LASERBOND®

PRODUCTIVITY | INNOVATION | CONSERVATION

COMPOSITE CARBIDE STEEL MILL ROLLS

IRD ASSOCIATION, INC – DURANT 2019

(DESIGNING THE FUTURE THROUGH INNOVATION)

Wayne Hooper – CEO

Peter Mutty – International Sales Manager

A BRIEF OVERVIEW OF LASERBOND LTD

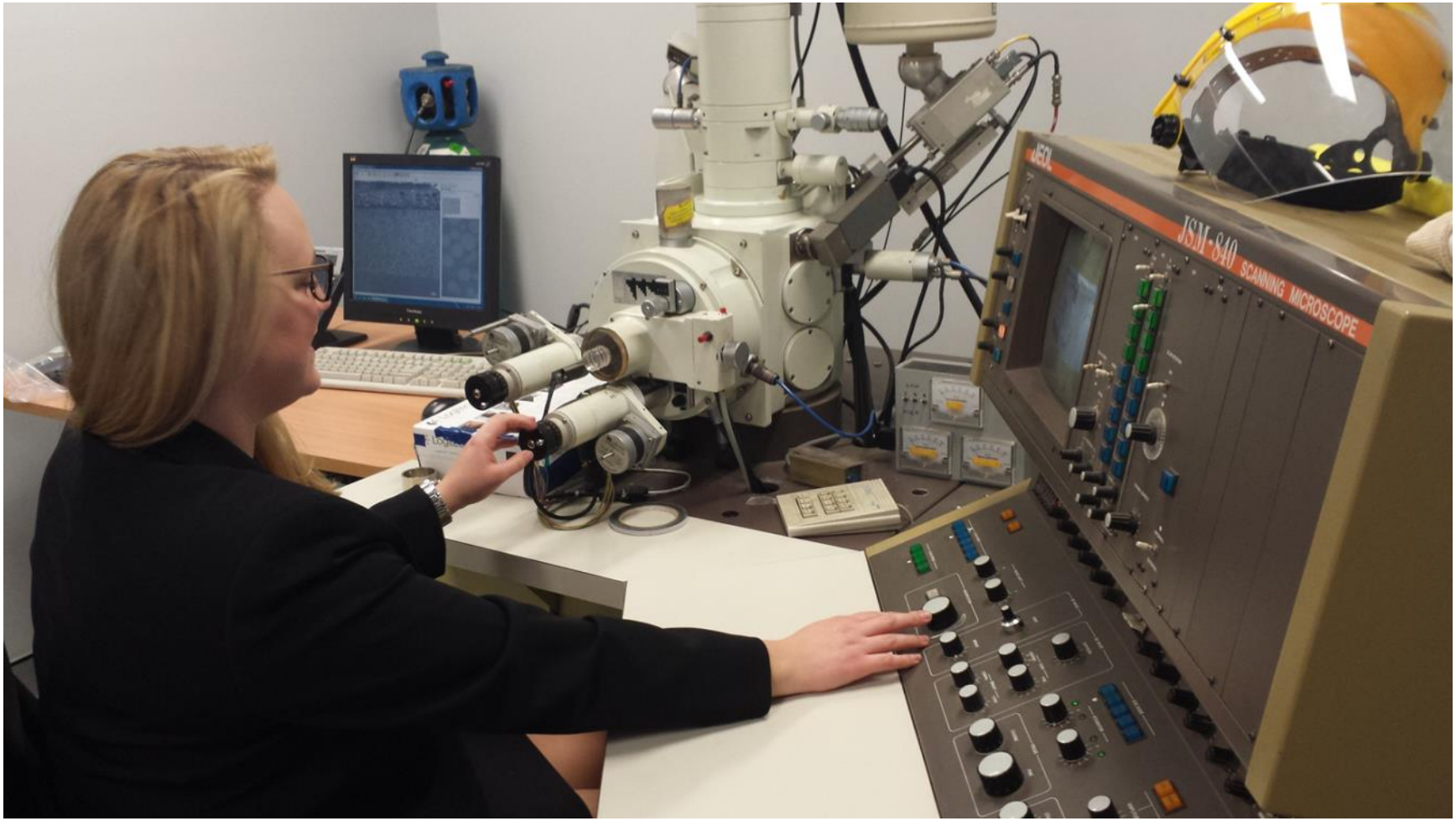
- Commenced business in 1992 as HVOF Australia, based in Sydney, Australia (family business)
- Focused on extending the life of wearing components in a range of industries including Earthmoving, Mining, Steel, Aluminum, Power Generation, Fluid handling…
- In late 90's, founders foresaw a need for a process offering low heat input combined with a metallurgical bond to deliver highest performance – LASER!
- Built first CNC controlled LaserBond® Cladding system in-house, commissioned in May 2001
- Listed on the ASX in 2007 as LaserBond Ltd to finance growth of business.
- Now running 5 LaserBond® Cladding Systems. Two facilities covering 70,000 sq ft. Employing approx 80 people. Market Cap circa US$55m.
- 3 Divisions: Products, Technology, Services
- In-House Lab (SEM). QA - ISO 9001. Strong R &D (Uni ToF-SIMS) Mapping

