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Focus

We are glad to inform you that with this issue of ECC Concord, we are celebrating 32 year of its existence. What began as a pure black & white 16 page issue in 1978, ECC Concord is continuing its journey in to the 32nd year. During the course of its journey, it has seen many upturns in terms of technology, management, coverage, quality and aesthetics.

Over the last three decades, ECC Concord has stood by its ideal of communicating to both external and internal publics about ECC – the organization, its people and its construction mission, values and practices. More importantly, we believe that ECC Concord has made a difference by adding value to ECC-ites including their clients and customers by giving them a greater understanding of ECC projects and expanding their knowledge on many technological fronts. Above all, highlighting significant contributions made by ECC in different spheres of industrial and infrastructure development in the country and abroad.

In this issue of ECC Concord, we are going forward with articles and features contributed by each OC. (i) The Signature Tower at Estancia and The Eden Park – both at Chennai brings out the unique concept of “Walk-to-Work” and “Villapartments” respectively. (ii) Two parallel bridges built over river Ganga at Allahabad was constructed by ECC using the technique of Balanced Cantilever Method. (iii) At Bushan Steel, ECC entered the project with an order of Rs.1400 million and today it is executing an array of critical projects worth more than Rs.24600 million and recently it commissioned the hot strip mill. (iv) L&T has developed comprehensive strengths in every sphere of Railway Construction offering end-to-end responsibility in engineering and execution of Permanent Way, installation of Overhead Equipment, Signaling and Telecommunication, including Construction of Private Railway sidings.

This issue is a record of all these and much more in the Kaleidoscope. You may find the contents and details interesting. Keep contributing your articles, views and opinions as they may serve as eye openers for the younger generation. Happy Reading.

- Editor
**ESTANCIA - the First Integrated Township in Chennai**

**Estancia** reads ‘Extensive Estate’ in Spanish, and that’s exactly the essence of the Estancia project developed by L&T at Chennai. Strategically located along the six-lane GST Road on NH-45 at Vallancherry, it is the first integrated township in Chennai. The project site is only 20 minutes drive from Chennai airport and is in close proximity to the suburban railway stations of Potheri and Guduvanchery. In view of its strategic location and importance, this project is being developed as a SEZ Corridor.

**Estancia IT SEZ** – has already wowed the industry with its unique and first-of-its-kind “Walk - To - Work” concept in Chennai. This concept envisages to provide a totally integrated township for the IT professionals to live, work and study, away from the congestion and pollution of the city. Spread over an area of 82 acres, the estate is surrounded by lakes and hills. Added to the natural beauty, the landscaped campus of Estancia presents a serene and environment friendly outlook that takes you away from the hustle and bustle of the city. The SEZ when completed and fully occupied is estimated to accommodate nearly 25000 people.

Estancia - promoted by Larsen & Toubro (L&T) and Arun Excello, primarily consists of three major components developed under three different special purpose vehicles (SPVs), This involves:

- **29 acres IT/ITES Special Economic Zone with 3.00 million sq.ft of built-up area for IT office space including area for amenities. (developed by L&T - Arun Excello IT SEZ Private Limited)**

- **39 acres residential gated township with over 2000 apartments. (developed by L&T - Arun Excello Realty Private Limited)**
• 14 acres of commercial and retail development with 4 star hotel, service apartment and School run by Vidya Mandir. (developed by L&T - Arun Excello Commercial projects private Limited)

World renowned architects RMJM of UK prepared the master plan and designed each and every building keeping in mind the latest concepts and modern practices of building international township layouts. Strata - a subsidiary of RMJM created the landscapes.

Immediately after finalizing the master layout plan (MLP) of IT SEZ, L&T approached the Ministry of Industry and Commerce, Government of Tamil Nadu for declaring this site as Special Economic Zone for housing IT, ITES and electronic hardware companies. Accordingly L&T obtained Clearances / No Objection Certificates from various government departments before proceeding with the development of IT SEZ.

The IT SEZ spread over 29 acres is demarcated into two areas - Processing and Non–Processing Zones. The Processing Zone will have a total built-up area of 1.65 million sq.ft covered in 5 blocks, each ranging from 2.80-3.67 lakh sq.ft of built-up area. A building for data center and a unique concept called Campus-Within-Campus is proposed in the Non-processing Zone.

**Signature Tower**

As one drives along the GST road, the breathtaking view of the iconic ‘inverted cone’ shaped Signature tower is hard to miss. With its, imposing and outstanding features, the Signature Tower stands out amongst the rest of the buildings as a landmark structure and is a cynosure of all eyes. Having a built-up area of 3.67 lakh sq.ft the Signature Tower is provided with common infrastructure like landscaping, internal approach roads, external lighting, sewer lines, sewage treatment plant etc.

Signature Tower that has been completed by L&T as a part of its first phase under Block – A, consists of one basement, one ground plus mezzanine floor including twelve upper floors, touching a height of 62.5m above the ground level. Spanning a width of 48.25m at the ground level the floor plate extends upto 59.16m at the 12th floor level supported by shear walls and
24 peripheral columns, providing the structure a total column-free workspace.

The entire structure is provided with 100% glazing which covers an area of 9900 sq.m on the exterior skin. This involved installation of 5298 double glazed panels of assorted sizes with ceramic fittings to prevent heat penetration. In addition, naturally ventilated fire escape staircases were shielded with aluminium louvers of 298 sq.m.

**Challenges**

Building the structure with its unique shape involved several challenges. As the water table was very high, continuous dewatering had to be done during excavation and construction of the basement. In addition, membrane water-proofing technology has also been used for the construction of the basement in order to prevent seepage of water.

The geometrical shape of the structure in the form of an inverted cone called for engineering expertise in building the columns which were sloping upwards to 83 degree from the ground level. As a result, the floor...
plate increased from 22000 sq.ft in the ground floor to 33,000 sq.ft on the 12\textsuperscript{th} floor. Thus, maintaining the alignment and centre of gravity to provide adequate structural stability for the expanding floor plates was critical to the structure. This was tackled by constructing the structure with the central core to begin with and then connecting it to the radiating peripheral columns by post tensioned beams. L&T used a special and unique formwork system which was used repetitively for building the structural system thereby saving on cost and time.

Commencing the work on the Signature Tower in January 2008, L&T completed the entire 12 storied structure by February 2010. With the completion of residential and commercial blocks in the SEZ, this integrated township will sport a new look and L&T is bound to change the scenario and lifestyle along the GST road.

The space marketing for Signature Tower is in progress and soon this building will house leading names in the IT/ITES industry, marking their signature on the Signature Tower. Customers here have the option to procure either raw space and build their own office workplace according to their design or L&T will provide built-to-suit facility as per customer requirements.

**Scope of works**

The engineering design, procurement and construction of Signature tower building has been done by the Buildings & Factories Operating Company of L&T’s Construction Division on total lumpsum turnkey basis. Detailed engineering design of the building has been carried out by the Engineering Design & Research Centre (EDRC) of Buildings & Factories Operating Company. The scope of work included:

**Civil**

- Post tension concrete slabs in office areas and in situ slabs in service areas
- Column-free workplace. (Columns are located only at the periphery)
- Double glazed glass façade with Aluminium Composite Panels
- Floor-to-floor height is 3.90 m
Highlights of Estancia IT SEZ – Signature Tower

<table>
<thead>
<tr>
<th>Location</th>
<th>GST Road, Guduvanchery, Chennai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Super Built-up Area</td>
<td>3,67,000 sq. ft (Approx)</td>
</tr>
<tr>
<td>Number of Floors</td>
<td>B + G + M + 12</td>
</tr>
<tr>
<td>Shape</td>
<td>Inverted cone shaped building</td>
</tr>
<tr>
<td>Height</td>
<td>62.6 m</td>
</tr>
<tr>
<td>Columns</td>
<td>24 peripheral columns</td>
</tr>
<tr>
<td>Glazing</td>
<td>Total external glazing area is 10000 sq.m, most of the area covered by Double glazed panels with ceramic fitting to enhance thermal insulation</td>
</tr>
<tr>
<td>Aluminium Composite Panel</td>
<td>4243 sq.m</td>
</tr>
<tr>
<td>Aluminium louvers</td>
<td>Fire escape staircase covered with aluminium louvers of 298 sq.m</td>
</tr>
</tbody>
</table>

Project Duration

<table>
<thead>
<tr>
<th>Project Commencement</th>
<th>January 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Completed</td>
<td>February 2010</td>
</tr>
</tbody>
</table>

Electrical
- 4000 KVA power supply from TNEB with 100% DG power back-up
- Separate Transformers for Computer Power and Air-conditioning
- Sandwich-Bus Risers used for main power, lighting and services with 100% spare Bus Risers.

HVAC
- 1500 TR centralized air-conditioning
- Adequate chilled water facility provided for server room air-conditioning
- Adequate AHU's installed on each floor for human comfort

Fire Detection & Protection System
- Analog addressable Fire Alarm System for smoke detection
- Centralized fire protection system
- Adequate fire escape staircases within the building
- Fire Hydrants and Fire Hoses with full-fledged Fire fighting systems
- High Side Fire sprinkler system

Building Management System
- Energy Monitoring
- Lobby, toilet and external lighting control
- Chiller control & monitoring
- AHU control & monitoring
- Public address system
- Access control system at basement & ground level

Granite flooring provided in the main lift lobby and vitrified tiles in the upper floors, lift and service lobbies
- Granite clad walls in lift lobbies
- Finished wash rooms/toilet bays in each floor of every block - separate bays for Gents, ladies and physically challenged.
- 8 passenger elevators and one 1.35t capacity service elevator
- Floor plate extends from 23,000 sq.ft in the first floor to 33,000 sq.ft on the 12th floor (Approx)
- Electrical and Communication ducts are provided for tenants in each floor
- Gross floor loading-800kg/sq.m
- CCTV systems at basement & ground level
- Electronic energy billing system

**Sewage Treatment Plant**
- For handling complete IT SEZ waste water

**Data & Voice Connectivity**
- Data and voice connectivity from various service providers have been brought to the premises already

**General**
- The ground coverage of Signature Tower is 20% with wide roads all around to avoid a concrete jungle feel
- Common amenities such as cafeteria, ATMs, etc, at ground floor

- Structural design is been done as per the latest seismic norms and for seismic zone 3

This project has many firsts to its credit. Besides being the first Integrated Township in Chennai, the structure and shape of the building is unique which again demonstrates the construction excellence and Imagineering skills of L&T. This building has been constructed to meet the International standards.

**Sundaram**
Project manager
ESTANCIA IT SEZ
As Nation builders, L&T has made a significant contribution to the development of housing sector by executing various residential and mass housing projects across India during the last few decades. At the same time, L&T is also a developer and is playing a major role in executing some of the prime residential township projects on its own. South City, Bangalore and Serene County, Hyderabad are two major projects developed by L&T in over 30 acres of land, which are in its final phase of completion.

The Eden Park, yet another major residential project from L&T which is being implemented presently, is creating news in Chennai City. It is being promoted by L&T South City Projects Limited (LTSCPL), a joint venture company between L&T Urban Infrastructure Limited (L&T-UIL), Dinesh Ranka Associates and Pragnya Fund in about 90 acres land at Siruseri, off Old Mahabalipuram Road on the IT corridor in Chennai. One of the significant achievements in this project includes L&T’s unique ability to procure land piece by piece, aggregating to 90 acres today.

The Eden Park township is being developed as a beautiful gated residential paradise wherein apartments, villas, school, club house, health care facilities and shopping arcades are all rising up in a well planned manner to make for a complete community living.

Phase I Project

Chennai City saw a real spurt in the residential sector when some of the big developers launched projects during the early part of 2007 on the IT corridor on OMR. However, a majority of these mega projects launched on OMR could not take off and commence its construction even after a year, for various reasons. However, L&T launched the Eden Park Phase 1 project in January 2008, after obtaining necessary approvals from the government and went ahead with its
construction activities, right from day one with an objective to hand over the project to its customers as per the agreed time schedule.

It is a well known fact that all building constructions, regardless of the nature and type of work, should comply with the government norms and it is only more imperative for a residential township project. In general, the design of the project has to comply with norms specified under National Building Code; relevant IS Codes, CMDA / DTCP stipulations, including norms stipulated by local fire/traffic/highway/aviation/pollution control authorities. Today, it is also important to strictly adhere to the norms specified by EIA (Environmental Impact Assessment) authorities. As a leader in construction, L&T ensures that it follows all these statutory norms very stringently.

For phase I project of Eden park, E I A Delhi stipulated the stringent requirement of shifting the car park to the basement and L&T met this condition of the government by accommodating the same in two level basement and L&T met this condition of the Government by accommodating the same in two level basement. As a result of this, L&T had to avoid the stilt parking (originally proposed) and make the podium surface free from vehicular movement and utilise the open area as a landscaped garden including leisure zone.

**Developer & Contractor**

While L&T Urban Infrastructure Limited, on one hand is playing a developer role through its special purpose vehicle LTSCPL, ECC’s Buildings & Factories Operating Company is playing the role of EPC contractor in this project. Each of these operating companies is putting in their best efforts in an effective manner in safeguarding project interests by maintaining a fine balance.

