



## **Redefining project and product engineering**



## Over eight decades of **UNDISPUTED LEADERSHIP**

Larsen & Toubro is an Indian multinational engaged in EPC projects, hi-tech manufacturing, and services. It operates in over 50 countries worldwide. A strong, customer-focused approach and the constant quest for top-class quality have enabled L&T to attain and sustain leadership in its major lines of business for over eight decades.

EPC PROJECTS				
CONSTRUCTION		EN	IERGY	
HI-TECH MANUFACTURING				
HEAVY ENGINEERING		DE	DEFENCE	
SERVICES				
IT SERVICES TE		CHNOLOGY SERVICES		
DIGITAL SERVICES & E-COMMERCE				
FINANCIAL SERVICES				
OTHERS				
REALTY	SMART WORLD & COMMUNICATION			
CONSTRUCTION & MINING MACHINERY				
RUBBER PROCESSING MACHINERY VALVES				

## The Indian **CONSTRUCTION GIANT**

L&T Construction, India's largest construction organization and ranked among the world's top contractors, has been transforming cityscapes and landscapes with structures of immense size and grandeur for several decades. The organization's capabilities span the entire gamut of construction - civil, mechanical, electrical, and instrumentation engineering - and its services extend to all core sector industries and infrastructure projects.

Several of the country's prized landmarks – edifices, structures, airports, industrial projects, flyovers, viaducts, water and power infrastructure projects - carry L&T's signature of excellence in construction. Today, more and more structures beyond India's boundaries are standing tall, thanks to L&T Construction.

#### L&T Construction straddles seven related businesses:

- Buildings & Factories
- Transportation Infrastructure
- Heavy Civil Infrastructure
- Power Transmission & Distribution

## Building landmarks, setting benchmarks<sup>\*</sup>

- 12 International Airports
- **310,000+** IT Seats
- 81,500+ Dwelling Units
- **90+** Manufacturing Facilities
- 27,000+ Hospital Beds
- 5 lakh + km of Water & Waste Water Networks
- 9,300 MLD of Water & Waste Water Treatment Plants
- 9.3 lakh Hectares of Land Being Irrigated
- 905 EHV Substations
- 45,345 ckm of Transmission Lines
- 100.000+ Habitations Electrified

- 420 km of Metro Rail Corridors

• Water & Effluent Treatment

- Minerals & Metals
- L&T GeoStructure

• 3.6 GWp Portfolio of Solar Plants

• 243 km of High-Speed Rail

• 23,134 Lane km of Roads, Interchanges, & City Infra

• **10.38 million** Sq. m. of Runways

• 9,163.7 MW of Hydro Power Projects

8,080 MW of Nuclear Power Projects

• 5,713 Tkm of Railway Track Laying

• 20,501 Tkm of Railway Electrification

40 million tonnes of Hot Metal (Iron) Making

 India's Largest City Surveillance Project: 6,000 cameras at 1,500 locations at Mumbai

## Minerals & Metals **STRENGTHENING THE SINEWS OF THE NATION**

The metallurgical industry has, over time, played a key role in the advancement of civilization with iron and steel emerging as the most important metals possessing infinite functional applications to touch every aspect of life. L&T has played a major role in the development, modernization, and expansion of several metallurgical plants in the country across ferrous and non-ferrous value chains in India and the Middle East.

The Minerals & Metals (M&M) Strategic Business Group of L&T Construction is India's market leader in Engineering, Procurement, and Construction (EPC) of metallurgical projects and is capable of undertaking detailed engineering, procurement, manufacture, supply, construction, erection, and commissioning of projects through its dedicated business units covering Project and Product businesses.



# Project Business

A one-stop solution for the ferrous and non-ferrous sectors covering iron and steel industries, aluminium, copper, zinc, lead, mineral beneficiation plants, and speciality conveyors.

### Product **Business**

Based in Kansbahal and Kanchipuram, serves as world-class heavy manufacturing facilities for a wide spectrum of fabrication, machining, and assembly of products for core industries such as chemical, cement, steel, paper, power, mineral, and railways.