LASERBOND – SYDNEY SHOP & HEAD OFFICE

58,000 sq ft. 70 Employees.
2 Shifts x 6 days/wk.
Metallographic Laboratory – Development of parameters.
Laser. HP HVOF. Plasma.

Large Capacity. Excellent Overhead Craneage. Cylindrical Grinding. Conventional Turning.
CNC Milling/Machining.
Vacuum Furnace Heat Treating

MATERIALS LABORATORY – PROCESS, MATERIAL & PARAMETER OPTIMISATION

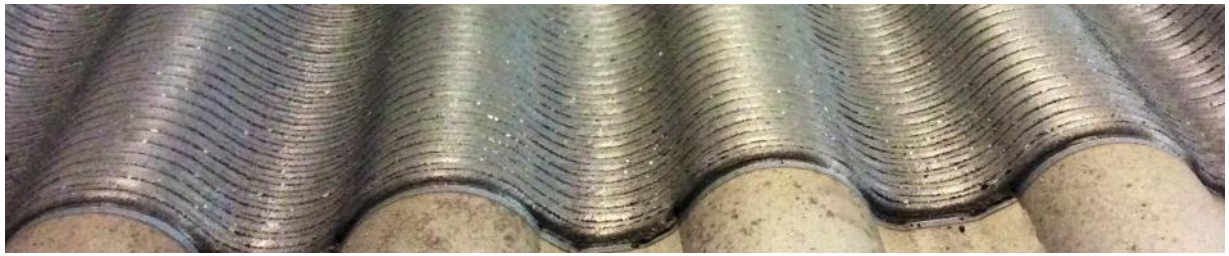


WHY LASERBOND® CLADDING?

It's about controlling the heat input….

- Welded (metallurgical) bond
- Precisely controlled energy source (Laser)
- Very low heat input
- Minimal dilution
- Minimal metallurgical side effects (HAZ) on substrate
- Materials considered "unweldable" can be laser clad

