGCIL representative mentioned that the tower at location no. 26 (D+18) had collapsed from ground level and all four stubs were found damaged near the chimney level. Due to sudden impact, Coping was also found cracked from top in all four stubs. The collapsed tower had fallen on the right side in transverse direction facing Samba S/S. Due to sudden jerk caused by collapsed tower no. 26, the top phase cross arm at adjacent tower (Loc No 25) was also damaged.

   Chief Engineer (PSE&TD), CEA, suggested that wind speed data from IMD observatories may be utilized for analysing the cause of tower failures. He further enquired about the reasons for failures occurring within 10 years of commissioning, to which the representative from Powergrid informed that, as per the revised wind zone map, the failed tower was located within 50 km of Wind Zone 5, whereas it had been designed for Wind Zone 4. The Chief Engineer (PSE&TD) clarified that, for towers located in overlapping wind zones, the higher wind zone shall be considered if the tower is situated within 50 km of the border area, and requested to ensure the same.

   He also enquired about the increased span between towers, in response to which the representative of PGCIL explained that a higher tower span results in reduced angle of deviation, enabling more effective utilization of towers. Chief Engineer (PSE&TD), CEA, suggested that CEA clearance must be obtained prior to implementation of higher spans as it effects the RoW requirements and further suggested to submit the tower design report and material test report. Director (PSE&TD), CEA requested to check the restored tower strength as per IS 802: 2015 as the tower was earlier designed as per IS 802: 1995 and to furnish the justification for utilizing the higher span.

After detailed deliberations in the meeting, it was concluded that the primary reason for the failure was the design of the tower for wind zone-4, whereas the tower has been experiencing the effects of Wind Zone–5 due to it falling in the overlapping area between Wind Zone-4 & Wind Zone-5.

(ii) **765 KV Fatehpur-Agra 2 Transmission Line (within 12 years):** In 765 KV Fatehpur-Agra 2 Transmission Line, 1 no. of suspension type tower (A+0) at Tower Location Number 722 got failed. The line was commissioned in the year 2013 and line length is 335 km. The reported probable cause of failure is Extremely high-speed cyclonic windstorm.

As informed by representative of PGCIL**,** an internal committee of PGCIL visited the site to assess the damage. The committee observed that the tower had buckled above waist level and both peaks were damaged. No tower members, nuts, or bolts were found missing. Material testing of the components was carried out, and the reports were found to be satisfactory. The failed tower has been restored by erecting a spare tower on the existing foundation. For meteorological assessment, PGCIL requested wind speed data from IMD corresponding to the time of failure. However, IMD expressed its inability to provide the information owing to the absence of wind sensors in Shikohabad District, where the tower was located.

Chief Engineer (PSE&TD), CEA enquired about the reasons for failures occurring within just 12 years of commissioning, to which the representative from Powergrid informed that the tower configuration is ‘Delta Type’ which might have contributed to the failure despite the tower having undergone strengthening.

Director (PSE&TD), CEA highlighted that several failures of Delta-type towers have been reported in recent years. Detailed studies carried out by CPRI and Manitoba on this tower type had revealed certain inherent design-related concerns. Based on these studies, it was advised to strengthen such towers. Strengthening is done by adding additional members rather than replacing the member entirely.

Chief Engineer (PSE&TD), CEA remarked that submitted information as per CEA format is incomplete and asked PGCIL to furnish full details as per CEA format. Additionally, Director (PSE&TD), CEA mentioned that restored tower should be designed as per latest IS, i.e., IS 802: 2015.

After detailed deliberation, it was concluded that the primary cause of the failure was the inherent vulnerability of the Delta-type tower configuration, which remains structurally less reliable even after strengthening interventions.

3. The Representative of **RVPNL** presented failures of 2 nos. of transmission lines covering total 10 nos. of Towers (9 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(iii) **400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line (with in 6 years)-** In 400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line, 8 nos. of suspension type tower (A+0) and 1 no of tension type got collapsed. The line was commissioned in the year 2019 and line length is 117 km. The reported probable cause of failure is heavy windstorm.

Representatives of RVPNL informed that two towers in the same line failed in the year 2021 and again 4 towers in the same line failed in the year 2023 and now again 9 towers failed in the year 2025. The material has been sent for testing. Further, an internal committee has also been formed to investigate the failure, the report of which is yet to be submitted. He further informed that the Towers have not been restored yet because of the issues arising due to land and crop compensation and expected to be restored by the next week.

Chief Engineer (PSE&TD), CEA enquired about the reliability level and reasons for failures occurring within just very few years of commissioning to which representatives from RVPNL stated that there might be some design issues in the towers.

The Chief Engineer (PSE&TD), CEA observed that the information submitted in the prescribed CEA format was incomplete. He directed that the same to be furnished in the complete CEA format along with all relevant reports and the presentation. He further emphasized that the matter be brought to the notice of senior officials of RVPNL and instructed that representatives well-versed with the subject should attend future meetings fully prepared. Director (PSE&TD), CEA requested to submit the Tower Patrolling reports also.

Complete information duly filled in the prescribed CEA format along with the details of wind zone in which the line is located is yet to be submitted by M/s. RVPNL.

(iv) **400 kV D/C Barmer- Bhinmal Line (within 6 years):** In 400 kV D/C Barmer- Bhinmal Line 1 nos. of suspension type tower (DA+9) at Tower Location no. 101 got collapsed. The line was commissioned in the year 2019 and line length is 144 km. The reported probable cause of failure is Heavy Rain, Wind Storm and Lightning.

The representatives of RVPNL informed that the line was restored on 05.06.2025, during which period the line remained out of service. It was further reported that earlier a (DA+9) type tower was in place; however, during restoration, a (DC+9) type tower was erected to reduce the span, considering that the tower location is surrounded by lower hills on both sides, which creates conditions conducive to the development of whirlwinds and cyclonic effects.

Chief Engineer (PSE&TD), CEA observed that the information submitted in the prescribed CEA format was incomplete. He directed that the same be furnished in the complete CEA format along with all relevant reports and the presentation. He further emphasized that the matter be brought to the notice of senior officials of RVPNL and instructed that representatives well-versed with the subject should attend future meetings fully prepared. Director (PSE&TD), CEA suggested to submit the intimation of failures within 48 hours so that site visit of the committee can be scheduled.

Complete information duly filled in the prescribed CEA format along with the details of wind zone in which the line is located is yet to be submitted by M/s. RVPNL.

4. The Representative of **THDCIL** presented failures of 1 no. of transmission lines covering total 3 nos. of Suspension Type Towers. The transmission line wise deliberations are as under:

(v) **220 kV Amarapur-Tharad Line (within 13 years)**: In 220 kV Amarapur-Tharad Line, 3 nos. of suspension type towers (DA+3) at Tower Location Nos. 21,22 and 23 got collapsed. The line was commissioned in the year 2012 and the line length is 90 km. The reported probable cause of failure is heavy gusty wind.

The representative of THDCIL informed that THDCIL has a 50 MW wind power project at Patan and that the 220 kV Amarapur–Tharad line is a shared infrastructure among 18 renewable generators, including THDCIL. He stated that any decision regarding this transmission line requires the consensus of all 18 generators at Patan. Regarding the tower failures, he reported that the foundations of towers at locations 21, 22, and 23 were completely damaged. In particular, the tower at location 21 was situated close to the existing river course. These towers were temporarily restored on ERS on 27.06.2025, and the new alignment was shifted approximately 56–60 meters away from the river course.

He further informed that GETCO is the O&M contractor for this line; however, GETCO declined to undertake restoration, clarifying that their scope is limited to routine maintenance activities only.

Director (PSE&TD), CEA sought details of the wind data source. The THDCIL representative explained that wind speed measurements were taken from sensors installed at the wind generator at a height of 90 meters, which records higher values compared to the tower height. He further enquired about the type of foundation adopted for the failed towers. It was informed that a simple non-pile type foundation had been used at the time of design and installation. However, over time, the river appears to have changed its course, and currently the tower at location 21 is very close to the river, with high water levels.

Director (PSE&TD), CEA observed that based on the aerial view the river was already located close to the tower foundations at the time of installation also. He therefore advised to submit the details regarding type of foundation with depth of foundation along with the soil test reports for both at the time of commissioning and at the time of restoration. He further instructed to intimate the failure incident within 48 Hrs. to CEA and directed that the restored towers be designed and strengthened in accordance with the latest provisions of IS 802:2015. He further directed to submit the complete information filled in CEA format along with all the relevant tests and reports.

The details regarding type of foundation with depth of foundation along with the soil test reports for both at the time of commissioning and at the time of restoration are yet to be submitted by M/s. THDCIL.

After detailed deliberations, it was concluded that the primary cause of failure may be the use of an inappropriate foundation type, which proved unreliable under conditions of waterlogging. **However, final conclusion may be drawn after receipt of the foundation design data and soil test report.**

5. The Representative of **GETCO** presented failures of 3 nos. of transmission lines covering total 4 nos. of Suspension Type Towers. The transmission line wise deliberations are as under:

(vi) **400 kV Kosamba Charal line and 400 kV Kosamba Panchham line- D/C Line (within 11 years)**: In 400 kV Kosamba Charal line and 400 kV Kosamba Panchham line- D/C Line, 2 nos. of suspension type towers (DR+0) at Tower Location Nos. 518(S) and 519 (S) got collapsed. The line was commissioned in the year 2014 and the line length for Kosamba Charal line is 248 km and for Kosamba Panchham line is 233 km. The reported probable cause of failure is extremely heavy wind and rain with lightning.

The representative of GETCO informed that the failed tower was located in a coastal area, however, its foundation had been designed for normal soil conditions. He suspected that the failure was likely due to foundation inadequacy and therefore suggested changing the foundation type for a 5 km stretch of the coastal section of the line. He further reported that the tower was restored on 15.05.2025.

Director (PSE&TD), CEA observed that the information submitted was incomplete in the prescribed CEA format. He directed that the same be furnished in the complete format along with all relevant test results and supporting reports. He requested submission of the soil test reports, both from the time of commissioning of the tower and from the time of failure along with photographs of the dismantled Tower and further advised referring to the "Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal Areas" (Report issued in May 2021) for appropriate adoption.

The soil test reports, both from the time of commissioning of the tower and from the time of failure along with photographs of the dismantled Tower is yet to be submitted by M/s. GETCO. Further, complete information in duly filled CEA format with details of wind zone is also awaited.

After detailed deliberations, it was concluded that the primary cause of failure was the use of an inappropriate foundation type, which proved unreliable under coastal conditions.

(vii) **220 kV Bhachunda Varsana/ Ukheda Varsana line (Line ownership of M/s Suzlon)**: In 220 kV Bhachunda Varsana/ Ukheda Varsana line, 1 no. of suspension type towers (DA+3) at Tower Location No. 336 got collapsed. The line was commissioned in the year 2004 and the line length for 173 km. The reported probable cause of failure is heavy rain, heavy wind and cyclone effect. Line restored on 23.05.2025.

The representative of GETCO informed that, as per the IMD report dated 06.05.2025, the wind speed in the nearby area was approximately 70–80 km/h, and the tower was designed for Wind Zone–5. He further stated that the line is a dedicated line and the ownership is with Suzlon Energy.

Chief Engineer (PSE&TD), CEA enquired why the tower had been designed as per IS 802:1977, whereas it should have been designed in accordance with IS 802:1995, since the installation was carried out in 2004. It was also highlighted that if the tower had been designed as per IS 802:1977, it would have been inadequate for the prevailing wind speeds reported by IMD, thereby leading to failure.

Accordingly, it was advised that GETCO verify the IS code actually followed during the design and commissioning of the tower from M/s Suzlon Energy and submit their findings to the Committee. It was further requested to provide IMD report dated 06.05.2025 indicating the recorded wind speed, along with the Tower Design Report prepared at the time of commissioning, and details of the necessary strengthening measures in line with the applicable IS code (IS 802:2015) as of now. Additionally, complete information in the duly filled CEA format, including all supporting reports and test results, was also sought for submission.

The requisite information sought in the meeting for further analysis of the cause of failure are yet to be submitted by M/s. GETCO.

After detailed deliberations, it was concluded that the primary cause of failure was inappropriate tower design, which did not conform to the relevant IS standards prevailing at that time, thereby rendering the structure unreliable and causing tower failure. Furthermore, since the line is a dedicated line, M/s Suzlon Energy shall be the responsible representative in matters pertaining to tower failures on this line.

(viii) **220kV Nakhatrana-Panadhro Line 1 & 2**: In 220kV Nakhatrana-Panadhro Line 1 & 2, 1 no. of suspension type towers (DA+0) at Tower Location No. 163 got collapsed. The line was commissioned in the year 1997 and the line length is 75 km. The reported probable cause of failure is heavy rain, heavy wind and cyclone effect.

The representative of GETCO informed that an internal committee visited the site. The failed tower was located in a coastal area, however, its foundation had been designed for normal soil conditions. He suspected that the failure was likely due to foundation inadequacy and therefore suggested changing the foundation type.

Chief Engineer (PSE&TD), CEA suggested that wind speed data from the nearest IMD observatories may be utilized for analysing the causes of tower failures.

Director (PSE&TD), CEA requested submission of the soil test reports, both from the time of commissioning of the tower and from the time of failure along with Tower Design Report at the time of commissioning of the tower and necessary strengthening measures as per the applicable IS code (IS 802:2015) as of now. Additionally, complete information in the duly filled CEA format, including all supporting reports and test results, was also sought for submission. He further advised referring to the “Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal Areas” (Report issued in May 2021) for appropriate adoption.

The requisite information sought in the meeting for further analysis of the cause of failure are yet to be submitted by M/s. GETCO.

After detailed deliberations, it was concluded that the primary cause of failure was the use of an inappropriate foundation type, which proved unreliable under coastal conditions.

6. The Representative of **MPPTCL** presented failures of 4 nos. of transmission lines covering total 24 nos. of Towers (21 nos. of Suspension Type Tower and 3 no. of tension Type Tower). The transmission line wise deliberations are as under:

(ix) **220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line (within 17 years)**: In 220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line, 1 no. of suspension type towers (JC) at Tower Location No. 8 and 1 no. of Tension type Towers (B60+10) at Tower Location No. 9 got collapsed. The line was commissioned in the year 2008 and the line length is 58 km. The reported probable cause of failure is Heavy storm and rain.

The representative of MPPTCL informed that the tower was commissioned in 2008 as per IS 802:1995, which was applicable at that time. It was further reported that the failed towers were restored using spare towers, and the restoration work was completed on 22.05.2025. He also mentioned that a special design tower with a 700 m span had been used for the river crossing.

The Chief Engineer (PSE&TD), enquired the reason of Tower failure within 17 Years only and directed MPPTCL for submission of Tower Design Report for further analysis. He further directed MPPTCL to submit the complete information in the prescribed CEA format along with the complete design documents and test reports. Additionally, he advised that the standard tower nomenclature, as adopted nationally, should be followed.

Out of all the sought details/ documents, Tower Design Report and complete information in duly filled CEA format is yet to be submitted by M/s. MPPTCL.

(x) **400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II**: In 400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II, 5 no. of suspension type towers (FD0+3, FD0, FD0, FD0, , FD0) at Tower Location No. 112,113,114,115,116 and 1 no. of Tension type Towers (FD30) at Tower Location No. 111 got collapsed. The line was commissioned in the year 1991 and the line length is 97 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that wind speed data from IMD Bhopal as well as from the Revenue Department of the concerned Tehsil was not available at the time of the tower collapse. He further stated that the tower, commissioned in 1991, had completed its service life without any prior failure. It was reported that the failed towers were restored using spare towers of the old design (as per IS 802:1977), and the restoration was completed on 15.05.2025. He further informed that strengthening of the Tower as per IS 802:2015 is proposed without changing the foundation.

Chief Engineer (PSE&TD), CEA suggested strengthening the towers in compliance to latest IS 802:2015. He also directed that foundation test reports be furnished after carrying out the necessary tests, noting that the towers are located in paddy fields where waterlogging conditions may prevail. Submission of all the details as mentioned in CEA Format may also be submitted along with all the design details and test.

Director (PSE&TD), CEA directed submission of the new tower design in accordance with IS 802:2015, along with proposed recommendations for strengthening of the towers.

The details sought in the meeting for further analysis of the reason for failure of Tower are yet to be submitted by M/s. MPPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was completion of the tower's service life, which likely led to weakening of the structure and eventual failure due to heavy wind.

(xi) **400 kV DCDS Bhopal Bina line Ckt.-I & II**: In 400 kV DCDS Bhopal Bina line Ckt.-I & II, 6 nos. of suspension type towers (FD0, FD0, FD0, FD0+3, FD0+6) at Tower Location No. 122, 123, 125, 126 ,127 got collapsed, 5 nos. of suspension type towers (FD0, FD0, FD0, FD0, FD0) at Tower Location No. 96, 98, 121, 128 ,129 got partially damaged and 1 no. of Tension type Towers (FD30) at Tower

Location No. 124 got partially damaged. The line was commissioned in the year 1994 and the line length is 135 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that Tower was commissioned in 1994 using IS 802:1977 applicable at that time and had completed almost its service life. It was reported that 1 circuit has been restored on ERS on 08.08.2025.

Chief Engineer (PSE&TD), CEA directed for submission of all the details as mentioned in CEA Format along with all the design details and test reports.

After detailed deliberations, it was concluded that the primary cause of failure was completion of the tower's service life, which likely led to weakening of the structure and eventual failure due to heavy wind.

(xii) **400kV DCDS Chhegoan- Julwania Transmission Line (within 11 years)**: In 400kV DCDS Chhegoan-Julwania Transmission Line, 2 nos. of suspension type towers (FD0, FD0+6) at Tower Location No. 240, 241, got collapsed and 2 nos. of suspension type towers (FD0+3, FD0+3) at Tower Location No. 235 and 239 got partially damaged. The line was commissioned in the year 2014 and the line length is 114 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that wind speed data from IMD Bhopal was not available and, therefore, data from the nearest tehsil was considered. The recorded wind speed at the time of tower failure was 50 km/hr. It was further reported that the failed towers were restored using spare towers of the old design (as per IS 802:1977), and the restoration was completed on 07.07.2025. He also mentioned that strengthening of the towers has been suggested in accordance with IS 802:2015.

Chief Engineer (PSE&TD), CEA enquired about the usage of IS 802:1977 for tower design when the line was commissioned in the year 2014. In response, the representative of MPPTCL clarified that strengthening has been proposed for all towers of the same line. The Chief Engineer (PSE&TD), CEA further directed submission of all details in the prescribed CEA format along with complete design documents and test reports.

Director (PSE&TD), CEA directed submission of the new tower design in compliance with IS 802:2015, along with proposed recommendations for strengthening of the towers which is yet to be submitted by M/s. MPPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was inappropriate tower design using IS 802:1977, which did not conform to the relevant IS standards applicable at the time of Tower Design, thereby rendering the structure unreliable and causing tower failure.

7. The Representative of **UPPTCL** presented failures of 5 nos. of transmission lines covering total 16 nos. of Towers (12 nos. of Suspension Type Tower and 4 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xiii) **400 KV ORAI - PARICHHA D/C – I & II (within in 9 years):** In 400 KV ORAI - PARICHHA D/C – I & II, 3 no. of suspension type towers (DA+0) at Tower Location No. 56,57 and 58 got collapsed. The line was commissioned in the year 2016 and the line length is 111 km. The reported probable cause of failure is heavy cyclonic storm.

Representative of UPPTCL informed that the tower was designed as per IS 802:1995, however, it was installed in the year 2016. He further clarified that while the foundation remained intact, damage occurred only to the stub. The tower was restored on 11.07.2025 by repairing the stub and erecting a spare tower. During this period, the line remained out of service.

