100 1908-2008

WALCHANDNAGAR

We help launch India's dreams

DEFENCE, AEROSPACE, MISSILES

WALCHANDNAGAR INDUSTRIES LIMITED

www.walchand.com

Seth Walchand Hirachand
(1882 – 1953)
Visionary Industrialist, Patriot & Founder
Walchandnagar Industries Limited (WIL)

Seth Walchand Hirachand, the man who gave India her first Air, Sea and Land transport is considered one of the pioneers of "Industrial Revolution" in pre-independent India. With a vision to make India self-reliant, he established Hindustan Aeronautics Limited (presently HAL - India's first aircraft manufacturing company) in 1940 and Hindustan Shipyard Limited (HSL) - India's first maritime/shipbuilding company) in 1941, amongst various others. Both HAL and HSL were later nationalised by the Government of India.

It is with this patriotic spirit that runs in our DNA that WIL has proudly carried the legacy forward and has a proven track record as a key player in many of the landmark projects of national importance ranging from the depths of the ocean to exploring the outer space.

About WIL

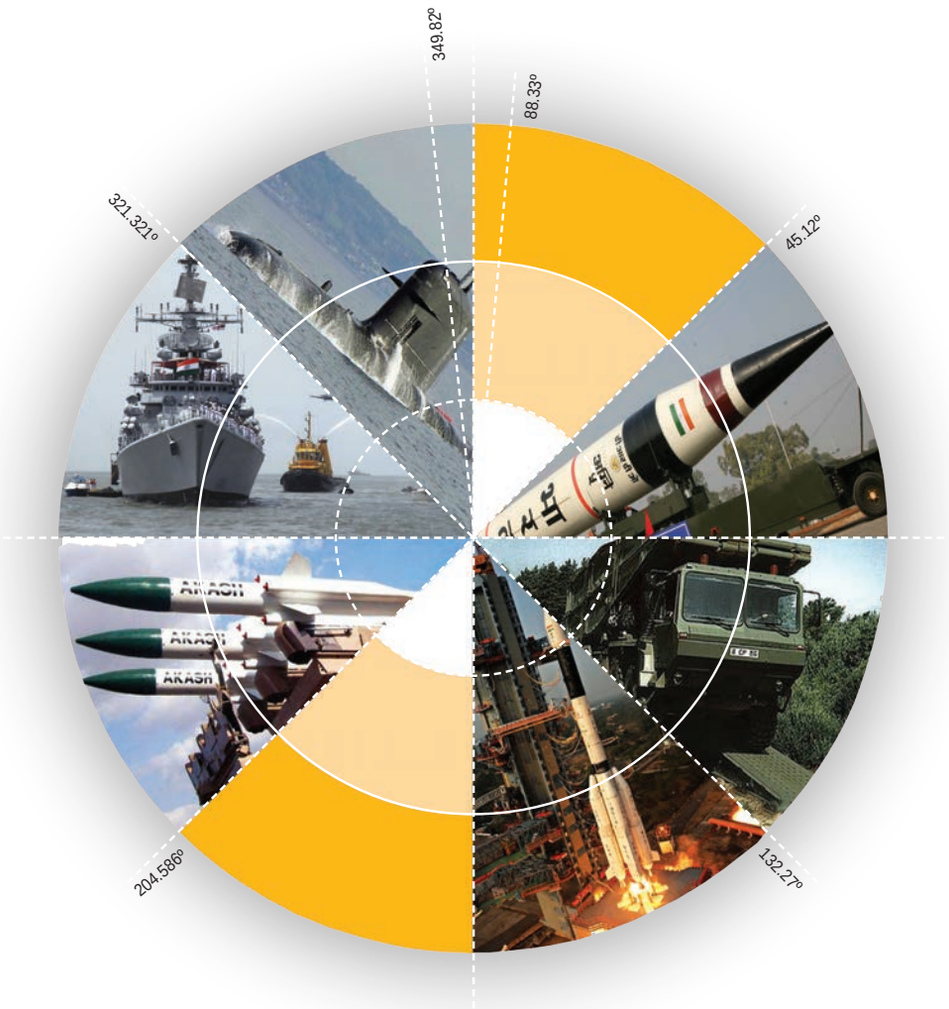
Walchandnagar Industries Limited (WIL) is an ISO 9001: 2008 certified company specializing in heavy engineering, high tech manufacturing and turnkey project execution, catering to customers across the globe. Backed by a strong foundation and a century old tradition of engineering excellence, WIL is known for its pioneering achievements and for its contribution to nation building activities.

