L&T Construction

L&T Construction is the construction arm of Larsen & Toubro for over six decades and has been building landmark projects in India and abroad. The hallmark of its continuing success is L&T’s ability to execute complex projects of large magnitude within the stipulated time and cost, as per international standards of quality and safety.

Larsen & Toubro

Larsen & Toubro is India’s largest technology, engineering, construction and manufacturing company - reputed for its engagement in key growth sectors, its ability to respond positively to challenging requirement and its excellent value system.

L&T has an international presence, with a manufacturing footprint in eight countries, a wide network of offices and collaboration with global majors. Today, the company sets engineering benchmarks in terms of scale and complexity. For over seven decades, L&T has been creating landmark assets for many of its customers and has been adjudged ‘India’s Best Managed and Most Respected Company’. L&T is regarded as the pre-eminent infrastructure major – often referred to as the ‘Builder of nations’.

L&T GeoStructure

L&T GeoStructure, formerly known as Foundation and Geotechnical Engineering Cell, is a part of the USD 11.7 billion Larsen & Toubro conglomerate. With over four decades of experience, it has wide expertise in all kinds of geotechnical and underground works, with specialist staff and state-of-the-art equipment from best of sources around the globe.

Your reliable partner in creating value to your project

Specialist contractor with capability:
- to execute all range of works
- in a timely manner
- with quality & safety

As a breakthrough solution provider:
- through ‘Design & Build’ model
- with vast and speedy international networking for latest trends and technologies
Geotechnical exploration involves a wide range of activities such as drilling, sampling, field-testing, laboratory testing and reporting.

Our state-of-the-art methods and techniques are aimed at thoroughly understanding and determining the properties of soils and rocks, enabling design of right type of foundations and geotechnical solutions.

**Drilling with hydraulic rotary / wireline system**

Sophisticated equipment and advanced drilling techniques enable us to explore up to 800m. Continuous coring is also our forte. Geotechnical and geological parametric studies for very sensitive projects such as nuclear reactors and underground LPG storage caverns were executed by wireline drilling up to 175 m.

**Piezocone penetrometer**

L&T GeoStructure has high-capacity penetrometer of 20 t which is capable of measuring important in-situ parameters with least disturbance.

**Pressuremeter**

L&T GeoStructure has high-capacity pressuremeter of 200 bar which can measure moduli of soil and rocks as well. Pressure tests up to a depth of 100 m were done at Kalpakkam Atomic Power Project, Chennai.

**Geophysical methods**

Geophysical tests such as electrical resistivity, seismic surveys, cross-hole seismic method were done in many projects.
The design requirement is met by a dedicated and specialised design team comprising a unique blend of technical expertise with extensive practical and on-site experience. The team offers end-to-end solutions such as feasibility studies, conceptual designs, comprehensive recommendations, detail engineering and economic alternatives pertaining to foundation for various projects such as buildings and factories, road and rail network, ports, bridges, power plants, hydropower, petrochemicals, etc.

The team has the capability to offer unique, technically sound and optimised solutions involving soil-structure interaction using in-house software and special numerical software.

The exclusive design team of L&T GeoStructure based at Chennai offers tailor-made cost-effective proposals to the client based on project requirement. The team is also equipped with latest technologies to provide alternate solutions for complicated ground condition and structure. In addition, the execution team of L&T GeoStructure supports the projects site team to solve technical issues arising during construction.

**Fields of expertise**
- Geotechnical assessment and report
- Analysis and design of on-shore, near-shore and off-shore foundations
- Excavation systems
- Ground improvement works
- Slope stability analysis
- Retaining structures
- Liquefaction analysis

![Alternate wall scheme for cooling water pump house using T-type diaphragm wall](image1)

![Optimised foundation system with pile raft interaction analysis for tall towers](image2)
Deep Foundation

Bored cast-in-situ piles

- Having a large fleet of high capacity drilling rigs covering a drilling spectrum of 0.5m to 3.0m
- Reaching depths up to 80 m using L&T GeoStructure’s drilling monsters - BG 36, BG 40, SR 100, C 600
- Drilling through rocks to achieve ultimate pile capacities of up to 1500 t
- First to introduce use of environment-friendly polymer in place of bentonite as drilling fluid, enabling higher quality drilling
- Executing 10 lakh RM per annum with medium range hydraulic rotary piling rigs, such as HR 180, BG 25, SR 70 and C 300
- Track record of having installed 21000 (about 4 lakh RM) bored cast-in-situ piles in a span of 15 months at IISCO - Burnpur, West Bengal
- Piling through slag fills using hydraulic rotary drilling rigs - a unique innovation that significantly enhanced productivity in Tata Steel project at Jamshedpur, Jharkhand
Deep Foundation

Driven piles

- Created an Asian record by driving 517 precast driven piles in a single day for Reliance Industries Limited at Hazira, Gujarat
- Driven 10 lakh RM of 50 m long precast piles for Reliance Industries Limited at Kakinada, Andhra Pradesh
- Employed Sure-Lock splice joint system to enable reliable, fast and deep precast pile driving in many projects
- First to introduce integrated driven precast and cast-in-situ piling equipment in India. L&T owns the largest number of integrated driven piling rigs in India which are capable of driving 600 RM per day per rig to high quality and safety standards
L&T GeoStructure’s high capacity drilling equipment are capable of drilling large piles of upto 3 m dia and 80 m depth using BG 40, SR 100 and C 600.