It was noted that in the report submitted to CEA by UPPTCL, the likely date of restoration was mentioned as 30.05.2025. Chief Engineer (PSE&TD), CEA observed that the information provided in the report was not consistent with the presentation, and appeared incorrect. He recommended review of the submitted data, particularly with respect to the restoration date and reliability level, and once again directed UPPTCL to submit all relevant information and reports to CEA. Director (PSE&TD), CEA recommended to the review the design as per IS 802:2015.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xiv) **220 kV Nehtaur-Mataur (765 kV PGCIL) Line (within 14 years)**: In 220 kV Nehtaur-Mataur (765 kV PGCIL) Line, 2 nos. of Tension type towers (B5 and SC) at Tower Location No. 6 and 7 got collapsed. The line was commissioned in the year 2011 and the line length is 73 km. The reported probable cause of failure is heavy storm due to which tower got bend at stub.

Representative from UPPTCL did not present this particular failure.

(xv) **220 kV Jagriti Vihar-Hapur (765 KV) D/C line (within 6 years)**: In 220 kV Jagriti Vihar-Hapur (765 KV) D/C line, 2 nos. of Suspension type towers (DA+5 and DA+0) at Tower Location No. 86,87 and 2 nos. of Tension type towers (DB+5 and DB+0) at Tower Location No. 85 and 88 got collapsed. The line was commissioned in the year 2019 and the line length is 73 km. The reported probable cause of failure is Wind storm/ cyclone.

Representative of UPPTCL informed that the tower was designed as per IS 802:1995, however, it was installed in the year 2019. It was informed that foundations of the Towers were not damaged and the line was restored on 30.05.2025.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xvi) **400 kV Panki- Unnao S/C Transmission Line (within 27 years):** In 400 kV Panki- Unnao S/C Transmission Line Manpur (Adani) line, 5 nos. of suspension type tower got collapsed. The line was commissioned in the year 1998 and the line length 49 km. The reported probable cause of failure is Very High Cyclonic Storm.

Representative of UPPTCL informed that the tower was designed for Wind Zone–4. It was reported that approximately 1.5 km of the span was affected, with damage limited to the foundation. UPPTCL was unable to confirm the specific IS code used for the tower design, and wind speed data for the incident was also not available.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xvii) **220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line (within 3 years)**: 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line, 2 nos. of suspension type tower (DA+5) at Tower location no 50 and 51 got collapsed. The line was commissioned in the year 2022 and the line length is 44.49 Km. for Hardoi-Mallawan circuit & 101.80 Km. for Mallawa-Shahjahanpur circuit. The reported probable cause of failure is heavy sporadic whirl wind followed by localized cyclonic storm.

Representative of UPPTCL informed that one tower was completely damaged and another one has damage in the cross arm and peak. It was also informed that KPTL design has extension 5 and 10. The wind speed data for the incident was not available with UPPTCL.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015 and strengthen the Tower accordingly. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

8. The Representative of **RENEW** presented failures of 1 no. of transmission lines covering total 7 nos. of Towers (6 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xviii) **400 KV DC Gadag - Narendra (New) Transmission Line (within 1 year)**: In 400 KV DC Gadag - Narendra (New) Transmission Line, 5 nos. of suspension type tower (DA+3, DA+3, DA+0, DA+3, DA+6, DA+0) at Tower location no 16/4, 16/6, 16/7, 16/8, 16/9, 16/10 got completely collapsed , 1 no of suspension type Tower (DA+0) at tower location no. 16/10 had its peak damaged and 1 no. of Tension type tower (DC+6) at Tower location no. 17/0 had only peak damaged. The line was commissioned in the year 2024 and the line length 94 km. The reported probable cause of failure is Heavy Wind & cyclonic wind whirl followed by rain.

Representative of Renew informed that the towers were designed as per IS 802:2015 for Wind Zone–1 and Reliability Level–1. The tower designs have been reviewed, and no irregularities were observed. It was further reported that the failed towers are located along the passage of the Almatti hills, where tunneling effects of wind are also possible. Material samples were sent for testing to CPRI and NABL-accredited laboratories. The test results obtained from the NABL-accredited laboratory were found satisfactory, while the results from CPRI are still awaited. With regard to wind speed data, requests have already been sent to IMD Bangalore, Almatti Dam authorities, and NTPC; however, responses are awaited. He further informed that the line was restored on 29.06.2025 using spare towers.

Director (PSE&TD), CEA, observed that a parallel transmission line in the same corridor was not affected, and but that line had been designed for Reliability Level–2 due to the quad conductor configuration, therefore it's a need to review requirement of change of present reliability level-1 to reliability level-2 for the twin conductor configuration in the 400 kV D/C line in the relevant regulation/Standard separately.

He further informed that during site visit on the physical inspection of the failed towers no ambiguities in the erection and maintenance were observed. No missing member and nut-bolts were there. The failed towers were located near to passage of the hills. Heavy wind conditions prevailed in the vicinity of transmission line during failure of the towers that may be cause of failure.

After detailed deliberations, it was concluded that a high intensity wind was observed in the area which had led to collapse of the towers in the transverse direction which subsequently led to failure of nearby suspension towers due to the cascading effect.

9. The Representative of **KPTCL** presented failures of 1 no. of transmission lines covering 1 no. of Towers (6 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xix) **220 kV SRS Huballi- Narendra Line:** In 220 kV SRS Huballi- Narendra Line, 1 no. Suspension tower (DA+6) at Tower location no. 6 got collapsed. The Tower was commissioned in the year 1980 and the line length 94 km. The reported probable cause of failure is the dumping yard created adjacent to the Tower at Tower location no. 6 and in between Location 6 and 7.

Representative of KPTCL informed that the tower was designed as per IS 802:1977. He described the site conditions, stating that the tower had completely collapsed, with leg members severely bent, though no missing members or damaged joints were observed. He further informed that the Hubballi-Dharwad Municipal Corporation (HDMC) had created a dumping yard near the line between location numbers 6 and 7. The dumping height in this area is approximately 10–15 meters. Despite repeated requests from O&M personnel to shift the dumping yard away from the transmission corridor, no corrective action was taken by HDMC.

KPTCL observed that continuous dumping near the failed tower, up to a height of 7–10 meters, created excessive dead load on the tower's leg members. Several fire incidents and severe pollution have also been reported in the vicinity of the dumping yard.

The internal team of KPTCL concluded that the dumping yard, by creating additional dead load on the tower's leg members, was the primary cause of the tower failure. The internal committee of KPTCL further proposed that the affected tower be replaced and relocated at a safe distance from the dumping yard, with an increased span of approximately 400 meters in place of the existing 310 meters, and with higher body extensions. It was also suggested that anti-fog disc insulators be adopted. In addition, legal action against HDMC has already been initiated by KPTCL.

Chief Engineer (PSE&TD), CEA enquired if KPTCL team has not visited the site as the issue appeared to be persisting for quite a long time, and also if any FIR have been lodged, to which Representative of KPTCL informed that legal action has been initiated against HDMC.

Director (PSE&TD), CEA enquired about the line clearance from the dumping yard, to which the representative of KPTCL replied that the clearance had been reduced due to the dumping activities, resulting in repeated line trippings. Director (PSE&TD), CEA directed KPTCL to furnish details to CEA regarding the actions taken to resolve the issue, O&M practices being followed, and the recommended measures proposed by KPTCL in this regard.

The details sought (actions taken to resolve the issue, O&M practices being followed, and the recommended measures proposed by KPTCL in this regard) in the meeting are yet to be submitted by M/s. KPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was the dumping yard located beneath the line. This rendered the structure unstable and ultimately led to tower failure. It was further recommended that KPTCL management engage with HDMC to ensure relocation of the dumping yard away from the transmission corridor.

10. The Representative of **NTPC** presented failures of 1 no. of transmission lines covering 1 no. of Tension type Tower. The transmission line wise deliberations are as under:

(xx) **400 kV Dadri- Harsh Vihar Ckt- 1&2 (within 13 years):** In 400 kV Dadri- Harsh Vihar Ckt- 1&2, 1 no. Suspension tower (DD+25) at Tower location no. 24 got failed and bent. This line with line length of 53 km was designed in the year 2009 and was commissioned in the year 2012. The reported probable cause of failure is high-velocity dust & windy storm following rain near the location. These winds were exacerbated due to heavy dust storms in the area.

The representative of NTPC informed that the tower was designed as per IS 802:1995. The failed tower was the tallest tower along the route of the line. The foundations were found to be satisfactory, the stubs were damaged. Minor damages were also observed in the towers at location no. 23 (DA+6) and location no. 25 (DD+25). On the day of the tower failure, all 10 power evacuation lines from NTPC Dadri tripped due to the dust storm followed by rain, resulting in a complete station blackout. It was further informed that three transmission lines pass beneath this line, which might have necessitated an increased tower height. The line was restored on 22.06.2025 using a spare tower of similar design.

Chief Engineer (PSE&TD), CEA enquired about the wind speed at the time of failure and suggested that the same be obtained from the nearest IMD observatory or any other reliable source and shared with CEA. He further observed that, since this was a special tower with high extensions and multiple crossing lines beneath it, the reliability level should have been enhanced to ensure greater structural stability in the crossing corridor.

Director (PSE&TD), CEA recommended to the review the design as per IS 802:2015.

After detailed deliberations, it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms. Furthermore, NTPC was recommended to analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.

The committee also opined that tower extensions may be designed for Reliability Level–2, while the rest of the tower could continue with Reliability Level–1 in the 400 kV D/C twin moose conductor configuration. It was also suggested that CPRI and PGCIL may validate requirement of this approach.

11. The Representative of **NRSSXXXVI Transmission Limited** presented failures of 1 no. of transmission lines covering 2 no. of Tension type Tower. The transmission line wise deliberations are as under:

(xxi) **400 kV D/C Babai-Bhiwani Transmission Line (with in 2 years)**: In 400 kV D/C Babai-Bhiwani Transmission Line, 2 nos. of Tension type Towers (DD+30) at Tower location no. 300 and 301 got collapsed. The line was commissioned in the year 2023. The line length is 111 km. The reported probable cause of failure is Heavy localized Cyclonic storm.

The representative of NRSSXXXVI informed that the line was designed as per IS 802:2015 for Reliability Level–1. However, the line was commissioned in the year 2023. No missing members were observed in the failed tower, and the material test reports were found satisfactory. Members of the Standing Committee also visited the site. Requests for wind speed data were sent to IMD Delhi and IMD Chandigarh; however, no response has been received. It was further informed that the line has been restored using an ERS, and erection of the replacement tower is expected to be completed by 30.09.2025.

The representative from PGCIL highlighted that when tower extensions are raised, the tower base increases and the overall tower weight increase, which may contribute to failures due to self-weight.

Chief Engineer (PSE&TD), CEA suggested for carrying out a simulation of the tower design considering an increased Reliability Level–2 and subjecting it to equivalent loading to verify whether the tower could withstand the load. If positive results are obtained at Reliability Level–2, the same may be implemented in the field. He further emphasized that in RFPs, the reliability level should be specified for power line crossings.

After detailed deliberations, it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms. Furthermore, NRSSXXXVI was recommended to analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.

The committee also opined that tower extensions may be designed for Reliability Level–2, while the rest of the tower could continue with Reliability Level–1 in the 400 kV D/C twin moose conductor configuration. It was also suggested that CPRI and PGCIL may validate requirement of this approach.

12. The Representative of **ADANI** presented failures of 1 no. of transmission lines covering 5 no. of Tower (2 nos. of suspension type and 3 nos. of tension type). The transmission line wise deliberations are as under:

(xxii) 400 kV Mahendragarh–Bhiwani Transmission Line (within 14 years): In 400 kV Mahendragarh–Bhiwani Transmission Line**,** 2 nos. of Suspension type Towers at location no 136 and 138 and 3 nos. of tension type of towers 135, 137 and 139 got failed. The line was commissioned in the year 2011. The line length is 111 km. The reported probable cause of failure is due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSSXXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone.

Representative of ADANI informed that their Tower failure is the collateral damage due to failure of Towers at Babai- Bhiwani Line. Towers no. 136–137 of this line are situated beneath the collapsed Babai–Bhiwani line, leading to the impact. Further, Tower No.135 and 139 suffered complete structural deformation with major damage to its top cross arm and leg of the Tower however, foundations were intact and towers no. 136 to 138 had impact on conductors, OPGW & earth wire. The restoration work was successfully completed with the erection of the spare tower, and the transmission line was re-energized on 04.07.2025.

Chief Engineer (PSE&TD), CEA enquired about the wind data and suggested to collect the wind data from the nearest IMD observatory or any other reliable source.

13. The Representative of **STERLITE** presented tripping of three 400 kV transmission lines mentioned below, feeding power to Mumbai three 400 kV transmission lines feeding power to Mumbai due to large no. of insulator failure. The deliberations are as under:

- 400 kV Phadge – Navi Mumbai
- 400 kV Phadge – Kharghar
- 400 kV Navi Mumbai – Vikhroli

The representative from M/s Sterlite informed that total 132 numbers of insulators including failed and suspected, have been replaced across all three lines, and as a corrective measure following three steps have been taken.

- The samples of failed/ burst insulators have been sent to ERDA for testing. However, the test reports are still awaited.
- Thermo-vision scanning of the insulator is being conducted across the entire line to identify the faulty insulator.
- OEM of the insulator has taken the samples and they are also doing root cause analysis

He apprised that FRP rod of the failed insulators is of 'AGNI' make, while the sheath is of 'TAG' make, pertaining to the manufacturing batches of December 2022 and July 2023. He also informed that many utilities have experienced issues with Insulators where the FRP rod is of AGNI make.

In this regard, the Standing Committee suggested to furnish a detailed report incorporating reports/ findings from ERDA and the OEM's, and to review their QAP in line with CEA's MQAP.

5. Statistics and Analysis of the EHV Transmission Line Tower failure:

5.1 Failure incidence intimation and report submission statistics:

SN	Category	Number of Failures	Number of Utilities	Remarks
1	Utilities intimated within 48 hrs on their own	3	2	PGCIL and UPPTCL (for 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur Line on same DC Towers) had submitted the failure cases on time
2	Utilities intimated after 48 hrs on their own	9	4	RVPNL, GETCO, UPPTCL (400 kV Orai - Parichha D/C line – I & II, 220 kV Jagriti Vihar-Hapur D/C line, 220 kV Nehtaur-Mataur Line) and NRSS XXXVI intimated within one month on their own
3	Utilities submitted Detailed Report in One Month on their own	16	8	PGCIL, RVPNL, GETCO, NRSSXXXVI, RENEW and UPPTCL (for 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur Line on same DC Towers) had submitted the Report on time
4	Utilities submitted Detailed Report after One Month but before CEA letter dated 11.03.2025 on their own	5	2	MPPTCL and UPPTCL (for 400 kV Orai - Parichha D/C line – I & II)
5	Utilities submitted Detailed Report only after CEA letter dated 11.03.2025.	7	5	THDCIL, KPTCL, NTPC, Adani and UPPTCL (for 220 kV Nehtaur-MataurLine, 220 kV Jagriti Vihar-Hapur D/C line, 400 KV Panki-Unnao S/C Line) had submitted the report after CEA letter dated 28.07.2025.
6	Utilities not submitted Detailed Report even after CEA letter	Nil	Nil	-

5.2 General Statistics of Reported EHV Transmission Line Tower Failures:

a) Failure of 75 Nos. of EHV Transmission Line Towers in 22 Nos. Transmission Lines of voltage class of 220 kV, 400 kV and 765 kV AC have been reported to CEA during the period of January, 2025 to June, 2025. The total 22 Nos. of EHV Transmission Lines failure are mentioned in the Table 1 given below:

Table 1: Details of failure of EHV Transmission Lines

S.N.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
1.	220 kV D/C Samba-Chowadhi-I/ Smba-Hiranagar-I Line	PGCIL	16.04.2025	2016	4	0	1	1	220 kV Single Zebra
2.	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	2013	1	1	0	1	765 kV Quad Bersimis ACSR
3.	400 kV D/C Barmer-Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	2019	-	8	1	9	400 kV Moose ACSR
4.	400 kV D/C Barmer-Bhinmal Line	RVPNL	05.05.2025	2019	-	1	0	1	400 kV Twin MOOSE ACSR
5.	220 kV Amarapur-Tharad Line	THDCIL	05.05.2025	2012	-	3	0	3	220 kV Single MOOSE ACSR
6.	400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line	GETCO	05.05.2025	2014	-	2	0	2	400 kV MOOSE ACSR
7.	220 kV Bhachunda Varsana/ Ukheda Varsana line	GETCO (Owner M/s Suzlon)	06.05.2025	2004	5	1	0	1	220 kV AL59
8.	220kV Nakhatrana-Panadhro Line 1 & 2	GETCO	08.05.2025	1997	4	1	0	1	220 kV Single Zebra ACSR
9.	220kV Sidhi-ATPS & 220 kV Sidhi-Rewa Line	MPPTCL	05.05.2025	October, 2008	-	1	1	2	220 kV Single Zebra ACSR

10.	400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II	MPPTCL	21.05.2025	Ckt.-1-31.03.1991, Ckt. II-18.06.1991	3	5	1	6	400 kV Twin MOOSE ACSR
11.	400 kV DCDS Bhopal-Bina line Ckt.-I & II	MPPTCL	11.06.2025	Ckt.-1-17.03.1994, Ckt.-II 23.03.1994	3	11	1	12	400 kV Twin MOOSE ACSR
12.	400kV DCDS Chhegoan- Julwania Line	MPPTCL	12.06.2025	2014	3	4	0	4	400 kV Twin MOOSE ACSR
13.	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	2016	5	3	0	3	400 kV Twin MOOSE ACSR
14.	220 kV Nehtaur-Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	2011	-	0	2	2	220 kV Single Zebra ACSR
15.	220 kV Jagriti Vihar-Hapur (765 KV) D/C line	UPPTCL	21.05.2025	2019	4	2	2	4	220 kV Single Zebra ACSR
16.	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	1998	-	5	0	5	400 kV Twin MOOSE
17.	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	2022	4	2	0	2	220 kV Single Zebra ACSR
18.	400 KV DC Gadag -Narendra (New) Line	RENEW	13.05.2025	2024	1	6	1	7	400 kV Twin Bundle ACSS/AW HTLS
19.	220 kV SRS Huballi-Narendra Line	KPTCL	17.05.2025	1969	1	1	0	1	220 kV Single Deer ACSR
20.	400 kV Dadri- Harsh Vihar Ckt- 1&2	NTPC	21.05.2025	2011-12	4	0	1	1	400 kV Twin MOOSE ACSR
21.	400 kV DC Babai-Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	2023	4	0	2	2	400 kV Twin MOOSE ACSR
22.	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	2011	4	2	3	5	400 kV Twin MOOSE ACSR
	Total					**59**	**16**	**75**	

b) The total number of incidences of failures of EHV Transmission Line Towers, and the Nos. of affected Tension type and Suspension type towers that have been reported to CEA for the period of January, 2025 to June, 2025 are indicated in the Fig. 1 given below.