WIL started its journey in the Sugar sector and established its name in the EPC / Turnkey business for the Sugar and Cement industries worldwide. The spirit of serving the nation, coupled with the manufacturing strengths of the organization gradually helped WIL diversify its portfolio in the high- tech manufacturing domain and WIL entered the Defence and Aerospace arena in early 1970s.

Today, with an unwavering commitment to customer satisfaction, WIL is one of India's leading heavy engineering companies for the manufacture and supply of custom-made, critical equipment in the Defence, Aerospace and Missile space and a reliable partner for all Govt. undertaken projects.

Armed with nationalism coupled with engineering excellence, the core competence of WIL lies in its ability to manufacture equipment for highly complex design configurations and handle a wide range of highly exotic materials such as different grades of Stainless steels (Austenitic, Martensitic, Super Duplex, Cladded etc.), Low alloy steels, High strength Maraging Steels, non-ferrous metals such as Copper Alloys, Aluminium Alloys.

Superior technical expertise and unmatched manufacturing capabilities enable WIL to meet stringent requirements and deliver equipment of unparalleled quality.



Portfolio of Offerings

Building a nation brick by brick is a task of generations and WIL has been doing just that.

With nation building at the core of its existence, WIL has been laying the foundation for a stronger India – on land, air, water, beyond (space) and beneath (underwater).

Over the years, WIL has been involved in manufacturing and supply of complex and critical equipment for the Defence, Aerospace and Missile sectors.

MISSILES
Strategic • Tactical

LAND SYSTEMS
Surface Launchers

GEARBOXES FOR NAVAL SHIPS
Frigates • Corvettes • OPVs • Naval Spares

SUBMARINES
Main Gearboxes • Weapons Systems • Aggregation of plant

LAUNCH VEHICLES

Missiles

WIL's association with the Defence Research & Development Organisation (DRDO) dates back to the 1980s. WIL is one of the very few industries that partnered with DRDO during the development phase of its ambitious missiles programmes viz. Akash & Agni.

It was more than two decades ago that DRDO approached WIL for their flagship projects. The combined expertise of the WIL engineers and the DRDO scientists as well as extensive R&D to develop critical manufacturing technologies to meet the design and stringent quality parameters helped Akash and Agni see the light of the day.

Since then, WIL is proud to own a status of being a dependable partner of DRDO for the manufacture and supply of components for Agni I to Agni V. Thanks to its relentless commitment to deliver, WIL has been the proud recipient of the Technology Absorption Award (1998).

WIL caters to missiles and systems for strategic and tactical projects.

Strategic Missiles

Projects Executed

When it comes to long range missiles, the buck stops at WIL. The first missile of the Agni series was tested in 1991, with WIL as a significant contributor.

Since then, WIL has been the only vendor to manufacture and supply motor casings for all the strategic missiles.

Unique Capabilities

- Qualified welders for butt and fillet welding of exotic materials like Maraging steels
- Heavy Duty hydraulic press and specially developed die/punches for pressing of domes of Rocket Motors. The technology of progressive punching and unmatched human skills
- Dust free and controlled environment enclosure for Auto TIG Welding of Rocket Motor casings and components
- Designed and developed special tooling like inter-changeabilty drill jigs and special purpose drilling
- Underground pit for Proof Pressure test and Burst testing test facility of Rocket Motors with strain gauge and acoustic emission measurements.
- State of the art NDE facilities for RT, UT, MPI, LPI and qualified inspectors

Tactical Missiles

Projects Executed

The development phase of Akash missiles demanded a strong understanding of the manufacturing technology in order to deliver based on the complicated design of more than a 100 missiles.

WIL successfully met up customer expectations and has manufactured and supplied over 200 combustion chambers till date.

During the productionisation phase, WIL has set up an exclusive infrastructure and facilities for manufacturing and supply of 20 sets of boosters and sustainers for Akash.