**Villapartments**

Villapartment, as the name suggests is a brilliant combination of all the best that one can expect in a villa and an apartment. It offers the perfect balance between the privacy, luxury and independence of a villa combined with the convenience, cost-effective maintenance and security of an apartment. Comprising 656 apartment units, phase I project of Eden Park is taking shape on 14 acres of land with its own architectural beauty that is standing tall. Aesthetically designed across 8 blocks with 14 levels, 2 basements, the three side open Villapartments comprise 2 and 3 bedroom dwelling units with state-of-the art amenities and the architecture of the entire structure is Vaastu-compliant. Floor area ranges from 1295 sq.ft for 2 bedroom apartment to 2010 sq.ft for the three bedroom premium villapartments.
Unique design highlights
- 3-sided ventilation
- Vaastu compliant
- Mechanized construction technology
- Reinforced Concrete walls to provide uninterrupted free space
- Solar water heating
- Recycled water for flushing and landscaping
- Vehicle-free ambience within the layout

Keeping you fit
- Gymnasium & Fitness Centre
- Swimming pool
- Jacuzzi / Sauna
- Men / Women Beauty Saloon
- Cycling / Jogging track
- Billiards, Table Tennis
- Massage / Aerobics room
- Cricket pitch
- Shuttle / Badminton Court
- Skating ring

Aesthetics
- Lush green landscaped area and lawns with central theme park for every tower
- Amphitheatre
- Water cascade
- Gazebo
- Pond with bridge
- Reflexology path

RC Wall Construction
Unlike the conventional method of construction involving column, beam frame work and brickwork infill, the construction of Villapartment is done with RC shear wall / Slab construction. In this method of construction, the wall and slab for the entire apartment unit is built in a single pour of concrete in a two day cycle per floor. Apart from the perfect dimensional accuracy and superior quality, RC wall construction also provides many other benefits:
- Eliminates the construction of columns.
- Walls and floor slabs are cast in a single pour of concrete.
- Acts as an earthquake resistant structure.
- Offers obstruction free space.
- Accelerates the speed of construction.
- Offers better thermal comfort compared to brick/block work construction

Tunnel Formwork
Using the Tunnel Form Technology - a room-sized structural steel formwork, reinforced concrete walls and floor slabs are cast in a continuous single pour of concrete. In addition, hot air curing is done for accelerated de-shuttering. L&T is using this advanced technology in Eden Park project and it is able to build one flat in two day cycle including complete walls.

Mechanized Construction
The entire construction of the project is being carried out by L&T through mechanized construction practices at site. This includes deploying
concrete batching plant, transit mixtures, concrete pumps and tower cranes. Apart from timely completion of the project mechanized construction practices ensure high quality and safety standards.

When completed, Eden Park will meet the total requirements of quality housing, needed for a real comfortable living, the mainstay of integrated townships that is self contained in every respect. It is a matter of great satisfaction that L&T has already made substantial progress in the first 4 blocks of phase 1 project and apartments are slated for handing over to the customers by July 2010.

**Future Proofing**

**Future-Proof Building (FPB)** means incorporating into your home features and solutions that will improve quality of life now and at the same time ensure your home maintains and improves its future value. The FPB initiative acts as a badge of confidence for consumers and encourages building professionals to use innovative building practices and high-quality products and services.

Keeping this in mind ‘Future Proofing’ has been done at Eden Park by an experienced team that has developed innovative next-generation optical access technology solutions and fiber-optic networks that will provide access to IPTV, video-on-demand, broadband data and voice services, digital and analog television broadcasts for residential customers.

‘Future Proofing’ at Eden Park ensures that the new homes are equipped for a multitude of broadband services that are available currently including all those new generation devices to come in the future. It enables the
home to accommodate a wide range of high-tech gadgets even before occupancy, saving precious time and effort.

**The amenities include**

- Broadband data connectivity
- Video phone connectivity for security and conferencing (Ready)
- HDTV and Blue-ray (Ready)
- Home automation (Ready)
- Home security
- Access control connectivity in the community (Ready)

The key benefit in a fiber network “Future Proof” home is that it can be managed by a single service provider – delivering Triple Play (voice, video and data) services in the community.

Eden Park is the first project in Chennai city where optical fibre connectivity is provided right upto the threshold of the apartment unit.

**Model Flat**

In order to keep pace with the major developers, L&T has put up a model flat with rich interiors and lush greenery to have a feel of the customer’s real home, when the project is fully developed. Model flat is attached with marketing office with facilities like air-conditioning, mini theatre to play the project films, pantry, rest room, visitors’ lounge, seating arrangements, including water connectivity.

This enabled L&T to showcase the product features in the most apt manner and this has won the appreciation of many customers.

**L&T Expertise**

L&T has been executing projects with four key principles.

- State-of-the-art technologies
- Speed
- Safety
- Quality

This 3SQ factor has been successfully adopted in the execution of many housing projects.

Several projects designed and constructed by L&T stand as testimony to the company’s adherence to values – safe design, innovative construction methods and enduring quality.

L&T has been able to take advantage of this combination in large townships, mass housing and hi-rise apartments with its ability to absorb proven technologies like L&T Formwork / Tunnel Formwork / Metal Formwork. And in this lineage Eden Park in Chennai with its outstanding construction features is a sure landmark in the making.

**G. Venkata Prasad**
Chief Operating Officer
L&T South City Projects Ltd
The National Highways Authority of India (NHAI) is entrusted with the development, maintenance and management of National Highways Development Project (NHDP) on the “Golden Quadrilateral” connecting the four metro cities of India.

The Allahabad Bypass Project, which is a part of the Golden Quadrilateral begins at km+158 of NH-2 near Kokhraj and ends at km+245 near Handia on the Delhi-Kolkata stretch bypassing the congested city of Allahabad. The total length of Allahabad Bypass project is 84.73 km and is divided into three packages, for the sake of construction. As part of this, NHAI invited bids from prequalified bidders on 27th January 2003 for the construction of a bridge across river Ganga at Allahabad (Package ABP1) and the contract was awarded to ECC, L&T’s Construction Division, after evaluation of bids in August 2003. Construction of the project was funded by International Bank for Reconstruction and Development.

Valued at Rs. 108.23 crore, construction of the 1010.2m long bridge across river Ganga began on NH-2 at km+163.280 and terminated at km+164.300 in the state of Uttar Pradesh. Construction of the bridge involved several challenges including logistics, erection and launching.

Salient Features

The structure involved construction of two independent parallel bridges with carriage ways named Left Carriage Way (LCW) and Right Carriage Way (RCW) each accommodating two-lanes of 7.5m width including one 1.5m wide pedestrian path in each. Both bridges are set apart with a clear 12m distance in-between to facilitate construction of independent wells.

The superstructure rests on 10m DIA well foundations having varying depths of 38.80m and 43.80m below water level. Jack down method was adopted for well sinking. The sub-structure is made of rectangular piers with pier caps.

Balanced Cantilever

The superstructure consists of precast segmental box girders (post tensioned) of varying span and weights (Span lengths are included: 1x62m + 4x95m + 2x62m + 4x95m
### Project Highlights

<table>
<thead>
<tr>
<th>Name of the Client</th>
<th>National Highways Authority of India, New Delhi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervision Consultant</td>
<td>Scetauroute International &amp; Frischmann Prabhu (India) Pvt. Ltd. JV</td>
</tr>
<tr>
<td>Design Consultant</td>
<td>SNC LAVALIN International Canada in association with Gherzi Eastern Limited India and Tandon Consultants Pvt. Ltd. India</td>
</tr>
<tr>
<td>Duration of contract</td>
<td>30 months</td>
</tr>
<tr>
<td>Total value of the contract</td>
<td>INR 1082.3 million</td>
</tr>
<tr>
<td>Length of the bridge (TWIN)</td>
<td>1010.2m. with 22.315m c/c between two carriageways and 12.00m clear distance on top</td>
</tr>
<tr>
<td>Span Configuration</td>
<td>62m + 95mx4 + 62mx2 + 95mx4 + 62m</td>
</tr>
<tr>
<td>Number and type of foundation</td>
<td>LCW &amp; RCW- 13 x 2 Well foundations of 10.00m diameter with 1.25m steining thickness</td>
</tr>
<tr>
<td>Type of superstructure</td>
<td>Segmental precast box girders, post-tensioned and continuous except at Pier no.6 location and at abutment</td>
</tr>
<tr>
<td>Type of Construction</td>
<td>Balanced Cantilever Construction using Under Slung Launching Girder</td>
</tr>
<tr>
<td>Total no. of precast segments</td>
<td>676 segments – Length varying from 2.5m to 4.0m and weight varying from 50 to 95 tonnes</td>
</tr>
<tr>
<td>Bearings</td>
<td>Fixed POT bearings at P3 and P9 Free POT bearings at all other locations</td>
</tr>
<tr>
<td>Expansion joints</td>
<td>Multi cellular modular strip seal (7 cell at P6 and 4 cell at A1 &amp; A2 each)</td>
</tr>
<tr>
<td>Shock Transmission Units</td>
<td>2 each at P2, P4, P8 and P10 locations connecting pier cap to Deck soffit – 16 nos total</td>
</tr>
<tr>
<td>Pier</td>
<td>Hollow rectangular box of 5.0mx3.0mx0.6m thick, 8.457m high, cast in single pour</td>
</tr>
<tr>
<td>Pier Caps</td>
<td>9.0m x 6.0m with varying depth</td>
</tr>
<tr>
<td>Continuity of spans</td>
<td>Continuity segments provided at mid spans of 95m &amp; at 5th segment from abutment, stitched with adjacent segments through high strength epoxy grout through the 100mm gaps.</td>
</tr>
<tr>
<td>Carriageway width</td>
<td>7.5m with 1.5m footpath on one side, carriageway centre is offset to deck centre by 950mm.</td>
</tr>
</tbody>
</table>

The Allahabad Bypass project is 84.73 km and is divided into three packages, for the sake of challenges including logistics, piers with pier caps. The total length of the bridge involved several sub-structure is made of rectangular well foundations having varying depths of 38.80m and 43.80m. Reconstruction and Development Project (NHDP) on the Golden Quadrilateral bridge across river Ganga began on 27 January 2003 for the distance in-between to facilitate pedestrian path in each. Both bridges are set apart with a clear 12m width including one 1.5m wide carriage way.

In addition, the bridge is installed with 16 shock transmission units (STUs), to arrest stresses acting on it under rapidly applied loads such as braking or even seismic tremors and at the same time move freely under slowly applied loads such as temperature, creep & shrinkage. The STU is connected between the superstructure and sub structure near the bearing location. This is the second bridge in India which is installed with STUs after the Second Bassein Creek Bridge (on NH-8).

### Construction Strategy

#### Precasting of Segments

Construction of the bridge deck involved producing match cast precast box segments of varying length, height and weight. Considering the geometry of the bridge alignment and total number of segments to be produced, Long Line Method of casting was adopted. Establishing the site facilities including casting yard in the limited area available was a challenge. Accordingly, the total number of segments to be produced, requirement of casting yard accessories like gantry cranes for lifting and moving precast segments, handling the reinforcement cage, laying the track foundations for gantry track, its logistics, survey towers, locating an ideal site for long line casting bed etc. were finalized.

All supporting accessories for segment casting like reinforcement jig (for making the reinforcement
As the quality of segments produced and cycle time for casting were the key factors of the project, systems with hydraulic jacks and pumps were introduced for shutter removal and movement of shutter from segment cast to next location. With these precast yard facilities, a record maximum monthly production of 40 segments and an average production of 30 segments were achieved at site with excellent surface finishes including all the shear keys with perfect edges. After achieving the required strength in casting bed, segments were lifted and shifted to stacking yard. Segments were then stacked in two tiers, (one above the other). A three-point support system was adopted for segment stacking.

Transportation of Segments

Transportation of precast segments (maximum height of 5.5m and 95t weight) from casting yard to bridge erection location (which is 3 km away from casting yard) was

Multi-axle trailer transporting the precast segments
challenging. Long bed trailer with multi axles were used for the same. The segments were lifted and loaded on the trailer using 120t gantry crane from the casting yard. In order to ensure safety during transportation, the segments were fixed to the trailer bed using the holding beams and Macalloy bars.

**Well foundations**

There were totally 26 wells (13 for each carriageway) and all of them were constructed as land wells. The top level of well cap for all the wells was kept at same level. Hence it was required to construct dummy wall over the well cap to enable the construction of pier on its top. Jack down methodology was used for sinking of wells.

**Bridge Erection**

As per the contract conditions, the bridge was to be constructed by **Balanced Cantilever Method**. Since the erection had to be done in a stringent time frame, segment erection throughout the year including the monsoon period (3 to 4 months) was planned. Moreover the water flow at the location of the bridge in Ganga river was quite nonlinear with heavy water discharge during the monsoon period. Due to the above constraints, meticulous planning was done in the casting to cater to the erection of segments for land spans as well as water spans. Considering these criticalities including many other aspects, a special erection scheme using launching girder and portal gantry having 120t capacity was developed and used. This scheme was adopted for the erection of both the land and water spans. Moreover, it was decided to use separate launching girders for left carriage way as well as right carriage way, to meet the tight construction schedule. Ensuring safety of enabling structures and the system as a whole was very crucial during erection of segments. Hence, necessary safety arrangements like access platform, walk ways etc were provided as part of enabling structures.

**Launching Girder & other enabling structures**

**Launching Girder**

The launching girder used for Right Carriage Way (LG-RCW) was of truss type and that of Left carriage Way (LG-LCW) was made of plate girders. Both launching girders were designed and fabricated considering the maximum weight of segment to be erected. Based on the erection sequence for first span and typical intermediate spans, the length of launching girders were of 193m and 183.5m respectively for RCW and LCW.