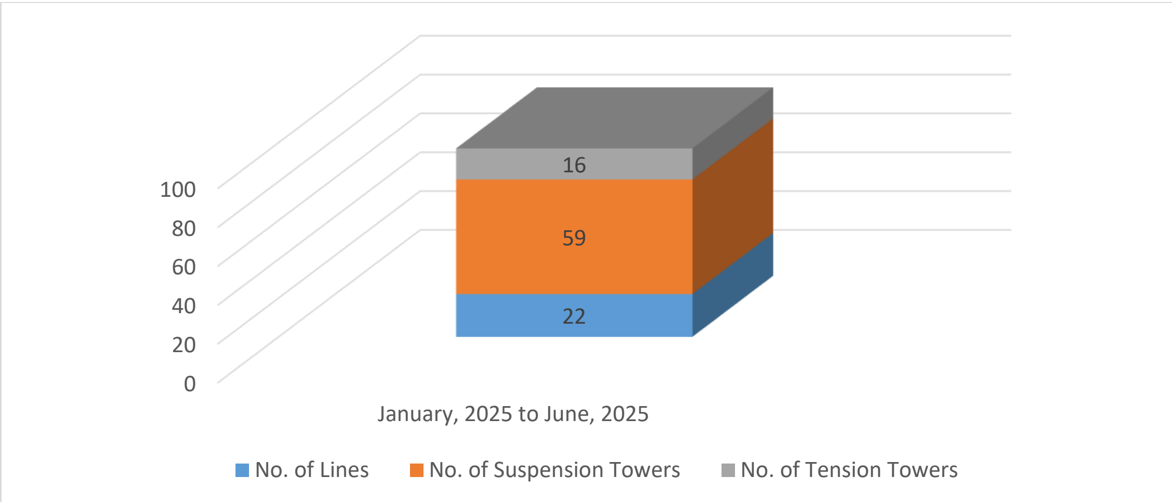


Fig. 1

c) The number of failed Suspension and Tension type towers at various voltage levels, reported for the period of January, 2025 to June, 2025 are indicated in Table-2 below:

Table 2: Voltage wise Tower failure

Voltage Level	Utility	No of affected line	No of Tower failed					
			Suspension tower	Tension Tower				Total no of Tower
			A	B	C	D	Total	
765 kV	PGCIL	1	1	0	0	0	0	1
	Total	**1**	**1**	**0**	**0**	**0**	**0**	**1**
400 kV	RVPN	2	9	1	0	0	1	10
	GETCO	1	2	0	0	0	0	2
	MPPTCL	3	20	0	0	2	2	22
	UPPTCL	2	8	0	0	0	0	8
	RENEW	1	6	0	1	0	1	7
	NTPC	1	0	0	0	1	1	1
	NRSS XXXVI	1	0	0	0	2	2	2
	ADANI	1	2	3	0	0	3	5
	Total	**12**	**47**	**4**	**1**	**5**	**10**	**57**
220 kV	PGCIL	1	0	0	0	1	1	1
	THDCIL	1	3	0	0	0	0	3
	GETCO	2	2	0	0	0	0	2
	MPPTCL	1	1	1	0	0	1	2
	UPPTCL	3	4	3	1	0	4	8

	KPTCL	1	1	0	0	0	0	1
	Total	**9**	**11**	**4**	**1**	**1**	**6**	**17**
Total		**22**	**59**	**8**	**2**	**6**	**16**	**75**

d) It can be seen from the below **Fig. 2** that at 765 kV Voltage level, 1 nos of Suspension type tower have failed in 1 no. of Transmission Line, at 400 kV Voltage level 47 nos. of Suspension type tower and 10 nos. of Tension type towers have failed in 12 nos. of Transmission Line, and at 220 kV Voltage level 11 nos. of Suspension type tower and 6 nos. Tension type towers of have failed in 9 nos. of Transmission Line.

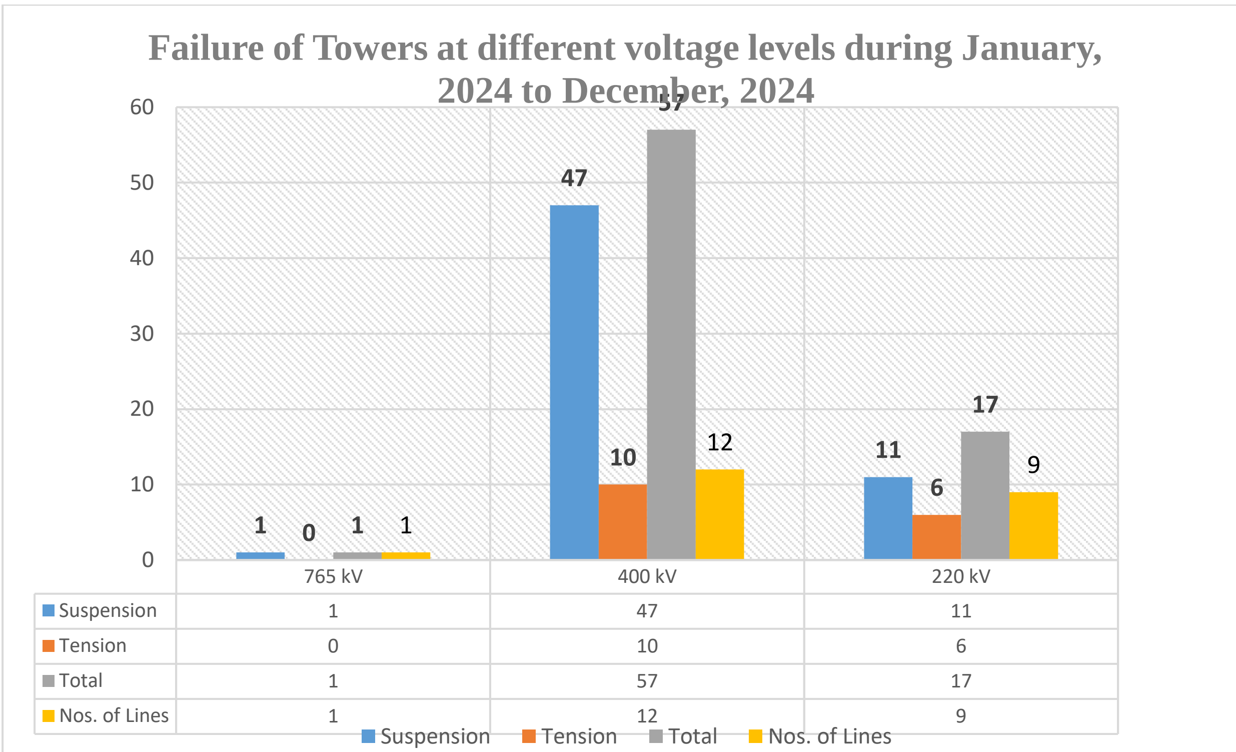


Fig. 2

e) It can be seen from the below **Fig. 3** that out of total 75 nos. of EHV Line Tower failure, 59 nos. are of Suspension type tower leading to its share of 78.7 % of total towers failed and 16 nos. are of Tension type towers leading to its share of 21.3 % of total towers failed. Out of total 16 nos. of Tension Type tower, 8 nos. are of Type B, 2 nos are of Type C and 6 nos are of Type D Tension type tower.

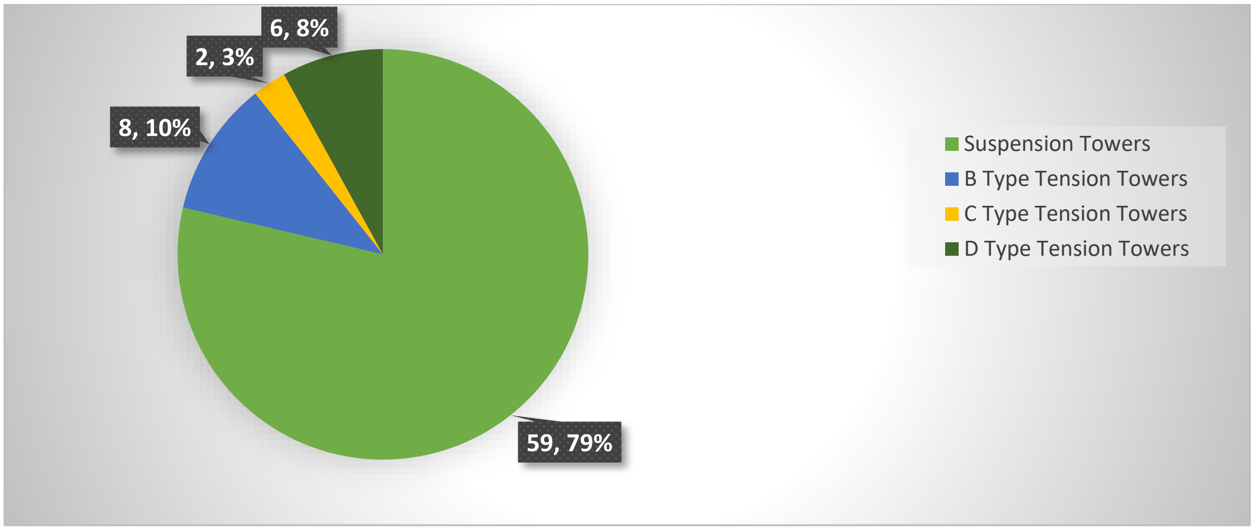


Fig. 3

f) It has been observed that the failure rate of Suspension type tower is much higher in comparison to Tension type tower. This may be because in normal terrain, generally, the nos. of Suspension type tower in any particular line is much higher than that of Tension type tower. Further, the Suspension type towers are not designed to take horizontal forces in the longitudinal direction and hence the failures of one suspension type tower causes secondary failure of adjacent Suspension towers due to the pulling force of conductors. In view of above, the loading criteria for the Suspension type towers have been made more stringent and the longitudinal and transverse force acting on Suspension type towers under security condition has been increased in revised IS 802: 2015.

g) The wind map of India was divided into three wind pressure zones that is light, medium & heavy, before the revision of IS 802 in 1995. In the third revision of IS 802: 1995, 6 wind zones were specified dividing various regions on the basis of 3 second wind gust speed. The no. of transmission lines and towers, failed during the period from January, 2025 to June, 2025 and designed according to various wind zones is given in **Fig. 4** below. It can be seen that the maximum No. of failure of towers have occurred for transmission lines which were designed for Wind Zone 3 and 4. It may be noted that maximum area of India is covered under the wind zones 2 and 4.

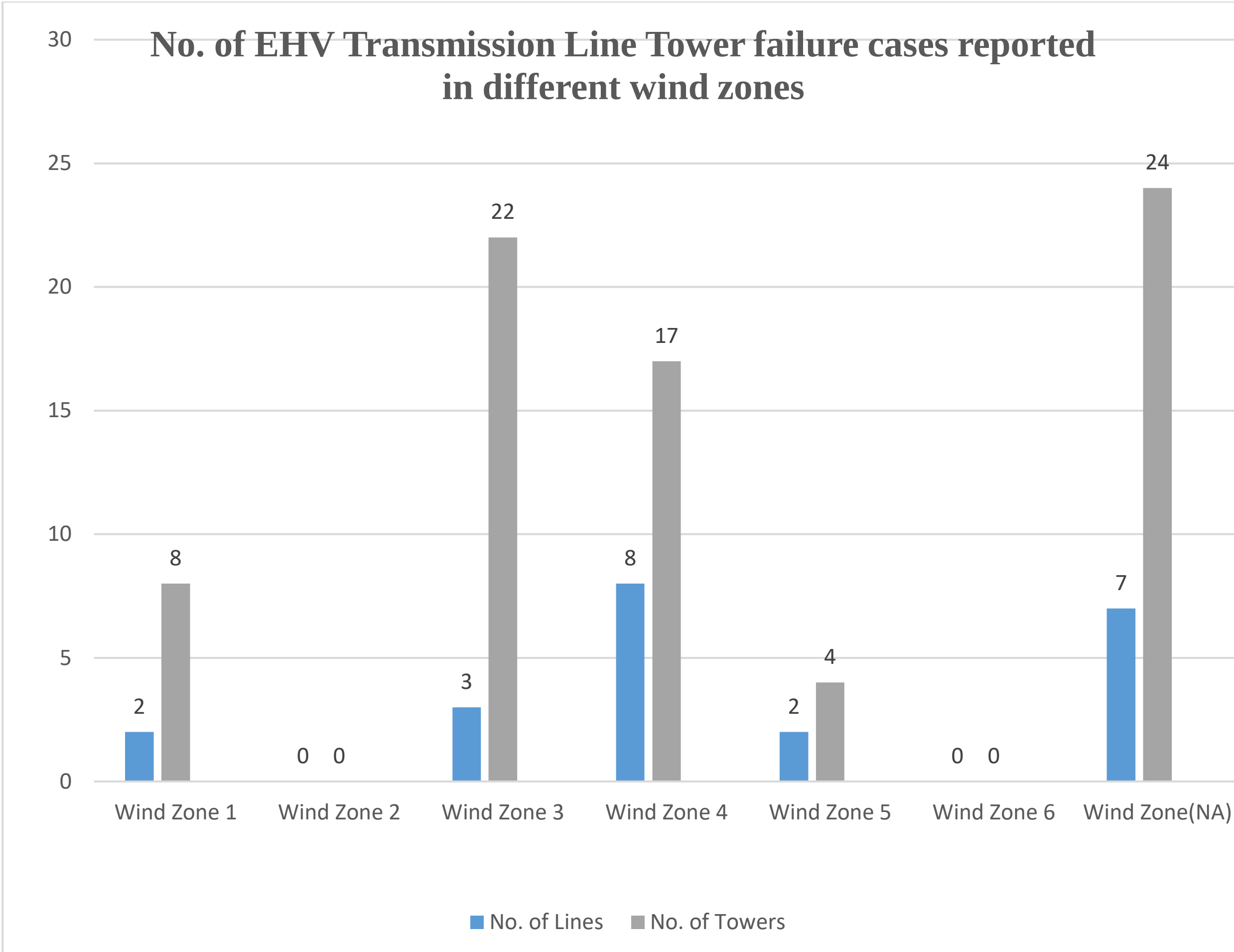


Fig. 4

5.3 Insights into Tower Failure Incidents during Past Years:

a) The details of previous EHV Transmission Line Tower failure incidents which were reported to CEA and have been discussed in the past Standing Committee meetings from the year 2014 onwards have been analysed by CEA and the graph depicting the failures of EHV Transmission Line towers occurred during past years (2014-June, 2025) that have been discussed in the previous Standing committee meetings are shown below in **Fig. 5**. The maximum No. of failures, i.e., 163 cases of tower failures occurred during year 2014. As has been observed in the previous Standing Committee meetings, the failure rate of suspension towers is much higher in comparison to tension towers. This may be because of the cascading effect of failure of suspension type towers i.e. secondary failure of adjacent suspension towers due to the pulling force of conductors which have been developed due to failure of another tower.

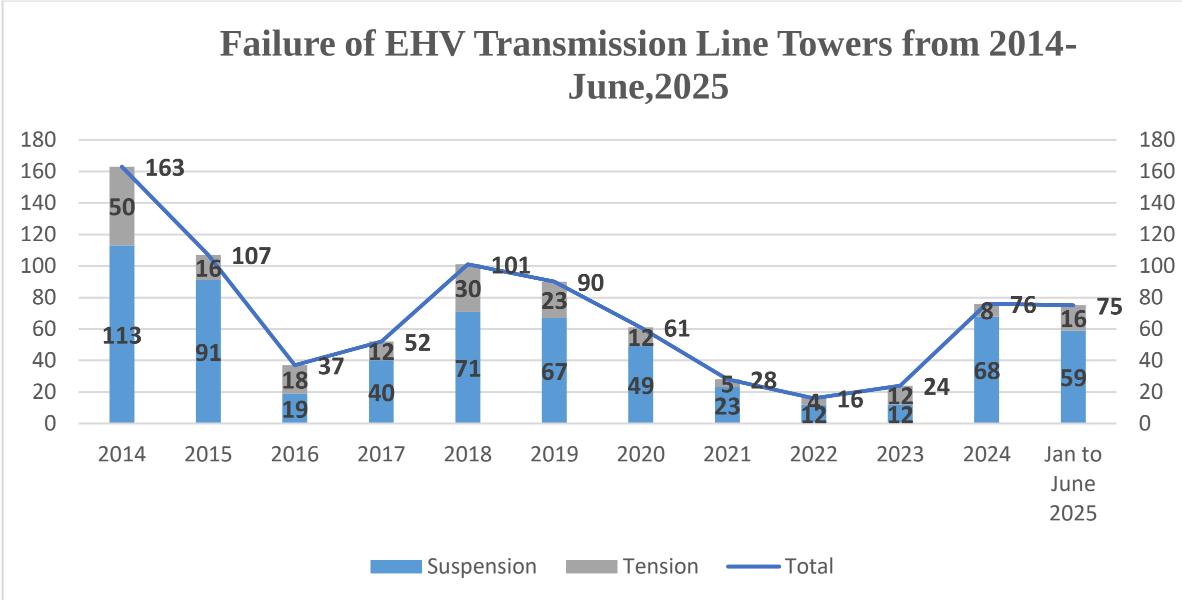
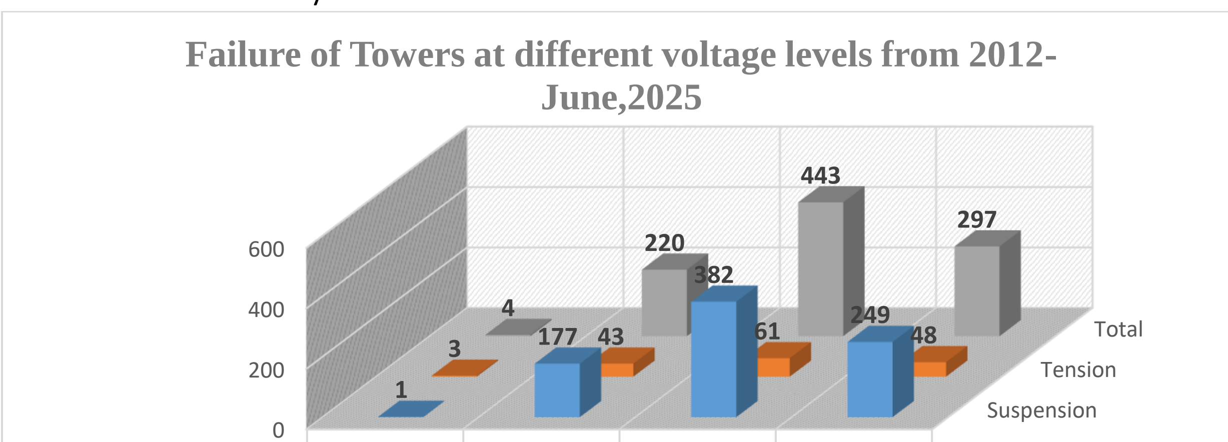


Fig. 5

b) The graph depicting the failures of towers at various voltage levels that have occurred in past years (2012-June 2025) and intimated to CEA which have been discussed in the Standing committee meetings are shown below in Fig. 6. It may be observed that towers of 400 kV voltage level have maximum incidents of failure. It may be noted that the mandate of the Standing Committee is to investigate failure of towers of 220 kV and above voltage class transmission line and the graph shows the details of only those transmission line failures which have been intimated to CEA.



	800 kV	765 kV	400 kV	220 kV
Suspension	1	177	382	249
Tension	3	43	61	48
Total	4	220	443	297

Suspension Tension Total

Fig. 6

6. Observations of the Committee

a) The type of failures of EHV Transmission Line Towers of various voltage levels can be broadly classified as under:
   - Deformation in legs of towers and cage portion of bottom cross arm level.
   - Buckling at stub level leading to complete collapse of towers with/without damage to tower foundation.
   - Buckling above 1st panel (normal tower) level with/ without damage to tower foundation.
   - Buckling from bottom cross arm level or top cross arm level or peak broken without any damage to lower portion of the tower and foundation.
   - Damage to foundation as well as to tower structure due to increased water level and additional force due to water flow/velocity in the river/soil erosion and inadequate protection to foundation of towers.
   - Shearing of stubs of leg members of towers.

b) The main cause of tower failures is attributed to high intensity wind as reported by the transmission utilities, however the utilities failed to produce wind data in many cases of EHV Transmission Line Tower failures which could substantiate their reasoning. The transmission utilities are unable to produce the actual wind speed data on the day of failures due to non-availability of wind speed data at the failure location. The standing committee observed that wherever reporting of tower failure is due to wind, the utility needs to get the wind data for the area from the IMD observatory/ nearby Airport/ nearest wind farms, or the State Irrigation Department which would serve as representative wind speed prevailing in that area at the time of failure. It was agreed that the high wind velocity during storm and local condition of whirl wind might have exceeded the design wind speed for which the tower is designed; however, this needs to be verified. Assistance of IMD & other agencies involved in metrological field may be taken by the affected utilities in this regard and utilities may request for sharing of the wind data obtained from Observatory/Satellite/ Radar.

c) The structural integrity of transmission towers depends on many factors including adequacy of technical standard/ stipulated codal requirement considered for designing the transmission tower, quality of material grade used in tower body, Construction methodology, workmanship and erection practices, Operations & Maintenance practices of the transmission utilities etc.

d) Over the years, Indian Standards for design of transmission line tower has undergone changes. As revision of codal provisions is a continuous process, the changes are to be implemented prospectively. **Strengthening of towers of existing transmission lines due to change in the codal provisions could be decided on case to case basis, if repeated failures are observed in a particular line**. **The Committee observed that the tower erected after restoration should be based on latest standards. And Spare towers which the Utilities procure also should conform to latest standards**

7. Recommendations and Remedial Measures suggested by the Committee:

The recommendations and remedial measures suggested by the Committee after detailed deliberations are given under:

I. Apart from intimating incidents of tower failures and furnishing detailed Report in stipulated format as per Regulation 48 (8) of CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, concerned utilities shall furnish a closure report for the event within 3 months including all the details and records. All utilities are requested to adhere to these timelines strictly.

