

LASERBOND®
PRODUCTIVITY | INNOVATION | CONSERVATION

Capability STATEMENT

LEADERS IN BETTER THAN NEW- TECHNOLOGY



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LASERBOND®
PRODUCTIVITY | INNOVATION | CONSERVATION

SERVICES DIVISION

Repair and refurbishing worn or damaged machine parts

PRODUCTS DIVISION

Specialised surface engineered components for OEM partners and end users.

TECHNOLOGY DIVISION

Design, manufacture, licensing & support of tailored cladding systems

RESEARCH & DEVELOPMENT

New cladding materials and application technologies

LaserBond Facilities



Capability Information

LaserBond Limited is an Australian publicly listed company (ASX:LBL) specialising in surface engineering, reclamation, engineering, precision machining and fabrication. We have been in operation since 1992, commencing operations as HVOF Australia Pty Ltd.

We were the first to design, build and operate a commercial laser cladding system in Australia. LaserBond manufactures, repairs, reclaims and enhances the performance of high wear, critical metal components in a range of capital intensive industries.

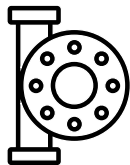
We operate under three business divisions including:

Services



The application of a range of surface engineering technologies and techniques for surface reclamation and re-engineering of high wear metal components. We also undertake dimensional restoration and repair of damaged or worn machine parts. Our workshops are equipped with a wide range of high capacity engineering machinery, that supports a comprehensive surface engineering facility.

Products



We research, design, develop and manufacture specialised high wear resistant components and equipment. Some of our products include steel mill rollers, wear rings, sleeves and rotary feeders. These are sold locally and exported to global end users and OEM's.

Technology



We design, manufacture, install, commission and licence tailored LaserBond® cladding cell systems throughout the world. Our licensees benefit from our long term, operational experience and investment in research and development and round the clock support to deliver superb outcomes for their customers.

“ We were the first to operate a commercial laser in Australia. LaserBond manufactures, repairs, reclaims and enhances the performance of high wear, critical metal components in a range of capital intensive industries.”

In addition to the specialised automation, design and manufacturing skills needed for building the LaserBond® equipment, we have extensive hands-on operational experience in delivering high performance outcomes using the following technologies:

- › LaserBond® cladding
- › High pressure HVOF thermal spraying
- › HVOF thermal spraying
- › Plasma spraying (especially ceramics)
- › Wire Arc spraying
- › Combustion wire and powder thermal spraying
- › Spray & Fuse coatings
- › Plasma Transferred Arc (PTA) weld overlay and hard facing
- › Conventional (MIG/TIG/MAG) weld overlays and hard facing
- › Polymer and polymer composite coatings
- › Specialised and automated welding
- › Wear, corrosion and temperature resistant alloys
- › Metrology - wear laboratory
- › Metallographic laboratory investigations
- › Vacuum/ gas quenched and conventional heat treatment
- › CNC and conventional milling, turning and boring
- › Large capacity vertical and horizontal machining
- › Cylindrical, surface and internal grinding
- › Super finishing
- › Specialised machinery manufacture.

At LaserBond we determine the characteristics of the wear affecting the surface then define the best cladding metallurgy and process to reclaim the equipment part. Our in-house capabilities allow us to reclaim components at far less cost and often in far less time than a new replacement.

Our cladding materials offer 'better than new' characteristics; tailored for improved resistance to corrosion, erosion, abrasion and impact conditions. We research, design and manufacture specialised new components to provide improved service life in challenging conditions.

➤ Our Work and Equipment

“ LaserBond manufactures, repairs, reclaims and enhances the performance of high wear, critical metal components in a range of capital intensive industries. ”

Cladding and Thermal Spray Surfacing Materials

- Tungsten Carbide, Chrome Carbide and other cemented Carbides
- Stainless steels - Martensitic, Austenitic, Duplex & Precipitation hardened
- Nickel alloys - Inconel, Hastelloy C and Ni Cr alloys
- Cobalt alloys - Stellite and Triballoy
- Bronzes and Copper alloys e.g. aluminium bronze
- Tools steels - H13, M2 and Vanadium steels
- Borides
- Cermets
- Ceramics - Chrome oxide, Zirconia, Aluminium oxide, Titanium dioxide and blends
- Polymers (PTFE, PFA, FEP, epoxies, nylon and rubber)
- Polymer-metal composites