**Erection Gantry**

120t capacity portal gantry was used over each launching girder to lift the segments and erect them in place. Gantry from all available sites were made use of after making required modifications in design and fabrication. The lifting was done with 185t capacity strand jack lifting systems. Spherical roller thrust bearings were used in lifting beams for 360 degree rotation of the lifted segments. The gantries were moved...
on CR100 rails fixed on the top of launching girders.

**Pier Brackets**

Launching girder was supported on two pier brackets at each pier location. The brackets on each side of piers were connected to pier shaft with high grade Macalloy bars (1030 Grade) and stressed using Macalloy jacks.

**Intermediate Supports**

Intermediate supports for launching girders were provided at the centre of each span of bridge. Structural steel trestles were supported on foundations (open foundations for land spans and pile foundations for river spans).

**Stabilizing Arrangement**

The erection method used for bridge was Balanced Cantilever Method. As the name suggests, the segments were erected as cantilever on both sides of pier in a balancing pattern from either end. Apart from the normal segmental bridge, this was designed with pier head segment supported on PTFE / Sliding bearing placed over pier. As per contractual conditions, a system was required to be developed for transferring the unbalanced forces from superstructure arising out of this methodology. These unbalanced forces are induced in case there is a fall of erected segment from any one arm of the erected cantilever portion. Since the quantum of load to be transferred was of the order of 600t on one side of pier, it was indeed a challenging job to develop a load transfer and stabilizing system.

**Bridge Erection**

For erecting the first arm of bridge, the segments were lifted from segment trailer on ground by portal gantry mounted on launching girder. After positioning the segment trailer in the required location, the first pier head segment was lifted using the erection gantry mounted on launching girder and the segment was moved to the first pier location. The segment was placed on the pier cap and adjacent segments were lifted and erected. For the balance arms, feeding of the segments were done from the trailer parked on the erected portion of deck. Controlling the horizontal and vertical profile of the cantilever edge of the bridge was yet another challenge for the site execution team.

After completion of one particular arm of the bridge, the launching girder was moved to the next location by Mechanized Truss Launching system. The system was to cater to the launching of double truss in a highly mechanized way with reduced launching time and increased operational efficiency.

**Achievements**

Being the first project where the construction engineering for segmental bridge was completely carried out by an in-house team of engineers, necessary precautions like load testing of all the enabling structures to full scale model prior to the execution at site were performed.

Design of major enabling structures such as mould and launching girders were carried out in such a way as to utilize the company’s available materials to the maximum possible extent. Mould engineering was specially developed to cater to varying vertical profile of the segment due to precamber and cross slope including varying segment dimensions.

Optimization of time and man power was achieved by implementation of mechanized truss launching system for erecting the launching girders from one span to the other. Horizontal and vertical deflection of the cantilever bridge during the segment erection was controlled by monitoring the erection co-ordinates by survey at each and every stage of segment erection.

*K. Senthil Nathan*

Head – Infrastructure Engineering & Technology
Orissa has an abundance of raw materials like iron ore, limestone, dolomite, manganese ore, quartz and coal, besides refractories and ferroalloys of various types. The state is endowed with large reserves of iron ore, estimated at 5.42 billion tons and there is a tremendous scope for utilising these reserves by manufacturers of steel, pig iron and sponge iron. With Paradip Port having road excellent connectivity with these belts, Orissa has gained great strategic importance in the country’s steel industry.

Bhushan Steel Limited (BSL), the largest manufacturer of auto-grade steel in India is presently building 5 million tons per annum (MTPA) integrated steel plant at Meramandali in Orissa, at a cost of around Rs 25,000 crore. This plant is located around 130km from Bhubaneswar.

The first phase of this project was installed with a production capacity 2.2 MTPA of steel, which involved erection of 180TPH twin shell Conarc furnace; 2X180TPH Laddle furnace, 1X Single strand slab caster in addition to 4 Kilns, a 110-MW Power Plant, Steel melt shop and Raw Material Handling facilities. The first phase also included production of sponge iron (6,80,000 TPA), Billet caster (3,00,000 TPA) and Slab caster (2.2 MTPA).

Phase – II

Currently the phase II of BSL is under implementation by L&T and this will have a capacity to produce 5 MTPA of steel. Metallurgical, Material Handling & Water Operating Company – a part of L&T’s Construction Division has been entrusted with the execution of various EPC packages, under this project. This involves 2.5 MTPA capacity (3814cu.m) Blast furnace, 2X2.3 MTPA capacity (204 sq.m) Sintering Plant, Raw material handling system along with “Civil,
Structural, Piping & equipment works” for two Slab Casters, two Basic Oxygen furnaces (BOF) including Civil works of 2.5 MTPA Coke oven (72 Batteries). The capacity of phase –II is likely to go up to 7 MTPA.

L&T entered Bushan Steel plant with a contract value of Rs.1400 million in November 2006. However, this rose to a total of Rs. 24591 million by February 2010, in view of the timely completion and commissioning of various plants and the confidence reposed by the client on L&T’s total project execution capabilities. With this, L&T is executing all major units of iron & steel making for an integrated steel plant concurrently in a single location and this is a matter of great satisfaction for all L&T-ites involved in this project.

### Scope of Works

Following are L&T’s scope of works involved in various projects under implementation:

**Phase-I (2.2 MTPA)**

#### Steel Melt Shop and Hot Strip Mill

Civil, Structural, Equipments and Piping work for SMS, Caster, Re-heating furnace, Hot Strip Mill & Water Complex.

- Civil & Structural Works for Coke Oven.
- Construction of 5 overhead tanks and 4 chimneys having height of 120m.
- 138m (width) X 660m (length) X 40.0m (height) structural building for Coil Storage Yard
- Mechanical work for 4X300 TPD Lime Calcinations Plant
• Construction of 50 km Plant Road & drains.

**Engineering, Supply and Construction of 3 Stacker & Reclaimer (1500TPH capacity) with 14.33 km Conveyor**

**Phase-II (5 MTPA)**

EPC of 2.5 MTPA Blast Furnace (3814 cu.m)

EPC of two 2.3 MTPA Sinter Plant (204 sq.m)

**SMS-III with BOF and 2 Casters**

• Civil, Structural, Equipment and Piping work for 2 Slab Caster and 2 Basic Oxygen Furnace with its auxiliary facilities.

• Civil & Structural Works for Coke Oven # 2.

**Engineering, Supply and Construction of seven 1500TPH Stacker & Reclaimer with two Wagon Tipplers of 20 tips per hour.**

Under Phase-I of the project execution, L&T has already completed majority of works including successful commissioning of units in Steel Melt Shop (SMS-II), Reheating furnace, Hot Strip Mill with all its utilities. Two stackers & reclaimer and 6.8 km long Conveyor and Conveyor Package-2002. Conveyor package-2006 is in the advanced stage of completion.

**Major items**

Major quantities of work involved for Phase-I and Phase-II are as follows:

• 1128000 cu.m concreting

• 187000 t of structural fabrication and erection

• 90000 t Equipment erection

• 10000 t Piping fabrication and erection

• 6 Overhead tanks and four 120m RCC Chimneys

• 12.34 km of conveyor gallery erection with 25.23 km of belt laying.

**Units Commissioned**

Following are the salient features of major functional units already commissioned:

**Steel Melting Shop**

**Twin Shell Conarc Furnace**

• Capacity: 180 t

• Tapping : Eccentric Bottom Tapping

• Power Rating : 145 KVA

• Lancing : Oxygen Top / Door lancing EBT lancing

**Slab Caster**

• Type: Single Strand Vertical Bending

• Mould Type: Vertical Compact type

• Top Argon Lancing

• Alloy wire feeding

• Power Rating: - 35KVA

**Re-Heating Furnace**

• Capacity: 300 TPH

• Furnace length: 37.5m

• Hearth length: 16m

• Walking Beam: 4 Nos

• Fixed Beam:
  • Charging Side: 5 Nos
  • Discharging Side: 6 Nos

**Ladle Refining Furnace**

• Capacity: 2 MTPA

• Casting Radius: 8m.

• Slab Thickness: 230 mm

• Slab Width: 800-1680 mm

• Slab Length: 6-12.5 m

• Casting Speed: 0.25 -12.5 m/min

• Machine length: - 37.450m

EPC of 2.5 MTPA Blast Furnace (3814 cu.m)

EPC of two 2.3 MTPA Sinter Plant (204 sq.m)

**Civil & Structural Works for Coke Oven # 2.**

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ECC CONCORD Jan-Mar 2010
As it is a green field project, there commenced with site clearance and achieving several significant. Gradually the fabrication works execution work commenced in the work. And thereafter, the project Project Manager, the project constraints faced at site was mobilizing a large awarded to L&T- Paul Wurth in addition, the toughest challenge construction of new furnace-II was 25mm. As the site located in a remote place with highlight of the BF-II includes: In addition, the toughest challenge faced at site was mobilizing a large pool of skilled workforce. As the site is located in a remote place with harsh climatic conditions (summer at 48° C and rainfall of 60mm during monsoon), there was no accommodation available for workmen in the vicinity. Therefore, the project management team had to overcome all these bottlenecks including the initial logistic problems before commencing the project work. And thereafter, the project works picked up momentum and began to move in a full-fledged manner, setting benchmarks and achieving several significant milestones. According to Mr. T.Kumaresan, Chief Project Manager, the project execution work commenced in the month of January 2007 with deployment of one Batching plant. Gradually the fabrication works commenced with site clearance and development of a fabrication yard. As it is a green field project, there were many political problems and local disturbances, too. To begin with, there was no boundary wall to the working site and this posed problems of safety of equipment and materials. Constraints

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### Blast Furnace – II

As part of BSL expansion programme, contract for the construction of new furnace-II was awarded to L&T- Paul Wurth consortium, on a turnkey basis. The highlight of the BF-II includes:

- **Hot metal capacity**: 2.5 MTPA
- **Hearth diameter**: 13 m
- **Working volume**: 3230 cu.m
- **Inner volume**: 3814 cu.m
- **Total volume**: 4186 cu.m
- **Max. production**: 7850 TPD
- **Avg. production**: 7150 TPD
- **No. of Tuyeres**: 34
- **No. of Tap holes**: 4
- **No. of Cast house**: 2

---

**Roughing Mill**

- **Type**: 4 High
- **Max. Thickness Reduction up to** 25mm
- **Main Drive**: 2X16000KW

**Finishing Mill**

- **Strand**: 6 Nos
- **Type**: 4 High Tandem Strands
- **Main Drive**: 6X7500 KW

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**Main Units in Phase-II**

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Project Manager, the project

Constraints

Finishing Mill

Roughing Mill

Hot Strip Mill   Main Units in Phase-II

Main Drive: 6X7500 KW accommodation available for

Type: 4 High Tandem Strands monsoon), there was no

Strand : 6 Nos

Max Thickness Reduction upto

Type: 4 High As part of BSL expansion

Jan-Mar 2010

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Inner volume : 3814 cu.m

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Working volume : 3230 cu.m

Hearth diameter : 13 m

Hot metal capacity : 2.5 MTPA

48  C and rainfall of 60mm during

Major Milestone Achievements

- 7, 30,793 cu.m concreting, from Jan’07 to Feb’10
- 89,823 t structural fabrication, from Mar’07 to Feb’10
- 74,715 t structural erection, from June’07 to Feb’10
- 38,902 t equipment erection, from Nov’07 to Feb’10
- 12,74,293 IM piping erection, from Jan’08 to Feb’10
- 13.65 km belt laying completed in conveyor package
- 58.2 million safe man-hours
- 6,002 t of structural fabrication in a single month.
- 31,449 cu.m concreting in a single month
- 50,449 sq.m shuttering in a single month
- 4342 t structural erection in a single month
- Erection of Asia’s heaviest crane girder 42mx2.4mx1.16m weighing 181t in single lift
- 4,340 cu.m concreting of blast furnace raft in record time of 49 hours.

Some of the salient features of BF-II include:

- 4 column type tower structure
- Bell-less top charging system
- Closed Circuit Stave cooling (Copper & CI)
- Automated Stock House with Fines Re-circulation system
- Pulverized Coal Injection system
- Two cast houses with 4 tap holes

- Slag granulation system (INBA type)
- 3 Nos. Hot Blast Stoves
- Heat Recovery System
- Top gas recovery turbine
- Blower House for 2 x 22.5 MW Electric Blowers

Major Technological Units and system package implementation included:

- Blast Furnace Proper & Top Equipment
- Cast House with De-dusting System
- Hot Blast Stoves
- Gas Cleaning Plant (GCP) & Clean Gas Main
- Slag Granulation Plant (SGP)
- Top Recovery Turbine (TRT) System
- Stock House with De-dusting & Charging System
- Electrical Power & Distribution System
- Instrumentation and Level 1 & 2 Automation
- HVAC System
- Water Cooling System
- Coal Grinding & PCI System
- Blower System
- Utilities
- Fire Fighting System

Scope of works

Detail Engineering

Complete indigenous equipment, Technological and building structures, Plant utilities, Water system facilities, Air conditioning and Ventilation, Fire fighting, Coal Grinding system, Electrics and instrumentation, Civil works including roads, drainage, railway track etc.

Indigenous supply items

Pumps, Fans, Pipes, fittings, valves, Ducts, chimneys, Coal Mill, Refractories, Bins, Silos etc.