Can produce high performance layers for highly stressed operating conditions



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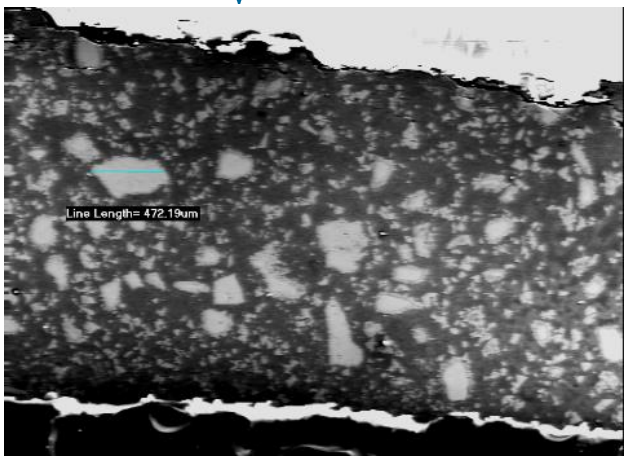
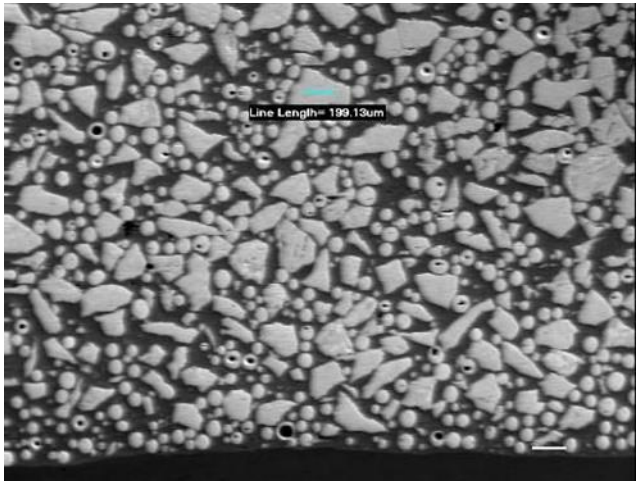
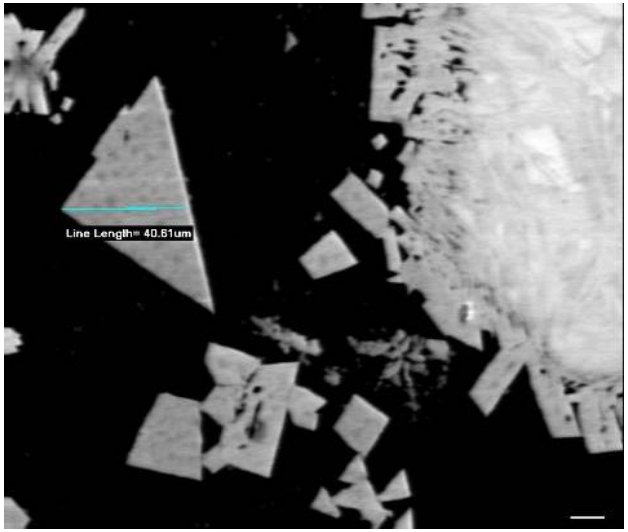
Composite Carbide by Plasma Transferred Arc (PTA)