II. Digitization of Spares and Inventory Management of transmission system assets using suitable software like SAP shall be taken up on priority basis.

III. Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal area [Report brought out in May, 2021) shall be considered for appropriate adoption by the Utilities concerned.

IV. All utilities to develop in-house teams equipped with relevant tower design software to simulate, analyze, and address design issues in failed towers.

V. It has been observed that wind intensity has changed in certain parts of the country due to climate change. In response, the wind map was revised by SERC in 2016 and incorporated into the National Building Code (NBC) by BIS. However, the revised wind map has yet not been included in IS 875. SERC, in coordination with IMD, has been requested to update the wind map. Until IS 875 is formally revised, utilities are advised to refer to the wind map provided in the National Building Code for the design of towers.

VI. After every failure, the concerned utility needs to submit the actual wind velocity prevailed in the affected area so that the Investigating Team of Standing Committee could get reference wind speed prevailed over that area. In this matter, the respective utility may seek the help of IMD/ nearest Airport/ nearest wind farms, or the State Irrigation Department to estimate the wind speed in affected area based on data obtained from observatory/ Satellite/Radar.

VII. The towers which were designed based on old standards should be checked and strengthened based on latest standards.

VIII. For Towers having special design with high extensions and having powerline crossing (single or multiple) beneath it, the Committee recommended to increase the reliability level to ensure greater structural stability. It was also suggested that CPRI may be consulted to validate this approach.

IX. The Committee further emphasized that in RFPs, the reliability level should be specified for power line crossings.

X. For towers located in overlapping wind zones, the Committee recommended that higher wind zone shall be considered if the tower is situated within 50 km of the border area, and the Tower may be designed accordingly.

XI. Due to climatic change, incidents of high winds are increasing. Transmission Utilities need to take proactive measures such as **increased line patrolling**, immediate replacement of missing members/bolts. Various deficiencies such as missing members, missing bolts, bent members, incorrect attachment of cross arm, chimney covered with soil, rusted stub/members etc. has been observed during the failure site visit of various transmission towers of different utilities. These deficiencies may be attributed to poor workmanship, erection deficiency, O&M issues etc. Utilities shall take necessary precautions and carry out proper maintenance of their lines so as to avoid failure of towers due to such deficiencies.

XII. Pile type foundation shall be used for towers located in river or creek bed or on bank of river having scourable strata or in areas where river flow or change in river course is anticipated, based on detailed soil investigation and previous years' maximum flood discharge of the river, maximum velocity of water, highest flood level, scour depth and anticipated change in courser of river based on river morphology data of at least past 20 years to ensure availability and reliability of the transmission line.

XIII. The transmission towers erected near river banks should be frequently patrolled and assessment based on history should be made to anticipate the change in course of river and necessary protection should be provided to towers to avoid its damage during such incident.

XIV. In case of damage of foundation of towers, the foundation design is required to be examined.

XV. The material test report of failed towers should be examined to ascertain the quality of the material.

XVI. Committee suggested to clear the encroachment in the ROW of the line. Committee advised that utilities should improve their erection, patrolling and operation and maintenance practices.

XVII. Regular patrolling of the lines is required for smooth and trouble free operation of line. During patrolling any unauthorized construction/use/ storage under and around the towers should also be checked and if such activity is observed, local administrative authority should be immediately informed for assistance and necessary action

*****

Annexure-I: List of Participants

CEA

1. Sh. N.R.L.K. Prasad, Chief Engineer (PSE&TD)
2. Sh. Bhanwar Singh Meena, Director (PSE&TD)
3. Sh. Pankaj Kumar Sangwan, Dy. Director (PSE&TD)
4. Smt. Jyoti Singh, Dy. Director (PSE&TD)
5. Smt. Rashmi, Assistant Director (PSE&TD)

CPRI

1. Sh. K. Vijaya Kumar, Engg. Officer-IV

POWERGRID

1. Sh. N.K.Sinha, Sr. GM
2. Sh. Indra Singh Rouriya, DGM-Engg (TL)
3. Sh. Jivesh Khanna, Chief Manager

RVPNL

1. Sh. Prashant Lodha, SE
2. Sh. Uday Singh Meena, SE

THDCIL

1. Sh. M.K. Jain, GM (I/C)
2. Sh. Tushar Shinde, Engineer

GETCO

1. Sh. D.M. Dangi, SE (Corporate)

MPPTCL

1. Sh. D.K. Agarwal, Chief Engineer
2. Sh. Ravendra Patel (Exe. Engineer)

UPPTCL

1. Sh. Mohd. Saud, Executive Engineer
2. Sh. Mohd. Shahid, Executive Engineer

RENEW

1. Sh. Pankaj Kumar, GM (Transmission)
2. Sh. Rahul Gupta, Manger (Transmission)

KPTCL

1. Sh. Sudhakar Garapati, AEE

NTPC

1. Sh. Arun Kumar Sharma, DGM
2. Sh. Tabish Adeel, AGM

NRSS XXXVI Transmission Limited

1. Sh. Sandeep Mahabale, CEO NRSS-XXXVI
2. Sh. Rajnish Mehrotra, Head (Corporate Affairs)
3. Sh. Shashank Takawale, Head (PMU & operations) NRSS-XXXVI
4. Sh. Pareoh Mestri, Group Head (Structural Design)
5. Sh. Sachin Rawool Group Head (Trans. Lines)

ADANI

1. Sh. Rahul Yadav, Manager (Transmission)
2. Sh. Saurabhh Sharma, Deputy Manager

RESONIA LTD

1. Sh. Harish Kumar, AVP (Design & Engg.)
2. Sh. Nitesh Ranjan, Head (O&M)
3. Sh. Mahesh Bhapat, Manager (O&M)

HVPNL Haryana

1. Sh. Randeep Chauhan, Executive Engineer
2. Sh. Surendra Singh, SE (T/S)

TATA Projects

1. Sh. Shyam Navin Chandra, GM (T&D Engg.)
2. Sh. Manideep Reddy, Engg. Manager

BSPTCL

1. Sh. Rajeev Kumar Ambasthe, E.S.E.

APRAVA ENERGY

1. Sh. Siddhartha Ghosh, Head- Operation (Transmission)

NHPC Ltd.

1. Sh. Kuruba Hari Babu, DGM (E)
2. Sh. Keshav Kishore Jha, SM (E)

BBMB

1. Sh. Ashok Gahlawat, Exe.Engineer
2. Sh. Aman Dahiya, Sr. Xem, O&M Delhi
3. Sh. Manoj Kr. Srivastava, SE (O&M)

4. Ms. Swati Sharma, SDO (TL)
5. Ms. Sakshi Jain, JE (TL)

OPTCL

1. Sh. S.M. S. Sahoo, GM (Elect.)
2. Sh. K. B. Behera, GM (Elect.)

Annexure-II: Detailed information of EHV Transmission Line Tower Failure cases as reported by Various Transmission Utilities

1. POWERGRID

The following Transmission Lines Towers of POWERGRID had failed during January, 2025 to June, 2025:

Sl. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
1.	220 kV D/C Samba-Chowadhi-I/ Smba-Hiranagar-I Line	PGCIL	16.04.2025	2016	4	0	1	1	220 kV Single Zebra
2	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	2013	1	1	0	1	765 kV Quad Bersimis ACSR

DETAILS IN RESPECT OF EACH TRANSMISSION LINE

1. 220 kV D/C Samba-Chowadhi I / Samba-Hiranagar I

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV D/C Samba-Chowadhi-I / Samba-Hiranagar I
2.	Date and time of occurrence/discovery of failure:	20:04 Hrs. of 16.04.2025 and discovery of failure immediately after failure
3.	Length of line (km):	220 kV S/C Samba-Chowadhi : 52.351 kms 220 kV D/C LILO portion Samba-Chowadhi / Samba-Hiranagar: 14.043 kms
4.	Type of configuration: (S/C, D/C, S/C strung on D/C towers, narrow base etc.)	Line is single circuit while LILO poriton is having double circuit towers
5.	Number of Towers and Type of Towers failed: [suspension / tension/dead end /special tower /river crossing tower/ Powerline crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 no. of Tension Type Towers Failed Tower at loc no. 26 (DD+18)
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No. 26 (Sequence from Hiranagar Sub-station)
7.	Name and size of conductor:	Zebra, Nominal Diameter: 28.62 mm
8.	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9.	Number and size of Ground wire/OPGW (if provided):	OPGW is 24 strand/12mm nominal dia.
10.	Type of insulators in use (Porcelain / Glass / Polymer):	Polymer
11.	Configuration of insulators (I / V / Y / tension)	Vertical configuration D/C Tension tower with each insulator string using Single Tension string
12.	No. of insulators per string and No. of strings per phase:	“Single Tension” string having one nos of 120 kN polymer insulator
13.	Year of construction / commissioning:	Charging on Commissioning: June 2016 (for D/C portion which was LILO at Samba of [220 kV Jammu (Chowadhi)-Hiranagar]
14.	Executing Agency:	M/s Mohan Energy Corporation (for LILO D/C portion constructed in June 2016)
15.	Weather condition on the date of failure:	Extremely windy with unprecedented high speed local cyclonic winds
16.	Wind speed and duration at the time of failure	Request letter sent to concerned authority for wind data.

17.	Terrain Category:	Located in generally plain terrain in a Khad area in Ghagwal Town in Jammu about 6 kms from Samba Substation
18.	Reliability Level	1
19.	Wind Zone (1/2/3/4/5/6) and velocity of wind for which tower was designed:	Wind Zone-IV, 47 m/sec (Non-Snow Zone))
20.	Details of earthing of tower (pipe type/ Counter poise)	Counter Poise
21.	Line designed as per IS: 802 (1977/1995/2015/any other code):	1995
22.	Type of steel	GI (Grade A)
23.	The agency who designed the line:	M/s RPG
24.	Any Special consideration in design:	
25.	Power flow in the line prior to failure:	220 kV S/C Samba-Chowadhi : 2.118 MW 220 kV D/C Samba-Hiranagar I: 8.668 MW
26.	Any missing member found before / after failure of towers:	No
27.	Condition of foundation after failure:	All the four stubs were found damaged near the chimney level
28.	Details of previous failure of the line / tower	No history of previous failure in the line
29.	Details of last maintenance activity along with date	Last patrolling report attached as Annexure-A Last Maintenance Activity attached as Annexure-B
30.	Brief Description of failure: [along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind-storm etc.]	The tower at location no. 26 (D+18) had collapsed from ground level and all four stubs were found damaged near the chimney level. Due to sudden impact, Coping was also found cracked from top in all four stubs. The collapsed tower had fallen in the right side in transverse direction facing Samba S/S. Due to sudden jerk caused by collapsed tower no. 26, the top phase cross arm at adjacent tower (Loc No 25) was also damaged. Photographs are attached as annexure.
31.	Probable cause of failure:	High speed localized cyclonic winds
32.	Whether line will be restored on ERS or Spare tower will be used:	Spare tower to be used
33.	Likely date of restoration:	Line restored on 27.04.2025
34.	Present Status:	Tower is completely stable
35.	Details of any Tests carried out after failure:	Visual Inspection was carried out by officials from POWERGRID, NRPC and JKPTCL however

<table>
<tr><td></td><td></td><td>no missing/ loose members or nut-bolts were observed.

Tower Material (MS / HT member samples have been collected and shall be tested in NABL accredited lab</td></tr>
<tr><td>36.</td><td>Single line diagram / clearance diagram of the failed tower(s) with all dimensions (Horizontal and vertical dimensions including the base width of tower)</td><td></td></tr>
<tr><td>37.</td><td>Tower spotting data</td><td>Attached as Annexure-C</td></tr>
<tr><td>38.</td><td>Tower Schedule for the failed section</td><td>
<table>
<tr><th>Tower No.</th><th>Tower Type</th><th>Span Length (m)</th><th>Angle of deviation</th></tr>
<tr><td>22</td><td>DB</td><td></td><td>08°10'22"LT</td></tr>
<tr><td></td><td></td><td>247</td><td></td></tr>
<tr><td>23</td><td>DB</td><td></td><td>09°15'16"RT</td></tr>
<tr><td></td><td></td><td>349</td><td></td></tr>
<tr><td>24</td><td>DA</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>350</td><td></td></tr>
<tr><td>25</td><td>DA</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>346.</td><td></td></tr>
<tr><td>26*</td><td>DD</td><td></td><td>30°00'01"RT</td></tr>
<tr><td></td><td></td><td>462</td><td></td></tr>
<tr><td>27</td><td>DB</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>303</td><td></td></tr>
<tr><td>28</td><td>DD</td><td></td><td>44°38'35"RT</td></tr>
<tr><td></td><td></td><td>337</td><td></td></tr>
<tr><td>29</td><td>DD</td><td></td><td>40°31'53"LT</td></tr>
</table>
</td></tr>
<tr><td>39.</td><td>Sag tension calculation considered for the design of towers</td><td></td></tr>
<tr><td>40.</td><td>Any other relevant information:</td><td></td></tr>
</table>

2. 765 KV Fatehpur-Agra 2 Transmission Line

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level	765kV S/C Fatehpur-Agra Ckt # 2
2.	Date and time of occurrence/discovery of failure	21-05-2025, 22:28 Hrs
3.	Length of line (km)	334. 83
4.	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C Delta Configuration
5.	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 No. "A+0" Type Suspension Tower
6.	Tower location No. with reference to nearest substation (indicate Name)	Location no.-722 near Agra Substation
7.	Name and size of conductor	ACSR Bersimis & Dia- 35.05mm
8.	No. of sub-conductors per bundle and bundle spacing	04 sub-conductors per bundle, bundle spacing: 457 mm.
9.	Number and size of Ground wire/OPGW (if provided)	Both Earth Wire
10.	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11.	Configuration of insulators (I / V / Y / tension)	"I" Type both Side, Middle "V" Type
12.	No. of insulators per string and No. of strings per phase	02/String, 02string/Phase
13.	Year of construction / commissioning	01 Nov 2013
14	Executing Agency	M/s KEC International Limited
15.	Weather condition on the date of failure	Heavy Thunderstorm and Wind
16	Terrain Category	Plain
17.	Reliability Level	2
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind: Zone	IV- 47 m/sec
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code	IS:802 (1995), Strengthened as per Manitoba Hydro International, Canada recommendations.
21.	The agency who designed the line	POWERGRID
22.	Any Special consideration in design	1. Tower also analysed for narrow front wind loading condition 2. Tower Strengthened as per Manitoba Hydro

		International, Canada recommendations.
23.	Details of last maintenance activity along with date	24-Feb-2025
24.	Power flow in the line prior to failure	259MW
25.	Any missing member found before / after failure of towers	No
26.	Condition of foundation after failure	OK
27.	Brief Description of failure [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	On 21.05.2025, due to high-speed cyclonic windstorm, the K-frame of the tower above waist level got twisted resulting in tower damage. Photographs & Newspaper cutting attached.
28.	Probable cause of failure	Heavy Cyclonic Wind
29.	Details of previous failure of the line / tower	NIL
30.	Whether line will be restored on ERS or Spare tower will be used	Line restored on Spare tower.
31.	Likely date of restoration	Line restored on 2nd June'25
32.	Present Status	Line restored on 2nd June'25
33	Details of any Tests carried out after failure (attach test reports)	Samples of Tower material collected and sent to NABL certified lab for testing
34.	Wind speed data of date & time of failure from nearby authorized observatory	No wind observatory installed nearby tower location (copy of IMD letter attached)
35.	Location of failed tower	
	a. Location Coordinates b. Nearest Airport c. District and State	a. 26.97725, 78.63683 b. Agra c. Agra & U. P
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Structural drawing attached.
37.	Tower weight	Approx. 23 MT
38.	Tower spotting data	Attached
39.	Tower schedule of affected section	Attached
40.	Sag tension calculation considered for design of tower	T = 9.7t. Sg = 14.80Mtr.
41.	Design document of failed towers	As per IS 802-1995
42.	Any other relevant information	-

2. RVPNL

The following Transmission Lines Towers of RVPNL had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
3	400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	2019	-	8	1	9	400 kV Moose ACSR
4	400 kV D/C Barmer- Bhinmal Line	RVPNL	05.05.2025	2019	-	1	0	1	400 kV Twin MOOSE ACSR

DETAILS IN RESPECT OF EACH TRANSMISSION LINE

3. 400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line

Sr. No.	Item Description	Details
01	Name of Transmission line with voltage level	400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line
02	Date and time of occurrence/discovery of failure	01.05.2025 at 21:05 Hrs
03	Length of line (km):	116.998 KM
04	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
05	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)	Total failure towers:- 09, DA+0=05, DA+3=03, DB+0=01
06	Tower location No. with reference to nearest substation(indicate Name):	400KV GSS RVPN Jaisalmer-2 (Bhensara)
07	Name and size of conductor:	ACSR Moose Conductor
08	No. of sub-conductors per bundle and bundle spacing	NA
09	Number and size of Ground wire/OPGW (if provided):	7/3.66 Earth wire & 24-F OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I & Tension
12	No. of insulators per string and No. of strings per phase:	02 Strings per phase
13	Year of construction / commissioning:	2019
14	Executing Agency:	M/s TATA Projects
15	Weather condition on the date of failure:	Rainy and heavy Storm
16	Terrain Category:	Plain & undolated
17	Reliability Level:	NA
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 5
19	Details of earthing of tower (pipe type/ Counter poise):	Counterpoise
20	Line designed as per IS:802 (1977/1995/2015 any other code):	2015
21	The agency who designed the line:	M/s TATA Projects
22	Any Special consideration in design:	NA
23	Details of last maintenance activity along with date:	31.03.2025

24	Power flow in the line prior to failure	219 MW
25	Any missing member found before / after failure of towers:	Yes
26	Condition of foundation after failure:	OK
27	Brief Description of failure:	Enclosed
28	Probable cause of failure:	Heavy Wind storm
29	Details of previous failure of the line / tower :	136 to 140
30	Whether line will be restored on ERS or Spare tower will be used:	No
31	Likely date of restoration:	10.07.2023
32	Present Status:	Restoration work under progress
33	Details of any Tests carried out after failure(attach test reports):	No
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower	
A	Location Coordinates:	Enclosed in Tower schedule
B	Nearest Airport:	Jaisalmer
C	District and State:	Jaisalmer (Rajasthan)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
38	Tower weight:	DA- 10.335MT & DB-17.60MT
39	Tower spotting data:	Enclosed
40	Sag tension calculation considered for design of tower	Enclosed
41	Design document of failed towers:	NA
42	Any other relevant information:	NA

