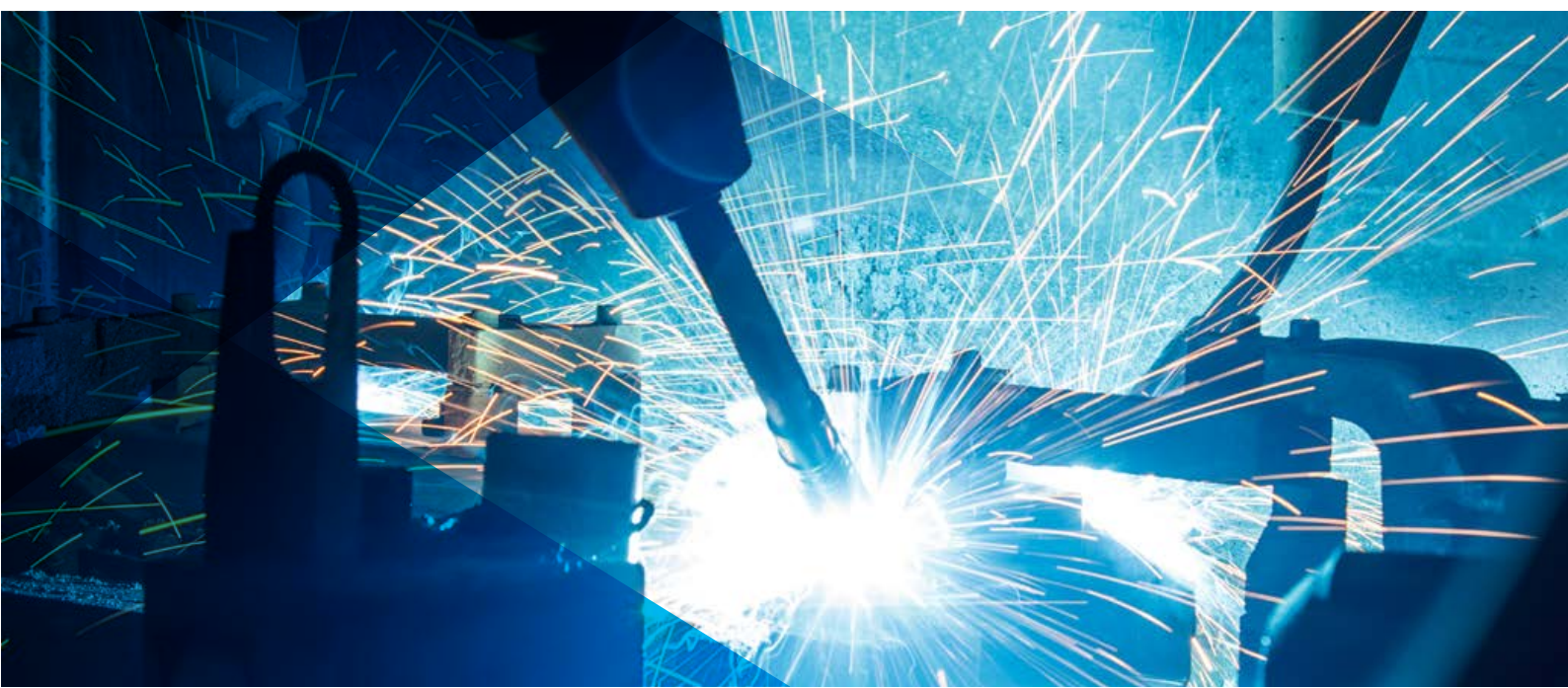




**WEAR SOLUTIONS**







### Introducing the Berg Extended Life Wear Plate Solution:

Berg Extended Life Wear Plate is produced using a Plasma Transferred Arc (PTA) process which combines a scientific metallurgist's formula with historical wear resistance indicators. Insuring the maximum Wear Plate life is achieved for all applications. The PTA method has resulted in Berg becoming a leader in the wear plate extended life technology.



### Berg Extended Life Wear Plate Advantages:

- The Berg Extended Life Wear Plate, PTA method can be achieved by placing layers less than 2 mm thick. This reduces the overall component weight and the likely hood of manual handling incidents.
- Extend wear plate life up to 10 times over conventional product life.
- Berg Wear Plate is light weight. The PTA hardfacing layer can be as thin as 2mm and the base material can be as thin as 4mm. This results in a lightweight product allowing for easier handling and reduced OHS issues.
- Reduces cost per hour on wear plate component's and maintenance labour costs.
- Non standard shapes and sizes can be readily manufactured through computer modelling, CNC laser cutting and robotic PTA applications.
- Berg Extended Life Wear plate is suitable for high impact and high abrasion environments.
- Berg PTA Hard facing Technology consists of 60% Tungsten Carbides in a Nickel Silicon Boron matrix providing full metallurgical fusion to the base material.



## Hardfacing

PTA Hard facing has unlimited applications including the typical major components which can be applied using the Berg Robotic Technology (BRT)

- Dredge Teeth
- Bucket Reclaimer teeth
- Ground Engagement Tools
- Coal Pulveriser Components
- Crusher Rollers
- Centrifuge Components
- Tank Agitator Blades
- Sugar Cane Hammers
- Grizzly bars
- Screens
- Hoppers, Chutes & Liners
- Wear Plates
- Clay Augers
- Pugmill Hammers
- Railway Ballast Tamping Tines
- Drill Subs & Stabilisers
- Plough & Trenching Tines
- Crawler Track Wheels & Pads
- Grader & Scraper Blades
- Excavator, Dragline & Reclaimer Buckets
- Organic Fibre Pulp & Chip Grinders
- Dozer Blades
- Ripper Boots
- FEL
- Trenchers
- Compactors
- Smooth & Sheep Foot Rollers

## Long Life Ground Engagement Tools

Berg utilises robotic hard facing of ground engagement tools. Application to tools used on equipment such as bucket wheel excavators, reclaimers and dredge cutters often provide increased life in excess of 50%. These results have been obtained in conditions of severe abrasion and impact in a wide range of applications.