Composite Carbide by LaserBond®

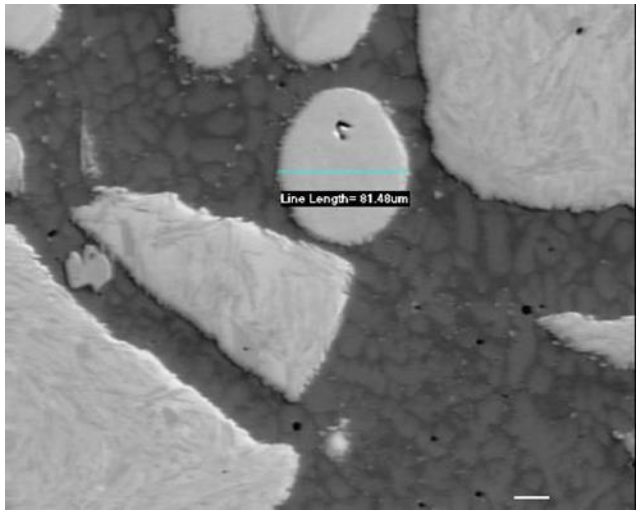


50x magnification





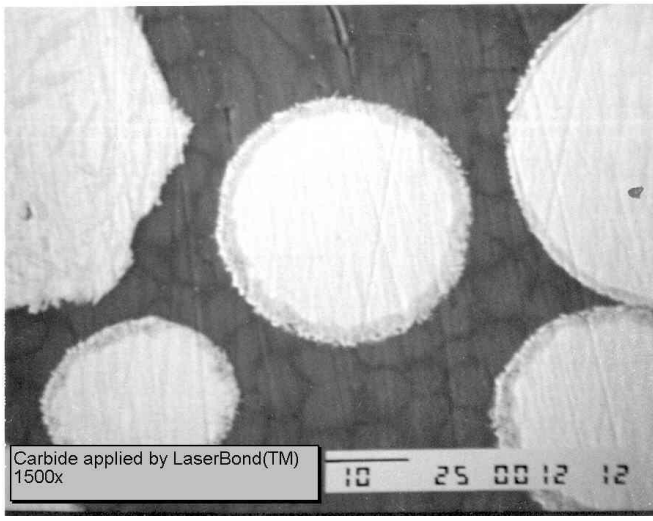
1000x magnification



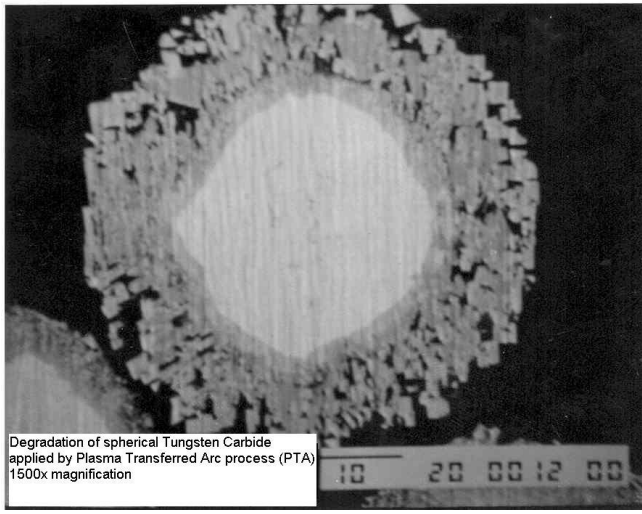
OUR NEW SCANNING ELECTRON MICROSCOPE
INVALUABLE TOOL FOR PARAMETER OPTIMISATION

JOEL JSM-IT200 SEM

Metallurgical bonding between tungsten carbide and nickel matrix



Decomposition of tungsten carbide in a PTA deposit



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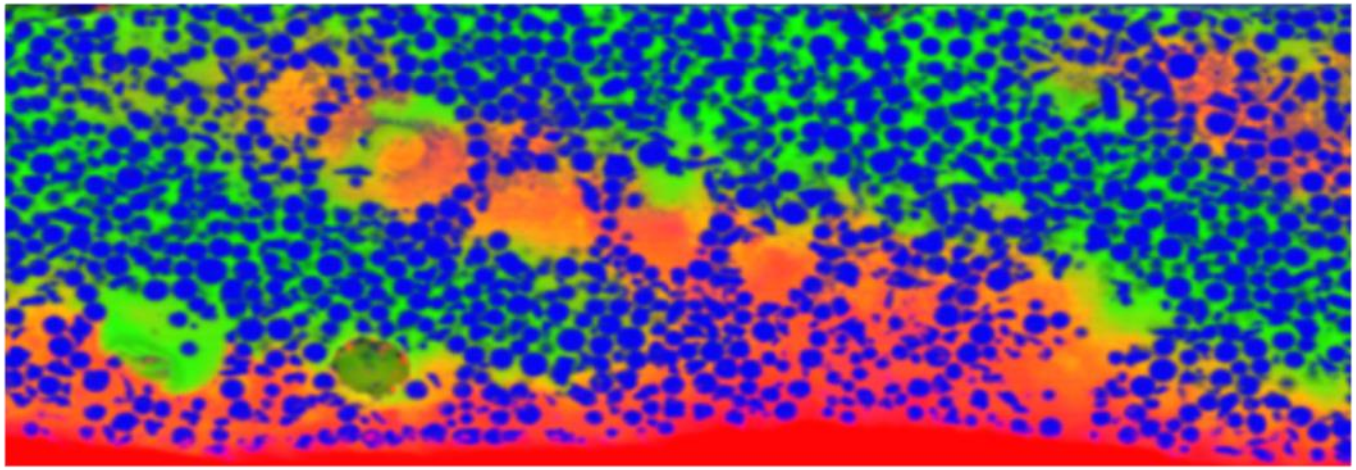
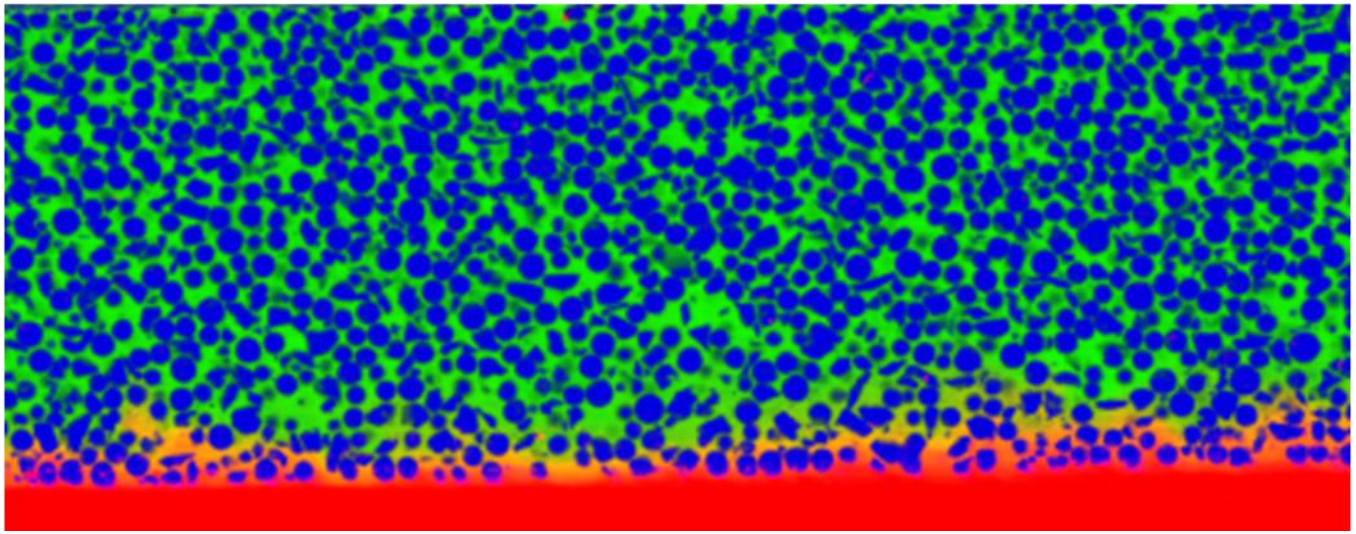
XFM MAP OF LASER CLAD WC