4. 400 kV D/C Barmer- Bhinmal Line

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	400 kV D/C Barmer- Bhinmal Line
2.	Date and time of occurrence/discovery of failure:	05.05.2025 at 04:14 hrs
3.	Length of line (km):	143.775 Km Barmer to Bhinmal end
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 no. suspension (DA+9)
6.	Tower location No. with reference to nearest substation(indicate Name):	Loc No. 101 (DA+9)
7.	Name and size of conductor:	Twin Moose Conductor, 597.2 Sq. MM
8.	No. of sub-conductors per bundle and bundle spacing:	AL-54/3.53 and Steel- 7/3.53
9.	Number and size of Ground wire/OPGW (if provided):	Ground (7/3.66 mm) and OPGW (24 Fiber)
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11.	Configuration of insulators (I / V / Y / tension):	I-string, Twin Moose
12.	No. of insulators per string and No. of strings per phase:	Composite Long Rod Insulator- 01 No.
13.	Year of construction / commissioning:	21.05.2019, Barmer/ Bhinmal
14.	Executing Agency:	RVPN
15.	Weather condition on the date of failure:	Heavy Rain, Wind Storm and Lightning
16.	Terrain Category:	Sandy Plains and sandy Dunes
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Requested to weather department of Govt. of Rajasthan but not provided
19.	Details of earthing of tower (pipe type/ Counter poise):	pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	-
21.	The agency who designed the line:	RVPN
22.	Any Special consideration in design:	-
23.	Details of last maintenance activity along with date:	Line patrolling done on date 01.02.2025 to 28.02.2025
24.	Power flow in the line prior to failure:	104 MW Barmer/ 102 MW Bhinmal
25.	Any missing member found before / after failure of towers:	No
26.	Condition of foundation after failure:	Damage

27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Heavy Rain, Wind Storm and Lightning
28.	Probable cause of failure:	Heavy Rain, Wind Storm and Lightning
29.	Details of previous failure of the line / tower :	Nil
30.	Whether line will be restored on ERS or Spare tower will be used:	Not restored on ERS and work is in progress for new erection of tower
31.	Likely date of restoration:	
32.	Present Status:	work is in progress
33.	Details of any Tests carried out after failure(attach test reports):	-
34.	Wind speed data of date & time of failure from nearby authorized observatory:	Requested to weather department of Govt. of Rajasthan but not provided
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	TL No. 101 a.25.597162 & 71.497112 b. Jodhpur c. Barmer and Rajasthan
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	15.50 MT
38.	Tower spotting data:	-
39.	Tower schedule of affected section:	1.2 Km
40.	Sag tension calculation considered for design of tower:	-
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

3. THDCIL

The following Transmission Line Towers of THDCIL had failed during January 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
5	220 kV Amarapur-Tharad Line	THDCIL	05.05.2025	2012	-	3	0	3	220 kV Single MOOSE ACSR

5. 220 kV Amarapur-Tharad Line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV Amarapur-Tharad Line
2.	Date and time of occurrence/discovery of failure:	05.05.2025
3.	Length of line (km):	1.4 Km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	3 nos. Tower / DA+3 Type
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No.21, 22, 23
7.	Name and size of conductor:	AL59 MOOSE
8.	No. of sub-conductors per bundle and bundle spacing:	ONE
9.	Number and size of Ground wire/OPGW (if provided):	24 CORE OPGW NA
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain
11.	Configuration of insulators (I / V / Y / tension):	I
12.	No. of insulators per string and No. of strings per phase:	One Insulator Per String and One String Per Phase
13.	Year of construction / commissioning:	2012
14.	Executing Agency:	KINTECH
15.	Weather condition on the date of failure:	Very Heavy Cyclonic Wind (40 Mtr/Sec) And Rain
16.	Terrain Category:	-
17.	Reliability Level:	-
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	-
19.	Details of earthing of tower (pipe type/ Counter poise):	Counter Type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	IS:802/1995
21.	The agency who designed the line:	KINTECH
22.	Any Special consideration in design:	-

23.	Details of last maintenance activity along with date:	Scope of GETCO
24.	Power flow in the line prior to failure:	-
25.	Any missing member found before / after failure of towers:	Some Member Missing Found During Inspection
26.	Condition of foundation after failure:	Damaged
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower No.21,22,23 Totally Collapsed and All Tower Stub Damaged
28.	Probable cause of failure:	Heavy Gusty Wind
29.	Details of previous failure of the line / tower :	Previous In 2020 5 Nos. Tower Collapse
30.	Whether line will be restored on ERS or Spare tower will be used:	ERS Used for One Month
31.	Likely date of restoration:	27.06.2025
32.	Present Status:	Both Line Charged After CEIG Approval
33.	Details of any Tests carried out after failure(attach test reports):	NA
34.	Wind speed data of date & time of failure from nearby authorized observatory:	NA
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	**Location Coordinates** **Village**-Adgam, Ta-Radhanpur. **Nearest Airport:** Ahmadabad, Gujarat. **District and State**: Dist.-Patan, Gujarat -385240
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	NA
37.	Tower weight:	Approx. 3.5 Ton
38.	Tower spotting data:	-
39.	Tower schedule of affected section:	Please refer **Appendix -I**
40.	Sag tension calculation considered for design of tower:	-
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

4. GETCO

The following Transmission Lines Towers of GETCO had failed during January 2025 to June 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
6	400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line	GETCO	05.05.2025	2014	-	2	0	2	400 kV MOOSE ACSR
7	220 kV Bhachunda Varsana/ Ukheda Varsana line	GETCO	06.05.2025	2004	5	1	0	1	220 kV AL59
8	220kV Nakhatrana-Panadhro Line 1 & 2	GETCO	08.05.2025	1997	4	1	0	1	220 kV Single Zebra ACSR

6. 400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line
2	Date and time of occurrence/discovery of failure	On dated 05.05.2025 @ 18:29, 400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line tripped from Both end, as probable fault jurisdiction is in Dahej Jurisdiction, Line patrolling carried out . During patrolling, it was found out that Loc No.518(S)-Top and bottom cross arm found bend, Loc No.519(S)-Tower collapsed from its foundation and Between Loc No. 520(S) to 521(S) -OPGW found broken.
3	Length of line (km):	247.60Kms and 233 Kms respectively
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C tower
5	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	02 Nos Suspension
6	Tower location No. with reference to nearest substation(indicate Name):	518(S) and 519(S) nearest Bhersam Village nearer to 220kV Dahej
7	Name and size of conductor:	ACSR Moose Conductor & 520mm^2
8	No. of sub-conductors per bundle and bundle spacing:	
9	Number and size of Ground wire/OPGW (if provided):	24F OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	SRI
11	Configuration of insulators (I / V / Y / tension):	
12	No. of insulators per string and No. of strings per phase:	1 &1
13	Year of construction / commissioning:	05.07.2014
14	Executing Agency:	Bajaj Electricals LTD
15	Weather condition on the date of failure:	Extremely Heavy wind and rain with lightning
16	Terrain Category:	

17	Reliability Level:	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	
19	Details of earthing of tower (pipe type/ Counter poise):	Rod type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	
21	The agency who designed the line:	
22	Any Special consideration in design:	
23	Details of last maintenance activity along with date:	30.03.2025-Jumper tightning of from loc no.498 to 554 of bharuch juridiction
24	Power flow in the line prior to failure:	400KV Kosamba Charal line-268 MW and 400KV Kosamba Panchham line-375 MW
25	Any missing member found before / after failure of towers:	No
26	Condition of foundation after failure:	02 Legs foundation found cracked and 02 nos are totally uprooted from ground of Loc No.519(S)
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	
28	Probable cause of failure:	extremely Heavy wind and rain with lightning
29	Details of previous failure of the line / tower :	-
30	Whether line will be restored on ERS or Spare tower will be used:	In PF
31	Likely date of restoration:	15.05.2025
32	Present Status:	Loc No. 519(S) tower erection work in prograss, Loc No. 518(S) cross arm repalced and damage cunductor work under progress
33	Details of any Tests carried out after failure (attach test reports):	No
34	Wind speed data of date & time of failure from nearby authorized observatory:	-
35	Location of failed towera. Location Coordinates:b. Nearest Airport:c. District and State:	A.Lat.21.7676790 Long.72.8526770 B. Surat C.Bharuch, Gujarat
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-
37	Tower weight:	10MT

38	Tower spotting data:	Attached here with
39	Tower schedule of affected section	Attached here with
40	Sag tension calculation considered for design of tower	-
41	Design document of failed towers:	-
42	Any other relevant information	-

7. 220 kV Bhachunda Varsana/ Ukheda Varsana line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	220kv Bhachunda Varsana/ Ukheda Varsana Line
2	Date and time of occurrence/discovery of failure	06.05.2025 at 13.30hrs
3	Length of line (km):	173 km
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C Tower
5	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1 Nos. Suspension Normal Tower
6	Tower location No. with reference to nearest substation(indicate Name):	Location no-336 Connected with 400kV Varsana s/s
7	Name and size of conductor:	AL 59
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9	Number and size of Ground wire/OPGW (if provided):	Single Ground wire
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I
12	No. of insulators per string and No. of strings per phase:	Single insulator per phase, Single string per phase.
13	Year of construction / commissioning:	18.02.2004
14	Executing Agency:	Suzlon
15	Weather condition on the date of failure:	Heavy rain with wind
16	Terrain Category:	Desert area
17	Reliability Level:	NA
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	5
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	Line designed as per IS:802 (1977)

21	The agency who designed the line:	M/S SUZLON(IN EPC project)
22	Any Special consideration in design:	No any special design not considered
23	Details of last maintenance activity along with date:	17-05-2024 Ground petrolling
24	Power flow in the line prior to failure:	60 Amp
25	Any missing member found before / after failure of towers:	NO
26	Condition of foundation after failure:	Towers twisted and collapsed. Foundation found ok.
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to wind gust on dated 06.05.2025, line tripped, after petrolling it was found that tower no 336 collapsed.
28	Probable cause of failure:	Heavy rain, heavy wind and cyclone effect.
29	Details of previous failure of the line / tower :	NA
30	Whether line will be restored on ERS or Spare tower will be used:	NA
31	Likely date of restoration:	20.05.2025
32	Present Status:	WORK UNDER PROGRESS
33	Details of any Tests carried out after failure (attach test reports):	No any test carried out
34	Wind speed data of date & time of failure from nearby authorized observatory:	Approx 70-80 KM/Hrs due to mini cyclone as per IMD Report 06.05.2025
35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Loc 336, 23.4587,69.678 Near 66kv Loria substation, Bhuj Airport, Kutch Gujarat
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Single line diagram & network is Attached herewith
37	Tower weight:	4 MT Appr.
38	Tower spotting data:	336(S): 23.4587,69.678
39	Tower schedule of affected section	Attached with here.
40	Sag tension calculation considered for design of tower	For ASCR AL59 conductor,32degree full wind, 3950 kg 0 degree 2/3 full wind ,4360kg
41	Design document of failed towers:	DA+3 tower

42	Any other relevant information	On dated 06.05.2025, due to heavy rain with very high wind gust at Loria,Sumrasar Village tower has been collapsed.

8. 220kV Nakhatrana-Panadhro Line 1 & 2

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	220kV Nakhatrana-Panadhro Line 1 & 2
2	Date and time of occurrence/discovery of failure	08-05-2025 18:35:00 Hrs
3	Length of line (km):	75 km
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C Tower
5	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1 No. Suspension Normal Tower
6	Tower location No. with reference to nearest substation(indicate Name):	163 (S)
7	Name and size of conductor:	ACSR Zebra
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9	Number and size of Ground wire/OPGW (if provided):	Single OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I
12	No. of insulators per string and No. of strings per phase:	Single insulator per phase, Single string per phase.
13	Year of construction / commissioning:	24.01.1997
14	Executing Agency:	M/s Kalpatru
15	Weather condition on the date of failure:	Heavy rain with wind
16	Terrain Category:	Costal and creek area
17	Reliability Level:	Design as old IS:802,Not applicable in old tower design (IS)
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	4
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	Line designed as per IS:802 (1977)
21	The agency who designed the line:	M/s Kalpatru
22	Any Special consideration in design:	No any special design not considered
23	Details of last maintenance activity along with date:	28.04.2025 Ground petrolling carried out

24	Power flow in the line prior to failure:	63 Amp
25	Any missing member found before / after failure of towers:	NO
26	Condition of foundation after failure:	Towers collapsed from Bottom
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to wind gust on dated 08.05.2025, line tripped, after petrolling it was found that tower no. 163(S) collapsed.
28	Probable cause of failure:	Heavy rain, heavy wind and cyclone effect.
29	Details of previous failure of the line / tower :	NA
30	Whether line will be restored on ERS or Spare tower will be used:	NO
31	Likely date of restoration:	31-May-25
32	Present Status:	New Tower Material collected from store
33	Details of any Tests carried out after failure(attach test reports):	No any test carried out
34	Wind speed data of date & time of failure from nearby authorized observatory:	-
35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Paneli Village, Ta- Lakhpat, Dist- Kutchh.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Single line daigram & network is Attached herewith
37	Tower weight:	3.6 MT Appr.
38	Tower spotting data:	163(S): 23.606098, 68.951446
39	Tower schedule of affected section	Attached with here.
40	Sag tension calculation considered for design of tower	For ASCR zebra conductor,32degree full wind,3950kg 0 degree 2/3 full wind ,4360kg
41	Design document of failed towers:	DA+0 tower
42	Any other relevant information	On dated 08.05.2025, due to heavy rain with very high wind gust at Paneli village tower has been collapsed.

5. MPPTCL

The following Transmission Lines Towers of MPPTCL had failed during January, 2025 to June, 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
9	220kV Sidhi-ATPS & 220 kV Sidhi-Rewa Line	MPPTCL	05.05.2025	October, 2008	-	1	1	2	220 kV Single Zebra ACSR
10	400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II	MPPTCL	21.05.2025	Ckt.-1- 31.03.1991, Ckt. II- 18.06.1991	3	5	1	6	400 kV Twin MOOSE ACSR
11	400 kV DCDS Bhopal- Bina line Ckt.-I & II	MPPTCL	11.06.2025	Ckt.-1- 17.03.1994, Ckt.-II 23.03.1994	3	11	1	12	400 kV Twin MOOSE ACSR
12	400kV DCDS Chhegoan-Julwania Line	MPPTCL	12.06.2025	2014	3	4	0	4	400 kV Twin MOOSE ACSR

9. 220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line
2	Date and time: 1. Occurrence of failure 2. Discovery of failure	05.05.2025 Time 00:45 Hrs/05:10Hrs
3	Length of line (km)	58.372 km. (Under tlm Sidhi)
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 (JC) suspension & 01(860+10) tension
6	Tower location No. with reference to nearest substation	Loc.No.8 (IC) & 9 (B60+10),220 kV S/s Sidhi
7	Name and size of conductor	ACSR Zebra
8	No. of sub-conductors per bundle and bundle spacing	Single ACSR Zebra
9	Number and size of Ground wire/OPGW	12.50 MM, Earth wire
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porcelain Insulator
11	Configuration of insulators (I / V / Y / tension)	suspension & 1 tension
12	No. of insulators per string and No. of strings per phase	Loc. No 8 (JC) 12 No. insulators per strings per phase/ 6 No. 2. Lac. No. 9 (1860-10) 13No. insulators per strings per phase/12 No.
13	Year of construction / commissioning	Oct-2008
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy storm and rain
16	Terrain Category	Hilly

17	Reliability Level	Category - 02
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	..
19	Details of earthing of tower (pipe type/ Counter poise)	Counter poise
20	Line designed as per IS:802 (1977/1995/2015 any other code)	YES
21	The agency who designed the line	MPEB Jabalpur
22	Any Special consideration in design	NA
23	Details of last maintenance activity along with date	01.04.2025
24	Power flow in the line prior to failure	20 MW
25	Any missing member found before / after failure of towers	NO
26	Condition of foundation after failure	Foundation was robust, only 2 No stub found bend due to tower collapse.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Heavy storm in that area therfore tower has been collapsed.
28	Probable cause of failure	Due to heavy wind and thunder across the line
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	Re-erection of tower same location.
31	Likely date of restoration	Restored on dt. 22.05.2025
32	Present Status	Charged on dt. 22.05.2025. AT 22:28 Hrs & 00.45
33	Details of any Tests carried out after failure (attach test reports)	Test reports of Sample of damge tower has been Enclosed given by testing lab, MP Laghu Udyog Nigam Ltd. Jabalpur
34	Wind speed data of date & time of failure from nearby authorized observatory	No data available at O/o Deputy director of meteorological department Satna/Nagpur.
35	Location of failed tower: a. Location Coordinates b. Nearest Airport District and State	8 (JC) & 9(860+10) (24.149792*N, 81.2257358°E) Rewa (M.P.) Shahdol Madhya Pradesh.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions	Not available

	(horizontal & vertical dimensions including base width of tower)	
37	Tower weight	28000 kgs.
38	Tower spotting data	Not available
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	
41	Design document of failed towers	
42	Any other relevant information	

10. 400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV DCDS Bhopal Itarsi (PGCIL) line Ckt.-1 & II
2	Date and time: 3. Occurrence of failure 4. Discovery of failure	21.05.2025 at 15:39
3	Length of line (km)	96.932 km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC)
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01. 04 no suspension tower collapse loc. no. 113(FD0), 114(FD0), 115(FD0), 112(FD0+3)/ 02. 01 no suspension tower partially damage loc. no. 116(FDO) 03. 01 no tension tower got partially damage loc. no. 111(FD30)
6	Tower location No. with reference to nearest substation	400 kV S/s Bhopal
7	Name and size of conductor	Twin moose ACSR conductor size 31.80 Dia
8	No. of sub-conductors per bundle and bundle spacing	02 no. conductor per bundle
9	Number and size of Ground wire/OPGW	OPGW 8 fiber & 24 fiber
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 no. and 01 no. string per phase in suspension tower and 24 no. and 02 no strings per phase in tension tower
13	Year of construction / commissioning	Ckt.-1-31.03.1991, Ckt. II 18.06.1991
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy thunder storm & cyclone
16	Terrain Category	Plan area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3
19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing (04 leg)
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977

21	The agency who designed the line	SAE India Ltd.
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	Ground patrolling done on date 13.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	NO
31	Likely date of restoration	Ckt-I charged on 11.07.25& ckt-1l 13.07.2025
32	Present Status	Rectification is under progress
33	Details of any Tests carried out after failure (attach test reports)	Mechanical & Chemical test of tower part (report enclosed)
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: c. Location Coordinates d. Nearest Airport District and State	04 no tower collapse 112(FD0+3),113(FD0),114(FD0), 115(FDQ) and 02 no tower got partially damage 111(FD30),116(FD0) Cordinates- List enclosed Nearest Airport - bhopal Dist. – Raisen (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Superstructure (9.173 MT)
38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	NA
42	Any other relevant information	No

11. 400 kV DCDS Bhopal Bina Line Ckt I & II

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV DCDS Bhopla Bina Line Ckt I & II
2	Date and time: 5. Occurrence of failure 6. Discovery of failure	11.06.2025 at 19:13
3	Length of line (km)	134.924 km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC)
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01. 06 no suspension tower collapse loc. no. 122(FDO), 123(FD0), 125(FD0), 126 (FD0+3),127(FD0+6) 02. 05 no suspension tower partially damage loc. no. 96(FD0),98(FD0), 121(FD0), 128(FDO),129(FD0) 03. 01 no tension tower got partially damage loc. no. 124 (FD30) 'T'
6	Tower location No. with reference to nearest substation	400 kV S/s Bhopal
7	Name and size of conductor	Name -Twin Moose ACSR conductor size-31.80 mm dia
8	No. of sub-conductors per bundle and bundle spacing	02 No conductor per bundle
9	Number and size of Ground wire/OPGW	OPGW 8 fiber & 24 fiber
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 no. and 01 no. string per phase in suspension tower and 24 no. and 02 no strings per phase in tension tower
13	Year of construction / commissioning	Ckt.-1-17.03.1994, Ckt.-II 23.03.1994
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy thunder storm & cyclone
16	Terrain Category	Plan area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3

19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing (04 leg)
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977
21	The agency who designed the line	SAE India Ltd.
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	Ground patrolling done on date 06.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed with detailed report
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	30.07.2025
32	Present Status	Rectification is under progress
33	Details of any Tests carried out after failure (attach test reports)	Mechanical & Chemical test of tower part will be carried out
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: e. Location Coordinates f. Nearest Airport District and State	6 no tower found collapse tower loc. no. (1) 97 (FD0+6), (2)122(FDO) (3) 123 (FD0), (4)125 (FDO), (5) 126 (FD0+3), (6) 127 (FD0+6) and 06 no tower got partially damage (1) 98 (FDO) bend from middle x-arm, (2) 96(FD0) bend canopy, (3)121 FD0 bend above bottom x-arm, (4) 124 (FD30) Transposition tower Bend above bottom farm, (5) 128 FD0 bend above bottom, (6)129 FDO bend above bottom. Cordinatos- List enclosed Nearest Airport Bhopal Dist. Vidisha (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Superstructure (9.173 MT)

38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	Na
42	Any other relevant information	No

12. 400kV DCDS Chhegoan- Julwania Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400kV DCDS Chhegoan- Julwania Transmission Line Ckt.-1 & II
2	Date and time: 7. Occurrence of failure 8. Discovery of failure	12.06.2025 at 19:08 Hr
3	Length of line (km)	113.639 KM
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1.) 02 Nos Suspension towers collapsed [240 (FD0), 241 (FD0+6)] 2) 02 Nos Suspension Partially Damaged [239 (FD0+3), 235 (FD0+3)l Total 04 no Suspension
6	Tower location No. with reference to nearest substation	Loc No. 340 is situated at 400kV Julwania Sub-Station
7	Name and size of conductor	Name -Twin Moose ACSR conductor size-31.80 mm dia
8	No. of sub-conductors per bundle and bundle spacing	02 No conductor per bundle
9	Number and size of Ground wire/OPGW	713.66 mm, Gl GW and OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 No. & 0L no. string per Phase in suspension tower.
13	Year of construction / commissioning	Year - 2014
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Cyclonic storm in localized qlgg
16	Terrain Category	Agriculture area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3
19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977
21	The agency who designed the line	SAE India Ltd.