Unique Capabilities

- Dust free and controlled environment enclosure for integration of propulsion system Section IV & Section V of Akash Missile.
- Complete final machining of booster motor of Akash missile in single set up on 5 axes CNC machine.
- Welding of Titanium alloys for Sustainer motor of Akash missile on a semi auto TIG welding set up under controlled environment.
- Set up for Hydro Testing and Burst testing of Motors upto 260 bars with strain gauge measurements
- Qualified welders for butt and fillet welding of exotic materials like MDN 250 and Titanium.
- Portable CMM – FARO Arm for inspection of components and sub-assemblies.

Land Systems

Projects Executed

Kartik /CEASE Bridge

WIL is contributing to DRDO under the Ministry of Defence, Government of India, in development, manufacture and supply of aluminum alloy bridges.

Mobile Launcher – wagon mounted & trailer mounted

With a view to enhance contributions and become a solution provider, WIL entered into various surface launcher system programmes.

Currently, WIL is executing surface launcher projects with systems such as hydraulics, controls for the Agni programme.

Naval Ships

WIL's engineering excellence and contribution to Indian Navy over 5 decades has secured its place as a preferred partner to INDIAN NAVY for most of their main propulsion warship gearboxes.

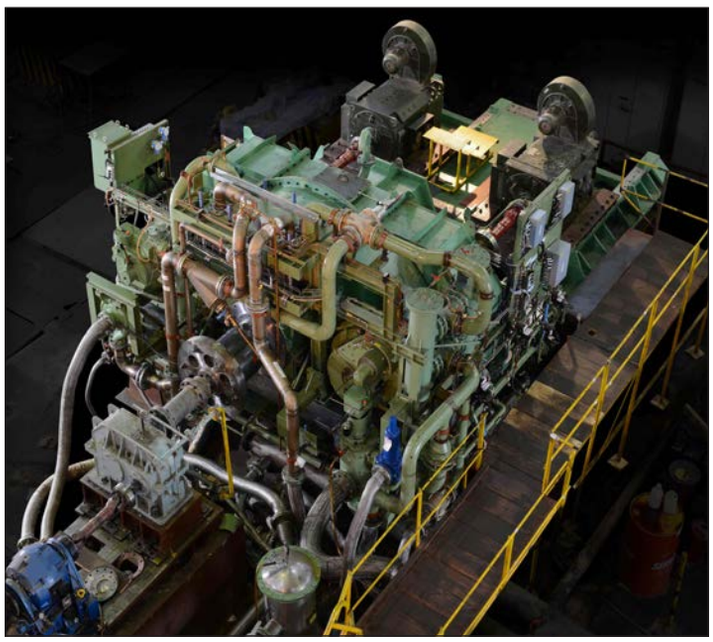
Supplied gearboxes to the following naval projects: Leander & Godavari class frigates, corvettes, lst (l), fleet tanker, survey vessel, ASW corvettes, submarine, etc – a total of 52 gearboxes

WIL absorbed the high speed heavy duty & marine gear technology through technical collaboration of over two decades with the world leader MAAG Gear Co Ltd, Zurich, Switzerland.

With an experience of over 5 decades and supply of over 52 marine gearboxes, WIL is capable of designing, manufacturing, installing & commissioning marine gearboxes of up to 50 MW. WIL is well conversant with NES, ABS, Lloyds, IRS and other relevant standards for marine applications.

All the 52 naval gearboxes supplied so far are working on ships to the entire satisfaction of the Indian Navy.

WIL Capabilities



- Optimized sizing of gears based on MAAG knowhow and International and Naval Standards
- Profile and lead correction on gears to ensure proper tooth contact on load
- Facility to carry out FEA for structural analysis, optimization, shock analysis, rotor dynamic analysis, etc
- Available software: KissSoft & KissSys, RBTS, ANSYS, Pro-Mechanica, Pro-E & Solis Works, etc
- Manufacturing capability to produce gears with highest class of accuracy with low noise
- Highly skilled and experienced manpower to produce high-class gearboxes

DET NORSKE VERITAS

STATEMENT OF COMPLIANCE

Certificate No. 2560-2013-CE-IND Rev 00
This Certificate consists of 3 pages

This is to certify that the product(s)

Gear Box

with name and/or type designation(s)

Model: GN, GS, GDN Series

Manufactured by

Walchandnagar Industries Ltd.
Walchandnagar, Tal. Indapur, Dist. Pune – 413114

has, on a voluntary basis, been assessed with respect to

the requirements for documentation specified in Annex VII, part B (a) of Council Directive 2006/42/EC on Machinery, as amended, and found to comply

