Herb Tobben creates solutions to customer problems at ZERO’s Sample Processing facility.

Herb’s Corner:

Paper Covers Rock, Rock Crushes Scissors...

by Herb Tobben
Manager, Sample Processing Laboratory
ZERO Products Div., Clemco Industries Corp.

©2001 Clemco Industries Corp. Reprinted with permission

This article relates to abrasive blast media.
For information on shot peening, see The Shot Peener newsletter or call Jack Champaigne . . . at home . . . preferably late at night.

Before we select blast abrasive for a particular application we first ask — what is the part made of, and what needs to be done to it?

Then we look for an abrasive with the size, shape, composition, density, and hardness to do the job. All else being equal, an abrasive's hardness determines its visible effect on the surface being blasted.

Today’s abrasives range in hardness from barely to very hard. On the Mohs’ scale, abrasives are rated on a scale of 1 to 10. The Mohs’ scale was originally designed to compare substances (not just blast media) and rate their ability to affect one another. For example, a substance might be described as “scratches copper” or “scratched by copper” meaning it was, relatively speaking, harder than or softer than copper.

On the Mohs’ scale, talc rates a 1, while diamond ranks a 10. The hardness for steel grit is measured on Rockwell C scale (Rc). The most common steel grit ranges from an easily deformed Rc 37 to a hard-hitting Rc 65.

Before you can select an abrasive, you need to know the hardness of the surface you plan to blast and know what you want the abrasive to do.

It’s a lot like that old game you played as a kid — scissors cuts paper; rock crushes scissors; paper covers rock. One substance has a predictable effect on another.

To remove a coating without affecting the underlying surface, choose an abrasive that’s harder than the coating but softer than the substrate. This is the principle behind dry stripping with plastic, wheat starch, baking soda, and other non-aggressive media. On delicate substrates such as the aluminum honeycomb used on aircraft skins, these non-aggressive blast media (aided by their low density) can remove outer coatings without affecting the anti-corrosion cladding material that protects the base material.

Finding blast media that are harder than the coating, yet softer than the substrate is not always possible. For example, what do you use to remove brittle chrome plating from somewhat soft aluminum castings? Any abrasive that will remove the hard chrome will also etch the surface and probably remove some substrate material. (OK, so maybe there are a few applications remaining for toxic chemicals.)

To remove a coating and etch the surface to provide a good bond with a subsequent coating, use an abrasive that’s harder than the coating and harder than the surface.

To put a matte finish on an already plated piece, use media of about the same hardness as the plating (or slightly harder).

To blend dissimilar materials and a uniform matte finish, use an abrasive harder than the hardest material you’re blasting and devise a process to limit the dwell time on the softer material.

If you’re not sure, experiment! Take some scrap parts and try out as many different abrasives as you can lay your hands on. With each abrasive, vary the blast variables — pressure, distance, angle, and time — until you get the desired result. Most important — keep good notes so you can repeat the process.

Got a question about shot peening, abrasive blasting, or sample processing? Clemco can help. Call 636 239-8135 or submit your request online at www.clemcoindustries.com.

Herb Tobben is Sample Processing Manager for Clemco Industries Corp. He is a regular speaker at the Shot Peening Workshops.

Guidelines for Centrifugal Blast Cleaning

by A.W. Mallory

$35.00

Note: Price does not include shipping.

To order, please call Electronics Inc. at:
1-800-832-5653 (USA and Canada) or (219) 256-5001

A web page search engine is now available for the library of abstracts. Over 2,000 articles are available for search at our website, including information on this book, at www.shotpeener.com