Before Optimisation



New LaserBond® process (patent pending)



WHY LASERBOND® ? (CONT)

It's about selecting the right materials….

- There is no "one size fits all" solution
- Need to know the operating environment
- What types of wear (abrasion, erosion, sliding, galling, corrosion)?
- What other factors (eg temperature, impact, corroding media, quenching etc)?
- What are the chemistry & physical properties of the substrate (eg the roll)?

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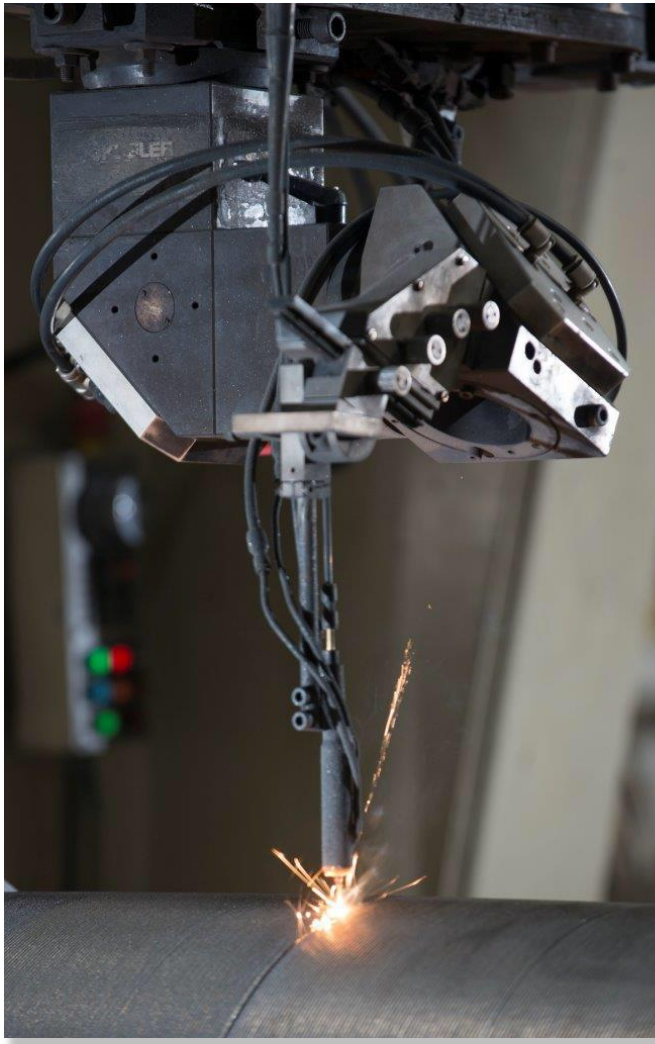
WHY LASERBOND® ? (CONT)

