WASH Tower for IOCL Paradip

HEAVY ENGINEERING BUSINESS

Overview

L&T's Heavy Engineering business is the global leader in meeting the supply of engineered to order hi-tech equipment needs of Refinery, Oil & Gas, Fertiliser, Petrochemicals and Nuclear plants.

The business has been at the forefront of introducing new techniques, products and materials in the manufacturing sector for over eight decades.

The A. M. Naik Heavy Engineering complex at Hazira is a globally-benchmarked state-of-the-art fully integrated, digitally-enabled manufacturing complex. Its capability spectrum not only covers in-house engineering, R&D centres, and world class fabrication facilities, but also includes a highly talented team, committed to a safe and sustainable work culture. The business achieved international recognition through an impeccable track record of executing large complex projects and constantly creating new international benchmarks.

The business is organised into following Product Business Units (PBUs) :

- **Reactor & Pressure Vessels** (RPV) PBU specialises in fabrication of Hydro-Processing Reactors, Tubular Reactors, Gasifiers, Ammonia Converters, Urea Reactors, Coke Drums, Fluid Catalytic Cracking (FCC) Reactor – Regenerator system, Oxidation Reactor, Titanium Cladded Equipment, LNG / Gas Processing Pressure Vessels and Heavy Columns.
- **Heat Transfer Equipment** (HTE) PBU specialises in Acrylic Acid Reactor System, Ammonia & Urea plant exchangers, High Pressure Heat Exchangers, Methanol Converters, PO reactors, VAM reactors and Fired-tube Waste Heat Boiler packages.
- **Process Plant Internals** (PPI) PBU specialises in proprietary process plant internals for Reactors and Ammonia Converter baskets. A large variety of critical internals for advanced refining processes are manufactured using materials like Stainless Steel, Duplex / Super Duplex Stainless Steel, Inconel, Monel, Hastelloy, Titanium, etc.
- **Modification, Revamp & Upgrade** (MRU) PBU offers value-added end-to-end solutions for FCC revamps, Crude Distillation Unit / Vacuum Distillation Unit revamps, Multi-shutdown Facility revamps, Urea Reactor Life extension, Coke Drum repairs, Heat Exchanger revamp, Urea Energy saving projects and emergency repairs for the process plant industry.
- **Nuclear** PBU specialises in key equipment for steam supply systems for nuclear power plants. It manufactures key components of the nuclear island like Steam Generators, End-Shields, Pressurisers, Safety Heat Exchangers, Reactor Header Assemblies, Calandria, End Fittings etc. It supplies critical components for Fusion Reactors (ITER), Fast Breeder Reactor, Handling spent fuel (Casks / Canisters) and critical equipment for strategic programmes.
- **Special Fabrication Unit** (SFU) fabricates critical Titanium Piping Spools, complex internals for Gasification Plants, Loop Reactor, Primary Quench Exchangers (PQE) for the petrochemicals sector.
- The business also has one of the world's largest **Forge shops**, L&T Special Steels and Heavy Forgings Private Limited (LTSSHF), a joint venture with Nuclear Power Corporation of India Limited. LTSSHF meets the critical custom-made heavy forging requirements of sectors like

Pertamina RR Package 4

nuclear and hydrocarbon. Its custom-made, high-quality products are used across the industrial spectrum.

Business Environment

The global economic recovery faced significant headwinds with new variants of COVID-19 and geopolitical situations causing supply-chain and logistics disruptions and steep escalation in input costs, which in turn resulted in deferred business opportunities. Overall, the business was successful in navigating the industry-wide domestic and global challenges through organisation excellence initiatives. The business succeeded in reaching out to new customers and making inroads in new territories like Turkey, Poland, and Uzbekistan.

The business continues to face foreign competition in domestic projects. To have a level playing field, it is proactively working through industry associations to influence the concerned ministries to mitigate the risks associated with the inconsistencies in the implementation of public procurement under 'Atmanirbhar Bharat' and also to ease / simplify certain processes applicable under BIS & GST.

The business has observed a surge in demand for Renewable Diesel and Bio Diesel plants (which are more eco-friendly). Enforcement of clean fuel standards – Renewable Energy Directive (RED) II, Renewable Fuel Standard (RFS) & Low Carbon Fuel Standard (LCFS) in developed countries, is providing sustainable growth in demand in this sector. Oil to Chemicals provide additional growth momentum in the mid to long-term in the petrochemical sector (especially in Asia) and LNG sector (especially in USA & Middle East). On the domestic front, the Government has approved multiple mega projects in the refinery and petrochemicals sector and further traction is seen in large scale private projects.

