

SIFCO ASC delivers \$95k annual savings

to OHV manufacturer

When a world-leading multi-national manufacturer of large surface mining equipment began researching a method of extending the service life of its cylinder heads, SIFCO ASC's selective brush plating outperformed welding on a number of key criteria.

Here, Derek Vanek of SIFCO Applied Surface Concepts (ASC), part of Norman Hay plc and the world leading supplier of selective plating technology and solutions, shares the success of the initial research, along with details of the eventual implementation of this highly-regarded remanufacturing solution.

Improving the service life of vital components is an important factor for any manufacturer, especially those designing and producing mission critical vehicles for highly corrosive environments such as the mining industry.

When it comes to a heavy mining operation, around-the-clock production, the relentless operative conditions, and the ever-increasing size and weight of the equipment will inevitably cause damage and considerable wear to some common components.

Some of these components pose particular maintenance issues due to their prohibitive size and location, such as the components within the hydraulic and transmission systems; and final drive components such as wheel axles and bearing seats.

Many manufacturers who have not found a proven repair solution will result to scrapping the entire component, drastically increasing their capital equipment costs. Corroded and damaged components have contributed to the US scrap rate of 73 million metric tons of ferrous metal, seven million metric tons of non-ferrous metal and two million metric tons of stainless steel scrap – figures which have been condemned by governments worldwide with new and evolving industry-specific environmental legislation.

While manufacturers are keen to find a solution to not only avoid the very need to scrap parts in the first place – thus avoiding the extensive costs associated with component failure – they also want to maximise component performance, reduce downtime, and execute a proven repair before failure.

The mining industry is working hard to move in favour of planned maintenance and faster, more convenient, performance-led solutions which can extend service life, reduce scrap and improve lead times.

73 million

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Remanufacturing cylinder heads with localised selective brush plating.

For one of the world's most renowned Japanese manufacturers of large surface mining equipment, the salvaging of failing cylinder heads, a vital component within any combustion engine, was pinpointed as an area for improvement. Initial research suggested that approximately 35% of all cylinder head failures were due to fretting; all common issues with multiple solutions available on the market, such as thermal/cold spray, sleeving, welding, replacement or selective brush plating.

An improvement plan was activated, with welding and selective brush plating identified as the two favoured remanufacturing methods. Each solution was put to the test and evaluated against strict criteria for performance, cost and lead time. Leading supplier of selective plating technology and solutions, SIFCO Applied Surface Concepts (ASC), was invited to showcase its innovative system, known as the SIFCO Process®, as part of the trial.

16%

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The trial results

Whilst welding the worn areas of the cylinder head cost less, it provided insufficient quality deposits and the potential of heat distortion. Each cylinder head was then selectively plated with nickel for dimensional restoration and wear resistance. Selective plating, although slightly more expensive, proved to be 16% faster and delivered a good quality deposit with little risk for part distortion since the operation is performed at room temperature.

The SIFCO Process® was developed more than 50 years ago, and was initially used for industrial repair applications, with early acceptance by the US Navy. Over the years, we have developed the SIFCO Process® to service a wide range of industrial repair and manufacturing applications.

The range of metals used in selective plating is extensive. The SIFCO Process® is used to apply any metals that are traditionally carried out by tank electroplating, the most common being; nickel, copper, cobalt, nickel-tungsten, cobalt chromium carbide, silver, gold and platinum. There are several preparatory steps in which a work area is prepared to receive an adherent deposit.

The appropriate preparatory procedure is determined by both the substrate of the component and the plating solution to be applied.

The process can be carried out manually, it can be mechanised, or it can be automated for high volume applications. The thickness of the plating is accurately controlled through use of an ampere-hour meter and once the required ampere hours are reached, plating is stopped and finished with a final water rinse and dry.

Ongoing remanufacturing partnership.

Following extensive trial successes, this renowned manufacturer implemented the SIFCO Process® as its preferred method salvaging end-of-life cylinder heads, citing the key benefits as reduced materials consumption and waste, lower energy consumption and the realisation of considerable annual savings of approximately \$95,000 as compared to new or replacement parts.

The benefits of selective brush plating.

The benefits of selective brush plating include the ability to accurately focus the plating onto specific areas of a component, enabling parts to be plated in-situ, which can drastically reduce downtime and minimise production delays.

Selective plating is best suited for localised areas on inside and outside diameters or flat surfaces. In contrast to tank plating, selective brush plating does not require extensive masking or special fixtures to plate the component.

30 TO 60

In market-leading selective brush plating systems, deposits can be plated at rates that are 30 to 60 times faster than conventional tank plating.

The length of time a plating operation will take is primarily determined by the amount of material that needs to be applied. In market-leading selective brush plating systems, deposits can be plated at rates that are 30 to 60 times faster than conventional tank plating. The performance and cost differences that these factors can make to maintaining, enhancing or repairing critical components can be significant. Whilst damage from wear, corrosion or mis-machining can be repaired using selective brush plating, this innovative solution should not just be considered for repair or salvage.

The full range of pure metal and alloy deposits available from class-leading brush plating specialists offer enhanced wear resistance, increased surface hardness, low electrical contact resistance or corrosion protection; all important considerations for the mining industry.



For more information on SIFCO ASC's innovating selective brush plating technology and solutions visit:

www.sifcoasc.co.uk