Know-how for design and installation of large dia rock socketed piles with ultimate pile capacity of 5000 t.

Installed high quantum of large dia bored cast-in-situ and driven piling for waterfront and offshore structures.

Expertise to install mono piles, continuous flight auger piles and displacement piles.

Installed 308 nos. of 50 m long, 1200 mm dia prestressed, precast hollow concrete marine piles at Adani Port under severe open sea conditions.
Retaining solutions for deep excavation and controlling underground seepages with state-of-the-art drilling and trenching equipment

**Diaphragm wall**
First to introduce trench cutter equipment in India for underground stations involving rock socketted permanent diaphragm wall for Delhi Metro Rail

Employed over-cutting joint technology for the first time in India for 40 m deep diaphragm wall installed for a shaft at Delhi Metro Rail

**Secant pile / Contiguous pile wall**
Installed India’s first secant pile wall for Delhi Metro Rail project at Hauz Khas

Successfully installed contiguous pile wall for challenging projects such as airports and high-rise buildings

**Cut-off wall**
Successfully executed India’s deepest 45m plastic concrete cut-off wall to arrest dam seepage in tough Himalayan terrain at Parbati hydroelectric power project.

Capability to achieve upto 120 m depth of 1.5 m thick diaphragm/cut-off walls using trench cutters

**Sheet pile**
L&T GeoStructure owns modern equipment in large numbers for installing sheet pile walls

Over 10,000 sq.m of sheet piling done for Dhamra Port project using Movax side grip vibro-hammer for the first time in India
L&T GeoStructure’s quest to create value for projects has resulted in various ground improvement solutions as alternatives to conventional deep foundations:

- Installed 8000 nos of sand columns to increase the bearing capacity of an underlying fly ash fill for Delhi Vidyut Board.
- First in India to explore improvement of slag fills using techniques such as vibro compaction, vibro replacement etc.
- Engineered ground improvement method using prefabricated vertical drain involving installation of 15 lakh RM at Dhamra Port project in Odisha.
- Employed vibro-compaction techniques using advanced vibro-hammers to improve loose sandy deposit.
- Capability of installing micro piles for projects even with limited headroom.
Advanced Foundation Testing

- **Static load test**: Wide experience in carrying out all types of static load tests like kentledge, anchor pile and rock anchoring method up to 1500 t

- **Low strain pile integrity test**: Experience of having carried out over 15,000 tests

- **High strain dynamic load test**: L&T GeoStructure holds a track record of carrying out tests on more than 10,000 piles including driven precast piles to monitor instant pile capacity in the field

- **Cross hole sonic logging**: Successfully generated pile profile along the depth for Chemplast at Karaikal, Tamil Nadu

- **Instrumented pile load test**: Optimised pile length at Tata Steel projects at Kalinganagar, Odisha and Reliance project at Kakinada, Andhra Pradesh

- **Plate load test**: Experience of having explored over 100 sites for soil and rock
L&T’s strong technology focus leverages its strength to optimise the cost which is in turn helpful to customers to realise their value for money. L&T’s superior project execution capabilities are ably supported by a talent pool of experts in various foundation engineering works.

At L&T, EHS (Environment, Health, Safety) is given prime importance. Utmost care is taken to ensure safety of employees, workmen and the assets. Our corporate management has enunciated policies that emphasise on EHS through structured and well-defined procedures at every stage of construction.

Resources

- Sheet piling at Dhamra Port, Odisha
- Driven pre-cast concrete piling at RIL, Kakinada, Andhra Pradesh
- Cut-off wall works at 1200 MW Punatsangchhu-I HEP, Bhutan
- Diaphragm wall works for Chennai Metro Rail Limited
- Diaphragm wall works for Delhi Metro Rail Limited
- Diaphragm wall works at RIL Kakinada, Andhra Pradesh
L&T GeoStructure’s fleet of foundation equipment

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary piling rig</td>
<td>52</td>
</tr>
<tr>
<td>Driven precast piling rig</td>
<td>4</td>
</tr>
<tr>
<td>Driven cast-in-situ piling rig</td>
<td>3</td>
</tr>
<tr>
<td>Sheet piling equip. (vibro-hammer)</td>
<td>11</td>
</tr>
<tr>
<td>Diaphragm wall grab</td>
<td>5</td>
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<tr>
<td>Diaphragm wall trench cutter</td>
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<tr>
<td>Soil investigation rig</td>
<td>16</td>
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<tr>
<td>Crane</td>
<td>33</td>
</tr>
<tr>
<td>Anchor drilling rig</td>
<td>3</td>
</tr>
</tbody>
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North
601, VI Floor, SSR Corporate Park, Sector 27B, 13/6 Delhi Mathura Road, Near NHPC Chowk, Faridabad - 121 003, Haryana Tel No : 0129 - 4181402

East
IV Floor, Kanak Building, 41 Chowringhee Road, Kolkata - 700 071 Tel No : 033 - 44019934

West
Landmark - B, Ground Floor Suren Road, off Andheri-Kurla Road, Andheri (East) Mumbai - 400 093 Tel No : 022 - 61817507