The following are examples of our work:

- Valves and seats
- Pump housings, impellers, shafts and shaft sleeves
- Conveyor shafts
- Mining and drilling equipment
- Steel mill rollers
- Bearing and seal journals
- DTH Hammers manufacture
- Pump bodies and rods
- Hydraulic cylinder rods
- Industry rollers
- Drilling equipment
- Pump sleeves, impellers, volutes
- Pump valves and piping
- Bushes and shafts
- Wear plates
- Axles
- Rail tracks
- Various drilling components
- Mining and mineral process equipment



Equipment

We have a large range of equipment for machining, grinding and finishing including:

- CNC lathes to Ø400mm x 2200mm between centres
- Conventional centre lathes to Ø1600mm x 8000mm between centres
- Horizontal machining centres including CNC horizontal boring and facing to 4000 x 2300 x 2300mm
- CNC milling machines to 3000mm x 900mm x 900mm
- Cylindrical grinders to Ø1250mm swing x 5000mm between centres
- CNC Vertical lathe boring to Ø3000mm x 2500mm
- Internal and planetary grinders
- Surface grinders
- Superfinishing to mirror finish on cylindrically ground components Ø500mm x 5000mm between centres.

Surface Engineering

Over 30 years of leadership in thermal spraying and being one of the founders in industrial laser cladding technologies, makes us specialists in surface engineering.

We have developed, patented LaserBond® deposition and HP-HVOF processes which offer unique surface characteristics and metallurgy. These are supported by large capacity CNC and conventional machining equipment, highly skilled people and quality workmanship.

There are a wide variety of repair and refurbishment options on offer. We also have the capability to analyse, design and manufacture components to original equipment manufacturer (OEM) standards, and include improved wear-life characteristics.

LaserBond® Cladding

We have a range of high power, flexible laser systems, which allows us to process a large range of components sizes; very small or large (up to 2100mm dia. x 6100mm lengths).

- 9 x High Powered lasers (3 x 6kW, 4 x 8kW, 1 x 12kW and 1 x 16kW) within the group, as follows:

NEW SOUTH WALES:

- 1 x CO2 LaserBond® cladding cell with integrated high capacity gantry work processing centres.
- 1x 8kW diode LaserBond® cladding cell with integrated 6 axis robotic work processing, coupled with a 2 axis manipulator centre capable of cladding complex geometries and internal bores.
- 1 x automated 8 kW multi robot LaserBond® cladding cell, incorporating robotic pick and load system with measurement capability and integrated thermal control.
- (Q2 2022) – New 6kW diode LaserBond® cladding cell with high speed cylindrical shaft capacity designed and optimised for the E-Clad™ and other rapid cylindrical applications up to 3.5m in length.
- Internal cladding heads capable of internal diameters of 75mm at 500mm depth, to 270mm ID at 1000mm depth.

VICTORIA:

- 1x 8kW diode LaserBond® cladding cell with integrated 6 axis robotic work processing coupled with a 2 axis centre capable of cladding complex geometries and internal bores (Q3 2021) providing up to 10T capacity and handling up to 2m Diameter and 6m in length.

“ 30 years of leadership in thermal spray and founders in industrial cladding, LaserBond are specialists in surface engineering. ”

SOUTH AUSTRALIA:

- 1 x 16kW diode LaserBond® cladding cell with integrated high capacity gantry work processing centre, rotation and tilt axes for up to Ø1600mm x 6000mm
- 1x 8kW diode LaserBond® cladding cell with an integrated 7 axis robotic manufacturing centre plus twin 10 ton multi axis manipulators.

QUEENSLAND:

- 1 x 12kW diode laser with integrated rotator and gantry system
- 1 x 6kW diode laser with integrated rotator and gantry system

Thermal Spraying

We have 7 x booths equipped with robotics and component manipulation up to 1600 dia. x 4000mm length.

Additionally, we have an HP HVOF (x4), HVOF (x2), Arc spray (x8), Air Plasma spray, combustion wire and combustion powder spray systems.

