

What a GREAT idea!

Notable notes in forest research at Oregon State University College of Forestry

What do cars and recycled plastic milk jugs have to do with forest products?

Wood is not usually thought of in connection with car manufacturing, but the next time you're in a Ford Thunderbird, notice the little shelf on which you rest your elbow. It's made of a material called a wood-plastic composite. Both the plastic and the wood often come from recycled materials—discarded wooden pallets and plastic milk jugs. Combining these materials offers a way to reduce waste of natural resources, make more use of recycled materials, and fill certain market niches. Demand for wood-plastic composites has heated up in the last few years. “It's still a small part of the market,” says **John Simonsen**, a professor in **Wood Science and Engineering**, “but it's growing at about 40 percent a year.”

His research is helping to make wood-plastic composites stronger, stiffer, and easier and cheaper to manufacture. As a chemist, he is interested in the interface between plastic and wood, two very different materials. Making composites is “like mixing oil and water,” Simonsen says. “You have to get them to stick together, and they don't easily do that.” Simonsen and his colleague, **Kai-Chang Li**, also in Wood Science and Engineering, are working on ways to create hybrid molecules, half



wood and half plastic. “We're taking molecules of polypropylene and ‘grafting’ another chemical to it.

For reasons not well understood, these hybrid molecules make wood and polypropylene mix more easily” and also greatly improve the strength properties of the product.

Wood fiber adds strength and stiffness to plastic, making the final product lighter in weight and, in some cases, faster to manufacture. Plastic adds resistance to rot and insect damage. Wood-plastic composites are best suited for nonstructural products like panels, molding, window frames, picnic tables, and highway signposts. They turn up in some less likely products, too, like drumsticks. “I've heard that the all-plastic ones are too floppy and all-wood ones are too dull-sounding,” says Simonsen, “but that these are just right.”



Wood-plastic composites still can't compete with real lumber for strength and stiffness, and probably will never replace dimension lumber for structural uses. But composites, says Simonsen, are a very practical way to improve the stewardship of natural resources. “If we're going to provide the standard of living people want with the resource base available, we're going to have to do more with less. Using recycled plastic and recycled wood to make new materials and new products is a way to achieve that.”