HOOKE COLLEGE™
OF APPLIED SCIENCES

Case Study – Materials Analysis

Automotive Quality Control

At a Glance

In order to maintain high quality standards, Toyota sent one of its lead Quality Control Analysts, Ryan Britton, to the Hooke College of Applied Sciences for comprehensive materials analysis training.

Situation

The automotive manufacturing process makes use of parts from all over the globe. This process allows for the introduction of material that doesn't belong, which may lead to defects in the final product. Toyota's Quality Control (QC) analysts, like Ryan Britton, are responsible for identifying and isolating the sources of contamination.

Issue

Finding and eliminating the source of contamination can be challenging without the proper technology and training. Many of the defects seen by Toyota QC analysts cannot be identified with the naked eye. As a result, proper characterization and source identification are not always achieved; this gives rise to recurrent defects, which become costly to fix again and again.

Solution

Following the Japanese philosophy of continuous improvement known as kaizen, Toyota sent Britton, one of its lead North American analysts specializing in the area of defects and failure analysis, to Hooke College of Applied Sciences (HCAS) for microanalysis training.

At HCAS, Britton attended courses on micro sample preparation, micro Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM).

Britton improved upon his knowledge, skills and analytical capabilities at the micro level through intensive hands-on practical training under the instruction of HCAS' subject-matter experts, several with decades of real-world analytical experience.

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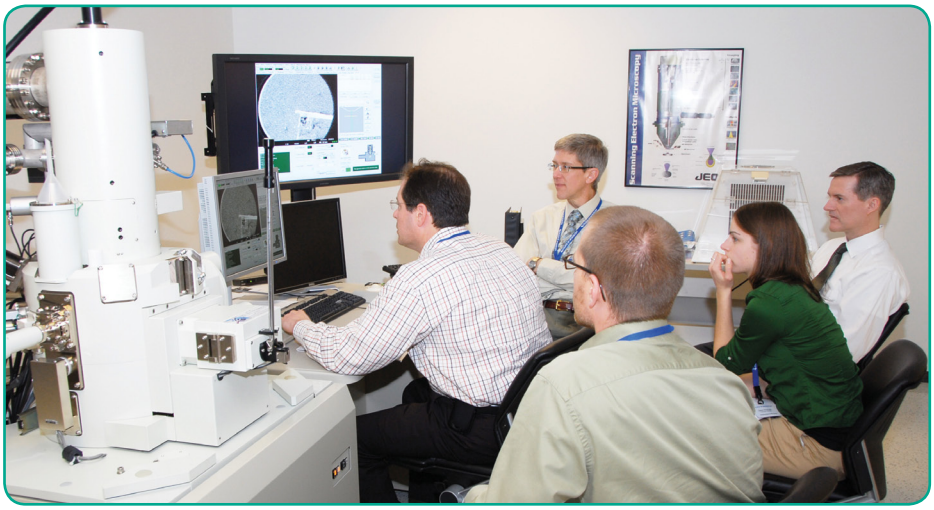
As part of the hands-on portion of the class, students are encouraged to bring in their own samples for analysis. This particular teaching method is a



Hooke College of Applied Sciences' instructors and students gather to analyze real-world samples using a state-of-the-art scanning electron microscope.

> "Before, we were unable to make definitive determinations, but now we can isolate the defects better, get more definitive answers to avoid line-down situations and high defect counts, and solve problems much faster," said Britton.

component of all HCAS courses, building the bridge between classroom practice and on-the-job application. Britton took advantage of this opportunity and provided a sample from Toyota.

The root cause of the tiny bumps on the bumpers of cars after paint application had eluded Britton at Toyota's corporate headquarters. Using state-of-the-art SEM technology available at HCAS and his newly acquired microanalytical skills, he was able to determine that the tiny bumps were a result of embedded contaminants caused by an additive in the resin.

"The courses I took at Hooke College of Applied Sciences have helped broaden the analytical capability I have at the micro level, rather than just providing a macro view or bigger-picture analysis," said Britton. "I'm able to do a much more focused analysis, as in the case of the bumper problem that I was dealing with when I was taking the SEM course."

Results

The use of microanalytical technology is quickly becoming one of the most powerful tools for QC analysts, especially in the automotive industry, where quality is a critical issue in the production process.

"In the case of the automotive industry, you simply cannot sell a car with bumps in the paint, so you have to track down the source of the defect and then eliminate the source," said Charles Zona, Dean of HCAS. "If a defect is observed during production, these cars must be pulled off the line to fix the problem, or the assembly line may have to be shut down until they find the source of the defects, which can be very costly."

Analyzing materials, such as plastics and paints, at a micro level gives analysts the ability to better characterize foreign materials and find a solution.

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Microanalysis is an important step in ensuring that only the best automotive products reach consumers.