Heat Treatment

We have 3 x Abar- Ipsen positive pressure quenching vacuum furnaces and 2 air recirculating tempering furnaces, providing state of the art heat treatment for air hardening materials to 1300 degrees Celsius. Cooling pressure up to 6 Bar. Capacity to 600 x 600 x 900 mm.

Traction and Release Coatings

LaserBond is a licensee of a range of traction and release coatings developed by Plasma Coating International. Coatings combine a thermal spray bond coat with a polymer topcoat. Properties inducing; durability, wear resistance, traction and release, hydrophobic, antimicrobial and antifungal.

Metallographic Laboratory

Equipped and staffed to carry out testing and examinations, including metallographic characterisation and chemical analysis.

- JEOL JSM-IT200 Scanning Electron Microscope (SEM) with Energy Dispersive X-Ray Spectroscopy (EDS)
- Optical microscopes
- Sample preparation equipment
- FARO portable coordinate measuring machine for precise measurements and reverse
- engineering restoration projects
- Rockwell hardness testing
- Vickers microhardness testing to ASTM E384

Products, Technology and Training

Our People

We pride ourselves on our team of highly skilled, experienced and qualified industry experts. Qualifications include, but are not limited to:

- Certificate 4 - Mechanical Engineering (Machining and Fabrication)
- Degrees in Mechanical and Electrical Engineering
- Masters Degrees in Business Management
- PhD's in Mechanical Engineering

Training and Development

Our leadership in surface engineering is maintained through an ongoing commitment to internal training and upskilling. All shop floor, sales, administration and management team members are multi skilled and familiar with all of our services, products and technology. Some further examples include:

- Our annual intake of apprentices
- Trade assistants becoming certified tradespeople
- A dedicated Learning and Development Manager to coordinate all workplace training and development, including our apprentice program.
- Formal documentation and training in surface engineering technologies and techniques
- Robotics, automation and advanced manufacturing programming.

Manufactured Products

At LaserBond we research, design, develop and manufacture specialised long wear life/ high performance consumables that contain our patent technology.

Current products include steel mill rollers, wear rings, sleeves and bark blower rotary feeders. We have other exciting innovations currently in the research and development phase.

Proprietary Technology Licensing

LaserBond® cladding or HVOF systems licensing can be acquired from LaserBond via tailored equipment, software, training and support packages. Licensing offers a range of complete multi-component turnkey solutions to OEM's and service providers seeking to deliver greater customer value in their target markets.

Tailored packages typically include LaserBond® or HP-HVOF hardware/ software integration supported by the necessary know-how, training, installation, onsite commissioning and ongoing technical support. We provide fully configured "production ready" systems and open access to many years of the exacting, unique experience and support required to deliver the shortest possible timeline from equipment purchase to return on investment.



> Industry Collaboration and Safety

“ We are committed to a zero harm workplace. Safety is a key component of performance for customers and major project supply chains. ”

Performance and Reliability

Our focus is always to deliver in full, on time and to specification for our customers. We have a track record of strong performance, reliability and timeliness. Supervisors work closely with Lean Manufacturing professionals, an excellent Quality Assurance System and an ERP system with Risk Management. Large projects move through their processes efficiently and reliably.

Safety Management System

We are committed to a zero harm workplace. Safety is a key component of performance for customers and major project supply chains. Our systems integrate with site and customer safety requirements. A disciplined approach to risk management and effective safety leadership is rewarded by continuous improvements in safety performance records. The system includes:

- ▶ Published health and safety policy (please refer to our website for more information)
- ▶ Certified workplace health & safety (BS OHSAS 18001 & AS/NZS 4801:2001) and PAS 99 Integrated Management Systems
- ▶ A senior manager is responsible for safety management
- ▶ Trained First Aid Officers
- ▶ Ability to track and report on safety statistics
- ▶ Workplace health and safety representatives

