

Efficiency comparison of abrasive media on tank car exterior refinishing

Change in abrasive media and blasting protocol delivers over 100% increase in efficiency

Methods Improvement Team: 10X Engineered Materials

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STUDY OVERVIEW

A manufacturer and refurbisher with one of the largest fleets of rail cars in North America sought ways to improve efficiency, surface quality and overall refurbishment cost per car. Goals were to: 1) maximize the number of cars completed per 24-ton pot of abrasives, 2) reduce dust and improve blaster visibility, 3) minimize abrasive embedment and over-profiling of the surface to reduce paint consumption, and 4) improve the quality of finished tank cars. The field study investigation began with baseline data collection for nozzle on-time, nozzle pressure, abrasive consumption and surface quality of their current blasting process using olivine abrasive. The olivine abrasive was replaced with 10X superoxalloy and data was again collected. Metrics for the two blast media were then compared. The 10X superoxalloy abrasive more than doubled the number of completed cars per 24-ton pot and reduced cleanup from two shifts per week to one. Cleanup reduction alone increased overall productivity by 8-10%.

BLASTING TEST RESULTS

	olivine blasting media	10X superoxalloy
Media Consumption	4.20 tons/car	1.96 tons/car
Total Blasting Cost – Single Pass	\$2,356/car	\$2,121/car
Total Blasting Cost – 3 10X superoxalloy re-uses		\$1,233/car
Average Surface Profile	4.2 mil	3.2 mil
Cleanup Downtime	two 8-hour shifts/wk	one 8-hour shifts/wk
Abrasive Disposal Cost	\$210/car	\$98/car
Cleanup Cost	\$160/car	\$75/car

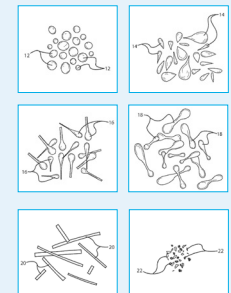
ADDITIONAL STUDY OBSERVATIONS

Overcoming the challenge of blasting dust. Dust production and accumulation is a common nuisance when using most blasting media. Olivine usage required frequent work stoppages to dissipate dust and restore blaster visibility. The 10X superoxalloy abrasive generated very little dust and as a result blasters were able to minimize work stoppages which further increased productivity. Blasters commented, "...the thing I like most about 10X is that I can see!"

The difference surface quality can make. A top priority of plant management was achieving time and cost efficiency without over-profiling or leaving embedded abrasive residues on the surface. 10X superoxalloy abrasive achieved both, decreasing profile from more than 4 mil to the desired 3 to 3.5 mil while producing a bright and clean surface finish. Reporting on the switch to 10X superoxalloy abrasive, site personnel also observed: 1) a superior aesthetic appearance on finished tank cars, 2) a measurable decrease in paint consumption when 10X superoxalloy abrasive was implemented into full production.