# PROJECT **BUSINESS**

M&M has constructed several major greenfield and brownfield projects in steel, aluminium, copper, zinc, and gold sectors, resulting in several long-standing customer relationships with all industry majors across India and the Middle East.

### Iron & Steel

M&M has considerable domain expertise to meet the specific needs of a large customer base, supported by technology prowess that is constantly upgraded through engineering and technology tie-ups with global leaders. M&M has commissioned various packages across the spectrum of iron and steel making for both greenfield and brownfield projects across India and the MENA region.

Our capability spectrum in ferrous metallurgical plants includes:

### **Ore Beneficiation & Agglomeration**

M&M's capabilities include complete solutions for Iron ore beneficiation and handling including process design, engineering, equipment selection, supply, and commissioning for high-capacity plants.





CDQ #11 at Jamshedpur





### **Iron Making**

M&M provides complete turnkey solutions for all the major units of iron making, covering Coke Oven Batteries and Coke Dry Quenching, Sinter Plants, Pellet Plants, Blast Furnace, and Raw Material Handling Systems, including Direct Reduction Iron Plants.



### **Steel Making**

M&M's turnkey solution for complete Steel Melt Shop including standalone packages for BOF and Caster.

### **Finishing Lines**

M&M serves the customers for different packages of finishing lines of the iron and steel industry covering Hot Strip Mills, Pickling Lines, Cold Rolling Mills, Pipe Mills, Annealing Lines, Tinning Lines, and Galvanizing Lines. We provide complete turnkey solutions for all the packages.









#### Recent project milestones in the metallurgical industry:

- India's biggest Blast Furnace with an inner volume of 5,358 cum. at JSW Dolvi
- 3 MTPA Coke Oven Plant #2: 4 batteries with a height of 6.25 m at JSW Dolvi ٠
- Construction and erection of 2 × 190 TPH / 1 × 140 TPH CDQ at JSW Dolvi ٠
- Supply and erection work for Steel Melt Shop #2 at JSW Dolvi ٠
- Slab Caster Project at SAIL's Bokaro Steel Plant of 1.3 MTPA ٠
- State-of-the-art 3 MTPA New Hot Strip Mill at SAIL, Rourkela •
- UAE's first Longitudinally Submerged Arc Welded (LSAW) Pipe Mill Project (2.4 LTPA)
- Tata Steel's Coke Dry Quenching of 2 × 100 TPH (for Battery #10 and #11), Jamshedpur •
- Civil, structural, and erection of 0.5 MTPA Utkal Alumina Expansion Project, Rayagada, Odisha ٠
- HZL 1.5 MTPA Lead–Zinc Beneficiation Plant, Ph-II & Ph-III, Dariba

### Other project milestones in the metallurgical industry include:





### Light, Base, & Precious Metals

M&M caters to a large spectrum of engineering requirements and contributes significantly to industrial growth in various sectors of these non-metals, having already delivered a wide range of customized solutions. Comprehensive offerings in the realm of non-ferrous metallurgical plants and minerals include:













# PRODUCT BUSINESS

### A range of product offerings and service support

The Product Business Unit (BU) is a world-class one-stop solution for a wide spectrum of design, manufacturing, and servicing of industrial products for the mining, cement, construction, steel, ports, and other core industries. We provide concept-to-commissioning cost-effective solutions with the provision of custom layouts and customized product features. M&M's Product BU has proven product performance of more than four decades with 1,000+ equipment across India, the Middle East, Africa, and Australia.



# PRODUCT OFFERINGS

The Product Business Unit has two types of product offerings: standard and custom.

