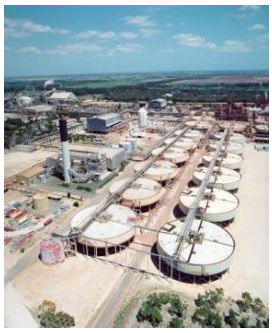
WELDING SERVICES
Mining & Mineral Processing

Mining and processing of natural resources is undoubtedly one of the Asia Pacific's major revenue producing industries. The use of capital intensive equipment, large throughputs, high temperatures and aggressive liquors, combined with harsh working conditions, imposes a great challenge to materials engineering.



Excavation and processing of mineral ores involve processes that cause wear, corrosion and thermal failure. All of these issues bring specific challenges for the welding engineer.

Although wear may be a relatively minor cost in the overall picture, it is a constant problem which cannot be solved, but can be delayed.

In mining and mineral processing the abrasive wear of components is responsible for the largest amount of material removal than any other mechanism. Failures of components, vessels, etc, through other mechanisms do occur as a result of the process conditions involved.

WOOD GROUP INTEGRITY MANAGEMENT (WGIM) personnel possess the knowledge and experience relevant to the specific requirements of the industry.

Component Failure

Failure causes downtime and loss of revenue but the repair may be complicated by the fact that the base material may not be readily welded. The solution may be to purchase a new component but where repair is selected, specific areas should be considered:

- Material.
- Operational function.
- Welding process.
- Welding consumable.
- Metallurgical issues.
- Non-destructive testing.
- Fitness-for-purpose.

Component Wear

Although a variety of wear mechanisms can cause failures, the principles controlling the repair do not change.

Selection of coatings based on hardness or standard wear testing may suggest coatings such as tungsten carbide/cobalt, chromium oxide ceramics or fused coatings as giving the ultimate performance there is no universal material suited to all applications.

Various technical factors require consideration such as:

- Corrosion and temperature.
- Substrate material.
- Surface finish or profile.
- Lubrication and severity, angle of attack and coefficient of friction.
- Loads, speeds, impact, shock, fatigue and ability to work harden.
- Thermal/electrical barrier or conductor.
- Non-magnetic.
- Abradable or abrasive.
- Weld overlay, thermal spray or pre-clad plates.

Economic considerations in the selection of the method of returning the component are also addressed such as:cost of wear materials:

- Lifetime and production rate.
- Cost of installation and removal.
- Cost of unscheduled downtime due to failure.
- Costs incurred by reprocessing product.
- Scrap value of used component.

Plant Problems

The purpose of process plant is to contain and treat feedstock for the production of useful substances. Its nature often involves elevated temperature and pressure in combination with corrosive and/or aggressive media. These conditions result in a variety of engineering materials being employed within the plant.

Typical areas that require addressing include:

- Caustic service.
- Acidic environments.
- Thermal degradation.