Construction

All civil works for foundations, buildings, road work, drainage system, railway track etc. Supply, fabrication and erection of structural work, installation, testing and commissioning of all imported and indigenous equipment, plant utilities, water system facilities, plant automation system etc.

Sinter Plant

Order for construction of two Sinter Plants was awarded to L&T as part of the expansion to suit the blast furnace requirement for sinter. Basic design of this plant was done by OUTOTEC and detail engineering and supply of indigenous equipment supply is being carried out by L&T.

Major units involved in the Sinter plant are as follows:

- Mixing and Proportionate Bins
- Sinter Machine Building
- Mixing and Nodulizing Drum
- Sinter Cooler
- Crushing and Screening Building
- Electrical control room
- Waste gas fan house
- Electrostatic precipitator
- Pump house
- 100m high chimney

Steel Melt Shop (SMS-III)

Civil and Mechanical work for SMS-III Expansion project involved the construction of following units:
The safety training hall specially established at site for imparting safety training, has a seating capacity of 60 at a time. This hall features various safety tools, tackles, gadgets and accessories that provide a clear understanding of the devices to everyone. In addition, it has a "Formwork Mock-up Yard" where hands-on demonstrations are carried out frequently. As a result of this, the site was able to achieve an all-time record of 58.2 million safe man-hours from 6th July 2007 to 7th June 2009, for which the site has received an international award from British Safety Council for the year 2008 including ECC Safety Rolling Trophy.

Environment, Health, Safety (EHS)

Maintaining the environment, health and safety of more than 12,140 workmen deployed during the peak of construction is a major challenge for the site operation. EHS was made possible and was ensured right from the commencement of the project. L&T’s management policy and EHS initiatives that are prevalent in the company saw to the compliance to this area of sustainability. Safety awareness programmes were regularly conducted at site for every category of workmen in material handling, working at heights/deeps, deep excavation and working in confined spaces including the Project office. Each and every workman was inducted for safety and safety culture was infused into every workman. They were given the freedom to alarm Engineers and fellow workmen for any unsafe acts, methods/zones. Pre-employment medical examination and screening of all workmen was done to ensure “Right Man for the Right Job”.

The site has set up an excellent fall prevention and fall protection system for people working at great heights. Also, height passes are issued to the workers after examining their physical and mental condition.
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**Labour Colony**

There is a full-fledged labour colony located within the plant premises, which accommodates more than 6000 workmen. This is specially created to avoid travelling long distances between home and work site. Frequent health check-ups for all labourers are conducted by a qualified and registered medical practitioner, who is accessible all the time together with a team of paramedics for first aid requirement if any.

**Construction Skills Training Center (CSTC)**

To cater to the huge requirement of skilled workforce, the Bhushan steel site has established a construction skills training centre at the site. Candidates are sourced from local Industrial Training Institute and villages and training is provided to the selected people in line with the systematic curriculum in the areas of formwork, bar bending, electrical work & welding trades.

**Response towards Environment and Society**

The site management is very much concerned to nurture, protect and preserve the environment and the society around its establishment. As the site operations are spread over a 3 sq. km area, saplings were planted along the boundary wall and near the labour colony. In addition, several CSR activities are carried out regularly to sustain the community near the site:

**Some of the major CSR activities that were carried out included:**

- Voluntary blood donation camps
- Malaria eradication programmes are carried out in the site as well as in surrounding areas
- Free medical camp for school children and villagers are conducted at periodic intervals in a nearby village school

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**5.5 MTPA Hot Strip Mill Commissioned at Bhushan Steel**

State-of-the-art 5 MTPA Hot strip Mill, erected by ECC at Meramandali, Orissa has been successfully commissioned on March 24, 2010. This Mill is equipped with two numbers of 300 TPH Walking Beam Reheating Furnace, one Roughing Mill, Coil Box, Pinch Roll, Six Finishing Mills, Two Down coiler and Three Roll Grinding Machine & Coil Conveyor System. The equipment were supplied by SMS Siemag, Siemens, Tenova and Waldrich Siegen. Earlier, the Steel melt shop with 180t Conarc Furnace, Slab Caster was commissioned on November 23, 2009. L&T executed the entire civil, structural, equipment erection, piping, electrical and instrumentation works of this prestigious project within a record of 36 months.
L&T recently executed a part of the Nandalur – Gunatakal Railway Electrification Project located on the Chennai – Mumbai railway main line under the jurisdiction of South Central Railway in Andhra Pradesh. Once the entire electrification work is completed in this section, the travelling time from Chennai to Mumbai is expected to get reduced considerably. Electric traction is the most energy efficient form of rail transport. It is estimated that every 100 km of route electrification results in an annual saving of more than four million litres of diesel, which in turn saves Rs. 25 billion in expenditure.

Being located in the Rayalseema region of Andhra Pradesh, the Nandalur-Guntakal section is replete with several cement and thermal power plants which needs transportation of large quantities of coal from the pit heads and cement from the cement plants to various destinations across the country. This has resulted in heavy goods traffic and electrification is carried out mainly to reduce the cost of rail, as well as freight operations.

Rail Vikas Nigam Limited (RVNL), a Special Purpose Vehicle - wholly owned by Government of India (Indian Railways) has been created to undertake project development, mobilization of financial resources and implement projects pertaining to strengthening of Golden Quadrilateral and Port Connectivity. It is the first major non-budgetary initiative for creating rail transport capacity ahead of demand and on a commercial format.

**Contract**

Rail Vikas Nigam Limited (RVNL) divided the 223 route km Nandalur-Guntakal Railway Electrification Project into two packages of which the 118 route km (279 track km) Nandalur – Kondapuram section package was awarded to ECC’s Railway Construction Business Unit.
RAILWAY ELECTRIFICATION on Nandalur - Guntakal section

L&T recently executed a part of the electrification project located on Mumbai. The electrification is expected to reduce travelling time from Chennai to Mumbai, which in turn saves Rs. 25 billion in expenditure. Electric traction is the most energy efficient form of rail transport. It is estimated that the Chennai – Mumbai railway main line will considerably benefit from the electrification.

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Fact File - Railway Construction Business Unit

Diversified into Railway Electrification : 1981
Entered into Railway Signalling : 2000

Comprehensive Railway Construction Business
Made its entry : 2005

Strengths
- Highly experienced Team of Engineers
- Capability to execute concept to commissioning of rail projects
- Strong In-House Engineering & Project Management Capability
- Vendor Sourcing and Selection of Equipments / Materials
- Adherence to World Class Safety Standards
- Emphasis on Quality, Technology & Speed
- Project execution is ISO 9001:2000 certified

Range of services
Rail Bed and Permanent Way Works
- Rail bed Works including Embankment Bridges & Culverts
- Associated Civil Works like Station Buildings, Staff Quarters and Platform & Passenger Amenities
- Execution of Track Linking works executed through mechanised means.
- Strategic alliance with leading Track Fittings manufacturers for ballastless track.
- Tie-up with global technology suppliers for ballastless track system

Overhead Electrification Works (OHE)
- Overhead Catenary System - Design, Supply, Erection, Testing & Commissioning of 25 kV, Single Phase 50 Hz, Traction Overhead Equipment on Turnkey basis including Traction Sub-stations, Switching Stations and Modification of Overhead Catenary System
- Strategic alliance with leading Rigid Overhead Contact System (ROCS) Manufacturers for Electrification of Underground Tunnels with Rigid Overhead Equipment

Signaling & Telecommunication Works (S&T)
- Proven experience in executing Panel Interlocking stations, Route Relay Interlocking stations
- Strategic alliance with leading Signalling manufacturers for Automatic Train Control system consisting of Automatic Train Supervision, Automatic Train Protection & Automatic Train Operation and Electronic Interlocking

Track record
Completed
- 5700 track km (TKM) of Overhead Catenary System, 19 Traction Sub-Stations and 200 Wayside Switching Station for Indian Railways
- Panel Interlocking Works in 32 stations for Indian Railways

Under Execution
- More than 600 TKM of permanent way works
- 1700 TKM of OHE installations
- Electronic Interlocking for 35 Stations

Clients
Indian Railways (All zones)
Rail Vikas Nigam Limited (RVNL), New Delhi
Central Organisation for Railway Electrification (CORE), Allahabad
Private Owners for Railway Sidings
Solid State Interlocking

In Railway operations, an interlocking is an arrangement of signaling system that prevents conflicting traffic movements where several lines meet or diverge as in the case of railway junctions or station crossings. An interlocking is designed so that it is impossible to give clear signals to trains, unless the route to be used is proved to be safe. In other words interlocking system ensures safety of train movements and these signals allow safe passage of trains into section of the tracks ahead of it.

Indian railways generally use Route Relay Interlocking and Panel Relay Interlocking for their railway signalling systems. These installations use thousands of Electro mechanical relays requiring complex wiring and interconnections. This apart, it necessitates traffic blocks of long durations and involves large pool of manpower to manage and control the traffic during such blocks.

Modern interlocking — those installed since the late 1980s, are generally solid state, where the wired networks of relays are replaced by microprocessor based installations with software control systems. This logic based software controls and facilitates the ability to make modifications whenever needed as against the hard-wired circuitry currently in practice in many places. Regardless of the technology used, interlockings are designed to ensure that no operation can be performed unless all prerequisites have been satisfied.

“Solid State Interlocking” (SSI) is the brand name of the first generation processor-based interlocking developed in the 1980s by British Rail, GEC-General Signal and Westinghouse Signals Ltd in the UK.

L&T has the long experience and expertise to handle major turnkey projects for signalling and telecommunication including design, installation, testing and commissioning of relay interlocking and electronic interlocking of stations, train detection systems, interlocking of level crossings, OFC-based telecom systems, etc.
In railway operations, an interlocking is a network of relays that are replaced by a microprocessor arrangement of signaling systems. This logic-based software prevents conflicting traffic movements where several lines meet. It also facilitates the ability to make modifications whenever needed, as opposed to the hard-wired circuitry currently in practice. Interlockings are designed to ensure that no operation can be performed unless all prerequisites have been satisfied. In other words, interlockings are designed to ensure the safety of train movements.

**Solid State Interlocking**

Modern technique of Microprocessor based Solid State Interlocking (SSI) has been adopted for signaling in the Nandalur – Guntakal section. This occupies considerably less space, consumes less power, is highly reliable and easy to install. Interlocking functions on programmed logic based on software that doesn’t require wiring in the system for individual route/signal. Signal alteration therefore doesn’t require any change in wiring but functions on the basis of data provided through the CPU. In addition, yard remodelling works if any to be undertaken in the future does not require large scale wiring alterations and testing, obviating the need for longer duration traffic blocks. Moreover, it costs 25% less for the installation of SSI indoor equipment for a way side station.

**Achievements**

Nandalur – Bhakarapeta, the first section (24 route km and 54 track km) of the Nandalur – Guntakal Railway Electrification Project was commissioned on February 21, 2010. Railways have commenced their freight and train traffic in this newly commissioned section with immediate effect. ECC’s Railway Construction Business Unit and RVNL have geared up their field execution activities to commission the balance works in a phased manner.

J. PRAKASH  
Project Manager
L&T commissioned the new Broad Gauge Line connecting Nagapattinam and Vailankanni as a part of the extension of Thiruchchirapalli-Thanjavur-Nagapattinam Railway section. This 9 km section connects Nagapattinam, an old historic town, and the well-known fishing harbour with Vailankanni, a pilgrimage centre for Christians from all over the country. The project assumes greater significance as it provides a vital Rail Link to the Holy Shrine for pilgrims from various parts of the country.

Though this project was proposed as early as 1999 and was entrusted to various small contractors on a piece-meal basis by Southern Railway, the project was abandoned halfway through by many of them owing to various local issues, natural calamities like tsunami, and other Railway administrative constraints. Southern Railway, therefore, tendered the balance works on an end-to-end responsibility basis at a lump sum price for the erection portion since the major supply portion was completed in the earlier period. This package was awarded to Railway Construction Business Unit of L&T.

**L&T’s scope of works included:**
- Earth Filling: 3,00,000 Cu.m
- Moorum Filling: 78,000 Cu.m
- Minor Bridges: 11
- Major Bridge (4 Spans): 1
- Level Crossing works: 7
- Track Linking: 11 TKM
- Station Amenities: 1

**Constraints**

The most complex and critical activity in the project was embankment formation which demanded quarrying and supply of mountains of earth. However, stringent laws prevailing with the Local Administrations including protests by local public against quarrying, made this a tougher task. Even though this was a government contract and a legal requirement, source identification and transportation was a major threat to the contract. Therefore, L&T had to transport the moorum material from Vallam near Trichy that was located at a distance of more than 120 km from the site.
NAGAPATTINAM - VAILANKANNI

Broad Gauge Line Commissioned

L&T commissioned the new Broad Gauge Line connecting Nagapattinam and Vailankanni as a part of the extension of Thiruchchirapalli-Thanjavur-Nagapattinam Railway section.

This 9 km section connects Nagapattinam, an old historic town, and the well-known fishing harbour with Vailankanni, a pilgrimage centre for Christians from all over the country. The project assumes greater significance as it provides a vital Rail Link to the Holy Shrine for pilgrims from various parts of the country.