### **Standard Products:**

L&T offers a wide range of Standard Products suited to a variety of applications and performance based on client requirements. These include:

- i. Feeding Solutions: Standalone Apron Feeders, Wobbler Feeders etc.
- ii. Crushing Solution: Crushers for Limestone, Coal, Gold, Copper ore and other minerals
- iii. Hard Rock Crushing Applications
- iv. Green Solutions: Surface Miners

### **Custom Products:**

L&T with its in house design and engineering team is capable to provide tailor-made solutions well suited to customers needs. These include:

- i. Material Handling Equipment: Wagon Tipplers, Stacker Reclaimers
- ii. High Speed Rail Equipment
- iii. Port Cranes
- iv. Steel Plant Equipment: Torpedo Ladle Cars
- v. Paddle Feeders
- vi. Metallurgical Equipment

## **Standard Products**

Crushing Systems and Equipment

### **Feeding Solutions**

M&M's apron feeders are engineered with custom design to suit tailored solutions for heavy-duty operation and a variety of material applications. These custom-built machines are designed to individual requirements of capacity, size, and material handled. These have integral matching scrapper conveyors with built-in drives to handle spillage, ensuring environmental control.

More than 850 apron feeders and wobbler feeders have been delivered across the globe, and L&T also provides specialized solutions for hot clinker handling, anode butt handling, and totally enclosed conveyors.



#### Application

Limestone, coal, gypsum, additive & corrective, aggregates and hard rock, gold, copper ore, specialized solutions for hot clinker handling, anode butt handling, and totally enclosed conveyors.

- Pan width: 700–2,800 mm
- Centre distance: 2,000–76,000 mm
- Up to 4,500 TPH

### **Crushing Solutions**

M&M's crushing systems cover multiple applications and materials, providing a comprehensive end-to-end solution across three major industries: cement, coal, and aggregates.

#### Application

Limestone, coal, gypsum, additive & corrective, aggregates and hard rock, gold, copper ore, and other minerals.

Capacity: Single plant up to 2,500 TPH

- Limestone Crushing Solution Impactor, Hammer Crusher
- Coal Crushing Solution Ring Granulator, Roll Crusher, Feeder Breaker, Rotary Breaker









## Hard Rock Crushing Applications

### **Aggregate Crushers**

L&T with its technological collaborator KEMCO, Japan designs, engineers and delivers best in class crushing solutions for wide of application requirements for aggregate and mining industry. L&T crushers can handle ROM size aggregates and provide primary, secondary and tertiary crushed aggregates for construction industry uses.

#### L&T's aggregate crushing range includes:

i. Jaw Crushers: Up to 800 TPH ii. Cone Crushers: Up to 500 TPH iii. Vertical Shaft Impactors: Up to 450 TPH









### SAC | e-Sepa | e7

M&M manufactures and supplies advanced automated solutions in association with Kemco, Japan, which can crush Hard Granite and Basalt minerals to produce fine particles suitable for construction material as a replacement for river sand.

These solutions can produce finer quality of hard minerals with precise fineness modulus and come in multiple variants such as SAC (a simple classification system), e-Sepa (classificationcum-screening alternative), and e7 (complete end-to-end comprehensive hard rock crushing solution).

A sustainable alternative to river sand, this highly versatile solution is eco-friendly and provides a perfect combination of size, shape, gradation, and purity of the end product.

### **Surface Miner**

L&T is a pioneer in the design and manufacture of rugged, cost-effective, eco-friendly surface miners. Since launching the first machine in 2004, L&T has established a dominant position in the Indian surface mining industry.

L&T Surface Miners have been significantly contributing to promote & sustain eco-friendly blast free mining in various mineral applications like Limestone, Coal, Bauxite etc. across India, Middle East, and Africa. We have a vision to constantly evolve the technology to extend it for blast free removal of harder and abrasive rocks including overburden in future.

#### Surface Miners are a popular option with various advantages:

- Environmental-friendly mining. No drill and blast required.
- Minimizes loss of minerals
- Eliminates primary crushing and cost of transportation of ROM.
- Designed for selective mining. Depth of cut can be pre-determined seam by seam.

