Earthtrack Hardfacing

“Engineered and Certified to meet every demand”
Earthtrack Hardfacing

BENEFITS OF HARDFACING

Parts and equipment that are exposed to wear are subject to abrasion, impact and/or erosion. These external factors cause hundreds of tons of material to be lost and productivity that can never be recovered. This represents significant expenses to companies in the recovery or replacement of these wear prone elements.

Postle MIG Tungsten Carbide provides a solution

1. Increase the service life of parts that become worn (shovel tips and adaptors, blades, dredging teeth, mixing blades, hammers) from 200% to 800% more than conventional hardfacing alloys.
   - Mining Equipment – shovel and bucket wear parts, drilling parts
   - Highway and Road Construction Equipment
   - Trenching Equipment
   - Processing Equipment – mixing blades
   - Dredging Equipment – cutter heads and teeth
   - Recycling Equipment – hammers and other wear parts

2. Improve productivity by keeping wear parts sharp and maintaining physical dimension tolerances.

3. Reduce expenses caused by frequent maintenance interruptions and downtime.

4. Reduce the cost of replacement parts

WHAT IS MIG-TC?

- MIG Tungsten Carbide utilizes the MIG welding process along with PS98 hardfacing wire and Tungsten Carbide particles to form a composite hardfacing that is highly resistant to severe abrasion and impact. It is made from extremely hard tungsten carbide particles (70Rc), deposited in a specially designed tool steel weld matrix – Postalloy PS-98WC at 58 Rc.
- The tungsten carbide particles are held in a hopper located directly above the welding operation. Immediately upon beginning to weld, the TC particles are dropped through a tube that is attached to the MIG gun nozzle and then feed directly into the molten PS98 matrix weld.
- MIG-TC offers a tremendous increase in service life compared to parts that do not have it.

HOW TO GO ABOUT IT?

- To decrease the material lost from the wear prone parts, the critical areas should be hardfaced with MIG Carbide according to the material that the wear prone part will be working with.

The material used as hardfacing – Tungsten Carbide with PS98 - will have hardness greater than the material causing the wear. This significantly decreases the loss of material from abrasive wear.
MIG TUNGSTEN CARBIDE

THE ULTIMATE IN ABRASION RESISTANCE

For severe abrasion, the Tungsten Carbide embedding hardfacing process with Postalloy PS98 Tool Steel Matrix Wire offers the ultimate in wear and abrasion protection and is economical to apply. It consists of a vibratory feeder and a standard semi-automatic MIG Gun, that delivers metered Tungsten Carbide particles to a molten weld pool at precisely the right moment prior to the puddle freezing. the result is a weld deposit filled with Tungsten Carbide surrounded in a 60 Rc tool steel matrix.

While chromium carbide has served the industry adequately for many years, more recent production demands on parts and equipment have dictated a harder, more wear resistant solution.

MIG Carbide Embedding with PS-98 offers 2 to 8 times better wear life than typical hardfacing alloys and can be deposited at 1.3 the cost of tungsten Carbide Hardfacing wires.

Typical equipment that can benefit from MIG Carbiding are mining and construction equipment, dredging equipment, blending, shredding and processing equipment, drill bits and agricultural parts.

(A) Typical capture of Tungsten Carbide with special formulation PS 98. Even distribution of carbides throughout the deposit.

(B) Microhardness of Tungsten Carbide particle (70Rc) and PS 98 (55Rc) matrix. The hard matrix provides maximum wear properties to the final deposit.

Tungsten Carbide volume is closely controlled by a vibratory feeder. More vibration will yield more Tungsten Carbide. PS98 can be mounted for automatic or semi-automatic welding.
TUNGSTEN CARBIDE / POSTALLOY PS 98

Application of MIG TUNGSTEN CARBIDE on loader and shovel tips enables them to be kept in service longer, resulting in more productivity.

ESTIMATED COSTS AND SAVINGS
SHOVEL EX5500 HITACHI USED AT YANACOCHA MINES

<table>
<thead>
<tr>
<th>TOOL/EQUIPMENT</th>
<th>PRICE PER TIP ($) NEW</th>
<th>SERVICE LIFE HOURS NEW</th>
<th>TIPS USED/MONTH NEW</th>
<th>COST/MONTH NEW</th>
<th>$$$ SAVINGS</th>
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<tbody>
<tr>
<td></td>
<td>WITHOUT MIG-TC</td>
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<td>SHOVEL EX5500</td>
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<td>LOADER 994D</td>
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<td>150</td>
<td>35.2</td>
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<td>$15,312</td>
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Comparison of tips used per month and the cost for LOADER 994D

Comparing the cost - parts put in service without hardfacing and with MIG tungsten carbide (Source: Yanacocha Mines)

Comparison of tips used per month and the cost for SHOVEL EX5500
FAQ

THE ULTIMATE IN ABRASION RESISTANCE

Does the MIG-TC hardfacing application change the properties of the base metal? Will it be softer? When the tungsten carbide/PS98 hardfacing wears away, will the base metal parts wear more quickly?

That is what many of our competitors would like to believe. However, several metallurgical analyses have been conducted. They show that the heat affected area (HAZ) is around 1mm right below the hardfacing’s matrix. The HAZ has the same hardness as the base metal.

Do I need to invest in a big infrastructure to be able to apply this technology?

No. In fact, you only need a standard welding machine for MIG and the carbide feeder, plus tungsten carbide and PS98 matrix wire. Of course, we provide the necessary technical support for your application.

What is the longest service life that products coated with MIG-TC have attained?

This is a hard question to answer because there are so many variables, especially in hardfacing cutting edges, blades and parts exposed to wear from abrasion, impact, erosion, etc.

Generally, an increase in wear life of 6 to 10 times can be expected for parts that are not hardfaced. Wear parts that are currently being hardfaced can expect a 3 to 6 times improvement in wear life.

ADVANTAGES OF HARDFACING

• LONGER SERVICE LIFE – Fewer replacement parts are needed when parts are hardfaced with MIG Tungsten Carbide.

• HIGHER PRODUCTIVITY - Upon improving wear life with MIG-TC, this contributes to the equipment working and producing more per hour. This increases the productivity and therefore your profits.

• LESS DOWNTIME - GREATER AVAILABILITY OF MACHINE - a longer service life means that it will you will spend less time replacing the tips. This contributes to a reduction in total operating costs.
**SHOVEL TIP PROTECTION**

ESCO Shovel Tips before being coated
Yanacocha Mines

ESCO shovel tip placed in operation at
60 hours of life - Yanacocha Mines

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**LOADER TIP FACING**

Mass hardfacing process with tungsten carbide on Loader Tips CAT 994 belonging to
Yanacocha Mines.

Loader tip ready to be put into operation.
Work carried out at Urteaga EIRL factories.

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**LIP PROTECTION**

ESCO lip protector before being hardfaced with
MIG Carbide - Yanacocha Mines

The same ESCO lip protector ready to be put into operation - Yanacocha Mines
BULLDOZER GROUSER BARS

MIG Tungsten Carbide and PS98 Hardfacing Wire

MINER WEAR SHOES

BLADES

HAMMER ROCK BITS