Though this project was proposed as early as 1999 and was entrusted price for the erection portion since Major Bridge to various small contractors on a (4 Spans) : 1 the major supply portion was piece-meal basis by Southern completed in the earlier period. This Level Crossing Railway, the project was abandoned package was awarded to Railway works : 7 half-way through by many of them Construction Business Unit of L&T. owing to various local issues, Track Linking : 11 TKM natural calamities like tsunami, and L&T’s scope of works included: Station Amenities : 1 other Railway administrative constraints. Southern Railway, Earth Filling : 3,00,000 Cu.m therefore retendered the balance Moorum Filling : 78,000 Cu.m works on a end-to-end The most complex and critical activity Minor Bridges : 11 responsibilities. The most critical and complex activity Minor Bridges included: Track Linking : 11 TKM constraints. The most complex and critical activity Minor Bridges included: Track Linking : 11 TKM

However, at the peak period, L&T was able to mobilize and transport more than 200 trucks of moorum per day from the quarry and carried out the Sand-Gravel mix in desired proportion to meet the Railway specification at site.

Construction of the major bridge work involving fabrication of four spans each of 19.2 m Box Girders was also an up-hill task owing to the heavy water seepage due to drastic tidal condition as the site was in close proximity to the sea which was at a distance of only 500 m. This made construction impossible for many small contractors and the work was left undone, due to its technical difficulties.

However, L&T overcame the technical difficulties by using heavy shuttering and staging works and casting them in-situ as the site location was not suitable for pre-casting. The alternative spans were cast at a height of 2 m and then lowered with the help of four 100 t strand jack lifting system after stressing and grouting. This methodology was well received by the client.

**Achievement**

The track linking works were taken up immediately after completion of over formation and the loco engine trial was conducted on 28.02.10 as targeted with an overwhelming reception of the local public, pilgrims and shrine officials fulfilling their 10 year long dream and desire. The final ballasting including miscellaneous works are underway and the project is expected to be opened for passenger traffic by the end of April 2010 after clearance from Commissioner of Railway Safety. Though a small project in stature, the Nagapattinam-Vailankanni broad gauge line posed several hardships for the execution team and has taught many tough lessons in management for accomplishing the tasks and this will help the team surmount tougher tasks to be faced in the future.

**D. Rozario Arockiaraj**

Project Manager
A 2,10,000 TPA Zinc Smelter Plant for Hindustan Zinc Limited (of Vedanta Group) at Dariba in Rajasthan, executed on EPC basis, was successfully commissioned on 28th March 2010.

This is the third plant, commissioned by L&T for Hindustan Zinc Limited. Earlier, 2 plants both located at Chanderiya in Rajasthan were commissioned in 2005 & 2007. It is a matter of pride for L&T that all the three plants have been commissioned in record time.

L&T’s scope covered all the disciplines of Mechanical, Electrical, Instrumentation and Civil & Structural Works. L&T also carried out the installation of critical equipment supplied by Outotec, Kunz & Andritz in this plant.

Apart from the EPC package, L&T carried out the complete Civil & Structural Works for the entire Dariba Smelter Complex comprising the Raw Material handling Section, Roaster, Sulphuric Acid Plant, Zinc Dust Plant, Utilities and other non-plant / auxiliary buildings.
A new CSTI facility was inaugurated at Jadcherla near Hyderabad on 4th February, 2010 by Mr. K.V. Rangaswami, President Construction. Mr. V.B. Gadgil, Sr. Vice President & Head-E & GP OC declared the Hostel building open. The construction of CSTI building started in March 2009 and it was completed in a record time of 9 months.

The Jadcherla facility is about 50 minutes drive from the Hyderabad International Airport and has well connected roads. Students largely come from the adjoining villages in Mahaboobnagar District. The Training Centre spans across 6.22 acres, comprising of Institute Block, with class rooms to accommodate 240 students, Exhibition Hall, Library, Conference Room and faculty room, etc. The Campus has Training Yards for Formwork, Masonry and bar-bending, besides covered sheds for Electrical and Welding trades. The Hostel Block can accommodate 157 Trainees and the staff quarters can accommodate faculty and other visiting staff.
It is a Rs 2,460-crore rail project that could ease the transportation woes of at least 15-18 lakh Mumbai residents, who each day hope to get home without being caught in a traffic snarl.

The Mumbai monorail project schedule is on track and the first phase of about 8.9 km between Chembur and Wadala is nearing completion and will be ready by December.

It being the first monorail in the country, all eyes will be on its performance as city managers across metros appear to be rapidly losing ground in their battle against rising traffic chaos.

A monorail system train runs on a narrow beam which the wheels of the train grip. It is lightweight and cost of execution is less than the conventional rail. The fully air-conditioned monorail system will run four-car trains. The average speed will be 30 km per hour and frequency of service every five minutes. The fare would range between Rs 8 and Rs 20. Initially, the monorail will operate with a carrying capacity of 568 passengers, which will then shift to six-car trains capable of carrying 850 passengers. About 15 sets of trains of four-car configuration will operate on the beam.

Larsen & Toubro and Malaysia-based transportation solution provider Scomi Group in consortium have been given Rs 180 crore for operation and maintenance of the system for two years. The monorail is expected to attract private vehicle owners to use public transport systems. The monorail systems are said to be ideal for urban congested corridors, due to its footprint at the ground level. It runs on rubber wheels and hence there is no noise pollution. However, it is meant to be only a feeder mode of transport to supplement the mass transport system and essentially cover routes that have little or no scope for widening. The system is currently in operation in countries such as Japan, Malaysia and China.

The Mumbai Metropolitan Region Development Authority, the nodal agency for implementation of the project, says over 60 per cent of the work in the first phase is complete and the second phase from Wadala to Sant Gadge Maharaj Chowk too will be ready by mid-2011.

The MMRDA has drafted plans to have a 100-km monorail network in the city to envelop far-flung areas of the busy metropolis. However, cost alone could prove to be a deterrent.

“Phase-1 is nearing completion and will be fully operational by December. This has been made possible by the sheer determination and hard work of the people involved in the project and also because of the immense cooperation and support we received from the locals,” said Mr Ratnakar Gaikwad, Metropolitan Commissioner.

Source Businessline-Chennai April 18, 2009

Mobile Formwork Accessories Store flagged off

Buildings & Factories Operating Company inaugurated three Mobile Accessories stores comprising of components required to meet the formwork needs of large projects across the country on 17th March 2010.

Envisaging the need for fast moving formwork accessories and improving material productivity in projects, this innovative Mobile Formwork Accessories Store, puts the user in the driving seat when it comes to storing and accessing on-site formwork material requirements.

Specifically designed to meet the formwork needs of large projects, the formwork accessories storage container enables project site to follow up system formwork as a whole with all required accessories thereby adhering to safety and quality parameters. On completion of the project, Formwork Accessories Container will be replenished by user before dispatching to next project site.

The unique features of the Mobile Accessories Store include:

- Caters to all L&T Formwork Systems including Alufo
- Provides Jigs and Fixtures for shutter making
- Toolbox with basic tools
- Poster display of L&T Formwork components and packing list
- The total weight and size of container is designed to load on normal truck. Hence it is transport friendly
- Solar lighting system
Mumbai monorail project on track
First phase of about 9 km between Chembur and Wadala is nearing completion.

It is a Rs 2,460-crore rail project that could ease the transportation woes of at least 15-18 lakh Mumbai residents, who each day hope to get home without being caught in a traffic snarl.

The Mumbai monorail project schedule is on track and the first phase of about 8.9 km between Chembur and Wadala is nearing completion and will be ready by December.

It being the first monorail in the country, all eyes will be on its performance as city managers across metros appear to be rapidly losing ground in their battle against rising traffic chaos.

A monorail system train runs on a narrow beam which the wheels of the train grip. It is lightweight and cost of execution is less than the conventional rail.

The monorail needs 1.0 m wide space and the beam rest on pillars 6.5 m high and can operate along existing road margins. The source of power is on the beam.

Larsen & Toubro and Malaysia-based transportation solution provider Scomi Group in consortium have been awarded the contract to design, build and commission the system. In addition, Scomi has been given Rs 180 crore for operation and maintenance of the system for two years.

The Mumbai Metropolitan Region Development Authority, the nodal agency for implementation of the project, says over 60 per cent of the work in the first phase is complete and the second phase from Wadala to Sant Gadge Maharaj Chowk too will be ready by mid-2011. MMRDA has made arrangements to relocate hawkers and hut dwellers along the alignment.

“The Phase-1 is nearing completion and will be fully operational by December. This has been made possible by the sheer determination and hard work of the people involved in the project and also because of the immense co-operation and support we received from the locals”, said Mr Ratnakar Gaikwad, Metropolitan Commissioner.

Four-car trains

The fully air-conditioned monorail system will run four-car trains. The average speed will be 30 km per hour and frequency of service every five minutes. The fare would range between Rs 8 and Rs 20. Initially, the monorail will operate with a carrying capacity of 568 passengers, which will then shift to six-car trains capable of carrying 850 passengers. About 15 sets of trains of four-car configuration will operate on the system from 5 a.m. to midnight initially.

The monorail is expected to attract private vehicle owners to use public transport in the long run as it would save considerable time and money.

Monorail systems are said to be ideal for urban congested corridors, due to its footprint at the ground level. It runs on rubber wheels and hence there is no noise pollution. However, it is meant to be only a feeder mode of transport to supplement the mass transport system and essentially cover routes that have little or no scope for widening. The system is currently in operation in countries such as Japan, Malaysia and China.

The MMRDA has drafted plans to have a 100-km monorail network in the city to envelop far-flung areas of the busy metropolis. However, cost alone could prove to be a deterrent.

MMRDA said world-over there has been no fatality in the history of the monorail technology and it was designed for fire resistance, toxic fumes and gases, besides the cars were based on a proven European design.

Source Businessline-Chennai April 18, 2009
Rs. 1500 crore orders for Buildings & Factories Segment

Larsen & Toubro’s Buildings & Factories Operating Company - part of the Construction Division – has bagged new orders aggregating Rs.1500 crores recently for the construction of hospitals, residential towers and factory buildings.

L&T has secured two orders for construction of hospital projects amounting to Rs 627 crores from HLL Lifecare Limited (A Govt. of India Enterprise)

The first order secured is for Jawaharlal Nehru Institute of Post-graduate Medical Education and Research (JIPMER) Puducherry involving turnkey construction of a 400 bed women & children hospital including hostel complex, teaching block and augmentation of existing facilities.

The second order is for the construction of ESIC medical college and hospital at Paripally in Kollam District, Kerala.

In the Residential Segment, a Rs 342 crores contract has been secured from M/s Shree Ahuja Properties & Realtors Private Ltd for the proposed residential “Ahuja Towers” at Prabhadevi, Mumbai.

In yet another development, a Rs 321 crores contract has been secured from M/s Lucknow Development Authority for the construction of residential towers.

Further orders worth Rs. 210 crores has been secured from various esteemed clients for the construction of an automobile factory at Manesar including add on works at Bhiwadi.

These orders further enhance the order book of the company which has already secured orders for major design & build contracts in Airports, IT Parks and commercial space. L&T has a commanding market share in these segments.

Rs. 1100 crore orders for B&F OC

Buildings & Factories Operating Company has bagged new orders aggregating to Rs.1100 crore recently for the construction of residential tower, ware houses, mall, & a factory building project.

L&T has secured a Rs. 500 crore contract from M/s Raghuleela Lessors & Developers Pvt Ltd (Wadhwa Group) for the construction of residential towers “The Address” at Ghatkopar(W), Mumbai.

In yet another development, Rs. 305 crore contract has been secured from M/s Arshiya International Limited for the construction of Ware houses & Allied Infrastructure works at Khurja, Uttar Pradesh.

Further orders worth Rs. 295 crore has been secured from various esteemed clients for construction of a mall at Kolkata and a factory building at Samalkha, Haryana.

These orders further enhance the order book of the company which has already secured orders for major design & build contracts in Airports, IT Parks and commercial space. L&T has a commanding market share in these segments.

Rs. 1017 crore orders for B&F OC

Buildings & Factories Operating Company - part of L&T’s Construction Division – has bagged two new orders including add on orders aggregating Rs.1017 crore for the construction of IT campus, residential towers and factory buildings.

L&T has secured a major Design & Build order worth Rs.566 Crore from Cognizant Technology Solutions India Pvt. Ltd for construction of their IT campus development at Siruseri, Chennai.

Another major order worth Rs.280 Crore has been secured from IREO Private Limited for the construction of “The Grand Arch” - multistoried residential apartments at Gurgaon, Haryana.
It has further secured orders worth **Rs. 171 Crore** for the construction of factory building and other add on works from existing jobs from various esteemed clients.

These orders further enhance the order book of the company which has already secured major design & build contracts in Airports, IT Parks and commercial space. L&T has a commanding market share in these segments.

**Chennai Metro Rail Project**

L&T has secured two contracts to design and construct the elevated viaducts from Saidapet to Officers Training Academy (OTA) at a cost of Rs. 173.30 crore for a distance of 5.17 km and from Ashok Nagar to St. Thomas Mount at a cost of Rs. 141.13 crore for 4.56 km. The project has to be completed in two years time.

The first corridor of the Metro Rail would be 23.1 km long of which 14.3 km would be underground and connects Washermenpet with Airport via Anna Salai. The 22-km long second corridor links Chennai Central with St. Thomas Mount and would be routed through Poonamallee High Road, Anna Nagar and 100-feet Inner Ring Road.

**Rs. 1126 Crore Orders for Metallurgical, Material Handling & Water Sector Projects**


**Metallurgical Sector**

Larsen & Toubro has secured an order valued at Rs. 300 crore from M/s. Sterlite Industries India Limited (a group company of Vedanta Resources) for the construction of 400,000 TPA Copper Smelter Plant at Tuticorin, in Tamil Nadu. The scope involves Design, Engineering, Supply, Erection, Civil & Structural work for the Smelter & Refinery.