Place and date:
Chennai, 2013-03-04

This Certificate is valid until:
2016-03-04

for DET NORSKE VERITAS AS

Iyer, Hariharan Sundareswara
Certification Manager

Sampath, Aishwarya
Project Responsible

Quality Focus

Rigorous quality control from raw material to finished product

- Mechanical testing lab for tensile, compression, FTT, impact, hardness, etc
- NDT: UT, radiography, MPT, DPT, etc
- Helium leak & vacuum testing
- 3D CMM, gear tester, optical tooling, profile projector
- Back to back testing facility with noise and vibration analysis
- WIL is on the approved list of quality surveillance agencies like Lloyds, ABS, IRS INDIAN NAVY, DNV, etc
- State of the art facility

Submarines

WIL has been contributing to the Nation's Strategic Program of Submarine building. WIL has developed special manufacturing processes, inspection & testing methods, exclusive facilities, strongly backed by engineering/design experts. Over the last 11 years, WIL has successfully met the program requirements.

WIL's contribution to this sector can be categorized into

- Engineering, manufacturing, supply and onboard installation of weapon systems
- Engineering, manufacturing, supply and onboard installation of plant equipment
- Design, manufacture, supply, testing and onboard installation of main transmission gearbox
- Aggregation & integration work related to the plant.

With demonstrated capabilities, WIL has earned the status of the preferred industry partner for such strategic programs.

Launch Vehicles

Projects Executed

From SLV3 to GSLV – Mk III, WIL has been an integral part of all space projects/ programs driven by Indian Space Research Organization (I.S.R.O). An association spanning over three decades, ISRO views WIL as a reliable manufacturer of booster motor casings, strap-on motors, nozzles, domes, handling rings and flex nozzle control tankages for different classes of Satellite Launch Vehicles.

The equipment manufactured by WIL, have been successfully used in the launching of "ROHINI", "SROSS", "IRS", G-Sat, TES, SRE, Chandrayan-I, Saral, SPOT-7 and other satellites.

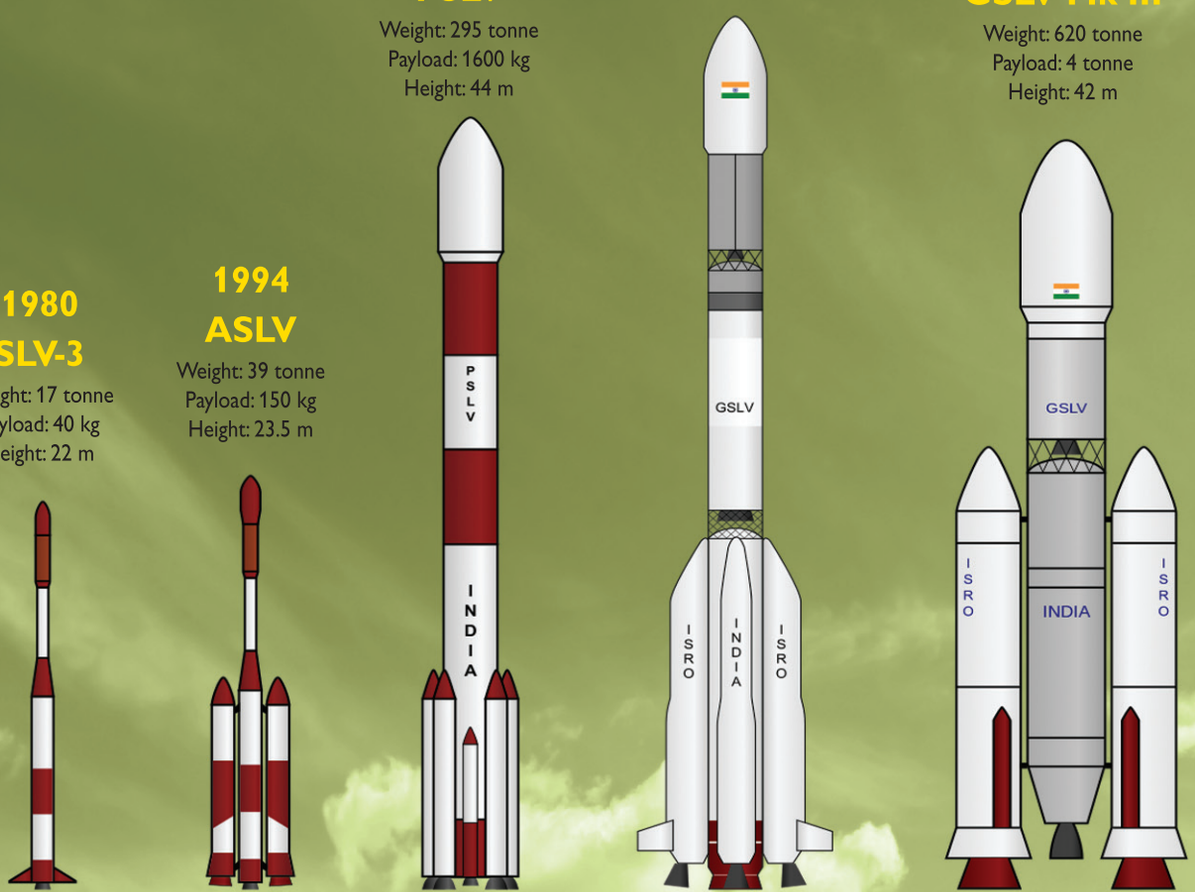
1980
SLV-3
Weight: 17 tonne
Payload: 40 kg
Height: 22 m