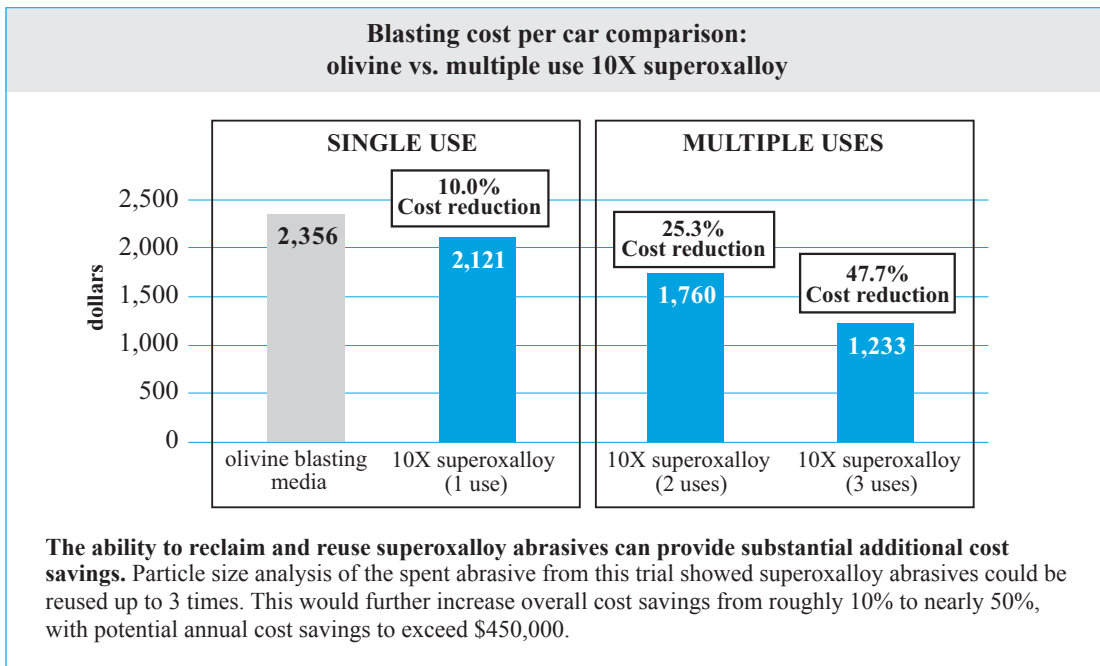
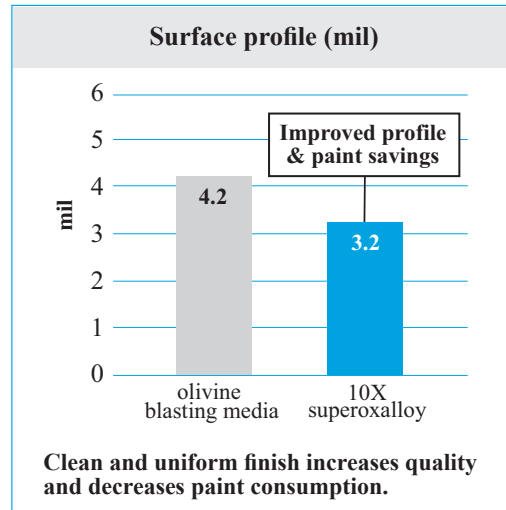
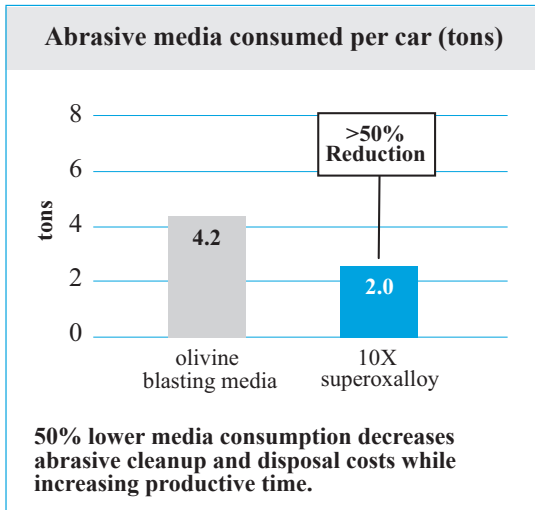
10X superoxalloy abrasive: an engineered alloy of oxide minerals created through highly controlled formulation and tempering. The media consists of non-crystalline amorphous particles which resist breakage under high speed mechanical impact.

10X superoxalloy abrasive particle shapes



The manufacturing process creates six distinct geometric shapes. The shapes vary in geometric characteristics such as angularity and roundness. That is how they perform cutting and profiling in a single blasting step.

Blasting performance comparison: olivine vs. 10X superoxalloy



The test process compared performance in exterior refinishing of tank cars using olivine vs. 10X superoxalloy abrasives at 110 psi pressure using Kennametal XL #10 nozzles.

Tank cars being blasted with 10X superoxalloy abrasive.

CONCLUSION

Based on the trial results, the facility switched exclusively to 10X superoxalloy abrasives and the blasting protocols recommended by the 10X Methods Improvement Team. The refurbisher’s goals were met and they are now experiencing: 1) improved abrasive efficiency, 2) higher quality single-pass results, 3) decreased overall costs, 4) increased productive time. In addition to improved economics, operators have expressed preference for working with low dust 10X superoxalloy, which has improved visibility during the blasting process and reduced cleanup time.

FOR MORE INFORMATION

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