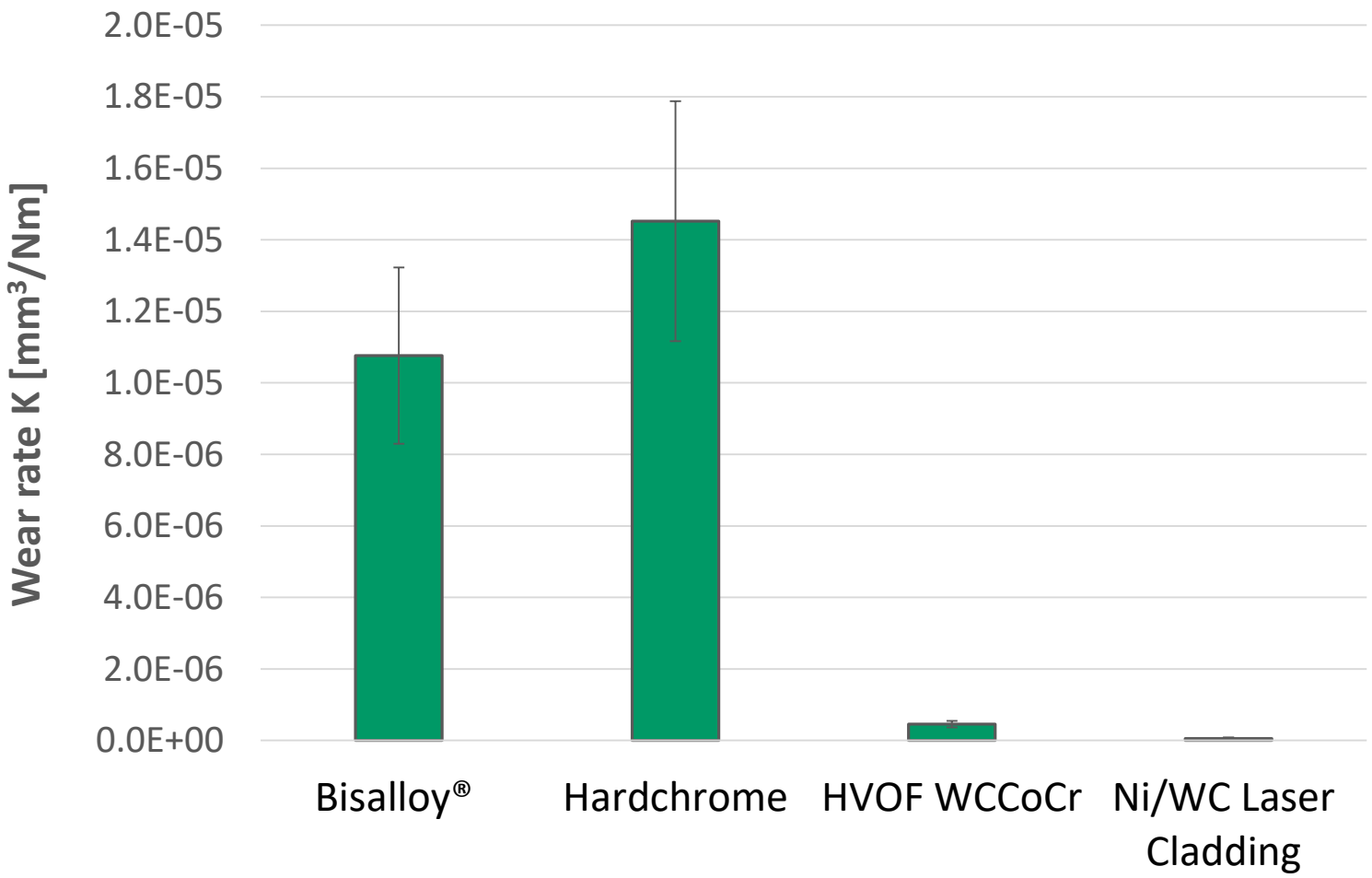
It's about fine tuning application parameters….