**L&T to design & build Interceptor Boats for Coast Guard**

Larsen & Toubro has been recently awarded a contract by the Ministry of Defence for the design and construction of 36 High Speed Interceptor Boats for the Indian Coast Guard. The contract is valued at Rs 977 Cr., and is among one of the main initiatives being taken by the government to strengthen coastal security.

The interceptor boats will feature aluminium-alloy hull construction with water jet propulsion to enable quick response which is vital for such applications. The interceptors will also be able to operate effectively in shallow water that will be critical for near shore action. These boats will be expected to significantly enhance our coastal security.

The design is being carried out in-house by L&T, at its “state-of-the-art” Ship Design Center, that is a part of L&T’s Heavy Engineering Division. The boats are planned to be constructed at L&T’s existing shipyard at Hazira, and at its new shipyard coming up at Katupalli near Ennore.

L&T has been building special purpose semi-submersible RO-RO/LO-LO, and Heavy Lift ships for export at its Hazira Yard, equipped to manufacture vessels up to 20000 DWT.

areas. The project is to be executed in 15 months.

L&T has also secured orders worth Rs. 210 crore from M/s. Hindalco Industries Limited for the Pot Superstructure and Auxiliary Facilities for their Aluminium Smelter and Refinery Project. The scope includes fabrication of Pot Superstructures and Flash Vessels. The project is to be executed in 21 months.

In yet another development L&T has bagged an order worth Rs. 100 crore from M/s. TATA Steel Limited for the installation of PCI units at Jamshedpur. The scope involves Design, Engineering, Supply, Erection, Civil & Structural work for Grinding & Drying System for Pulverised Coal
Injection in “H” & “I” Blast Furnaces. The project is to be executed in 24 months.

Material Handling Sector

In the area of material handling L&T has received an order worth Rs. 182 crore from Tata Steel Limited for Raw Material Handling System Package–II at Jamshedpur for Sinter, Coke, and Coal (partly) including Wagon Tippler, Side Arm Charger, Stacker Reclaimer on EPC basis. The project completion schedule is November 2011.

Water Sector

In addition, L&T has secured an order worth Rs. 231 crore from UP Jal Nigam Limited for the city of Varanasi. The scope of work includes Design and Execution of Storm Water Drainage system consisting of RCC pipes and open drains of approx. 80 km, construction of water receiving bodies including Rain Water Harvesting and Rehabilitation Works. The contract period is 18 months.

Delhi Jal Board has placed an EPC order for Rs. 103 crore for supplying 120 Million Gallons per Day (MGD) water from Wazirabad Water Works to Chandrawal Water Works by twin raw water main of MS pipes 1900 mm / 1800 mm diameter including upgradation of raw water pumping station and ancillary works. The Project is to be executed in 14 months.

Rs. 1181 crore orders for Power Transmission & Distribution works

Electrical & Gulf Projects Operating Company, a part of L&T’s Construction Division, has bagged six orders aggregating Rs.1181 crore for construction of power transmission line and substation works. Three of these six orders worth Rs.741 crore have been secured from the Gulf markets and the other orders worth Rs.440 crore are for domestic projects.

L&T has secured two orders from UAE against stiff international competition. The first one is a breakthrough order valued at Rs.265 crore and has been received from Dubai Electricity and Water Authority (DEWA) for supply, installation, testing and commissioning 240 km of 132 kV Extra High Voltage (EHV) cabling. This project is to be completed in 18 months.

Abu Dhabi Distribution Company (ADDC) - an arm of Abu Dhabi Water and Electricity Authority (ADWEA) has placed an EPC order on L&T valued at Rs.100 crore for construction of Power Distribution Network to Aryam Island, near Abu Dhabi city. This involves 17 km of 33kV Double Circuit Over Head Transmission Line, 40 km of MV Cabling including Protection, SCADA, DC system and other auxiliaries. The project is to be completed in 16 months.

L&T’s Gulf Operations Business Unit is currently executing twenty-four 132 & 33 kV rating Substations in UAE. These orders further reinforce the company’s total capability, operational efficiency and customer goodwill garnered by L&T in UAE.

The third order valued at Rs.376 crore has been secured by Larsen & Toubro (Oman) LLC – a joint venture company of L&T in Muscat from Oman Electricity Transmission Company (OETC) for executing on EPC basis 200 km of 220 kV and 132 kV Double Circuit Overhead Transmission Lines and associated 220/132/33 kV GIS substation. This 200 km of Overhead Transmission Line is the biggest EHV Transmission Line order for L&T Gulf Operations and also one of the longest transmission line projects to be executed in the Sultanate of Oman. Similarly 220 kV GIS Substation, will be the highest voltage level in the Country of Oman. The project is to be completed in 18 months and M’s Energoprojekt Entel are the project consultants.

L&T is the leader in EHV space in Oman and this order secured against stiff competition reinforces the strong market presence of L&T in Oman.

L&T becomes first private sector player with Rs. 1,00,000 Crore order book

At the Business Standard “Best Company of the Year” awards function, Mr. A. M. Naik, Chairman and Managing Director, announced that L&T is the first private sector player to achieve a feat of accumulating an order book worth over Rs. 1 lakh crore. The only company ahead of L&T in this regard is the Government owned Bharat Heavy Electricals Ltd.
Rolls-Royce and Larsen & Toubro to Collaborate on Global Nuclear Opportunities

Larsen & Toubro Limited and Rolls-Royce, the global power systems company, have signed a Memorandum of Understanding (MoU) for cooperation to effectively address the projected need for light water reactors (LWR) in India and internationally. LWR technology is in use in over sixty per cent of civil nuclear power plants operating worldwide.

The two companies have agreed to collaborate on areas including nuclear instrumentation and controls, engineered products and systems, reactor components, engineering services, in-service reactor support and waste management.

The cooperation with L&T for instrumentation and controls will form the first operational phase of this relationship to bridge the gap in the existing supply chain in support of India’s ambitious new build program.

The agreement between Rolls-Royce and L&T follows the recent bilateral Civil Nuclear Cooperation Declaration by the Indian and UK Governments, which enables UK and Indian industries to engage in civil nuclear commerce.

In the domestic front, L&T has secured an order for Rs. 246 crore from Power Grid Corporation of India Limited (PGCIL) for the construction of 159 km of Biswanath Chariali – Tangla Section of ± 800 kV HVDC Bipole Biswanath Chariali – Agra Transmission Line System. This is L&T’s second ± 800 kV HVDC Line order secured from Power Grid Corporation of India for transfer of power from the North East to the Northern and Western parts of the Country. The project is to be completed in 36 months.

In yet another development, the Power Grid Corporation of India Limited (PGCIL) entrusted L&T with an order for Rs. 74 crore for construction of 36 km long 400 kV Transmission Lines from Vindhyachal/Sasan – Vindhyachal Pooling Station, associated with Vindhyachal IV Power Station. The project is to be completed in 18 months.

In addition, the company has secured a Rs. 120 crore order from Steel Authority of India Limited (SAIL) for expansion of their 4.5 MTPA Rourkela Steel Plant. The project is to be completed in 21 months and this involves design, engineering, supply, erection, testing and commissioning of medium voltage substation with interplant cabling, SCADA including associated civil works.

Rs. 582 Crore orders for E&GP OC

Electrical & Gulf Projects Operating Company – a part of L&T’s Construction Division – has bagged orders worth Rs. 582 crore from various customers for four electrical projects in India and UAE. Details of projects awarded and value include:

A Rs. 155 crore order from Tamil Nadu Electricity Board, Chennai, for the turnkey construction of 37 km of 400 kV environment-friendly Multicircuit Transmission line involving narrow base towers. The project is to be completed in 10 months and will transmit power from North Chennai Thermal Power Station Stage II to Almathy 400 kV Substation.

A Rs. 90 crore order for construction of 765/400 kV Air Insulated Substation at Unnao (UP) for Uttar Pradesh Power Transmission Corporation Limited (UPPTCL) at Lucknow, through Crompton Greaves Limited, Gurgaon – the Main Contractor. The order was secured against international competitive bidding and the entire project will be completed in two phases – First phase by March 15, 2011 and Second phase by July 31, 2011.

A Rs. 70 crore order from NLC Tamilnadu Power Limited (NTPL), a Joint venture company of Neyveli Lignite Corporation and Tamilnadu Electricity Board, Chennai for the construction of 400/220 kV Indoor type Gas Insulated Switchyard at 2x 500 MW NTPL Power Project, Tuticorin. The entire project is to be completed in 34 months in a phased manner for different packages.

A Rs. 267 crore (USD 58 million/ AED 213.25 million) breakthrough EPC order from Federal Electricity and Water Authority (FEWA)-UAE for the construction of two 132/33/11kV Gas Insulated Substations. To be completed in a tight frame construction schedule of 13-
15 months, these gas insulated Substations will considerably improve the power system stability in the Northern Regions of UAE.

This breakthrough order was secured against stiff international competition and paves the way for wider opportunities for the company in UAE. FEWA is the federal authority for the development of power infrastructure in Northern Emirates of UAE.

**Rs.668 crore worth of orders from Oman for various Buildings & Infrastructure Projects**

Larsen & Toubro (Oman) LLC, a subsidiary of L&T in Muscat has bagged Rs.668 crore worth of orders for various buildings & infrastructure projects in the Sultanate of Oman. This includes two orders from Muscat Municipality for Rs.274 crores (RO 22.831 million) for infrastructure works and three other orders valued at Rs.394 crores (RO 32.756 million) for construction of industrial/commercial buildings.

It has bagged a **Rs.274 crore order (RO 22.831 million)** for Design and Construction of a Flyover, dualization of Wadi bridge (5.8 km) including Widening and Junction Improvements at Al Athaibah Interchange.

The order was secured against international competitive bidding is to be completed in phases – First phase by November 2010 and Second phase by December 2011.

It has also secured a **Rs.178 crore (RO 14.80 million)** order for carrying out Internal Development and Services for Oman Botanical Garden (Phase III), for Diwan of Royal Court. The work to be completed in 28 months involves construction of embankment wall including pipe culverts, water management system, landscaping, irrigation, helipad construction, providing renewable energy system, construction of internal roads and associated MEP works.

Further the company has bagged a **Rs.145 crore (RO 12.076 million)** order from Oman Oilfields Supply Center LLC for the Construction and Maintenance of Mixed use Development Project at Al-Khuwair, Muscat.

This involves commercial, residential buildings with a total built up area of 39,670 sq.m including associated MEP and external finishing works. The project is to be completed in 24 months.

The other two orders valued at **Rs.71 crore (RO 5.88 million)** pertains to MEP installation works for the Proposed Transport Complex at Seeb for Royal Court Affairs and construction of mill building, silos and steel structures for the packing section of Salalah Mills Company (SAOG).

**L&T Signs Agreement for Six Laning of Samakhiali Gandhidham Road (NH-8A) on DBFOT basis**

L&T Samakhiali Gandhidham Tollway Private Limited, a SPV incorporated by L&T, has signed the Concession Agreement for Six Laning of the 56 km stretch of NH 8A with NHAI on March 19, 2010. The Project would be executed on a BOT DBFO (Design Build Finance & Operate and Transfer) basis, with a Concession Period of 24 years. The estimated project cost is of the order of about Rs 1400 crore and the project is scheduled to be completed within a period of 30 months. The Concessionaire is entitled to collect tolls from the users of the Project Highway during the Concession Period, including the Construction Period.

As part of Phase V of the National Highways Development Programme (NHDP), the National Highways Authority of India (NHAI) is Six Laning the existing four lane stretches of the Golden Quadrilateral. One of the prestigious and important links in this Corridor is the Connecting Link of NH 8A which is the main evacuation route for Kandla and Mundra Ports, connecting to the hinterlands spread out in the interior Gujarat and Northern India, extending to Rajasthan, Haryana, Punjab and beyond.

With this project, L&T currently has 13 projects in its BOT Roads Portfolio, out of which 7 are presently in operation phase, 5 in construction phase, and this project is entering the development phase, thus cumulating in a length of 4600 lane km, and a total investment of Rs 12,000 Crores. L&T is optimistically viewing the expanding road infrastructure space and is keen on adding a few more key road corridors in its kitty in the near future.
Hon’ble Union Minister for Home Affairs visit L&T Subansiri project in Arunachal Pradesh

Hon’ble Home Minister Mr. P. Chidambaram visited Arunachal Pradesh for a proposed visit to Twang near China Border. Since the weather condition was not favorable for the proposed visit to Twang Mr. Dorjee Khandu, Hon’ble Chief Minister of Arunachal Pradesh decided to show the Subansiri Project, one of the largest project in the state on April 2, 2010.

At the project site the delegation was received and given a warm welcome by Mr. Anilkumar Pandey, Project Manager (L&T) along with Mr. Sharaf, ED, (NHPC) and Mr. Om Prakash, GM (NHPC). He was then briefed about the various components of the project at Subansiri Viz. Power House, HRT and Dam works and progress of the same. The involvement of local community and employment to the local people under Corporate Social Responsibility activities at project site was also explained to the dignitaries.