#### Application

Coal, lignite, soft to medium hard limestone, bauxite, and others. **Capacity:** Up to 1,200 TPH

#### Variants:

60 Ton Class: KSM 223, KSM 303, KSM 403. 100 Ton Class: KSM 304, KSM 304C, KSM 404.

## **Custom Products**

### Wagon Tippler

M&M offers tailored solutions for unloading all types of wagons. The product profile includes all three types of Wagon Tipplers: Rota Side, Tandem, and Hybrid Tandem Wagon Tippler.

L&T's in-house design and manufacturing team contributes to producing state-of-the-art tipplers with high throughput, versatility, minimum civil footprint, and ease of operation. All machines are in compliance with latest RDSO guidelines and are continuously updated in design & features by leveraging alliances with leading global technology players.

#### Application

Mines (iron ore, coal), plants (steel, cement, power), and ports. **Capacity:** Tippling up to 50 wagons in an hour

#### Variants

- Rota Side Wagon Tippler
- Tandem/Twin Lifting Tippler and Hybrid Tandem Tippler
- Wagon Tippler with Shifter Pusher





### Paddle Feeder

M&M's Paddle Feeder has a large range in terms of capacity ranging from 1,000 TPH to 4000 TPH and can be electric- or hydraulic-driven based on the customer needs. This customized equipment is compact and robust with higher efficiency and lower power consumption and is thereby apt for multiple raw material handling applications.

### **Port Cranes**

L&T provides comprehensive Port Crane solutions – Ship to Shore (STS), Rubber Tyred Gantry Crane (RTGC) Rail Mounted Gantry Crane (RMGC), Level Luffing Crane (ELL), and Goliath Crane (GGC) in collaboration with Konecranes, Finland – to Indian shipyards and ports.

Konecranes is one of the leaders in the material lifting business, particularly ports and shipyards, having delivered more than 3,000 port and shipyard cranes across geographies. A world-leading group of Lifting Businesses™, Konecranes offers lifting equipment and services that improve productivity in a wide variety of industries. L&T Konecranes have the resources, technology and determination to deliver on the promise of Lifting Business.

With Konecranes being a market leader in this segment and L&T being the leading manufacturer in India, we commit to provide the most competitive, optimized and cutting-edge solution for Port & Shipyard Cranes by ensuring international quality standards, latest technology, advanced safety features, unparalleled reliability & robust after sales and service support.

### **Stacker Reclaimer**

M&M's Stacker Reclaimer offers the most technologically advanced solution for the raw material handling system for a variety of materials. With a high efficiency of operation and higher system reliability, this engineered solution has a proven track record of having supplied multiple units of equipment across India to major players in the industry.

Equipped with sound design expertise, L&T provides cutting edge study, fail proof solutions custom made to client requirements. L&T stacker reclaimers are characterized by their compactness, robust nature, power optimization and lower maintenance and operation cost.

L&T has been supplying this equipment since 1980s across India, Africa and Middle East. With decades of experience and supply of stockyard equipment for various applications, L&T enjoys the majority market share and is a one-stop solution for your material handling requirements.

#### Application

Mines (iron ore, coal), plants (steel, cement, power), and ports. **Capacity:** Up to 11,000 TPH

#### Variants

- Luffing/Slewing Stacker
- Bucket Wheel Reclaimer
- Bucket Wheel Stacker cum Reclaimer



## **High-Speed Rail Equipment**

### **Straddle Carrier**

Tyre-mounted Straddle Carriers are used to handle girders of 30–40 m span range with a maximum handling capacity of 1,100 MT. The straddle carrier is used to shift the box girders within the casting yard and to shift them to the feeding area of the bridge gantry location.

### **Transport Girder**

Tyre-mounted Transporter Girders are used to handle girders of span range from 30 m to 40 m with maximum handling capacity of 1,100 MT. A transporter girder is used to shift the box girders over the initially erected spans to their final launching location.