Lean Manufacturing

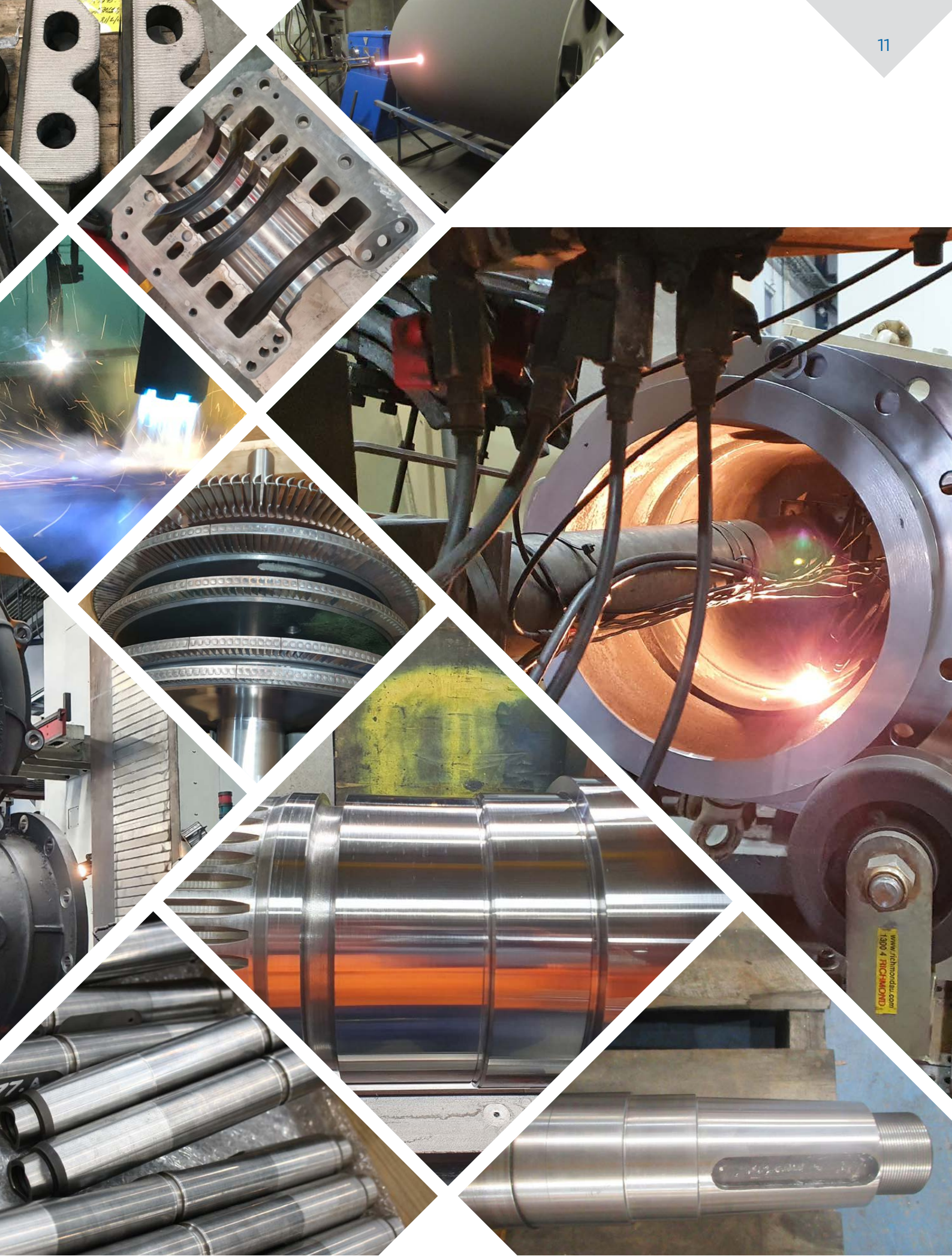
Our personnel are trained and facilities designed to incorporate Lean 5S manufacturing. A methodical team-based approach to organising the work space, which ensures the processes are arranged ergonomically, efficiently and is capable of a repeatable, quality output.

Strict process controls deliver measurable improvements in quality, on-time delivery, waste and organisation culture. Lean 5S is applied throughout our company from the front desk to the despatch dock.









Environment, Risk and Quality

Environment Management Systems

Environment protection is extremely important to us. Efficient internal processes, monitored utilities usage and waste management are fundamental principles to internal operations. We believe that our customers also benefit from these practices.

