

QUALITY AT WORK

Image analysis eliminates material variation

When there's a product-quality mystery to be solved, nothing is as effective as concrete, objective information for uncovering the source of the problem. Masco Corp., a Taylor, MI, manufacturer of plumbing products, cabinets, and hardware, had a problem involving the extruded-brass bar stock it used to manufacture 65,000 faucets per day. The material had a sporadic history of high defect rates, including cracking during manufacturing and corrosion during field service. Various lots of material yielded different defect rates. Finally, the company decided to investigate the cause of the material variations.

Searching for clues required using microstructural evaluation to compare materials from many different lots and suppliers. Unfortunately, the company's existing image-analysis system had limited capabilities. Its computer system was outdated, and in some cases it would even abort certain tests because of insufficient memory. "Oftentimes we were simply using subjective, visual analysis because the old system was inadequate for some of our needs," said John Finch, senior metallurgical lab engineer for Masco's research and development department. The materials weren't homogeneous, so it was necessary to analyze a large number of fields on each sample to obtain a good statistical measurement of the features. The visual method, in addition to being less precise, was inadequate for such large volumes of analysis.



Photo: Masco Corp.

Terry Chuhran, metallurgical lab technician, uses the Clemex 640 image-analysis system to analyze materials.

Help came in the form of the Clemex 640 image-analysis system from Clemex Technologies, Longueuil, Quebec, Canada. The system digitizes camera images and allows users to quickly quantify image features and calculate statistical trends in the collected data. According to Finch, the system was very easy to install with a little bit of computer knowledge. "The sales representative gave us some initial software training, and we were up and running."

Finch said that the new system is more versatile, has a much larger memory capacity, and will be easy to upgrade when new computer-technology advances come along. The system has also drastically cut the time required for data collection. "The time to perform certain tasks was reduced from six to eight hours in some cases to less than an hour. This allows us to analyze more samples on a project and achieve better statistical results."

"Our system is primarily used as a problem-solving tool," said Finch. "For instance, one lot of material produces good parts and another lot's or vendor's

material produces bad parts. The system would be used to quantify the internal, microstructural features in order to compare the two lots and determine any differences. The differences, along with knowledge of the product, would lead to a solution to the problem or an improvement in the product or processing."

The results of the investigation pinpointed the microstructural condition that was causing the problems in the materials. At the time, there was little or no monitoring of the material performed by either Masco or the vendors. But, armed with hard data supplied by the Clemex system, in conjunction with production defect rates, Masco wrote the microstructural requirements into its material specifications, and when process control at the vendors' plants improved, "Lo and behold, our problem went away," said Finch. The amount of cracking during manufacturing decreased, and the faucets' rate of corrosion-related field failures was reduced, resulting in a significant drop in warranty claims.—Nancy Chase

BENEFITS

- ✓ Material-variation problem eliminated
- ✓ Analysis time reduced more than 80%
- ✓ More data, better statistical results
- ✓ Fewer corrosion-related field failures
- ✓ Fewer warranty claims

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Clemex Technologies, Inc., 800 Guimond, Longueuil, Quebec J4G 1T5
Telephone: (514) 651-6573
Fax: (514) 651-9304
<http://www.clemex.com>
e-mail: info@clemex.com