The Modification, Revamp, Upgrade (MRU) business, identified as a Lakshya growth initiative has taken off well, both in India and GCC countries. Increasingly, clients are opting for revamps and deferring greenfield investment projects.

NPCIL's biggest expansion of the country's nuclear power capacity by building 10 nuclear power reactors in 'fleet mode' with an aim to reduce costs and speed up construction time is underway. Most of the purchase orders for bulk procurement of critical equipment such as Steam Generators, Pressurisers and Reactor Headers have been placed for the construction of the 10 proposed units of the new indigenous 700 MWe Pressurised Heavy Water Reactors (PHWRs). Further, Fleet procurement for this strategic sector is also expected in next 2 to 3 years and Nuclear PBU is well poised to tap this opportunity.

Major Achievements

In the international market, the business secured breakthrough orders for the supply of Purified Terephthalic Acid Plant Equipment for SASA, Turkey; Ethylene Oxide Reactors for PKN Orlean, Poland and Enter Corp / Fargana Refinery, Uzbekistan; LNG equipment for projects in Europe and Australia, Hydro-Processing Reactors for PEMEX, Mexico and Rodeo Refinery, USA and FCC Reactor Systems for JGC, Japan / Basra, Iraq.

The business ensured uninterrupted customer supplies throughout the pandemic year by dispatching six complex and heavy Tubular Reactors to various customers in China, six of the World's Heaviest Coke Drums to Mexico, and five Reactors & Heavy Vessels for a Green Diesel Project in USA.

In the domestic market, the business secured breakthrough orders for an Oxidation Reactor for IOCL Paradip PTA Project, securing dominance in the Urea Reactor (10th Urea Reactor in a row), Titanium Piping Spool for NRL JV Bio Refinery under Green Initiative arena and Seismic Stopper for 1st High Speed Rail in India.

End Shield

The MRU business has seen spectacular growth in FY 2021-22. The business has booked the largest order for a Gas Processing Unit in the Middle East and an FCC revamp order (IOCL Barauni). Moreover, the MRU team has executed the most complex HPCL Revamp Project 10 days ahead of schedule during the peak of COVID-19's 2nd wave in April / May 2021.

The nuclear business team completed the assembly of the ITER Cryostat's (the world's largest stainless-steel, high-vacuum pressure chamber) top lid in the site workshop in France. This was an important milestone in the global nuclear fusion arena as well as a moment of pride for India. The business also created a new global benchmark in nuclear manufacturing by delivering the four 700 MWe steam generators for the Gorakhpur Haryana Anu Vidyut Pariyojana (GHAVP) 1 & 2 project (6 -12 months ahead of contractual delivery date despite the COVID-19 pandemic) and dispatched the pair of end-shields for the GHAVP 1&2 project (3 months ahead of schedule).

Significant Initiatives

Digital and organisational excellence initiatives accelerated the journey to be the global best Heavy Engineering company.

Improving competitiveness for products like Renewable Diesel Reactor, HP Screw Plug Heat Exchangers and Heavy Columns & Vessels has been identified as a major initiative to increase market share.

Notable digitalisation initiatives include IoT-enabled Industry 4.0 Smart Stations in welding & overlay operations, Virtual 3D Layout Simulation and Digi-Eye – for real-time project progress monitoring. Digitalisation in office areas includes automation of design & procurement, supply chain management and estimation system.

The 'Quality at Root' initiative was embarked upon by the business to reduce the cycle time of manufacturing by eliminating non-value-added activities. This initiative will ensure a sustainable 'First Time Right' quality culture.

LTSSHF has focussed on upgradation of manufacturing technology and achieved very low reject rates for Nuclear and Hydrocarbon sectors.

Outlook

FY 2022-23 is expected to provide a growth momentum in view of an improved global economic environment. It is expected that the investment in renewables projects, petrochemical and LNG sectors may continue to see an uptrend. The business expects higher investments in Renewable Fuel / Refining projects in USA & Southeast Asia, LNG projects in USA & Middle East and Fertiliser projects in Australia, USA & Middle East.