Hon’ble Home Minister appreciated L&T’s work and the involvement of local community in the project. During the conversation he also mentioned his close association with L&T and personal contacts with A. M. Naik and K.V. Ranagaswami.
World Water Day celebrated at L&T

World water day 2010 was celebrated by ECC on 22nd March 2010 at its Chennai Campus. Mr. K.V. Rangaswami (Member of Board & President “Construction” of Larsen & Toubro Limited) gave the inaugural address and emphasized the importance of water & its necessity to the society at large. Chief guest for the day Prof. Dr. S. Mohan (Director – National Institute of Technical Teachers Training and Research) emphasised on world water scarcity, effects of population and urbanization on water scarcity, reuse in irrigation and agriculture and advantages & disadvantages of using waste water in developed and developing countries. He also spoke on the success story of Ooty lake and importance of Membrane Bio Reactor as an upcoming technology. Prof. Dr. K. Thanasekaran (Professor Centre for Environmental Studies) gave a special address about water and its relevance to industries and educational institutions. A presentation titled “Water & L&T” was given by Mr. N. Ramasethu (Head – Waste Water collection & treatment MMH&W-OC) which covered the contribution of L&T towards sustainable use of water. To create awareness about water an ‘e-water-quiz’ was arranged on 20-03-10 for all ECC employees and the first three Winners of e-water-quiz were honoured with prizes on world water day. A wide array of water purifiers from leading manufacturers were also displayed in the campus for employees to procure the same at discounted prices.

The celebration emphasized on the following

- Importance of reuse and recycle of water
- Good sanitation practice
- Prevention of pollution, Treatment of contaminated water supplies, restoration of degraded water resources and eco-systems

[Image of Mr. K. V. Rangaswami addressing the gathering during World Water Day Celebrations]
World Plumbing Day was Celebrated at Larsen & Toubro on March 11, 2010 the programme started with a technical presentation on “Innovations in Effluent Treatment” by M/s. Sartime Horological Private Limited, Chennai which covered salient features on:

- Bio composting of Organic waste
- Zero Discharge
- Oil and Solid Separation
- Climate change sustainability
- Water efficiency dry drains
- Water quality
- Grey / Black water
- Codes, standards or regulations

- Product labeling
- Counterfeit product
- Disease outbreak control
- Water harvesting

Green Plumbing was also given the spotlight during the programme. A gist of various benefits of this initiatives is as follows:

Green plumbing is decreasing our carbon and water footprint through the use of low flow fixtures, energy efficient water heaters, recycled greywater, rainwater & solar hot water systems. Clean water suitable for human use is a non-renewable resource. While the earth’s ecosystem and our treatment efforts do much to renew water resources, we have exceeded the earth’s capacity to sufficiently renew water for our use. In addition, our treatment efforts require carbon emitting energy contributing further to our carbon footprint. Decreasing our carbon footprint is not only good for the earth, but also great on the checkbook. With the energy efficiency tax credits now available, tank less and condensing water heaters have a lower cost per lifetime than standard tank type heaters.
Ten Lessons From the Future

A corporate lecture was organized for senior management at Manapakkam, Convention Centre on 8th April 2010. The lecture was by Mr. Anton Musgrave, Joint CEO of Future World SA, an organisation of experts who help organizations understand their future business context, choose their ideal future and fast-track its creation, through powerful insights unique communications and strategic processes.

The topic ‘Ten Lessons From the Future’, included a powerful audio-visual experience - which was Future World’s latest experience on working with business and governments around the world. It looks on the forces shaping the future (including social networks, new consumerism etc) and the opportunities, customers and the markets. Mr. S.N. Subrahmanyan, EVP & Head – B&F OC invited and introduced the speaker, saying that the speech was going to be invigorating and thought provoking and will certainly open a new line of vision into the future for the audience.

Mr. Musgrave spoke on how the technology has evolved from the early 1970s, and how it might develop in future and influence our lives. He showed a few examples of futuristic technologies being developed around the world, including a 3-Dimensional printing machine that prints clothes and research being carried out on manufacture of body parts.

Speaking about Businesses, Mr. Anton Musgrave stressed that it is imperative to understand the absolute essence of our business and serving the Customers with what they need and what would best suit them. The new business models of today are changing, the change driven by the business leaders of tomorrow like Google, Yahoo, eBay and so on. He said that innovations have to be made constantly and new business opportunities have to be explored to stay ahead, instead of fine tuning the existing systems. And in doing so, some processes / services become extinct to make way for new businesses.

He iterated that there are immense opportunities in the future and with a good understanding, one can design and create his/her own future. Mr. Musgrave added that everything and everyone would be interconnected in the future and that we are entering into the new age of accountability for business.

He concluded the speech by listing out the ten lessons for the future which are:

1. Information and ideas fuel the economy! Pure knowledge is worthless, skills are everything.
2. BioTech is the 2nd information revolution! Advances in biotechnology are being fuelled by information professionals rather than biologists and will create an economy more profound than the digital age.
3. It's the 'personal' age! As we move from central power to personal power, we realise you can decentralise everything: computing, knowledge, energy production, health care, manufacturing, responsibility, etc.
4. Leadership can be widely shared! Organisations resemble flocks of birds as staff take turns to lead aspects of the enterprise.
5. Fractal/non-linear behavior is the norm! You can't simply extrapolate from the past. The most powerful successes are not predictable. Taking risks is safer than doing nothing! Chaos is not frightening, really, it's just biological behavior!
6. The 'unknown' is the field of all possibilities! Uncertainty presents the moment of real freedom, beyond the known of historic baggage. Your plans must be dynamic.
7. Eat yourself, become your own worst nightmare! Don't wait for new competitors to show you how customers ought to be serviced - do it yourself, while you can afford it.
8. You can no longer learn from experience! The faster the future changes, the less relevant experience becomes. You must learn from the future. Learning is no longer owned by educators, and education is no longer owned by government.
9. Don't compete! It's the most competitive market ever so don't compete! Find white-space opportunities in which you have no competitors.
10. It's one world, one mind, one time! The planet is covered in information professionals rather than biologists and will create an economy more profound than the digital age. You must use the entire global resource base. You must beat to your customers’ drum.
Exploring Multiple Dimensions of Hydro Power

Representatives from Hydel BU, Faridabad met Mr. Jigme Yoser Thinley, Honorable Prime Minister, Royal Government of Bhutan on 6th February, 2010 at ITC Maurya in New Delhi. The meeting was organized as a strategic initiative for upcoming projects in this nation of thunderbolts in Himalayas.

Mr. N. Baskara Raju, Executive Vice President & Head - Infrastructure Operating Company, Mr. P. Niranjana, General Manager & Head - Hydel BU, and Mr. K. K Gupta, Joint General Manager & Head - Business Development & Tendering - Hydel BU, Faridabad were present for the meeting.

L&T is currently executing work involving construction of a diversion tunnel, dam, intake and de-silting arrangements, including hydro-mechanical works of Punatsangchhu HEP-I for Punatsangchhu Hydro Power Authority, Bhutan. WAPCOS Ltd is the engineering and design consultant of the project that is scheduled for completion in 66 months. This is the first of a series of 10 hydropower projects jointly identified by the two governments to achieve an installed capacity of 11,576 MW by 2020.

During the meeting, L&T representatives discussed the vibrant progress and latest technology that L&T is deploying to complete the projects on time. Such cross-border, hydro projects offer ‘win-win’ benefits to both India and Bhutan.

Build 4 India, Hyderabad

In the exhibition, display panels exhibiting the various reputed projects across the globe were displayed. In the external stall at the same expo, a stall built completely of L&T formwork was put up. This stall, which was the cynosure of all eyes, helped exhibit the various types of formwork and its application in an effective manner.
Electrical and Gulf Projects Operating Company participated in WETEX 2010 International Exhibition at Dubai between 9 and 11 March 2010. This was conducted in the International convention and exhibition centre and covered water, Energy Technology & Environment theme.

During the exhibition display panels on power transmission and distribution projects executed by the OC in GCC countries were on show in the 36 sq.m stall area. Pictures of urban infrastructure projects were also displayed at the exhibition to showcase ECC’s project execution capabilities across the globe. Clients and associates in and around Dubai visited the stall and appreciated the display. They also showed interest in partnering with ECC for future projects.

The 6th Land and Naval Defence Systems Exhibition popularly known as DEFEXPO 2010 was held at the Pragati Maidan exhibition grounds, New Delhi and was inaugurated by Hon’ble Defence Minister, Shri A.K. Anthony, Government of India. The event showcased the land, sea and air capabilities of Indian defense sector while latest defense technologies and armaments were also put on show. This event is conducted with an aim to strengthen Indian defense sector and to promote defense exports from India.

Visitor profiles to the exhibition include Indian Defense Establishments, Overseas Business Delegations, Suppliers and Dealers of Defense Products/Equipment, Private Sector Industry, Government Departments, Manufacturers, Air Force, Navy, Senior Officers from Coast Guard, Police, Para Military Services, Services from India and Abroad, Serving Defense Officers from Indian Army.

Defence Ministers from UK, Bulgaria, Hungary, Nigeria, Turkey, Uganda, Senegal and Suriname along with Official delegations from 41 countries also attended the deliberations.
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**Bulk Solids India Exhibition, Mumbai**

The first Bulk Solids India Exhibition was held in Mumbai on the 2nd and 3rd March, 2010 and ECC displayed its capabilities in the sphere of Bulk Material Handling Business at this exhibition.

L&T’s unmatched capabilities encompassing the entire gamut of material handling business were exhibited at this show. Some of the areas in focus included:

- System design and engineering
- Manufacture, procurement and supply
- Civil and structural construction
- Erection, testing, commissioning and performance test
- Spares and after sales service
- Operation and maintenance

**CeMAT Expo, Mumbai**

ECC’s Bulk Material Handling solutions for the Power, Port, Steel and Mining Sectors were showcased at the CeMAT expo held in Mumbai between 10th & 13th December, 2009.

**Elecrama 2010, Mumbai**

Electrical Instrumentation & Communication and Transmission Line sectors from E&GP OC projected their EPC capabilities in power transmission and distribution at one of India’s largest trade shows, Elecrama 2010 held between 20th & 24th January, 2010 in Mumbai.
Family Planning Association honours L&T

Family Planning Association of India (FPA) honoured ECC’s Chennai Regional Office (CNRO) for its excellent contribution towards FPA initiatives. Mr. Pannerselvam, Minister for Health along with Mr. M.K.Subramaniam, Mayor, Corporation of Chennai presented the award to Mr. Babu Raj Singh, Regional Manager, Chennai Region, at the Diamond Jubilee Celebrations of FPA held on February, 24, 2010 in Chennai.

The award was presented in recognition of the following programmes conducted for staff and workmen at the project sites of L&T Estancia, JIPMER (Pondicherry), NLC (Neyveli), L&T Coimbatore, TNRS03 (Ramanathapuram), TARE(Tiruvallur) and KNPP (Kudankulam).

- Role of Male member in family for uplifting the quality of life
- Mother and Health care
- Food and Nutrition
- AIDS prevention and Family Planning

FPA is India’s leading and largest reproductive and sexual health organization. It provides information on sexuality education, family life and a wide range of services in sexual and reproductive health including family planning.
KCP cement project site organised a health camp on Sunday 14th February, 2010, at Jagayyapet, Krishna District of Andhra Pradesh. There are around 1000 labourers working in KCP Site. This health camp was organized in association with Family Planning Association of India (FPAI), Hyderabad and inaugurated by Mr. Rajesh B. Kondle, Project Manager.

A strong team of 22 members from FPAI were present to support the camp. While eminent Doctors from FPAI conducted health check-up of the workers, prescribed and distributed medicines, FPAI team members gave lectures to spread awareness among workers regarding AIDS, HIV and other diseases like TB, Malaria, Typhoid and the precautions to be taken by them. The lectures were conducted in Hindi and Telugu. Around 510 male workers were examined in this camp.

As part of safety month celebrations, Blood Donation, Eye care and HIV awareness camp was conducted at vessel project, Vizag on 30.01.2010. ECC staff and workmen actively participated in this camp. Even the family members of L&T staff actively participated in the camp and donated blood. A total of 411 units of blood was donated by the donors in this camp. Eye care and HIV awareness information was also shared. This camp was organized in association with Red Cross blood bank society. In the last five years a total of 2725 units of blood has been donated by this project members.
Students visit L&T Nursery in support of project ‘Green Hands’

Students from various schools in and around Chennai visited L&T nursery at the Manapakkam campus and participated in project ‘Green Hands’.

On 9th January 2010 around 60 students from Amrita Vidyalayam visited the L&T Nursery and participated in the activities of ‘Project Green Hands’ along with L&T volunteers.

The children were given hands-on training in tree plantation and were taught about the various types of trees and their usage in daily life. Also, the children were educated on the various environmental hazards, global warming, advantages of recycling etc through games like puzzles and quiz contests. The students had a great time learning in the natural environment.

Yet another event was conducted on 31st January, wherein 55 students and 10 teachers from Government High School, Chithathur in Kanchipuram District visited the nursery and underwent a hands-on training on tree plantation.

300 saplings from L&T’s Nursery finds new home

Coinciding with the Safety Month celebration and marking a drive on Environment, Health & Safety, an event was organized on January 7, 2010 at the Government High School at Chithathur, near Kanchipuram. More than 1000 students participated in planting over 300 saplings donated from Project Green Hands nursery at ECC Manapakkam Campus.
Opportunities for Bhutanese youth in Construction thro’ CSTI

The Royal Government of Bhutan (RGoB) organized a special programme to educate the youth of Bhutan on the employment opportunities in different fields in a bid to minimize the unemployment issues at Bhutan.