22	Any Special consideration in design	Strengthening of towers structure are proposed
23	Details of last maintenance activity along with date	Ground patrolling done on date 23.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation and stub ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed with detailed report
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	Nil
30	Whether line will be restored on ERS, or Spare tower will be used	Spare tower used
31	Likely date of restoration	Restoration work compelled on dtd 7.O7.2025
32	Present Status	line charged ckt-l at 1"9:44hrs and Ckt-ll 19:46 hrs dtd 7.O7.2025
33	Details of any Tests carried out after failure (attach test reports)	Under Process
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: g. Location Coordinates h. Nearest Airport District and State	02 Nos towers collapsed [240 (FD0), 241 (FD0+6)l 02 Nos Partially Damaged [239(FD0+3) & 23s(FD0+3)] Cordinatos- List enclosed Nearest Airport - indore Dist. – Khargone (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Suprestructure (9.173 MT)
38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	NA
42	Any other relevant information	NA

6. UPPTCL

The following Transmission Lines Towers of UPPTCL had failed during January 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
13	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	2016	5	3	0	3	400 kV Twin MOOSE ACSR
14	220 kV Nehtaur-Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	2011	-	0	2	2	220 kV Single Zebra ACSR
15	220 kV Jagriti Vihar-Hapur (765 KV) D/C line	UPPTCL	21.05.2025	2019	4	2	2	4	220 kV Single Zebra ACSR
16	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	1998	-	5	0	5	400 kV Twin MOOSE
17	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	2022	4	2	0	2	220 kV Single Zebra ACSR

13. 400 kV ORAI - PARICHHA D/C – I & II

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	400 KV ORAI - PARICHHA D/C – I & II
2.	Date and time of occurrence/discovery of failure:	11.05.2025 13:51 Hrs.
3.	Length of line (km):	111 km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C on D/C tower
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	03 Nos tower failed Failed tower type : DA+0
6.	Tower location No. with reference to nearest substation (indicate Name):	Tower No. 56, 57 & 58 Parichha Thermal Power Station
7.	Name and size of conductor:	ACSR Twin Moose conductor Overall Size of conductor 31.77 mm Specification of conductor : 54/7/3.53
8.	No. of sub-conductors per bundle and bundle spacing:	ACSR twin Moose conductor Bundle spacing – 450 mm
9.	Number and size of Ground wire/OPGW (if provided):	01 No Earthwire (7/3.66 mm) & 01 No OPGW (24 fiber)
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain
11.	Configuration of insulators (I / V / Y / tension):	V type
12.	No. of insulators per string and No. of strings per phase:	02 string per phase. & 23 Nos insulator per string
13.	Year of construction / commissioning:	2016 (Commissioning)
14.	Executing Agency:	M/s Gammon India Ltd., Nagpur
15.	Weather condition on the date of failure:	Heavy storm / cyclone / squall.
16.	Terrain Category:	Plain
17.	Reliability Level:	2
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 5, 90 Km/H surface wind at time of fault
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	---
21.	The agency who designed the line:	SAE
22.	Any Special consideration in design:	No

23.	Details of last maintenance activity along with date:	Tree cutting and Month of April 2025
24.	Power flow in the line prior to failure:	170 Amp on each Ckt.
25.	Any missing member found before / after failure of towers:	No
26.	Condition of foundation after failure:	Foundation is ok
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower collapse, Due to heavy cyclonic storm / squall. [Photographs attach)
28.	Probable cause of failure:	Due to heavy storm / cyclone / squall.
29.	Details of previous failure of the line / tower :	17/05/2017 (13:58 Hrs)
30.	Whether line will be restored on ERS or Spare tower will be used:	Old & used spare tower will be used for restoration of line.
31.	Likely date of restoration:	30/05/2025
32.	Present Status:	Restoration work underway.
33.	Details of any Tests carried out after failure(attach test reports):	Send for testing result awaited.
34.	Wind speed data of date & time of failure from nearby authorized observatory:	90 Km/Hr. wind speed
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Tower no 56 (DA+0) 25.668570 N, 78.846630 E Tower no 57 (DA+0) 25.671270 N, 78.848770 E Tower no 58 (DA+0) 25.674050 N, 78.851010 E Kanpur Kanpur (U.P.)
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Drawing enclosed
37.	Tower weight:	Tower type DA +0, weight 9.63 MT
38.	Tower spotting data:	NA
39.	Tower schedule of affected section:	Enclosed.
40.	Sag tension calculation considered for design of tower:	NA
41.	Design document of failed towers:	SAE make D/C tower (BOM & tower erection drawing enclosed).
42.	Any other relevant information:	Tower fail during heavy storm/ cyclone / squall.

14. 220 kV 220 kV Nehtaur-Mataur (765 kV PGCIL) Line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV Nehtaur-Mataur (765 kV PGCIL) Line
2.	Date and time of occurrence/discovery of failure:	19:56 Hrs. on date 21.05.2025
3.	Length of line (km):	72.477 km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	02 Nos. Towers Tension tower (B+5, SC type)
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No. 06 and Tower No. 07, near of 765 kV Mataur PGCIL substation
7.	Name and size of conductor:	Zebra conductor and overall diameter 28.62 mm
8.	No. of sub-conductors per bundle and bundle spacing:	One conductor per phase
9.	Number and size of Ground wire/OPGW (if provided):	One Earth wire size 7/3.67 mm
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain insulators
11.	Configuration of insulators (I / V / Y / tension):	Tension
12.	No. of insulators per string and No. of strings per phase:	16 Nos. insulators and 01 no. string per phase
13.	Year of construction / commissioning:	30.09.2011
14.	Executing Agency:	M/s Scantac
15.	Weather condition on the date of failure:	Heavy storm and Heavy rain
16.	Terrain Category:	
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	80 km per hour.
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	
21.	The agency who designed the line:	Kalptaru (Sangam Allahabad manufacture)
22.	Any Special consideration in design:	

23.	Details of last maintenance activity along with date:	On dated 17.05.2025 TLPS patrolling done
24.	Power flow in the line prior to failure:	11 MW load flow through Mataur to Nehtaur
25.	Any missing member found before / after failure of towers:	NIL
26.	Condition of foundation after failure:	Normal
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to heavy storm tower banded at stub (Photographs Attached)
28.	Probable cause of failure:	Heavy storm and Heavy rain
29.	Details of previous failure of the line / tower :	NIL
30.	Whether line will be restored on ERS or Spare tower will be used:	220KV Charla to Mataur line tower used (Tower no 5 to tower no 3 LILO portion) for restored 220KV Nehtaur – Mataur line.
31.	Likely date of restoration:	28.06.2025
32.	Present Status:	In Service
33.	Details of any Tests carried out after failure(attach test reports):	NIL
34.	Wind speed data of date & time of failure from nearby authorized observatory:	
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	a.(i) Tower No. 6 (29.319314,78.338147) a.(ii) Tower No. 7 (29.320000,78.335456) b. Delhi Airport c. Meerut and Uttar Pradesh
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	7800 kg (for old B+5 S/C type tower)
38.	Tower spotting data:	
39.	Tower schedule of affected section:	Attached
40.	Sag tension calculation considered for design of tower:	
41.	Design document of failed towers:	
42.	Any other relevant information:	

15. 220 kV Jagriti Vihar-Hapur (765 KV) D/C line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level :	220 kV Jagriti Vihar-Hapur (765 KV) D/C line
2.	Date and time of occurrence/discovery of failure:	21.05.2025, 20:00 Hrs.
3.	Length of line (Km) :	26.307 Km.
4.	Type of configuration : [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.	D/C
5.	Number of Towers and type of towers failed : [Suspension/tension/dead end/special tower/river crossing tower/Power line crossing/Railway Crossing etc., with/without extension (indicate the type & length of extension)].	04 Nos. Towers failed Tower No. 85 – DC+5 – Tension 86 – DA+5 – Suspension 87 – DA+0 – Suspension 88 – DB+0 – Tension
6.	Tower location No. with reference to nearest substation (indicate Name):	Tower No. – 88, nearest to 220 KV Sub-Station Partapur (Jagriti Vihar) Meerut
7.	Name and size of conductor:	Zebra, 420 Sq.mm.
8.	No. of Sub-conductors per bundle and bundle spacing:	Single Conductor
9.	Number and size of Ground wire/OPGW (if provided):	OPGW, 24F
10.	Type of insulators in use (Porcelain/Glass/Polymer):	Porcelain
11.	Configuration of insulators (I/V/Y/tension):	I, Tension (Single String)
12.	No. of insulators per string and No. of strings per phase:	Suspension – 14 & Single string per phase Tension – 16
13.	Year of construction/commissioning:	14.09.2019
14.	Executing Agency:	-
15.	Weather condition on the date of failure:	Rainstorm (CYCLONE)
16.	Terrain Category:	Category 1
17.	Reliability Level:	-
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 4
19.	Details of earthing of tower (pipe type/Counter poise) :	Pipe type

20.	Line designed as per IS:802 (1977/1995/2015 any other code) :	-
21.	The agency who designed the line:	KPTL
22.	Any Special consideration in design:	-
23.	Details of last maintenance activity along with date:	Hapur Ckt-Ist, dt. 21.04.2025 to 22.04.2025 Hapur Ckt-IInd, dt. 23.04.2025 to 24.04.2025
24.	Power flow in the line prior to failure:	Hapur Ist – 4.07 MW Hapur IInd – 3.58 MW
25.	Any missing member found before/after failure of towers:	No
26.	Condition of foundation after failure:	Good condition
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone/wind storm etc.]	Attached
28.	Probable cause of failure:	Wind storm/CYCLONE
29.	Details of previous failure of the line/tower:	N/A
30.	Whether line will be restored on ERS or Spare tower will be used:	Spare Tower used
31.	Likely date of restoration:	31.05.2025
32.	Present Status:	Good
33.	Details of any Tests carried out after failure (attach test reports):	-
34.	Wind speed data of date & time of failure from nearby authorized observatory:	-
35.	Location failed tower a) Location Coordinates: b) Nearest Airport: c) District and Stat :	a) Latitude - 28.891275^0, Longitude - 77.750223^0 b) Indira Gandhi International Airport Delhi c) Meerut, Uttar Pradesh
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-

37.	Tower weight.	Tower No. 85 (DC+5) – 9.811 MT + 2.881 MT = 12.692 MT Tower No. 86 (DA+0) – 4.391 MT = 4.391 MT Tower No. 87 (DA+5) – 4.391+1.144 MT = 5.535 MT Tower No. (88 DB+0) – 7.694 MT = 7.694 MT
38.	Tower spotting data:	Attached
39.	Tower schedule of affected section:	Attached
40.	Sag tension calculation considered for design of tower:	Attached
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

16. 400 kV Panki- Unnao S/C Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV Panki- Unnao S/C Transmission Line
2	Date and time: 9. Occurrence of failure 10. Discovery of failure	30.05.2025, Time 16.27 hrs
3	Length of line (km)	48.8km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	5 Nos. Suspension Polymer
6	Tower location No. with reference to nearest substation	400 KV S/S Panki
7	Name and size of conductor	Moose
8	No. of sub-conductors per bundle and bundle spacing	2 Nos. Suspension Polymer
9	Number and size of Ground wire/OPGW	OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11	Configuration of insulators (I / V / Y / tension)	Suspension (V)
12	No. of insulators per string and No. of strings per phase	02 Nos. Suspension Polymer String
13	Year of construction / commissioning	1998
14	Executing Agency	M/s. Lashani Enterprises
15	Weather condition on the date of failure	Cyclonic Storm
16	Terrain Category	
17	Reliability Level	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code)	

21	The agency who designed the line	KEC
22	Any Special consideration in design	-
23	Details of last maintenance activity along with date	15.05.2025
24	Power flow in the line prior to failure	20 MW
25	Any missing member found before / after failure of towers	No
26	Condition of foundation after failure	OK, Partially Damage
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Stubs 03 nos. tower broken out of 5 nos. Towers
28	Probable cause of failure	Very High Cyclonic Storm
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	27.06.2025
32	Present Status	NORMAL
33	Details of any Tests carried out after failure (attach test reports)	
34	Wind speed data of date & time of failure from nearby authorized observatory	
35	Location of failed tower: i. Location Coordinates j. Nearest Airport District and State	Longitude 80°13' 03.0320 Latitude 26°31' 45.236° Chakeri Airport Kanpur (UP)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37	Tower weight	5.6 MT
38	Tower spotting data	
39	Tower schedule of affected section	
40	Sag tension calculation considered for design of tower	
41	Design document of failed towers	
42	Any other relevant information	

17. 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers

Sr. No	Item Description	Details
1	Name of Transmission line with voltage level:	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers
2	Date and time of occurrence/discovery of failure	Time 03:52 dt. 15.06.2025/ Time 08:00 dt. 15.06.2025
3	Length of line (km):	44.49 Km. & 101.80 Km.
4	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit.
5	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end /special tower /river crossing tower / Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	2 Nos. (DA+5) Suspension tower
6	Tower location No. with reference to nearest substation (indicate Name):	Tower No. 50 & 51 (220 KV Substation Hardoi)
7	Name and size of conductor	ACSR Zebra Conductor 54/7/3.18
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor.
9	Number and size of Ground wire/OPGW (if provided)	48 Fibre OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer	Porcelain Disc Insulator.
11	Configuration of insulators (I / V / Y / tension):	I- Configuration.
12	No. of insulators per string and No. of strings per phase	14 Disc Insulators (1 String per phase for Suspension Tower)
13	Year of construction / commissioning	LOA - 4326/ETDC/4/TD-448/MAN/Pkg.-2 dt. 17.12.2019, Date of commissioning 03.08.22
14	Executing Agency:	M/s Man structurals Pvt Ltd., Jaipur
15	Weather condition on the date of failure	Heavy localised cyclonic wind & rain with thunder storm.
16	Terrain Category	Plain
17	Reliability Level:	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind Zone -4
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	IS:802/1995

21	The agency who designed the line:	UPPTCL
22	Any Special consideration in design:	KPTL Design
23	Details of last maintenance activity along with date	Preventive Maintenance, Date : 26.05.2025 to 30.05.2025. No defect observed.
24	Power flow in the line prior to failure:	48.28 MW on 220KV Hardoi-Mallawan line and 13 MW ON 22O KV Mallawan- PG (Shahjahanpur) Line
25	Any missing member found before / after failure of towers	NIL
26	Condition of foundation after failure:	Foundation is intact, upper portion of stub damaged.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower got damaged due to heavy and strong cyclonic winds. Photographs attached.
28	Probable cause of failure:	Due to heavy sporadic whirl wind followed by localized cyclonic storm might have exceeded the designed wind speed damaged the tower no. 50, 51.
29	Details of previous failure of the line / tower:	T. No 85-88 (220 KV Sub-station Hardoi) failed due to localized storm in year 2024-25
30	Whether line will be restored on ERS or Spare tower will be used:	Spare towers shall be used for restoration of towers & circuit Mallawan-PG (Shahjahanpur) is being used at 220 KV S/S, Hardoi by changing jumpering arrangement & protection settings (SLD enclosed)
31	Likely date of restoration:	30.06.2025
32	Present Status:	Restoration work in progress
33	Details of any Tests carried out after failure (attach test reports):	Damaged member shall be sent to NABL certified laboratory for material testing. Report shall be shared to CEA-PSETD after test result receive.
34	Wind speed data of date & time of failure from nearby authorized observatory:	Request letter sent to IMD lucknow to provide us the real time wind speed data. However, we have enclosed documentary evidence viz. photographs, reports of thunder strom/ cyclonic events & associated damages to trees/ infrastructure & cattle life, etc. which shows the high wind speed in the affected area.