In the domestic segment, the business expects launch of new projects in coal gasification, petrochemical, and specialty chemical industries. The MRU business expects sustainable increased demand.

In the domestic nuclear projects, the customer is evaluating fleet procurement in lumpsum turnkey mode to speed up the implementation process. The projects relying on the foreign technology program continue to progress at a snail's pace. Internationally, nuclear energy is gaining traction based on the recent focus on net zero emission targets. The decommissioning and decontamination business opportunity is also picking up momentum due to retiring nuclear power plants in Europe / USA / Japan, etc.

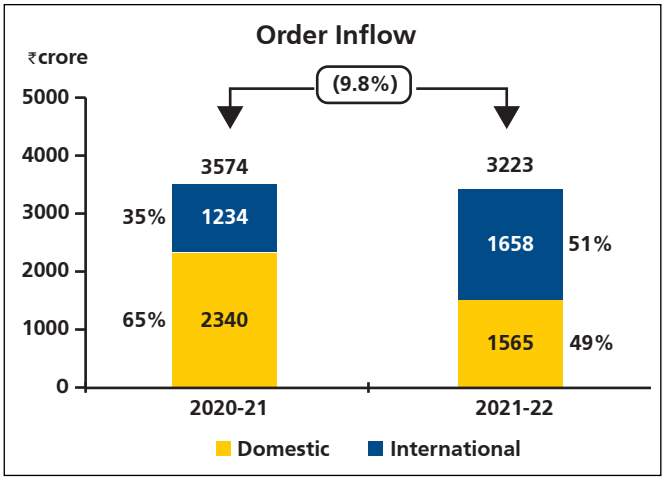
The demand for heavy forgings is largely dependent on the outlook of the Nuclear, Defence, Hydrocarbon, Thermal power, and Hydro power industry segments. In the Defence

Ethylene Oxide Reactor weighing 1157 MT for IOCL's Paradip Refinery

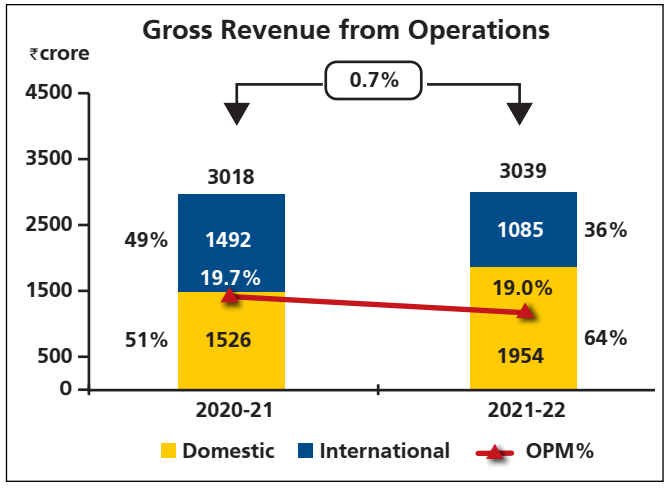
sector, LTSSHF has been certified as the only indigenous producer of large and heavy forgings and thick plates for the prestigious strategic program. The focus of the forgings business remains to fill the gap in the country with respect to manufacturing of critical heavy forgings.

The business remains positive in its outlook for order prospects. However, in view of the recent geopolitical situation, the commodity price escalations have created cost pressures on the awarded contracts / tenders in PSU sector due to longer bid to award exposure. Digital and organisation excellence initiatives will result in higher value creation on a long term basis.

Financial Performance of the Segment



The Heavy Engineering segment recorded an Order Inflow of ₹ 3,223 crore for the year ending March 31, 2022, lower by 9.8% as compared to the previous year, mainly due to deferral of orders in the Nuclear Equipment System business and Fertiliser & Petrochemicals business. The share of international orders increased to 51% from 35% in the previous year with receipt of a large value international order in the Refinery sector.



The segment's gross revenue of ₹ 3,039 crore remained steady compared to the previous year. The share of revenue from international operations has reduced from 49% to 36% in FY 2021-22 since the previous year had a higher execution of overseas refinery orders.

The segment's operating margin declined from 19.7% to 19%, mainly due to reduced export incentives under the revised scheme.

Funds employed by the segment as at March 31, 2022, at ₹ 1,584 crore, was lower by 8.9% over the previous year, mainly attributed to better collections and receipt of GST refunds.