It requires approximately 30 gigajoules of energy to produce 1 tonne of steel. We can typically reclaim a worn component manufactured from that 1 tonne of steel using only 1 gigajoule of energy, ensuring reclaiming and remanufacturing is cost effective and also more beneficial for the environment. The system includes:

- › Environmental and safety policy statement (please refer to our website for further information)
- › Certified Environment (ISO 14001:2004) PAS 99 Integrated Management Systems
- › A senior manager is responsible for environmental management

Risk Management

- › Risk management matrix to identify and assess potential risks
- › Risk management system and procedures to manage the actual risk (risk assessment procedures for work on site or at customers' premises)
- › Compliance with Local, State and Federal Government regulations

Insurance Coverage

- › Public Liability Insurance of \$20,000,000
- › Workers Compensation
- › Industrial Special Risks Insurance
- › Business Interruption Insurance

Quality Management

Robust quality assurance systems are fundamental for our customers and us. For capital intensive industries where downtime and throughput have significant cost implications, it is clearly understood that products and services must meet or exceed specifications. The systems we have in place includes:

- › Published quality policy (please refer to our website for further information)
- › Independently certified Quality (ISO 9001:2008) PAS 99 Integrated Management Systems
- › Test inspections and test plans
- › A dedicated Quality Manager and support team is responsible for all aspects of quality management
- › Non-conformance records (NCR) tracked and managed in M1 ERP
- › Procedures for assessing and approving the quality systems of subcontractors.



➤ Communication and Reporting

Capacity Levels

- Over 100 employees across Australia and globally
- Revenue in excess of \$25M per annum
- Facilities have the ability to scale up workforce levels to manage large projects and accommodate additional shift work when required.

Area of Operation and Supply

We operate throughout Australia and export globally. We have customers in North America, South America, Africa, Asia and Europe.

Proactive Reporting

Consistent and superior customer service is our priority. Effective and proactive reporting occurs via our M1 Enterprise Resource Planning system, whereby all shop floor, supervision and management teams can monitor electronic job status reports in real time, as well as remotely from a customer site.

Face-to-face weekly toolbox, production and sales meetings take place to ensure that any delays, changes or issues affecting delivery can be managed and communicated promptly to our customers.