- This is where the metallographic laboratory & 27 years of experience comes in
- Pre-heat, post heat
- Laser power, focal length, spot size
- Powder feed rate
- Surface speed
- Shroud gas flow & chemistry

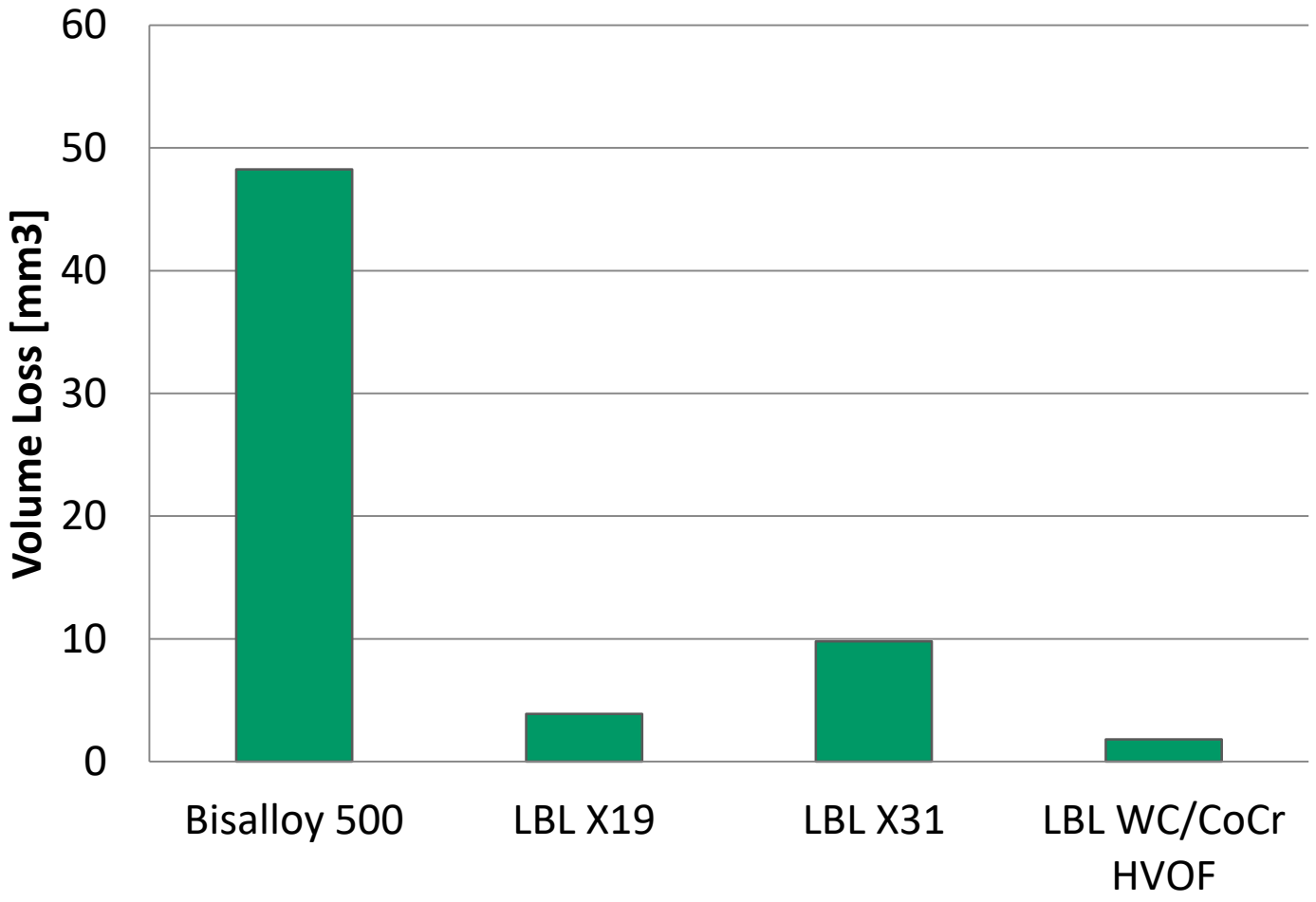
This tuning is critical to guarantee performance