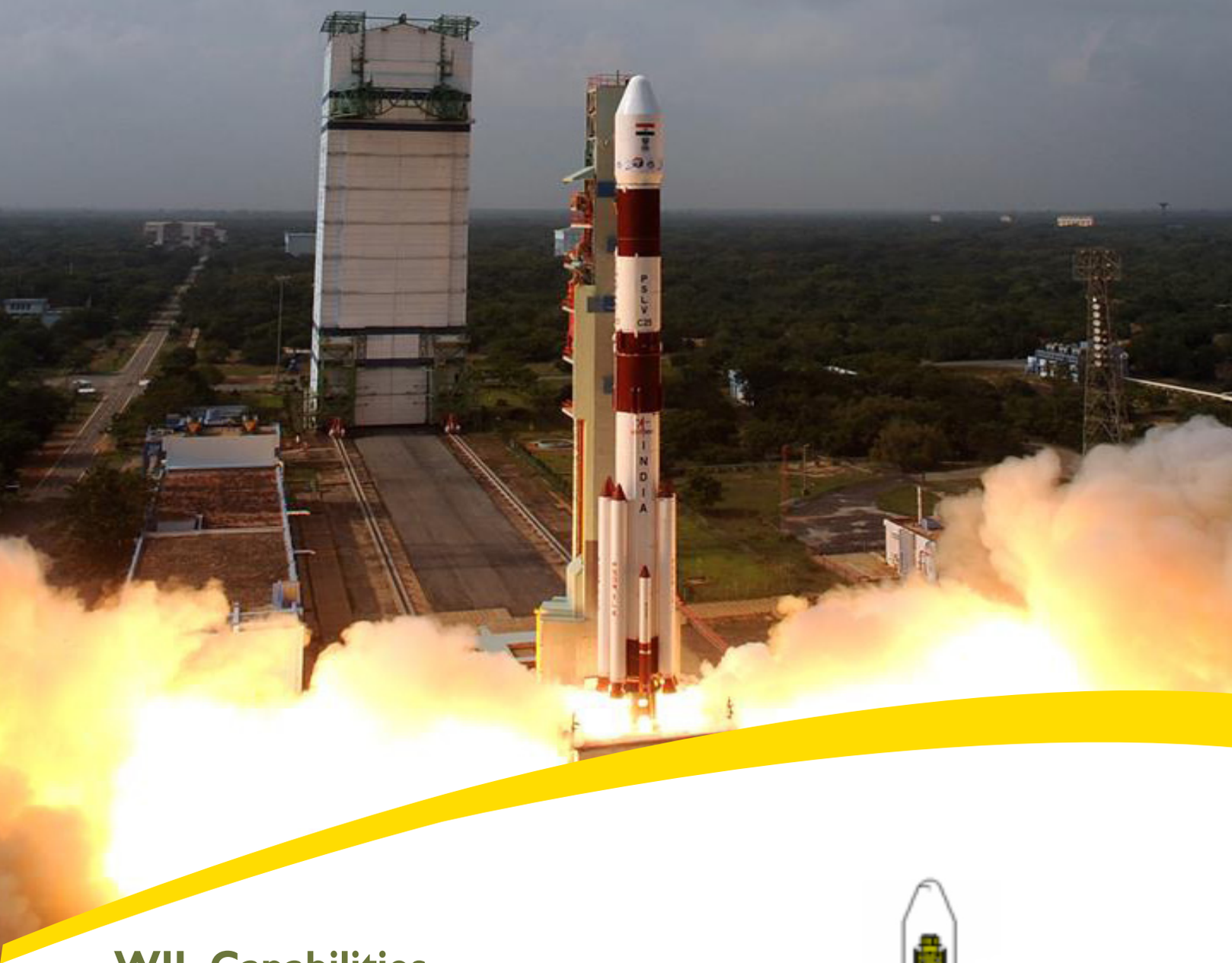
1994
ASLV
Weight: 39 tonne
Payload: 150 kg
Height: 23.5 m