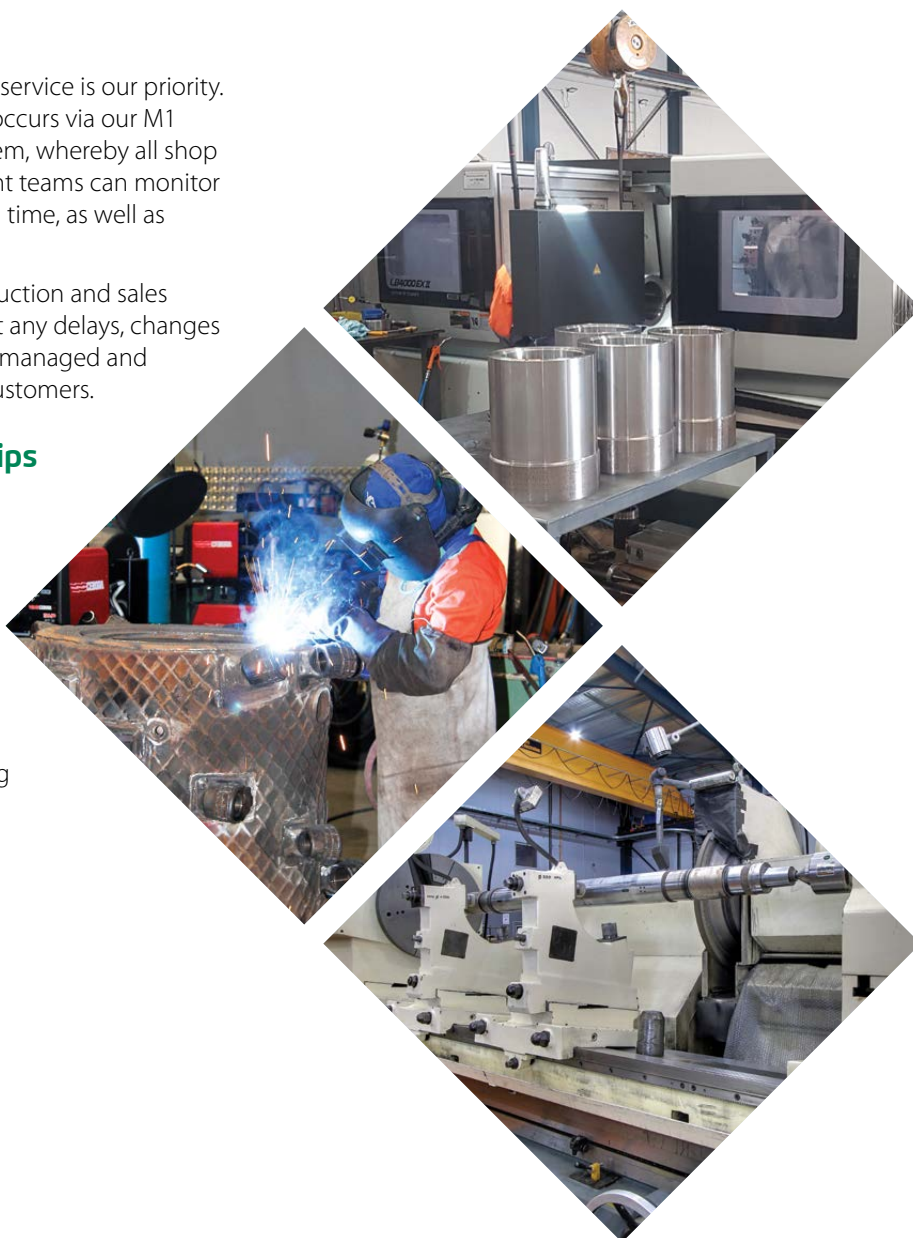
Key Customer Relationships

We have developed long term, business relationships with quality industry partners by undertaking collaborative research and development to create tailored solutions to wear life problems. Some of these partners include:

- Alcoa World Alumina
- Androck Engineering and Mining
- BHP Billiton
- BlueScope Steel
- Flowserve Pumps
- FLSmidth
- Komatsu
- Liebherr
- Nucor Steel
- Sandvik Australia
- Weir Minerals
- WesTrac

Responsiveness

The cost of production downtime, caused by breakdown or extended shutdown time is always top of mind for us. Our team are highly responsive and have the capacity to provide our customers with quick and reliable quotes, undertake work efficiently and work extended hours to reduce downtime costs. We also offer 24-hour contact access to key personnel and facilities. Our customers have access to dedicated after hours' contacts and we have personnel on hand to manage emergency and breakdown work 24-hours a day, 7 days a week.



Innovation and Collaboration

Industry Leadership

We have held an industry leadership reputation since the early days of metal reclamation and protection. From inception in 1992 with thermal spraying, then in 1999 by introducing laser cladding. High Pressure HVOF and LaserBond® cladding are relatively young, therefore new applications continue to be researched and developed.

R&D Team

Our surface engineering innovations have resulted in the development of new processes, equipment and patents. The R&D team is fully equipped with an in-house laboratory to conduct testing and examination including metallographic imaging and characterisation, hardness testing and chemical analysis. One of the main tools for this research is our Scanning Electron Microscope (SEM).

The SEM allows for investigation of surface engineered layers and base material metallurgy down to the nanoscale. Our lab is routinely used for the optimisation of coatings and overlays, quality control of incoming materials, reports to customers on new applications and materials, and failure analysis as required.

Examination of the effects on substrate metallurgy of the coating and cladding operation is routinely performed to ensure component integrity, or structural properties are not compromised.

