

**A**pplications

**S**olution

**I**nnovative

# Super Duper ZuperHammer

By Cory Booz & Mike Sexton

The challenge - This past year our Wear Specialist Cory Booz was presented with a wear issue to find an innovative solution application for a Midwest cement customer who had issues with their secondary one directional limestone crusher. This case posed a special set of problems that needed to be resolved.

Root issue - During full production, the client would have to rebuild his old hammers every day with hard surface rod to insure proper grind requirements. This would require the plant to shut down the crusher and have two people every night (one in the crusher welding on the hammers and one as a hole watch because it's a confined space) spend up to six hours doing the job. This also led to problems like headaches and carpal tunnel in the welder's wrist due to the repetitive motion of hard surfacing the hammers in the cramped space. This also required hundreds of pounds of hard surface rod. The client, over the past few years, had tried several different hammers from a variety of vendors in an effort to solve the



Conventional daily laborious hardfacing of hammers

## ZuperHammers with ZuperBlock Tips



problem of continuous, laborious hammer rebuilding. Nothing worked.

Enter stage left - ZuperWear to the rescue! ZuperWear uses a unique Sintered Carbide Technology. Sintered Carbide Technology consists of:

- Complex metallic compounds and carbides that are ground into a very fine powder.
- These metallic powders are then precisely measured and blended thoroughly together in batches according to a formula that has been custom designed for a specific wear need.
- The powdered metallurgy mixture is then poured and compacted into a mold with a mild steel backing.
- Once formed, the powder castings are loaded into a vacuum sealed autoclave and heat treated at a high temperature.

Outcome - A block of Sintered Carbide with its compounds locked into a metallic matrix. A microscopic view of the crystalline structure is completely different from its competitor. As you can see, the old method of conventional hardfacing leaves acicular "strings" of chrome carbide unevenly distributed with random concentrations. (See figure 1) But the ZuperWear, with its Sintered Carbide Technology, produces hexagonal "honeycomb" like crystalline structures that are evenly distributed with consistent concentrations. (See figure 2) The resulting product demonstrates a performance of longer lasting, even, and consistent wear.



ZuperBlock Tips with bolts

Solution - A complete set of ZuperHammers with replaceable ZuperBlock Tips were installed in the secondary crusher. The first run of these went very well; they ran for two months with no hardfacing and no downtime. Then a decision was made

(continued on page 2)

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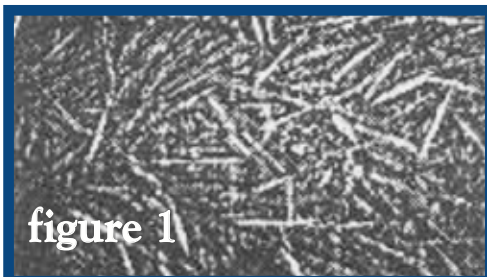


figure 1

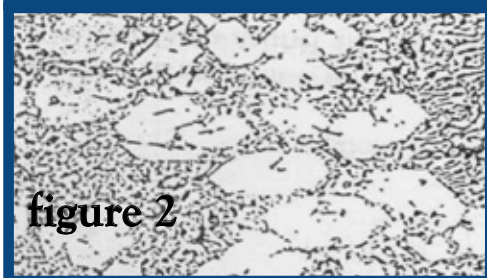


figure 2

by the plant to use the secondary crusher as a primary crusher while the primary crusher was being overhauled. Unfortunately the magnet to remove metal is ahead of the primary not the secondary. They ended up getting a large piece of metal in the crusher that destroyed many of the ZuperBlock Tips. However, at that point they decided that the ZuperHammers did so well, that if they ever had to use the secondary as a primary again, they would simply swap hammers in until they could get back to the normal line-up. Then they would use the ZuperHammers again in the secondary.

**Results** - Currently the new set of ZuperHammers has been running for over four months and crushed over 90,000 tons of limestone with no problems whatsoever. The ZuperHammers are still running and the plant maintenance team members are very happy with the performance because the hammers have eliminated the need for the old hardfacing procedure which entailed:

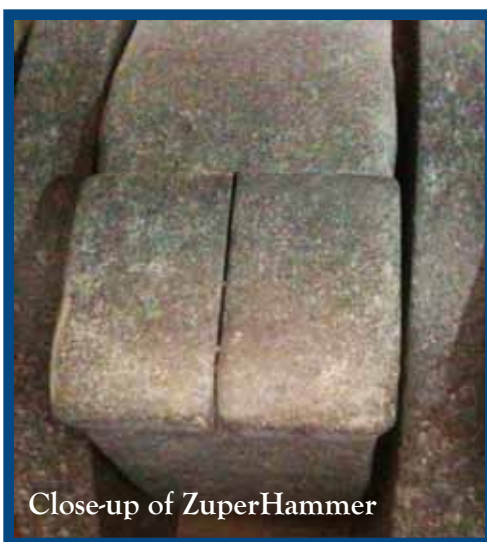
- Cost of labor to weld and supervise. (At least \$7800 per month.)
- Cost of welding wire. (At least \$2500 per month.)
- Cost of health hazards. (Can you put a price tag on the cost of someone's health?)

**Bonus** - The ZuperBlock Tips have additional benefits! Once the removable tip is worn out on one side, it can be unbolted and rotated 180° then put back into production. When the tips are finally shot, they are simply replaced. There is no need for a whole new set of hammers. The replacement ZuperBlock Tips cost less than the previous hammers that were in use. Just replacing the tips is also a labor savings by not having to pull and replace the hammer bodies. That's very cost effective and pretty simple compared to trashing the entire set and replacing them with new ones.



**Success** - In four months the plant has not yet had to replace the ZuperHammer's ZuperBlock Tips and they are still going strong today. They have not rotated them yet either. The true life span of the ZuperBlock Tips in this particular application is still unknown. Conservative estimates seem to indicate that the plant is saving an average of at least \$10,300 per month not to mention the health benefits.

This has reduced the size of the workforce and the two happier, healthier workers are now able to concentrate on other maintenance issues. That's more than what the cement plant paid for the complete set of ZuperHammers with tips originally! How much savings are we looking at for the year? At least \$123,600! The hammers with their tips are currently being monitored and the tips will be weighed and measured upon the completion of their run. So far, everything is ZUPER DUPER!



Results in comparing both sets of hammers.	Manganese Body	Sintered Carbide Tip	No Hardfacing	Reduced Down-Time	Softer Maintenance	Reversible Tip	Replaceable Tip	Easy Replacement	Cost Effective
Manganese Hammer	X								
ZuperHammer	X	X	X	X	X	X	X	X	X

# Innovative Solution

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