Dasho Dr. Sonam Tenzin, Secretary, Ministry of Labour & Human Resources, RGoB, invited Mr. K G Nagaraj, from the Hydel Business Unit & Mr. Gautam Narayan Pramanik, of CSTI, Kolkata to give brief presentation for Bhutanese youths on “Opportunities for Bhutanese youths in Construction thro’ Trainings”. About 3000 Bhutanese youths and other Senior Delegates of Govt. of Bhutan participated in this one day seminar at Thimpu on 09th March’2010.

AP flood relief measures

Floods devastated the two states Andhra Pradesh & Karnataka in the first week of October 2009. Many districts of Andhra Pradesh and Karnataka were badly affected and several people lost their homes and livelihood.

On observing the severe problems faced by people in those affected areas, employees at L&T came forward and raised a “FLOOD RELIEF FUND”. Excellent support from all the employees helped a lot in collecting a significant amount.

With the generous fund collected, L&T distributed a bag consisting of essential commodities to around 400 families in one of the worst affected remote village of Ayyavaripalle in Mahaboobnagar district of Andhrapradesh.

In another philanthropic gesture, L&T ECC, Vessel projects, Vizag - donated Rs. 1,04,120/- to the Chief Minister’s flood relief fund to help the needy people affected in the Krishna river floods during October 2009.

The demand draft was handed over to Visakhapatnam district Collector Shri. J Syamala Rao on 27.10.2009. ECC staff, workmen and Supervisors of the agencies working in Vessel projects contributed generously to raise the fund for this noble gesture.

In response to the donation, the Secretary to the Government had sent a letter of appreciation to the staff of L&T.
Training center for tailoring inaugurated

On 6th March, 2010 a new tailoring training center was inaugurated by Mrs. Lalita w/o Mr N Baskara Raju, Head and Executive Vice President, Infra OC at Malkapuram, Vizag.

As a part of corporate social initiative, the Infrastructure operating company’s Vizag vessels project site has taken the initiative of training the wives of the workmen in tailoring and embroidery. The spouses of L&T employees, members of the Vizag chapter of Prayas and Prema along with members from other charitable organizations were present during the occasion.

NDTV Hindu covers L&T’s Corporate Social Initiatives

NDTV Hindu, the news and entertainment channel produced a 30 minute programme - ‘Pay it Forward’ covering L&T’s Corporate Social Initiatives. The programme telecast on 11th February, 2010 highlighted L&T Construction Division’s path-breaking initiatives of Construction Skills Training Institute (CSTI) at Manapakkam, Chennai and the social activities carried out at the PRAYAS Medical Centre at Virugambakkam (Chennai).

The programme provided an in-depth video coverage on how L&T’s corporate sustainability through CSTI not only improved the living standards of the students getting trained at CSTI, but also provided a professionally trained workforce to the construction in India. In the interview on Prayas Medical Centre that ensued, Mrs. Chitra Rangaswami, President - Prayas Trust, said that “Running a medical centre with free medicines and lab facilities called for a lot of resources which the Prayas team members were instrumental in proffering to the poor and needy”

L&T’s CSR at Lunana, Bhutan

Larsen and Toubro donated Rs. 200,000 to the department of geology and mines of the Royal Government of Bhutan on 15th September 2009. The donation was used to purchase gumboots and gloves for the over 300 workers engaged in the Lunana lake mitigation project.

During the 1994 Glacial Lake Outburst Floods (GLOF), a total of 965 acres of pasture land was washed away or covered by silt and sand which affected people in the region dependent on yaks for their livelihood. The objective of this mitigation project is to reduce climate change-induced GLOF risk in the Lunana valleys in Bhutan.

In Bhutan, L&T has built the 4.4 km headrace tunnel at Geduchhu for the 1020 MW Tala hydroelectric project, executed the 75 km long 400 kV double circuit transmission line between Tala-Pagli and Khogla among others. L&T is also involved in the construction of the 1,200 MW Punatsangchhu I project.
Free Eye Screening Camp at Kanchipuram

Over 700 people from Kanchipuram and neighbouring villages benefited from a comprehensive free eye screening and cataract surgery camp jointly conducted by L&T – ECC Workshop, Neervalur; Aravind Eye Hospital, Puducherry and PRAYAS Trust (L&T’s Ladies Social Welfare Group), on Saturday, February 20, 2010. A team of doctors and paramedical staff under the guidance of Dr. Krishna Kumar screened the patients. L&T provided spectacles on the spot for 300 patients. 120 patients who needed surgical intervention were taken to Aravind Eye Hospital for cataract surgery which was done free of cost.

The camp was inaugurated at Pachaiyappas School, Kancheepuram. The function was presided by Mr. A. Nambirajan, District Revenue Officer, Kancheepuram. Commending the initiatives of L&T, Mr. Nambirajan and other dignitaries said that many more such camps are required to benefit the rural sector.
CSR activity at Agartala

Over 628 students benefited from the CSR initiative undertaken by L&T Agartala Medical College Project site to improve the facilities at the New Kunjaban Township Higher Secondary School at Agartala.

The project staff supported the school in developing their library by providing books and furniture, distributed sports items, musical instruments, plates and water filters to improve the infrastructure for students. These items were handed to the headmistress of the school at a function held at the school on 29th March 2010.

Free medical camp at Korba

A free medical camp was conducted at Barpali village, Korba on 14th March 2010 by L&T’s Ranchi-Sipat Transmission Line Team. This camp was inaugurated by Mr. Nihlani - Deputy Collector of Korba District. In his speech, Mr. Nihlani lauded L&T for conducting such social welfare programmes that touches the lives of people across the country. About 250 patients benefitted from this camp.
Mr. A.M. Naik Wins ‘CEO of the Year’ Award from ISTD, Bangalore

The Bangalore based Indian Society for Training & Development (ISTD), has conferred its prestigious ‘CEO of the Year’ Award on Mr. A.M. Naik. The award was presented at the 40th ISTD National Convention held in Bangalore recently.

Mr. S. Raghavan, Sr. Vice President, IPM-OC, MIPD, accepted the award on behalf of Mr. Naik from Prof. J. Philip, Dean of Xavier Institute of Management Education, Bangalore.

The award carried a cash component which Mr. Naik has donated back to ISTD. He stated: “At L&T, our business vision has always been closely aligned with the larger goals of nation building. Keeping this broader objective in mind, we are returning the cheque so that it can be utilised for organising various training programmes by ISTD.”

ISTD is a premier institution devoted to the cause of human resources development in India. It was established in April 1970 as a non-profit society and has a large membership of institutions and persons involved in training and development of human resources.

For Metallurgical, Material Handling & Water - OC

The following Nine sites of MMH&W (OC) have bagged the Prestigious British Safety Council International Safety Award for 2009:

1. HZL – Dariba (Ph – III) Project : Ahmedabad Cluster
2. 50 MGD Water Supply Scheme from Narayanpura to JSW Project : Chennai Cluster
3. NSRDWS – Anantapur – Phase III : Hyderabad Cluster
4. GNSS – Tadipatri LIS
5. Nellore Water Supply Improvement Scheme
6. Tata Steel Project
7. Sinter Plant – Rourkela
8. DVC Koderma
9. Vedanta Alumina Refinery – Lanjigarh : Kolkata Cluster

The International Safety Award recognizes and rewards Organizations that show a real commitment to improving corporate health and safety. The award is acknowledged by the UK Health and Safety Executive as a powerful motivator for achieving high safety standards.

Benefits include:
- International recognition for the Organization commitment to improving workplace health and safety.
- Enhanced reputation with customers and stakeholders.
- Positive press and PR.
- Prestigious winners’ banquet.

The Winners’ Banquet: The 2010 Banquet will take place on Friday, 21st May at the Grosvenor House, Park Lane, London where the Awards will be presented to all the Winning Organizations World wide.
**IMS Certification for Infra OC**

**Infrastructure OC** received accreditation for its Integrated Management System (IMS) for Environment, Health & Safety (EHS) by demonstrating conformance to the following international standards,

- **OHSAS 18001:2007** (Occupational Health & Safety Assessment Series)
- **ISO 14001:2004** (Environment Management System)
- **ISO 9001:2008** (Quality Management System of EHS function)

IMS certification shall add significant value to the OC business through

- Systematic improvement of EHS management system to international standards.
- External Recognition for our systems.
- Adds credential to organization and helps in securing orders.
- **Exhibit Company’s commitment on EHS to stakeholders.**

The certificates were awarded by M/s DNV (Det Norske Veritas), the Certification Body, on 31st March 2010.

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**ISO Certification for Plant and Machinery**

Plant and machinery department of Building & Factories Operating Company has obtained accreditation in ISO 9001: 2008 Certificate. To enhance the certified qualification Plant and Machinery department applied for accreditation comprising the scope in,

- Procurement
- Deployment
- Installation
- Commissioning
- Operation
- Maintenance
- Repair/Overhauling/Refurbishment
- Discarding Nonperforming assets

This constitutes the total life cycle of Plant and Machinery. It was ensured that all the Major sites were covered under QMS adaptation. Plant and Machinery B&F OC maintains a legacy in adopting & institutionalizing systematic maintenance procedures and documentation.
Mr. A.M. Naik Honoured with OceanTEX Business Leader of the Year Award

Mumbai based CHEMTEC Foundation has awarded late Mr. Subir Raha, ex-Chairman & MD, ONGC, Mr. A.M. Naik, its prestigious ‘OceanTEX Business Leader of the Year’ Award. Mr. K. Venkataramanan, OceanTEX President (Engineering & Construction Projects) and Board Member, L&T, accepted the award on behalf of Mr. Naik from the Governor of Maharashtra.

The awards function was a part of OceanTEX 2010 exhibition and conference which focused on the chemical process and energy production industries. Mr. K. Sankaranarayanan, at the OceanTEX 2010 awards function in Mumbai. Mr. Venkataramanan also received the ‘Emerging Indian MNC’ award for L&T.

Mr. Rahul Dhir, MD & CEO, Cairn India, Mr. P.M.S. Prasad, Executive Director, RIL, Mr. B.N. Bankapur, Director (Refineries), IOCL, Mr. Arun Balakrishnan, CMD, HPCL, Mr. Rahul Dhir, MD & CEO, Cairn India, Mr. P.M.S. Prasad, Executive Director, RIL, Mr. B.N. Bankapur, Director (Refineries), IOCL, Mr. Arun Balakrishnan, CMD, HPCL, have been serving the Indian chemical and process industry since 1975.

L&T received the Infrastructure excellence award in the Oil & Gas category for the construction of Underground LPG Cavern Project at Vishakapatnam. 50 infrastructure development companies submitted over 100 project entries and participated in the process. After an initial screening of applications by Grant Thornton, the short-listed projects were presented to an eminent jury of experts.

The Awards function was held on 18th March 2010, at The Grand, New Delhi.

E18 - A Division of Network 18 has initiated the Infrastructure Excellence Awards in association with CNBC TV18 to recognize and felicitate companies for excellence in the field of infrastructure development. For the first time in India, these awards are based on overall excellence in execution of projects and its impact on the economy. NICMAR (National Institute of Construction Management & Research) is the Knowledge Partner and Grant Thornton is the Consulting Partner to the awards.

Mr. K. S. R. K. Verma, Joint General Manager, Hydel BU receives the award from Mr. Kamalnath, Hon’ble Union Minister for Roads & Highway.

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Mr. Rahul Dhir, MD & CEO, Cairn India, Mr. P.M.S. Prasad, Executive Director, RIL, Mr. B.N. Bankapur, Director (Refineries), IOCL, Mr. Arun Balakrishnan, CMD, HPCL, and late Mr. Subir Raha, ex-Chairman & MD, ONGC, were also conferred awards in various categories at OceanTEX.

The awards function was a part of OceanTEX 2010 exhibition and conference which focused on the chemical process and energy production industries. The exhibition was organised by the CHEMTECH Foundation, a leading industry association, which has been serving the Indian chemical and process industry since 1975.
L&T receives Business Standard’s ‘Company of the Year’ award

Union Home Minister, Mr. P. Chidambaram, presented the Business Standard ‘Company of the Year’ Award to Mr. A.M. Naik, Chairman & Managing Director at a glittering function in Mumbai. Mr. Naik accepted the award, along with Mr. Y.M. Deosthalee, Chief Financial Officer, and Mr. K. Venkataramanan, President (Engineering & Construction Projects).

Addressing an elite gathering of industrialists, business leaders, corporate chieftains and senior government officials, Mr. Naik harked back to Mr. Chidambaram’s memorable description of L&T as the only company qualified to belong to India’s ‘national sector’. He said L&T was strongly committed to nation building, and had chosen to earn revenues the difficult way. Mr. Naik reaffirmed L&T’s commitment to creating shareholder value by successfully meeting all future challenges.

The characteristics of L&T that impressed the Awards jury, comprising industrialists and business analysts, were:

- Ability to withstand the economic downturn through a strategically diversified portfolio, efficient cost structure, technology leadership and presence in the core sector.
- Ability to carve a niche for itself despite tough multinational competition.
- Ability to use its capital efficiently and turn in good returns on net worth.
- Robust business model management.
- High ethical standards.
- Constant maintenance of high standards of governance.
- Capability to position itself for the future so as to able to maintain growth even in difficult times.

In conclusion, the jury declared that L&T was best positioned for the future in complex and critical businesses that are vital for India’s development.