Product uniformity resulting from consistent overlay thickness, fusion and heat input provides a predictable tooth life. This enables plant operators to predict bucket maintenance with more certainty and reduces the possibility of adaptor damage. Our experience has enabled us to determine the overlay geometry that substantially improves impact and abrasion resistance while maintaining effective penetration for every application.

Weld metal overlays used on ground engagement tools are predominantly nickel based alloys with up to 70% fused tungsten carbide. These materials offer extreme abrasion and impact resistance. Where the combination of extreme abrasion and impact is not present we utilise chrome and titanium carbide based overlays selected to meet the specific application.





## CASE STUDY - OIL QUENCH PUMP

### Background

The Oil Quench Pumps operates at approximately 330°C and is in constant operation with a current of approximately 6-9 months MTBR. In order to stay competitive the client was seeking a rebuild that improved efficiency of at least 15% and to reduce down time.

### Problems Identified

- Severe wear and cavitation
- Short lifespan
- Loss of performance
- Costly downtime
- Excessive vibration and noise

### Design Improvements

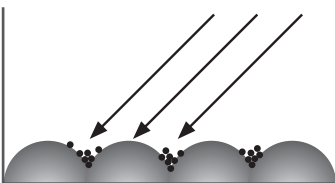
- Re-engineered the whole pump to API 610 standards.
- Changed the metallurgy to reduce wear.
- HVOF (Tungsten Carbide Composition) spay coating to protect against heat / wear.
- Modification of the finished surface to reduce wear

### Procedures Used

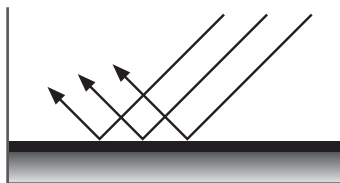
- Tafa JP-500 HPHVOF [High Pressure High Velocity Oxygen Fuel] gun
- The powder coating is a blend of Tungsten Carbide 88% and Cobalt 12% [WcCo 88/12]

### Conclusion

The re-engineering and rebuild process implemented by Berg has improved efficiency levels above client expectations with the reconditioned pump showing little to no wear at the 6 month inspection.



Previous repair reclamation



Berg ground finish & HVOF



Cavitation & erosion



Before

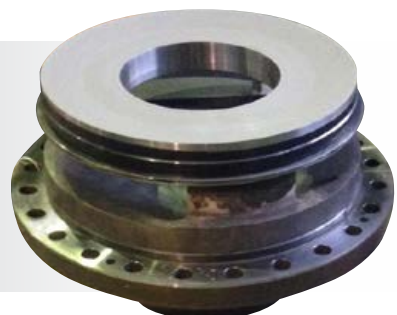


During rebuild



Finished product

The client has been using and evaluating the pump for 8 months and are extremely please with it's performance and wear resistance





## Berg Plasma Transferred Arc (PTA) System

The PTA hardfacing process utilises powdered metal consumables combined with plasma welding to provide a metallurgical bond with the base material. The PTA process has a highly efficient deposition rate (typically 95%) while other process such as HVOF and Metal spraying have deposition rates as low as 25%-65%.

### Benefits Of The PTA Process Include:

- Corrosion and erosion resistant overlays of exceptional quality can be produced on a wide range of substrates.
- Deposition rates as low as 0.3 Kg per hour can be applied to intricate components and up to 16 Kg per hour on heavy components, wear plates and pipes.
- Coatings applied using this process commonly have superior bond strength, mechanical properties and grain structure to those applied by spraying processes.
- When good materials selection is combined with PTA application, technology component life can be extended well beyond levels currently accepted as normal.
- Highly efficient deposition rates resulting in less wastage.
- Lower heat input for the same deposition rates reducing the possibility of deformation.
- Utilising powders PTA enables a wide range of different combinations of alloys and hardfacing materials to be deposited on base materials.
- Extensive experience in a very wide range of PTA hardfacing materials.
- Robotic control of the PTA process provides increased flexibility, repeatability whilst providing the typical increase in efficiency provided by such systems.

### Typical Hardfacing Materials:

- Tungsten carbides in a nickel boron silicon or nickel, chrome boron silicon matrix.
- Stellite 1,6 and 21.
- Triballoy 600,800 and 900.
- Ultimet.
- Hastalloy and Inconell.
- Alloys International PTA atomized metals and wires.
- A comprehensive range of Durum PTA atomized metals and wires.
- Specialized alloys from other leading suppliers.
- Titanium Nitriding of Titanium pipe, pump and valve components.

### Note:

Materials 1-7 can be applied to many carbon and stainless steels. They have also been applied to some exotic metals.

Titanium Nitriding is a surface conversion process that can only be performed on specific grades of titanium.

A wide range of other Alloys / base material combinations are available.

Berg will research and develop innovative hardfacings for specific customers. Comprehensive technical support is available in selection of materials and analyses with the view to continuous improvement.

Standard products are all subject to stringent quality control measures with documentation of results from tests being supplied to the customer along with the product.







Berg are a proud Australian engineering business that has built a reputation for excellence on the back of two generations – and more than four decades – of Berg family passion.

Headquartered in Brisbane and with bases in the Asia Pacific we strive to provide our clients with intelligent asset lifecycle management solutions that reduce operating costs, maximise performance, extend asset life; all the while ensuring we meet our ISO accredited quality and safety standards.

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