ASTM G99 – PIN ON DISK – SLIDING WEAR



ASTM G65 – 3 BODY ABRASION



FULLY CUSTOMISED TURNKEY SYSTEMS

- Fully integrated PLC controlled Laser Cladding systems
- Component Handling (lathe, turntable)
- Cladding Head handling (robot)
- Laser source
- Powder nozzle

Laser 5 (Adelaide)

LASERBOND - OUR POINTS OF DIFFERENCE

PRODUCTIVITY | INNOVATION | CONSERVATION

- **Constant Innovation – R & D Projects, Depth of Experience**
- **Culture of Over Achieving – Not just one service interval!**
- **Custom Blended Alloys – flexibility to drill down on elements**
- **Thinking Outside the Square -'Non-Standard' Approach**
- **LaserBond Cladding difficult materials. Eg High Chrome Irons – considered non-weldable. Inconel 718 on Copper**
- **Willingness to partner with others – UniSA, Berendsen**

SOME EARLY ENDORSEMENTS FROM THE USA

Email dated 2/17/19

"One of the rolls got a good test last week. A bearing failed so the roll locked up. As a result beams were drug across the roll for a period of 5 DAYS!! The roll looks as good as new despite having been subjected to this abuse. A very promising start."

Email dated 3/28/19 from SC

"FYI. We installed the last of the RT6 rolls that you sent us. One roll ran backwards for a week and there is not one mark/groove on the roll. So far, I am impressed."

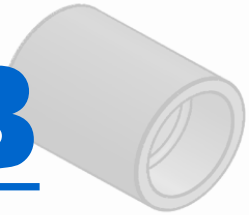
A recent quote dated 7/18/19

"LaserBond is the best product we have ever trialled on these Table Rolls in all the years I have been here."

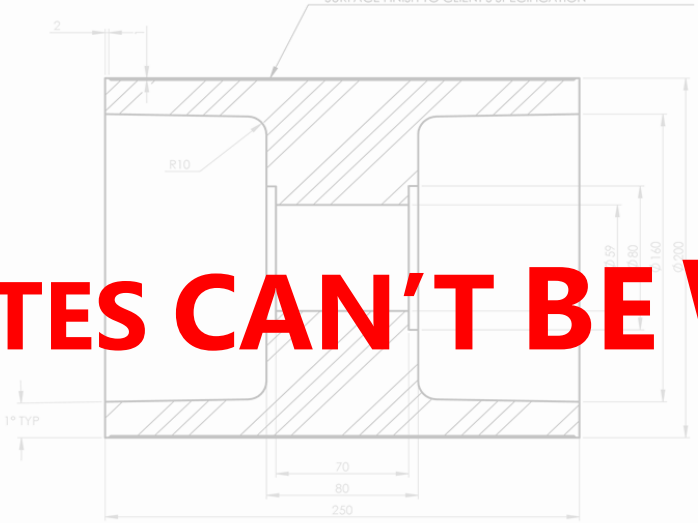
And lastly

"We used to change a cartridge of Leveller Rolls every 3 mths but now we only have to change them every 7 mths for bearing maintenance. With modified bearing systems we expect to obtain a service life of at least 12 mths – a 400% plus improvement."

COMPOSITE CARBIDE STEEL MILL ROLLS



EAT LAMB



5,000 COYOTES CAN'T BE WRONG!

'Designing the Future Through Innovation'

Acknowledgements to IRD Association, Inc