35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Longitude 27.2584640 Latitude 80.1563280, No Airport, Hardoi, U.P
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-
37	Tower weight:	04.175 MT (DA+5)
38	Tower spotting data:	Enclosed.
39	Tower schedule of affected section	Tower No. Tower type span length 47 DB+5 359 48 DA+0 279 49 DA+0 318 50 DA+5 299 51 DA+5 335 52 DA+0 331 53 DA+0 322 54 DB+0 315
40	Sag tension calculation considered for design of tower	-
41	Design document of failed towers:	-
42	Any other relevant information:	NA

7. RENEW

The following Transmission Lines Towers of RENEW had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
18	400 KV DC Gadag - Narendra (New) Line	RENEW	13.05.2025	2024	1	6	1	7	400 kV Twin Bundle ACSS/AW HTLS

18. 400 KV DC Gadag - Narendra (New) Transmission Line

<table>
<tr><th>Sr. No</th><th>Item Description</th><th>Details</th></tr>
<tr><td>1</td><td>Name of Transmission line with voltage level:</td><td>400 KV DC HTLS Twin HTLS Gadag - Narendra (New) Transmission Line</td></tr>
<tr><td>2</td><td>Date and time of occurance/discovery of failure</td><td>13.05.2025</td></tr>
<tr><td>3</td><td>Length of line (km):</td><td>93.507 KM</td></tr>
<tr><td>4</td><td>Type of configuration:
[(S/C, D/C, S/C strung on D/C towers, narrow base etc.)</td><td>D/C strung on D/C Tower</td></tr>
<tr><td>5</td><td>Number of Towers and Type of Towers failed: [suspension/ tension/dead end/special tower/river crossing tower/ Powerline crossing/Railway Crossingetc., with / without extension (indicatethe type & length of extension)]</td><td>
<table>
<tr><th>Sl. No.</th><th>Location No.</th><th>Tower Number</th><th>Tower Type</th><th>Remarks</th></tr>
<tr><td>1</td><td>16/4</td><td>52</td><td>DA+3 (1.5M RC)</td><td>Collapsed</td></tr>
<tr><td>2</td><td>16/6</td><td>54</td><td>DA+3 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>3</td><td>16/7</td><td>55</td><td>DA+0 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>4</td><td>16/8</td><td>56</td><td>DA+3 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>5</td><td>16/9</td><td>57</td><td>DA+6</td><td>Collapsed</td></tr>
<tr><td>6</td><td>16/10</td><td>58</td><td>DA+0 (1M RC)</td><td>Peak damage</td></tr>
<tr><td>7</td><td>17/0</td><td>59</td><td>DC+6</td><td>Peak damage</td></tr>
</table>
</td></tr>
<tr><td>6</td><td>Tower location No. with reference to nearest substation(indicate Name):</td><td>16/4, 16/6, 16/7, 16/8, 16/9, 16/10 and 17/0</td></tr>
<tr><td>7</td><td>Name and size of conductor:</td><td>HTLS Conductor ACSS/AW 478 SQMM</td></tr>
<tr><td>8</td><td>No. of sub-conductors per bundle and bundle spacing:</td><td>Twin Bundle HTLS</td></tr>
<tr><td>9</td><td>Number and size of Ground wire/OPGW (if provided):</td><td>1 Earthwire & 1 OPGW (24 Fiber)</td></tr>
<tr><td>10</td><td>Type of insulators in use(Porcelain / Glass / Polymer):</td><td>Polymer</td></tr>
<tr><td>11</td><td>Configuration of insulators (I / V / Y / tension)</td><td>“I” & Tension</td></tr>
<tr><td>12</td><td>No. of insulators per string and No. of strings per phase:</td><td>2 (Two)</td></tr>
<tr><td>13</td><td>Year of construction / commissioning:</td><td>30 August 2024</td></tr>
<tr><td>14</td><td>Executing Agency:</td><td>RS Infraprojects Private Limited</td></tr>
<tr><td>15</td><td>Weather condition on the date of failure:</td><td>Heavy Wind & cyclonic wind whirl (Yellow alert of IMD)</td></tr>
<tr><td>16</td><td>Terrain Category:</td><td>Plain</td></tr>
<tr><td>17</td><td>Reliability Level</td><td>1</td></tr>
<tr><td>18</td><td>Wind Zone (1/2/3/4/5/6) and velocity of wind:</td><td>WZ-1 velocity 33m/sec</td></tr>
</table>

19	Details of earthing of tower (pipe type/Counter poise):	Pipe Type Earthing
20	Line designed as per IS:802 (1977/1995/any other code):	IS 802 (Part 1 / Sec 1) : 2015/TS
21	The agency who designed the line:	RS Infraprojects Private Limited
22	Any Special consideration in design:	Drag Coefficient as per IS 802 (1995) & WZ as per National Building Code
23	Details of last maintenance activity along with date	27th, 28th, 29th & 30th Jan 2025
24	Power flow in the line prior to failure:	62 MW in 400 kV Line -01 & 64 MW in 400 kV Line -02. Total 126 MW
25	Any missing member found before / after failure of towers:	No
26	Condition of foundation after failure:	Foundation are ok, however few stubs are bend & at some places chimney are cracked due to load of fallen structure.
27	Brief Description of failure: alongwith photographs(if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Formation of wind tunnel or whirl nearby tower collapsed area where the wind speed is very high and resulted collapse of towers.
28	Probable cause of failure:	Overload factor approx 1.78 times of Actual wind at collapsed tower location above designed wind on the basis of certain calculation prepared by us.
29	Details of previous failure of the line / tower :	Nil
30	Whether line will be restored on ERS or Spare tower will be used:	Spare Tower will be used
31	Likely date of restoration:	18th Jun 2025
32	Present Status:	Fallen structure dismantling U/P. Work is at hold for CEA/CPRI/PGCIL inspection.
33	Details of any Tests carried out after failure:	NO
34	Wind speed data of date & time of failure from nearby authorised observatory:	
35	Location of failed tower	
	a) Location Coordinates	

Loc No	Tower Type	GPS CO-ORDINATES	
		EASTING	**NORTHING**
16/4	DA+3	**597260.18**	**1813069.21**
16/6	DA+3	**597929.33**	**1812522.41**
16/7	DA+0	**598266.15**	**1812247.18**
16/8	DA+3	**598597.40**	**1811976.49**
16/9	DA+6	**598929.25**	**1811705.31**
16/10	DA+0	**599266.07**	**1811430.08**
17/0	DC+6	**599577.00**	**1811176.00**

	b)Nearesh Airport:	Hubali

	C) District and State:	Vijaypura, Karnataka
36	Single Line diagram/clearance diagram of failed tower(s) with all diamensions (Horizontal & vertical dimensions including base width of tower	
37	Tower weight:	<table><tr><th>Type</th><th>Total</th></tr><tr><td>DA+0</td><td>8,428.30</td></tr><tr><td>DA+3</td><td>9,698.76</td></tr><tr><td>DA+6</td><td>10,478.41</td></tr><tr><td>DC+6</td><td>17,896.09</td></tr></table>
38	Tower spotting data:	
39	Tower scheduled of affected section	
40	Sag tension calculation considered for design of tower	
41	Design document of failed towers:	
42	Any other relevant information	

8. KPTCL

The following Transmission Line Tower of KPTCL had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
19	220 kV SRS Huballi-Narendra Line	KPTCL	17.05.2025	1969	1	1	0	1	220 kV Single Deer ACSR

19. 220 kV SRS Huballi- Narendra Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	220kV SRS Huballi Narendra D/C Line
2	Date and time: 11. Occurrence of failure 12. Discovery of failure	17.05.2025 at 14.32Hrs
3	Length of line (km)	139
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	One tower of type DATOM
6	Tower location No. with reference to nearest substation	Loc No 6 From 220kV SKS Huballi Substation
7	Name and size of conductor	ACSR Deer Conductor Complete Dia 29.89mm 30/4.27mm +7/4.27mm
8	No. of sub-conductors per bundle and bundle spacing	Single Deer Conductor
9	Number and size of Ground wire/OPGW	48F OPGW, 12.4mm Dia
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porcelain
11	Configuration of insulators (I / V / Y / tension)	T Configuration
12	No. of insulators per string and No. of strings per phase	14 Nus
13	Year of construction / commissioning	1969
14	Executing Agency	Not Available
15	Weather condition on the date of failure	Heavy Rain. However. No wind activity was Recorded
16	Terrain Category	2
17	Reliability Level	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Light Wind Zone (Wind zone 1, 33m/s)
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe
20	Line designed as per IS:802 (1977/1995/2015 any other code)	IS 802 1977

21	The agency who designed the line	L&T
22	Any Special consideration in design	Nil
23	Details of last maintenance activity along with date	NA
24	Power flow in the line prior to failure	At 14:00 Hrs Ckt-1 8MW & Ckt-2.7MW
25	Any missing member found before / after failure of towers	Nil
26	Condition of foundation after failure	Good and Intact
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	The tower is located in fairly flat land. The land adjacent to the line belongs to Huballi-Dharwad Municipal Corporation. The tower has failed completely in main leg member one panel above the ground level and completely collapsed in transverse direction Photographs and tower schedule enclosed.
28	Probable cause of failure	i. The Huballi -Dharwad Municipal Corporation (HDMC) nas created dumping yard adjacent to the tower at Loc No:6 and in between Loc 6-7. The height of the dumping yard is about 10 to 15M ii. It is found that, there has been extensive dumping of garbage, waste and even dead animals on one side of the tower footing at Loc 6. The accumulated load from the dumped materials appears to have exerted uneven loading and likely exerted additional stress on the leg members on one side, Compromising on tower's structural balance area between loc no 6 and 7 as well as reports of persistent iii. There also has been continuous fire incidents in the dumping yard emission of various gases. The combination of thermal stress from fires may have weakened the tower metal components iv. Furthermore, significant deposition of garbage on the power conductor has led to increase of both diameter and weight of the conductor which might have added additional load on the conductor. v. During inspection it was found that there has been frequent tripping of the line due to

		decreased vertical clearance between Loc No 6 and 7 due to the accumulated garbage up to height of 10-15M
29	Details of previous failure of the line / tower	Nil
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	2 Months
32	Present Status	Under Progress
33	Details of any Tests carried out after failure (attach test reports)	Nil
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: k. Location Coordinates l. Nearest Airport District and State	15.32596057 75.116375463 Airport :Huballi District & State :Dharawad District Karnataka State
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	NA
37	Tower weight	4.5MT
38	Tower spotting data	NA
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	NA
41	Design document of failed towers	NA
42	Any other relevant information	Nil

9. NTPC

The following Transmission Line Towers of NTPC had failed during January 2025 to June, 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
20	400 kV Dadri-Harsh Vihar Ckt-1&2	NTPC	21.05.2025	2011-12	4	0	1	1	400 kV Twin MOOSE ACSR

20. 400 kV Dadri- Harsh Vihar Ckt- 1&2

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400KV Dadri-Harsh Vihar Ckt-1&2
2	Date and time: 13. Occurrence of failure 14. Discovery of failure	May 21, 2025; 20:19 Hrs.
3	Length of line (km)	53.284km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 No. of Tower failed. Tower Type DD with +25M Extension
6	Tower location No. with reference to nearest substation	No. 24, Near Dehra Jhal, Approx. 9km from NTPC Dadri
7	Name and size of conductor	Moose ACSR 32mm Size
8	No. of sub-conductors per bundle and bundle spacing	Twin
9	Number and size of Ground wire/OPGW	12mm Size, 02 Nos.
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer, 160kN
11	Configuration of insulators (I / V / Y / tension)	I Configuration
12	No. of insulators per string and No. of strings per phase	Single I String
13	Year of construction / commissioning	2011-12
14	Executing Agency	M/s Powergrid
15	Weather condition on the date of failure	On the evening of May 21, 2025, adverse weather conditions prevailed, marked by severely stormy weather condition.
16	Terrain Category	Normal Plain Area
17	Reliability Level	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind Zone-4, Velocity 44-47 m/s
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type

20	Line designed as per IS:802 (1977/1995/2015 any other code)	Yes
21	The agency who designed the line	M/s Powergrid
22	Any Special consideration in design	Line Patrolling done during the period from
23	Details of last maintenance activity along with date	07.05.2025-17.05.2025.
24	Power flow in the line prior to failure	250MW each line
25	Any missing member found before / after failure of towers	None
26	Condition of foundation after failure	All four concrete foundations of tower-24 were found intact. Structure was found bent above the foundation.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	On the evening of May 21, 2025, adverse weather conditions prevailed, marked by heavy storms and rainfall. At approximately 20:19 hrs., amidst this stormy condition, both the 400KV circuits (Ckt-1&2) transmission lines from Dadri to Harsh Vihar tripped on phase-to-phase faults. Also, a station blackout happened during the storm. Subsequent inspection during line patrolling identified that Tower no-24 of the Dadri-Harsh Vihar circuit had collapsed. Due to the heavy storm effect, uprooting of trees within NTPC Dadri & in vicinity was observed.
28	Probable cause of failure	The root cause of the Tower collapse was the high-velocity dust & windy storm with the following rain near the location. These winds were exacerbated due to heavy dust storms in the area.
29	Details of previous failure of the line / tower	None
30	Whether line will be restored on ERS, or Spare tower will be used	Line to be restored through Permanent Tower Structure on existing foundation
31	Likely date of restoration	17.06.2025
32	Present Status	Charged
33	Details of any Tests carried out after failure (attach test reports)	Following tests to be performed before charging of the lines: - a. Tower Footing Resistance b. IR Test c. Continuity Test d. Offline fault locator test
34	Wind speed data of date & time of failure from nearby authorized observatory	

35	Location of failed tower: m. Location Coordinates n. Nearest Airport District and State	a. 28°39'31"/77°35'43" b. New Delhi c. Ghaziabad, U.P.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Attached (Annexure-1)
37	Tower weight	53626KG
38	Tower spotting data	Attached (Annexure-2)
39	Tower schedule of affected section	Attached (Annexure-3)
40	Sag tension calculation considered for design of tower	Attached (Annexure-4)
41	Design document of failed towers	Standard DD Type Tower Super Structure & 25M Extension, BoM and Drawing attached.
42	Any other relevant information	

10. NRSS XXXVI TRANSMISSION LIMITED

The following Transmission Line Towers of NRSS XXXVI Transmission Limited had failed during January, 2025 to June, 2025.

Sl. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
21	400 kV DC Babai-Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	2023	4	0	2	2	400 kV Twin MOOSE ACSR

21. 400 kV D/C Babai-Bhiwani Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV D/C Babai-Bhiwani Transmission Line
2	Date and time: 15. Occurrence of failure 16. Discovery of failure	13.06.2025 at around 15:30 hrs./ 13.06.2025 at around 19:30 hrs
3	Length of line (km)	110.962
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit - Twin Moose
5	Number of Towers and Type of Towers failed[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/RailwayCrossing etc., with / without extension (indicate the type & length of extension)]	Total 2 nos. and DD with extension (30 meter) [Powerline Crossing]
6	Tower location No. with reference to nearest substation	AP-86/0 (Tower no. 300) & AP-87/0 (Tower no. 301
7	Name and size of conductor	ACSR Moose Conductor 31.77 mm. (54 Al./7 Steel/3.53 mm
8	No. of sub-conductors per bundle and bundle spacing	2 nos. Bundle; spacing 400 mm
9	Number and size of Ground wire/OPGW	1 no. Ground wire. Size 7/3.66 mm. Ground wire/ 1 no. OPGW. Size 24 Fibre OPGW 12.5 mm
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11	Configuration of insulators (I / V / Y / tension)	Tension
12	No. of insulators per string and No. of strings per phase	2 insulators per string & 2 no. of strings per phase
13	Year of construction / commissioning	2023
14	Executing Agency	M/s Tata Projects Limited
15	Weather condition on the date of failure	: Heavy cyclonic storm with gusty winds
16	Terrain Category	2
17	Reliability Level	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind Zone 4
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code)	Yes (2015)

21	The agency who designed the line	M/s Srushti Associates, Mumbai
22	Any Special consideration in design	
23	Details of last maintenance activity along with date	Patrolling of line on 23 May 2025
24	Power flow in the line prior to failure	Circuit I – 18 MW Circuit II – 16 MW
25	Any missing member found before / after failure of towers	No
26	Condition of foundation after failure	Foundation is intact.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	The area in which the towers are located witnessed very high intensity winds. Tower failure has occurred due to rotational movement of the localised heavy wind (tornado). Newspaper cutting and photos attached
28	Probable cause of failure	Heavy localized Cyclonic storm (tornado)
29	Details of previous failure of the line / tower	Not Applicable
30	Whether line will be restored on ERS, or Spare tower will be used	As an immediate measure one circuit will be restored on ERS. Subsequently, other circuit will be taken as per the load requirement.
31	Likely date of restoration	28-Jun-25.
32	Present Status	Back stay provided to towers on either side of the failed towers to safeguard these towers.
33	Details of any Tests carried out after failure (attach test reports)	Will be carried out
34	Wind speed data of date & time of failure from nearby authorized observatory	
35	Location of failed tower: o. Location Coordinates p. Nearest Airport District and State	a. Easting 612008, Northing 3178215, Elevation 215.78 for AP-86/0 & Easting 612155, Northing 3178319, Elevation 215.86 for AP87/0 b. Hisar Airport. c. Hisar, Haryana
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Attached
37	Tower weight	58265.17
38	Tower spotting data	Attached
39	Tower schedule of affected section	Attached
40	Sag tension calculation considered for design of tower	Attached
41	Design document of failed towers	Attached
42	Any other relevant information	

11 ADANI

The following Transmission Lines Towers of ADANI had failed during January 2025 to June 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
22	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	2011	4	2	3	5	400 kV Twin MOOSE ACSR

22. 400kV Mahendragarh–Bhiwani Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400kV Mahendragarh–Bhiwani Transmission Line
2	Date and time: 17. Occurrence of failure 18. Discovery of failure	13.06.2025, 15:30 hours Discovery immediately after failure
3	Length of line (km)	49.862Km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit - Twin Moose
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	Tower No. 135: Crossarm & Peak Bend and tower deformed (Tension Tower DY+0) Tower No. 136-139: Conductor, Earthwire & OPGW Damaged. (136 - Suspension DR+0) (137 - Tension DY+0)
6	Tower location No. with reference to nearest substation	135, 136 to 139, PGCIL Bhiwani Substation
7	Name and size of conductor	ACSR Moose Type (Dia-31.77mm)
8	No. of sub-conductors per bundle and bundle spacing	Two (02)
9	Number and size of Ground wire/OPGW	Earth wire - 01 Side OPGW - 01 Side
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer - SRI Insulator
11	Configuration of insulators (I / V / Y / tension)	Suspension - I String Tension - Twin String
12	No. of insulators per string and No. of strings per phase	Suspension - 01 Insulator / String & Phase Tension - 02 Insulator / String & 04 Insulator / Phase
13	Year of construction / commissioning	26-04-2011
14	Executing Agency	M/s Gammon India Limited (Transrail)
15	Weather condition on the date of failure	The region experienced sporadic occurrences of intense whirlwinds, followed by a localized cyclonic storm accompanied by rainfall.
16	Terrain Category	Normal Terrain - (Category - 02)
17	Reliability Level	Category - 02
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 4

19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type Earthing
20	Line designed as per IS:802 (1977/1995/2015 any other code)	IS 802:1995
21	The agency who designed the line	M/s Gammon India Limited (Transrail)
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	The patrolling of the above locations/towers was carried out on 22.05.2025 in the previous cycle and no abnormality was observed.
24	Power flow in the line prior to failure	CKT-I : 316MW CKT-II : 318 MW
25	Any missing member found before / after failure of towers	NIL
26	Condition of foundation after failure	All foundations in the affected section were found intact.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	This is with reference to the incident that occurred at 15:30 hours on 13.06.2025, during which a severe localized storm affected the region near village Nimriwali, Tehsil Bhiwani (Haryana). As a result of this extreme weather event, transmission towers of the 400kV Babai–Bhiwani line [owned by NRSS XXXVI Transmission Limited (Tata Power)] collapsed, Tower No.135 suffered complete structural deformation with major damage to its top cross arm and affecting conductors, OPGW & earth wire towers no. 136 to 139 of the 400kV Mahendragarh–Bhiwani D/C transmission line [Owned by Adani Transmission India Limited (ATIL)]. Notably, towers no. 136–137 of our line were situated beneath the collapsed Babai–Bhiwani line, leading to the impact (Refer attached our Letter No. ATIL/ Force Majeure/14062025, dated 14.06.2025 to NRLDC)
28	Probable cause of failure	Due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSS XXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone.
29	Details of previous failure of the line / tower	NIL
30	Whether line will be restored on ERS, or Spare tower will be used	ERS could not be installed due to severe Right of Way constraints and the unavailability of a suitable corridor for installation. Restoration was carried out using a spare tower only.
31	Likely date of restoration	Line restored and charges on: CKT-I: 04.07.2025, 16:49 Hrs.

		CKT-II: 04.07.2025, 17:21 Hrs.
32	Present Status	The restoration work was successfully completed, and the transmission line was re-energized on 04.07.2025.
33	Details of any Tests carried out after failure (attach test reports)	As the incident was caused by the collapse of a transmission tower belonging to another utility, and no technical deficiency was observed in ATIL's assets, no post-failure testing was conducted.
34	Wind speed data of date & time of failure from nearby authorized observatory	As the incident was caused by the collapse of a transmission tower belonging to another utility, and no technical deficiency was observed in ATIL's assets, hence no major data was collected from authorized observatory.
35	Location of failed tower: q. Location Coordinates r. Nearest Airport District and State	TN-135 (Lat- 28°21'31.04"N, Long 76°13'29.65"E) TN-136 (Lat- 28°21'20.85"N, Long- 76°13'30.19"E) TN-137 (Lat- 28°21'13.90"N, Long- 76°13'18.73"E) Nearest Airport - Delhi Dist. - Bhiwani, State - Haryana
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Tower No. 135 - 25.789MT
38	Tower spotting data	Enclosed
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	Enclosed
41	Design document of failed towers	Design parameters are indicated in Tower Spotting Data (TSD).
42	Any other relevant information	The localized cyclone in the surrounding area was extremely intense, causing significant impact to the transmission infrastructure.

