INDIA'S LARGEST TOWER TESTING FACILITY

L&T TRANSMISSION LINE TESTING & RESEARCH STATION
(An ISO/IEC 17025:2005 NABL Accredited Laboratory)
Larsen & Toubro (L&T), a USD 9.8 billion technology-driven engineering, construction and manufacturing organization is one of the largest and most admired companies in India’s Private Sector.

For over 70 years, L&T has been offering a gamut of advanced solutions, critical engineering services and products to diverse customers in India and abroad. L&T’s Engineering Construction & Contracts Division (ECC) is India’s largest and ranks 34th among top global contractors (Engineering News Record, USA – 2010). ECC’s services cover the entire realm of construction – civil, mechanical, electrical and instrumentation engineering – on EPC basis. L&T possesses wide ranging capabilities and expertise to meet every requirement of power generation, transmission and distribution.

Revolutionizing Power

Over the years, L&T’s Power Transmission & Distribution division has acquired extensive experience, knowledge and unmatched skills in executing critical power transmission projects for clients across the globe. Having executed more than 10,000 km of EHV power transmission lines in India and over 1500 km in the international markets, the company has a strong foothold and extends its services to 10 countries worldwide.

For over two decades, L&T has been offering end-to-end EPC services that include design, manufacture, supply of towers, construction, testing and commissioning of EHV power transmission lines, and has established itself as a reliable partner in the transmission line industry.
L&T’s Transmission Line Testing & Research Station (TLTRS) is one of the largest tower testing stations in India and the country’s first private testing station to be accredited by National Accreditation Board for Testing & Calibration Laboratories (NABL). TLTRS since its inception in November 2009 has completed testing of towers for many international clients from Spain, Oman, Abu Dhabi and Egypt.

This state-of-the-art testing station is established in an area of 25 acres at Kanchipuram (near Chennai) for testing various voltages of transmission line towers. TLTRS conforms to international design specifications and can test the adequacy of all components of the transmission line structures and their connections to withstand the design loads specified for the test structure under stimulated conditions. In addition, it provides insight into actual stress distribution of unique configurations, fit-up verification and performance of the structure.

It is equipped with facilities to perform tests on square or rectangular base lattice towers, monopoles, tubular structures and guyed towers for capacities up to 1200kV. Apart from analyzing the accuracy of assumptions made in design calculation, this testing bed also ensures that the towers meet the desired performance criteria.

The strategically located control room, the largest of its kind in the country (17,500sq.ft – ground + two floors), is equipped with unobstructed viewing gallery (3,500sq.ft) for 360 degree view. This enables engineers to have better control of the entire testing process.

The control room is equipped with high-capacity (100t) digital UTM (Universal Testing Machine) for load cell calibration of tower members. This facility also boasts of a specially designed built-in data acquisition and control system, with the latest equipment for operational support. A jumbo tower crane, spanning the entire area of erection and testing operations expedites the testing process.
The SCADA system coupled with auto, semi-auto and manual operation controls the movement of winches. Digital theodolites and strain gauge cells of varied capacities are used for load/deflection measurement in different conditions.

Yet another unique feature of this testing centre is the prototype fabrication unit for carrying out fabrication / proto-assembly of test towers. Modifications envisaged in tower members during failure of the testing process are carried out quickly. This proto-fabrication facility (500 ton per month) is set up in an expanse of 19,500sq.ft and is equipped with a CNC machine to expedite the process.

Hassles of shifting assembled tower members from the manufacturing facility to the testing station are duly eliminated by using this proto-fabrication unit. During failure, a full-fledged design office at the testing station complements the fabrication unit in preparing the revised drawings and manufacturing tower members for replacement in the least possible time. The design engineers can also assist customers with 3D structural analysis and detailing whenever required. TLTRS is the only testing centre in India, where full-fledged fabrication facility is available within the station premises.

With a gamut of operations under a single roof – from design, detail engineering and manufacturing of towers in ISO & OHSAS certified factories at Pudhucherry and Pithampur including testing of towers in its own centre to turnkey construction of transmission lines – L&T is poised to meet challenges and set indelible benchmarks in the transmission line industry.
Advantages

- Computerised central loading and monitoring system to simulate the actual loading
- Freedom for design engineer to choose any shape of tower to achieve optimization
- Electrically operated winches with dual-speed variable frequency drives enable smooth loading
- Accuracy in testing to can be achieved; thanks to the sophisticated in-house SCADA touch-screen based software
- Towers up to 1200kV with 95m height can be tested
- Towers can be tested to exceptional heavy loading (1000t per leg) and large base width (up to 35m)

As part of its R&D efforts, TLTRS constantly upgrades its knowledge and expertise in transmission line design and testing. Plans are afoot to develop and acquire new concepts applying advanced technology, configurations and materials for different size and shape in the transmission line field.

Test Bed Highlights

- Maximum Test Tower Base Width – 35m x 35m
- Maximum Test Tower Height – 95m
- Maximum Compression / Uplift per Leg – 1000t
- Allowable Overturning Moment – 70,000t-m
- Maximum Cross Arm Spread – 70m
- Maximum Transverse Wire Load – 100t per point
- Maximum Longitudinal Wire Load – 70t per point
- Maximum Vertical Wire Load – 60t per point
- Load Application System – 65 Nos. 5t capacity Electrically Operated Winches
- Load Measurement System – Stain Gauge Type Load Cell
- Material Testing and Calibration – 100t digital UTM
- Tower Erection through Tower Crane