Industry Associations

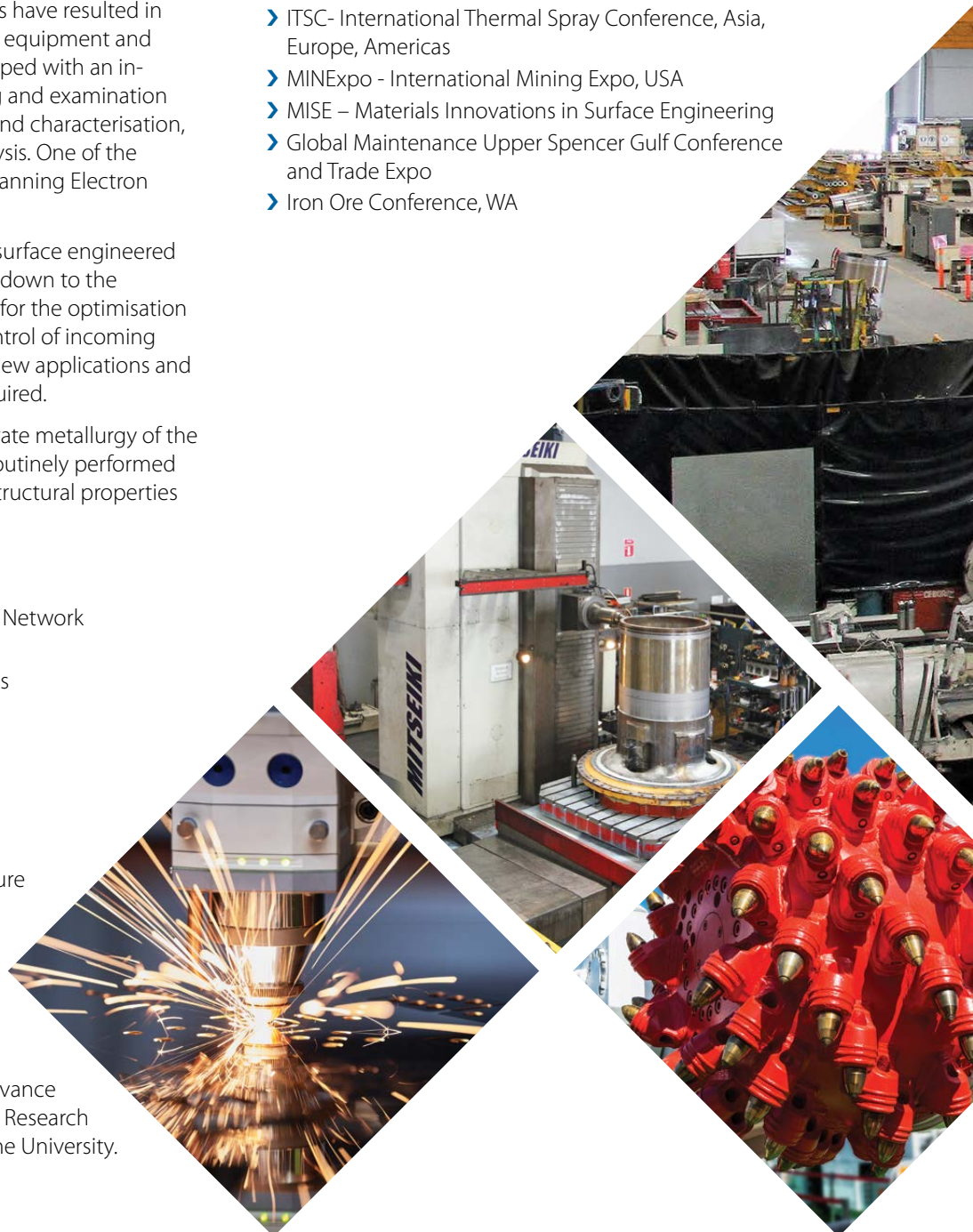
- AIDN Australian Industry Defence Network
- AustMine
- ASM American Society of Materials
- LIA Laser Institute of America
- NSW Business Chamber
- Weld Australia

R&D Collaborations

- University of South Australia - Future Industries Institute (FII)
- Monash University - Institute of Railway Technology (IRT)
- ANSTO - The Australian Nuclear Science and Technology Organisation
- SEAM - Surface Engineering of Advance Materials through ARC (Australian Research Centre) and with FII and Swinburne University.

Industry Presence, Speakers and Exhibitors

- AIMEX - Asia Pacific's International Mining Exhibition, NSW
- QME - Queensland Mining Expo, QLD
- AOG – Australasian Oil and Gas Exhibition and Conference, WA
- IMARC - International Mining and Resources Conference, VIC
- ITSC- International Thermal Spray Conference, Asia, Europe, Americas
- MINExpo - International Mining Expo, USA
- MISE – Materials Innovations in Surface Engineering
- Global Maintenance Upper Spencer Gulf Conference and Trade Expo
- Iron Ore Conference, WA





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Quality 9001,
Environment 14001,
Health & Safety 4801