#### **Product Specifications**

Traveling speed (no load): 10 km/hr Traveling speed (with load): 5 km/hr Steering angle: +/– 30 degrees Number of wheels: 216 Generator: 415 V, 50 Hz, AC Power unit rating: 566 @ 2,100 rpm (2 nos.)`

### Launching Girder

Rail-mounted Launching Girders are used to handle girders of span range from 30 m to 40 m with maximum handling capacity of 1,100 MT, supported over the erected spans. The completed pier cap will erect the full-span precast girders to their final position, and the launchers will then be auto launched to the next position.

#### **Product Specifications**

Winch trolley travel (without load): 0.6 to 6 m/min Winch trolley travel (with load): 0.3 to 3 m/min No. of hoists per winch trolley: 2 DG: 365 kVA, 415 V Auto launch speed: 3 m/min Long movement of trolley: 63 m





### Torpedo Ladle Car

L&T offers Torpedo Ladle Cars (TLCs) in various capacities from 175 T to 400 T to meet the transport requirement of molten hot metal in steel plants. With 3 decades of experience in this field, L&T is uniquely positioned to offer concept to commissioning solutions for hot metal handling with TLCs meeting specific customer requirements.

The TLCs offered by L&T, designed and manufactured at our integrated manufacturing facility in Kansbahal, Odisha with stringent quality control measures, are equipped with advanced features like automated positioning systems, on-board weighing systems, online

### Metallurgical Equipment

The Product BU also manufactures customized equipment for the metallurgical industry (steel, aluminium, zinc, copper, etc.) meeting international standards/specifications. Our complete range of equipment for the steel sector caters to:

#### Coke Oven

Pusher cars, charging cars, guide cars, quenching cars and quenching car locomotives, wagon pushers, reversing winches, etc.

#### Iron Making

Top charging equipment; tuyere stocks; probes; hot metal handling systems including torpedo ladle cars, transfer cars, ladles, etc.; slag handling systems including transfer cars, slag pots, etc.

#### **Steel Making**

Basic oxygen furnaces, electric arc furnaces, vacuum degassing systems, ladle transfer systems including transfer cars, ladles, ingot strippers, etc. tracking systems, simple & reliable drive arrangement etc. L&T has been a preferred partner for Torpedo Ladle Cars across Steel industries backed by our strong references / installation base, inhouse design capabilities, state-of-art manufacturing facilities, robust after-sales support, and service network.

We have provided elite technology of Torpedo Ladle Car to major steel plants in India like Rashtriya Ispat Nigam Ltd. Vizag (RINL), TATA Steel, JSW BPSL, JSW Steel, JSL etc. L&T is committed to provide the most optimized solution for the Blast Furnace operations.



Continuous Casters: Equipment of billet/slab caster including ladle turrets, tundish cars, strand guide segments, dummy bar systems, roller tables, etc.

#### **Rolling Mills**

Equipment for hot/cold rolling mills, Steckel mills, wire rod mills, etc., such as walking beam conveyors, coiler mandrels, coil transfer cars, pinch roll assembly, flatteners, bridle roll assembly, descalers, adjustable guides, shears, belt wrappers, etc.

In addition, L&T manufactures customized equipment for the non-ferrous segment (e.g., aluminium, copper, zinc) as per specific customer requirements.

## **Manufacturing Facilities**



### **Kansbahal Works**

L&T's Kansbahal Works is a world-class integrated manufacturing centre with facilities for fabrication, machining, assembly, and undercarriage works and is an ISO-certified unit accredited with ISO 9001:2015, ISO 14001:2015, ISO 45001: 2018, and OHSAS 18001:2007 certifications.

- 12,800 sq. m fabrication shop
- 16,050 sq. m covered area
- Assembly, testing, and inspection facilities

## **Unmatched design & engineering** capabilities

### **Powerhouse in** engineering design

M&M's Engineering Design & Research Centre (EDRC) in Kolkata is certified for ISO 9001:2008 for its operations and, with its advanced engineering resources, provides computer-aided engineering and simulation facilities. It has a multi-disciplinary team of engineers with sophisticated software and hardware facilities to provide value-added integrated engineering services for clients across projects with detailed design and engineering support as a part of the business's comprehensive EPC services. Our comprehensive engineering services include basic/detailed engineering, proposal engineering, crushing plant layout design, and product development and optimization.