1993
PSLV
Weight: 295 tonne
Payload: 1600 kg
Height: 44 m

2003
GSLV
Weight: 414 tonne
Payload: 2.5 tonne
Height: 49 m

2014
GSLV Mk III
Weight: 620 tonne
Payload: 4 tonne
Height: 42 m





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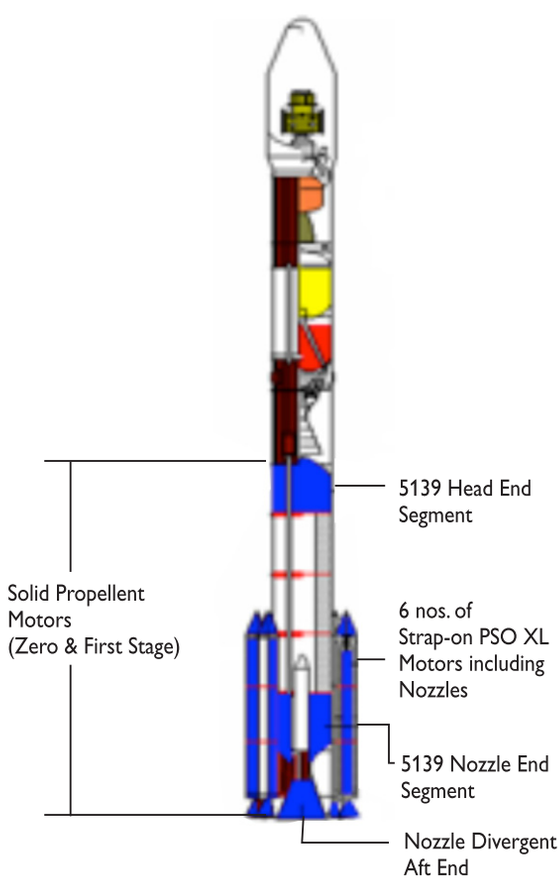

Manufacturing Facilities

Highlights

- Area under the crane: 56,000 sqmtr
- Single piece lifting capacity of 200T
- Plate bending capability up to 200 mm
- Sophisticated automatic welding systems capable of precision welding of exotic materials
- Sophisticated, multi-axis CNC machining centres, vertical boring and horizontal boring machines and gear machining/grinding centres.
- Complete in-house set up to carry out NDT such as x-ray, UT and destructive testing on test bars
- Large lathe for machining diameters up to 6.5 m
- Modern measuring instruments for precision measurement of dimensions
- Well-trained & experienced work force to operate the manufacturing set up

14 m heavy duty VTL

Critical Materials Handled

Cladded steel (stainless steel, titanium cladding), alloy steel (including varieties of Cr, Mo steels), stainless steels (austenitic, martensitic & super-duplex types), high strength maraging steel, vanadium steel, INCONEL, MONEL, INCOLOY, titanium alloys, aluminum alloys, cobalt alloys, etc