12 STERLITE

23. Outage of 400 kV Line in Mumbai Area

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	1. 400KV-NAVI MUMBAI-PADGHE-PG 2. 400KV-PADGHE-PG-KHARGHAR-1 3. 400KV-NAVI MUMBAI-VIKHROLI
2.	Date and time of occurrence/discovery of failure:	1. 31.07.2025/ 3:45 hrs 2. 30.07.2025/ 12:15 hrs 3. 31.07.2025/ 3:24 hrs
3.	Weather condition at the date of failure	Extreme weather conditions, including heavy rainfall and high-velocity winds
4.	Brief Description of failure	400 kV Phadge PG - Kharghar, 400 kV Padge PG-Navi Mumbai and 400 kV Navi Mumbai - Vikhroli lines were reliably operating since its commissioning in September-2024, however, the said lines have tripped on 30-07-2025/31-07-2025, leading to failing of long rod polymer insulators. It is stated that the region has experienced extreme weather conditions, including heavy rainfall and high-velocity winds, and it has contributed to the failure of insulators and subsequent tripping. It is also to update that the said issue has also been escalated to the top management of Insulator OEM (M/s Tag) to conduct the root cause analysis.
5.	Probable cause of failure	The line tripped due to multiple insulator failure at various locations. The RCA of insulator failure is under process and will inform the root cause once finalized.
6.	Insulator Failure Details	Please refer Annexure-A
7.	Details of wind zone & Pollution Level in the areas of above Insulators	Wind Zone- 03, moderately polluted
8.	Original Test Report in support of Quality of the Insulator used	Attached
9.	Details of any Tests carried out after failure (attach test reports)	Testing under process, will share the report once concluded.
10.	Post Failure Test Report	Testing under process, will share the report once concluded.
11.	Quality Assurance Plan followed by the Utility for Insulators	Attached
12.	OEM Analysis of failure of Insulators	Under process
13.	Utility Analysis for failure of the Insulators	Under process
14.	O&M Plan followed by the Utility	Attached
15.	Details of the last maintenance activity along with date	Only non-shutdown maintenance activities are carried out on the line. Considering the high loading, shutdown request was deferred in the month of Mar’25 & May’25 by grid operators. Hence the shutdown maintenance was not carried out.

16.	Voltage & Power flow in the line prior to failure	As remote end bays belong to PGCIL & KVTL (Adani), the said data is not available with M/s MUML.

Annexure-III: Proforma for reporting of failure of EHV Transmission Line Towers

Sl. No.	Details	Remarks
1.	Name of Transmission line with voltage level:	
2.	Date and time of occurrence/discovery of failure:	
3.	Length of line (km):	
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	
6.	Tower location No. with reference to nearest substation (indicate Name):	
7.	Name and size of conductor:	
8.	No. of sub-conductors per bundle and bundle spacing:	
9.	Number and size of Ground wire/OPGW (if provided):	
10.	Type of insulators in use(Porcelain / Glass / Polymer):	
11.	Configuration of insulators (I / V / Y / tension):	
12.	No. of insulators per string and No. of strings per phase:	
13.	Year of construction / commissioning:	
14.	Executing Agency:	
15.	Weather condition on the date of failure:	
16.	Terrain Category:	
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	
19.	Details of earthing of tower (pipe type/ Counter poise):	
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	

21.	The agency who designed the line:	
22.	Any Special consideration in design:	
23.	Details of last maintenance activity along with date:	
24.	Power flow in the line prior to failure:	
25.	Any missing member found before / after failure of towers:	
26.	Condition of foundation after failure:	
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	
28.	Probable cause of failure:	
29.	Details of previous failure of the line / tower :	
30.	Whether line will be restored on ERS or Spare tower will be used:	
31.	Likely date of restoration:	
32.	Present Status:	
33.	Details of any Tests carried out after failure (attach test reports):	
34.	Wind speed data of date & time of failure from nearby authorized observatory:	
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	
38.	Tower spotting data:	
39.	Tower schedule of affected section:	

40.	Sag tension calculation considered for design of tower:	
41.	Design document of failed towers:	
42.	Any other relevant information:	

Annexure-IV: Composition of Standing Committee of Experts

Central Electricity Authority
Office of the Secretary

Date 24/9/99 30

No.5-41/98/Secy/CEA / 809

(Technical Committee No 16)

Office Memorandum

Subject: **Constitution of Standing Committee of Experts to investigate the Failure of Towers.**

Because of transmission line tower failures taking place in the country, resulting in disruption of power on large scale for long periods, it has been decided as per chapter-II, para 3 (viii) of the Electricity (Supply) Act. No 54 of 1948 to constitute a Standing Committee, consisting of experts in the field of EHV Transmission lines from CEA, Power Grid, CPRI, IIT Delhi, & SEB (of the State, where tower failure has taken place). In the event of any failure of towers for transmission lines of 220kV and higher voltages of power utilities, members of the committee should immediately visit the site to have first hand information and ascertain the causes of failure and give recommendations to prevent such recurrences in future.

2. The scope and terms of reference of the committee shall be as follows:

(i) To investigate the causes of failure of towers.

(ii) Recommendations to avert recurrences, of such failures in future.

3. Committee will submit its report within three months, from the date of failure.

4. Concerned power utility will provide all assistance, required by the committee in carrying out the meetings, make arrangements for immediate site visit after failure of towers by providing transport and travel facilities and preparation of the report.

5. All the Organisations/Power Utilities are requested to nominate their officers/alternate as their representative, and intimate to Chief Engineer STE, C

Every incident of Tower failure must be immediately reported to Chairman, CEA and Members of the Standing Committee.

8. This issues with the approval of Chairman, CEA.

3/9

(VIJOY KUMAR)
Secretary (CEA)

O/C

CMD Power Grid, New Delhi.

DG CPRI, Bangalore.

Head of Civil Engg. Deptt., IIT Delhi

Chairman of SEBs/Transmission Corporation/Grid Companies

PS to Chairman, CEA

PS to Member (PS), CEA

As per list Enclosed.

Copy to: Chief Engineer (GM), CEA
PS to Secy CEA

SS(M)CE
1/10/99

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
सचिव का कार्यालय
सेवा भवन, आर० के० पुरम्,
नई दिल्ली - 110 066
****

No.CEA/5-41(18)/Secy-2012 / 166 Dated: 06.08.2012

OFFICE ORDER

Subject: Re-composition of the Standing Committee of Experts to investigate failure of towers-Amendment - Reg.

Standing Committee of Experts was constituted vide this Office Memorandum (Techincal Committee No. 16) of even no. dated 30.09.1999 to investigate the causes of failure of towers. After the enactment of Electricity Act, 2003, it is felt necessary to re-compose the above said Committee. The revised Compostion of the Standing Committee of Experts to investigate failure of towers is given below:

1. Chief Engineer, SETD, CEA	-	Chairperson
2. Additional Director, (CPRI)	-	Member
3. Head, Deptt. of Civil Engg, Delhi Technological University	-	Member
4. Representative from Power Utility where Power failure occurred	-	Member
5. Member Secretary, Regional Power Committee where Power failure occurred	-	Member
6. Director (Transmission), SETD, CEA	-	Member Secretary

The other terms of reference shall remain the same as indicated in the above referred Office Memorandum.

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

To:

1. Chief Engineer, SETD, CEA
2. Director (Transmission), SETD, CEA
3. Additional Director, Mechanical Enginering Division, Central Power Research Institute (CPRI), C.V. Raman Road, Banglore
4. Head, Deptt. of Civil Engineering, Delhi Technological University, Shahbad Daulatpur, Bawana Road, Delhi

Sh [illegible]

5. Representative from Power Utility (as per list enclosed)
6. Member Secretary, Regional Power Committee (NRPC, WRPC, SRPC, ERPC & NERPC)

Copy for information to:

1. SA to Chairperson, CEA
2. SA to Member (PS), CEA

Copy for kind information to:

1. Secretary, Ministry of Power, Sharam Shakti Bhawan, Rafi Marg, New Delhi
2. Chairman and Managing Director, Powergrid Corporation of India Ltd., Saudamini, Plot No.2, Sector-29, Gurgaon

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

Annexure-II

Transmission towers failure during Jan-June 2025 in Northern Region									
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Date of Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Cause/ Conclusion as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Recommendation as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Action Taken by Concern Utiity As on Date**
1	220 kV D/C SambaChowadhi-I/ SmbaHiranagar-I Line	PGCIL	16.04.2025	17.04.2025 (on ByPass Arrangement) 27.04.2025 (Permanent)	2016	1	it was concluded that the primary reason for the failure was the design of the tower for wind zone-4, whereas the tower has been experiencing the effects of Wind Zone–5 due to it falling in the overlapping area between Wind Zone-4 & Wind Zone-5	1. check the restored tower strength as per IS 802: 2015 as the tower was earlier designed as per IS 802: 1995. 2. furnish the justification for utilizing the higher span.	No action taken reported by utility to NRPC.
2	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	02.06.2025	2013	1	Concluded that the primary cause of the failure was the inherent vulnerability of the Delta-type tower configuration, which remains structurally less reliable even after strengthening interventions.	1. PGCIL to furnish full details as per CEA format. 2.Restored tower should be designed as per latest IS, i.e., IS 802:2015.	No action taken reported by utility to NRPC.
3	400 kV D/C Barmer Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	5.10.2025	2019	9	The reported probable cause of failure is heavy windstorm. However, No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Details of wind zone in which the line is located. 3. Submit Tower Patrolling reports	No action taken reported by utility to NRPC.
4	400 kV D/C Barmer Bhinmal Line	RVPNL	05.05.2025	05.06.2025	2019	1	The reported probable cause of failure is Heavy Rain, Wind Storm and Lightning. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Details of wind zone in which the line is located.	No action taken reported by utility to NRPC.
5	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	30.05.2025	2016	3	The reported probable cause of failure is heavy cyclonic storm. No conclusion drawn by Committee	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015.	No action taken reported by utility to NRPC.
6	220 kV Nehtaur - Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	24.05.2025	2011	2	The reported probable cause of failure is heavy storm due to which tower got bend at stub. No conclusion drawn by Committee as UPPTCL representative was absent.	Nil	Not Applicable.
7	220 kV Jagriti Vihar -Hapur (765 KV) D/C line	UPPTCL	21.05.2025	30.05.2025	2019	4	The reported probable cause of failure is Wind storm/ cyclone. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
8	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	09.06.2025	1998	5	The reported probable cause of failure is Very High Cyclonic Storm. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.

Transmission towers failure during Jan-June 2025 in Northern Region									
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Date of Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Cause/ Conclusion as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Recommendation as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Action Taken by Concern Utiity As on Date**
9	220 KV Hardoi Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	11.07.2025	2022	2	The reported probable cause of failure is heavy sporadic whirl wind followed by localized cyclonic storm. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
10	400 kV Dadri- Harsh Vihar Ckt- 1&2	NTPC	21.05.2025	22.06.2025	2011	1	1. It was concluded that the primary cause of failure was the impactof high-velocity dust and wind storms.	1. Analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability. 2. Review the designed as per IS 802: 2015. 3. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
11	400 kV DC Babai- Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	01.07.2025(On ERS Ckt-2) 16.07.2025 (On ERS CKT-1)	2023	2	it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms.	1. Analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.	No action taken reported by utility to NRPC.
12	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	04.07.2025 (Permanent)	2011	5	The reported probable cause of failure is due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSSXXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone. No conclusion drawn by Committee.	wind data from the nearest IMD observatory or any other reliable source.	AESL has shared the action taken vide email dated 11.11.2025

Annexure-III

Transmission towers failure since July 2025 in Northern Region							
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Reported Cause**
1	400 kV Jalandhar-Sambha (Ckt-1)	NRSS XXIX/ INDIGRID	26.08.2025	30.09.2025 (ERS)	2016	5	flooding of Ravi River
2	400 kV Jalandhar-Sambha (Ckt-2)	NRSS XXIX/ INDIGRID	26.08.2025	16.10.2025 (ERS)	2016	5	flooding of Ravi River
3	400 kV Koldam(NT)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1	NRSS XXIX/ INDIGRID	10.10.2025	Not restored	2014	1	continued land subsistence
4	400KV Chamera 1 Chamera 2	POWERGRID	26.08.2025	08.09.2025 (ERS)	1997	1	flash floods in Ravi River followed by washing away of Tower No 78
5	400KV S/C Chamera 2 Kishenpur	POWERGRID	06.09.2025	18.09.2025	1997	1	sinking of land

सं. 22-17/2/2020-ओ एम [252889]
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power

Nirman Bhawan, New Delhi
Dated : 04th November, 2025

OFFICE MEMORANDUM

Subject: Minutes of the meeting held under the Chairmanship of Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary Services– reg.

Please find enclosed herewith a copy of minutes of the meeting held under the Chairmanship of Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary Services for information and necessary action.

Encl: As above

04.11.2025
(Thenkholal Baite)
Under Secretary to the Government of India
Telefax: 23062492; Email:opmonitor-power@nic.in

To

1. Chairperson, CEA
2. CMD, Grid India
3. CGM, Grid-India with the request to forward a copy of minutes of the meeting to all concerned RPCs.

Copy to:—

PPS to Secretary (Power)/ PS to Addl. Secretary (OM/R&R/ Transmission)/ PPS to Director (OM/FSC).

Minutes of meeting held under the chairmanship of the Secretary (P) on 22.10.2025 to discuss the deployment of Battery Energy Storage Systems (BESS) for Ancillary Services

****

A meeting was held under the Chairmanship of Secretary (P) on 22.10.2025 to discuss the deployment of Battery Energy Storage Systems (BESS) for Ancillary Services. The meeting was attended by senior officers of the MoP, CEA and Grid-India. The list of participants is **Annexed.**

2. Grid-India made a detailed presentation on the subject highlighting the following points:

(i) Ancillary services are essential to maintain grid stability and reliability by balancing real time demand and generation.

(ii) Ancillary Services are broadly classified into three main categories based on their functionality and mode of operation viz. Frequency Control Ancillary Services (FCAS), Voltage Control Ancillary Services (VCAS) and Black Start Ancillary Services (BSAS).

(iii) Frequency Control Ancillary Services are intended to maintain the system frequency within the permissible band by balancing generation and demand. FCAS are divided into three levels of control such as Primary Control through Governor action, Secondary Control through Automatic Generation Control (AGC) and Tertiary Control through Market-based dispatch. Voltage Control Ancillary Services are designed to maintain voltage levels within acceptable operational limits and Black Start Services used to restore the grid following a total or partial blackout.

(iv) A total of 83 power plants (215 generating units) encompassing 81,130 MW installed capacity have been integrated under AGC including coal, hydro, gas-based stations and pilot projects on Solar, BESS and Pumped Storage Plants (PSP). Pilot testing of 20 MW/40 MWh Battery Energy Storage System (BESS) at BRPL Kilokari-1 was conducted in May'2025. The BESS pilot demonstrated effective response to AGC signals in both charging and discharging modes. Similarly, Tehri Pumped Hydro Station was pilot-tested in September, 2025.

(v) The ongoing expansion of the ambit of AGC to bring intra-state plants and IPPs into the SRAS, alongside pilots with new technologies such as solar, BESS, and pumped hydro, approx. 6500 MW of intra-state generation has already been integrated under Secondary Reserve Ancillary Services (SRAS) and further inclusion is under progress.

(vi) Participation of intra-state plants will strengthen system reliability, provide operational experience and enhance SLDC readiness to implement intra-state AGC in the future. **Secretary (Power)** emphasized the need to expeditiously replicate AGC implementation across all generating stations and SLDCs to enable real-time frequency control and integration with AGC. **Secretary (Power)** advised Chairperson, CEA to take up the matter with the heads of IPPs, State generating companies and SLDCs and monitor commissioning of AGC and participation in SRAS.

(vii) During the evening peak period, plants are fully requisitioned to meet the high demand. Consequently, there are no upward reserves available in this duration. In the solar hours, plants are scheduled at or below their Minimum Technical Load (MTL) due to high renewable generation. As a result, there are no downward reserves available during these hours. In other periods, TRAS capacity is available in the range of 3,000 MW- 4,000 MW. Secretary (Power) emphasized that as per the Resource Adequacy, reserve monitoring is equally important and directed that Reserves being maintained and despatched at the intrastate and interstate level should be included as a regular agenda item in review meetings.

(viii) Apart from continuing present balancing activities, a BESS capacity of around 2500 MW/ 5000 MWh dedicated for Ancillary Services would keep frequency to almost 90% of the time within the permissible band on typical days. A 2-hour BESS configuration was found optimal for ancillary services. As per study, the second cycle availability will boost the ability to counter the evening peak dip in frequency when needed. Further, one-hour and two-hour BESS satisfy the required frequency improvement target while 0.5 hour BESS may be inadequate under energy deficit scenarios.

(ix) It was highlighted that Grid-India's studies have suggested that there is a value proposition in utilizing a portion of a BESS's capacity for Ancillary Services to support grid balancing, even while the remaining capacity is engaged in energy arbitrage or generation as per its PPA schedule.

(x) It was proposed to undertake a pilot of 500 MW / 1000 MWh BESS exclusively for ancillary services at the inter-state level to define technical requirements and regulatory modalities.

3. Secretary (Power) advised that advance procurement of reserves from BESS may be considered for completion by 2027 and directed Grid-India to initiate necessary actions in consultation with CERC. Secretary (Power) also noted that with the growing availability of cost-effective storage, the same should be leveraged for Ancillary Services.

4. After detailed discussions, following action points emerged in the meeting:

(i) SLDCs and Intra-state generating stations shall be pursued to maintain adequate reserves and implement Automatic Generation Control for balancing and improving the grid frequency profile.

(Action: Grid-India / RPC / CEA)

(ii) Considering the growing need for system balancing, CEA to work with Independent Power Producers, State generation companies and SLDCs towards establishment of infrastructure for Automatic Generation Control and participation in intra-state AGC/secondary reserve ancillary services. A monthly update may be provided by CEA to MoP.

(Action: CEA)

(iii) Reserves being maintained and despatched at the intrastate and interstate level shall be reviewed in the National and Regional Power Ministers' Conference.

(Action: Grid-India, CEA & MoP)

(iv) Grid-India shall initiate actions for regulatory approvals for advance procurement of reserves from Battery Energy Storage Systems for despatch under ancillary services.

(Action: Grid-India)

(v) Grid India to undertake Pilot of 500 MW / 1000 MWh BESS exclusively for ancillary services at interstate level for devising the future roadmap.

(Action: Grid-India)

5. The meeting ended with vote of thanks to all participants.

****

4/5

Annexure

List of the participants

Ministry of Power

1. Shri Pankaj Agarwal, Secretary (Power) ------ In chair
2. Shri Srikant Nagulapalli, Additional Secretary (R&R/ Transmission)
3. Shri Parveen Dudeja, Director (OM)
4. Shri Thenkholal Baite, Under Secretary (OM)

CEA

1. Shri Ghanshyam Prasad, Chairperson
2. Shri Vijay Kumar Singh, Member (Power System)
3. Smt. Ammi Ruhama Toppo, Chief Engineer (Power System Planning & Appraisal-I)

GRID- INDIA

1. Shri S.C Saxena, CMD
2. Shri. R.K Porwal, Director (SO)
3. Shri Vivek Pandey, CGM
4. Shri Phanishankar Chilkuri, Chief Manager

5/5