L&T is one of the first companies to implement an Engineering Management System in its business operations that integrates all execution processes to provide project teams with up-to-date information at all stages of execution.

EDRC offers comprehensive engineering solutions from concept to commissioning for a wide variety of disciplines covering mechanical (system and equipment),



civil and structural, and electrical and instrumentation for Iron Making; Steel Making; Rolling & Finishing Line; Alumina Refinery; Alumina Smelter; Copper Smelter; Copper Refinery; Zinc & Lead Smelter & Refinery; Beneficiation for Iron, Zinc, Lead, Copper, & Coal; Mining; Raw Material Handling in Metallurgical Plants; Mineral Beneficiation Plants; and Ports & Harbours. EDRC is also a pioneer in design and engineering solutions for the manufacturing and supply of critical equipment such as stacker reclaimers and other stockyard machines, wagon tipplers, marshalling equipment, paddle feeders, crushers, grizzly feeders, and bin extracting systems including rapid/wagon loading systems.

EDRC has migrated completely to a 3D platform. The complete engineering of the Ma'aden Gold Project was done on Aveva E3D, and the model was linked with the schedule as a part of 4D BIM implementation. Later, Digital Twin was created where the 3D model was linked with related documents such as P&ID, GA, Equipment List, Data Sheet, O&M Manual, and the like.

Optimal engineering solutions are on offer using high-end software such as:











Comprehensive engineering capabilities cover the following:

#### Process

- Process flow diagrams and piping & instrumentation diagrams
- Sizing and selection of equipment
- Plant operational philosophy
- Site-based design verifications





#### **Mechanical and Utilities**

- Plant and equipment layout
- Equipment design, basic, and detail engineering
- Finite element analysis and discrete element analysis
- Pipe stress analysis and isometrics
- Design of utility and HVAC systems
- Complete dry and water-based dedusting system
- Design of firefighting system
- Speciality conveyor design

#### Civil, Structural, and Architectural

- Plant layout
- Geotechnical engineering
- Civil and structural engineering
- FEM and dynamic analysis
- Architectural planning and design
- Infrastructure planning (roads, drainage)



#### Instrumentation and Automation

- Plant automation
- Instrument lists and specifications
- Control and safety logic development
- Instrument installation drawings
- Loop schematics
- Plant communication system
- CCTV (security and surveillance) system
- Fire detection and alarm system (FDA)





#### Electrical

- HV & LV power distribution system designs
- Electrical power system studies and analysis
- Equipment sizing and layouts
- Cable engineering
- Illumination engineering
- Plant electrics
- Power SCADA and power quality improvement
- Machine electrics
- Integrated stockyard management system
- Earthing and lightning protection designs and layouts





The in-house Equipment Design Team of EDRC has designed and commissioned the Straddle Carrier, Girder Transporter, and Launching Girder for the High-Speed Rail Project for the first time in India, a development that has helped L&T attain a global benchmark.







## **Operational Excellence 4.0**

M&M has established systems and processes to deliver complex EPC projects and products on time across the globe to the complete satisfaction of the customers. Digitalization and automation of the processes are in line with EPC/Industry 4.0, comparable with the best in the world.

- Safety: Core to the business with Zero Harm policy
- Sustainability: Commitments to become Carbon Neutral by 2040 and Water Neutral by 2035
- Quality: QMS adhering to ISO 9001:2015 and product quality
- Construction Methods & Planning Centre: Modularization and mechanization of construction and schemes
- P&M: Owned assets
- Formwork: 3D schemes with certified professionals with alternate materials

### **Digitalization across EPC**





Beam welding machine



Beam line machine

### We are present at

#### Kolkata

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Visit us at www.Intecc.com/metal-metallurgical-construction-companies-Int-construction/



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#### Nairobi, Kenya

Aggregate Dry Port Facility at Ras Al-Khaimah, UAE



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