Series of heavy duty horizontal boring machines

Heavy duty plate bending machine

Heavy duty vertical boring machine

Large capacity lathe and
double column plano miller

Quality

Quality Assurance & Control

- At WIL, elaborate quality systems are laid down and practiced from design to commissioning of jobs to ensure that they are manufactured to meet the requirements of national & international standards such as ISO, ISI, ASME, IBR, ASTM, API, ANSI, DIN, BS, AGMA, TEMA, etc. Periodic quality audits are conducted to ensure effectiveness of the quality systems
- WIL has worked with reputed inspection agencies such as, LLOYDS, BUREAU-VERITAS, LINDE, CONSORTIUM, IBR, EIL, PDIL, ISRO, NPCIL, POWERGAS, HOLTEC, UHDE, RDL, INDIAN NAVY, BARC and have successfully executed projects to their satisfaction

Complying with Various Codes

- Fabrication of components complying to various codes of conformance such as ASME Sec VIII Div 1, Sec III NB, NC, ND, Sec I, Sec IX, Sec V, IBR, ISO, DIN and specific customer codes such as Nuclear Power Corporation
- Welding procedures and welders are qualified under the various third party inspection surveillances such as IBR, NPCIL, VSSC, EIL, LRIS, Bax Council, TEIL, BV, DNV, DRDL, HOLTEC, BARC etc

LRQA Business Assurance

- **100+** years of engineering excellence
- Presence in **3 continents** and over **20 countries**
- **40+** years of association with DAE, NPCIL, BARC, ISRO & Indian Defence
- **6500+** gearboxes supplied globally

Why Choose WIL

- Specialized skillsets for critical jobs
- Unmatched engineering expertise
- Quality focus
- Quick delivery times
- Ability to handle complex jobs
- Fully in-house manufacturing facility
- Ability to handle exotic materials (ferrous/non-ferrous)
- Stringent testing procedures
- Cutting edge manufacturing technologies
- Customised solutions
- Ability to grasp and execute critical requirements

Defence Research & Development Organisation
Ministry of Defence

TECHNOLOGY ABSORPTION AWARD
1998

M/S WALCHANDNAGAR LTD.

M/s Walchandnagar Industries Limited (WIL) a leading private sector industrial firm has made significant contributions in fabrication of special hardware for multiple aerospace and missile applications. Special missile launchers and combustion chambers fabricated based on DRDO designs are outstanding work of technology absorption and realisation. The innovative fabrication techniques and process using special alloys like margarin steel and titanium alloy added to the preformance of the system. This industry situated in a remote place has shown techniques of cost-effective fabrication of high technology products with excellent trained manpower.

In recognition of the outstanding contributions made by the firm in absorbing technology developed by DRDO and productionising, the DRDO confers the 'Technology Absorption Award' to Walchandnagar Industries Limited for the year 1998.

(Dr. A.P.J. Abdul Kalam)
Scientific Adviser to Raksha Mantri

Future Plans

Missile Airframes

WIL has a strong presence in missile motor casing. It is now entering adjacent areas of missile airframes to maximize brand presence. WIL has targeted upcoming programs in large tactical missile segments. It is developing specialized machining & welding skills to work in non-ferrous materials.

Naval Transmission System

WIL is extending its gear box capabilities to enter and grow into transmission components for naval ships. WIL is also expanding in the area of Propulsion system integration for design, manufacture, supply and integration of total Propulsion system excluding Prime mover.

Aero Structures

WIL is forming partnerships and getting itself accredited for entry into the aero-structure market . It is upgrading processes and skills to work on non-ferrous materials. It is also expanding material handling skills for next generation materials such as composites.

WIL has initiated strategic growth plans in both domestic and international markets and has planned significant investment towards capacity expansions through forward and backward integrations.

With vast experience, unmatched skills and state of the art manufacturing facilities, WIL is poised to play a larger role in supplying defence and space equipment/ products to domestic and international markets.

WIL Success Stories

WIL is amongst the first in the country to manufacture major critical components for:

- **INS Arihant**, the first Indian-built nuclear submarine
- **Chandrayaan-I**, India's first Moon mission
- **Mangalyaan**, India's Mars mission
- **Agni V**, India's ICBM programme
- Satellite launch vehicle for ISRO
- One of the largest optical telescopes in India
- Main propulsion gearboxes for Indian-built navy frigates

OTHER BUSINESS AREAS

Boiler • Cement • Foundry • Sugar

Mining & Metals • Nuclear • Precision Instruments

Marketing & Projects Office

WALCHANDNAGAR INDUSTRIES LIMITED

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Ariel view of Walchandnagar manufacturing facilities