

# "Doing the Right Thing" Focus of Coatings Research



By Dean Woodbeck

It is all about doing the right thing. At least, that is what John Gershenson and his fellow researchers believe as they help engineers deal with the environmental impact of coatings.

“Design engineers care about function and cost,” Gershenson says. “All things being equal at the end of the day, they would also like to do the right thing and minimize the environmental impact. But they don’t really want to learn about that, because they have enough things going on in their heads.”

Enter Gershenson and his colleagues, who plan to create a painless method for engineers to use to choose coatings—like paint. “If they tell us the performance they need from a coating, we will tell them which choice has the lowest environmental impact,” he said.

The project, funded by a \$457,000 National Science Foundation grant, seems almost overwhelming. Each paint, or other coating, will need to be carefully classified as to its use and performance. Then some measure of environmental impact must be assigned, taking into account the life cycle of the coating—how it is produced, applied, used, and disposed of.

“We will end up with quantitative relationships between performance and impact and then, one step beyond that, we will provide design engineers with some rules of thumb. Right now we are skewed toward painting and the automotive industry, because that is a huge problem, environmentally.”

Much of the success of this approach will be in developing a strict and orderly classification system for the coatings. Gershenson says that ASTM standards will make determining and comparing performance relatively easy. Doing the classifications and assigning environmental impact is much less precise.

“We’re calling this part of the project the ‘auditability,’” he said.

For that, the team will rely on an accountant, Richard Ratliff of Utah State University. Ratliff has developed 12 guidelines for determining what comprises “persuasive evidence.”

*Facing: John Gershenson (standing by computer) and students in a user-friendly lab.*

“He didn’t think these could be quantified,” Gershenson says, “but we are working at quantifying them.”

The team also includes an environmental engineer from Utah State, Ryan Dupont, who provides the expertise on the environmental impact of the production, use, and by-product disposal of various coatings.

“We are proceeding in a very structured manner,” says Gershenson, “so that it is very clear how to expand this process to cover other areas. We are hoping to sell this method to the people that actually produce the coatings. They will be able to chart their products in terms of performance and impact.”

The researchers believe that products with both high performance and low environmental impact will be able to use this information in sales and marketing efforts.

Gershenson is part of a growing number of faculty in Tech’s mechanical engineering department concerned with engineering for the environment. John Sutherland, a professor in the department and a leader in green-and-clean-manufacturing circles, was instrumental in bringing Gershenson to Michigan Tech.

“This may look like a small university from the outside,” Gershenson said, “but from the inside, it is a huge college of engineering. There is a history here and a push toward collaboration; people are not as territorial here. There are faculty across the college and university who are interested in collaborating. I’ve never had this sort of opportunity before.”

For now, Gershenson says there are two graduate students working on the project, although he hopes to recruit more and to develop ways for undergraduates to participate.

“We have a difficult time recruiting mechanical engineering students on a project like this,” he says. “They say, ‘Oh, that’s not mechanical engineering, it is environmental.’ But we need mechanical engineers—the eventual end-users—driving the process in order to get something useful.”

The project is sponsored by the design and manufacturing group at the National Science Foundation, Michigan Tech, and Utah State Univ.