Ideas on the Edge

Breaking Up is Hard to Do

EDWIN TAM AT THE UNIVERSITY OF WINDSOR IS LOOKING FOR NEW WAYS TO BREAK UP YOUR OLD RIDE FOR RECYCLING.

The assembly of a modern automobile is a marvel of technology and planning. Too bad we don't put as much thought into taking it apart at the end of its useful life.

When your once-loved set of wheels finally wheezes to a halt, the chances are that 20 percent of it will go directly to a landfill site. In fact, some of the new materials we're using to manufacture cars are actually making them harder to recycle.

"We're in an era now when we focus very much on fuel consumption," says University of Windsor researcher Dr. Edwin Tam. "So there's been a huge push for light-weight plastics to replace metal. But plastics are a lot harder to recover. So we've solved one environmental problem but created another."

RESEARCH THAT MATTERS
REAL-WORLD BENEFITS FOR ONTARIANS:
- less potentially toxic waste in landfills
- reduced use of oil for making plastics

The automotive salvage process usually begins with "dismantlers," who pull off valuable parts and drain fluids. The stripped wreck is then crushed and put through a "shredder," emerging as a tangled mass from which magnets and other technologies can extract much of the remaining metal. What's left is a mix of plastic, fibres, foam, glass and other residues known in the salvage industry as "shredder fluff."

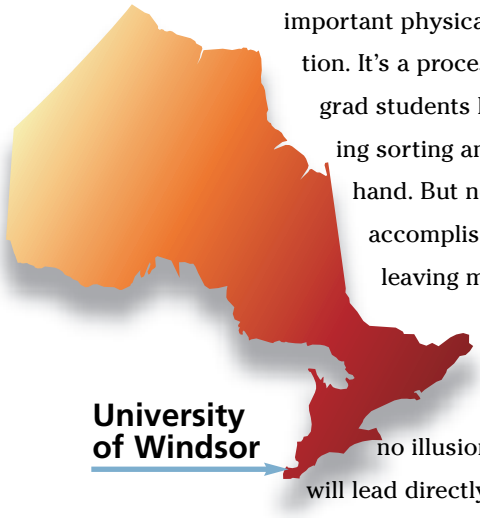
Using air currents and flotation techniques, recyclers can separate many of these remaining components from one another. The crushed plastic fragments recovered by these processes, however, represent a very mixed bag of formulations. They can only be effectively recycled if they can be further broken down by type. But how?

That's the question Dr. Tam is asking. And he thinks that one answer may be found in the physical characteristics of the broken pieces. "In a perfect world," he explains, "let's say that plastic A is much harder, more brittle than plastic B. So if you shredded them up, the brittle plastic would break into smaller pieces, and the softer plastic would likely stay in larger pieces." Of course, it's not a perfect world. But Dr. Tam is convinced that the shape and size of plastic fragments could provide valuable clues about the composition of different kinds of plastics. And if so, devices like sieves could be designed to separate them.

Dr. Tam is developing his ideas with the help of a

"solids-sizer," funded in part by the Ontario Innovation Trust. The machine uses a camera and sophisticated software to classify materials that pass through it on the basis of their physical characteristics. When Dr. Tam feeds it a small load of mixed plastics, the unit provides a complete breakdown of the pieces by size, shape and even colour—allowing him to look for patterns that could provide important physical clues to composition. It's a process that used to take grad students hours of painstaking sorting and measurement by hand. But now the work can be accomplished in seconds—leaving more time for developing and testing new ideas.

EDWIN TAM



Dr. Tam is under no illusions that his research will lead directly to a miracle method of segregating plastics. "We can't just put everything in a black box and have all the technology to separate every last thing. But even if there's some cross contamination, you'd be able to separate the bulk of the plastics for recycling."

Given that as much as 1.3 million tons of plastic from cars goes into North American landfills every year, that would be a big step in making us as smart in the way we dispose of cars as we are in the way we build them.

Project: Instrumentation for Characterizing Size-Reduced Waste Plastics to Improve Automotive Recovery and Recycling
Institution: University of Windsor
Research Sector: Engineering
Principal Investigator: Edwin Tam
Trust Investment: $47,250
CFI Investment: $47,250
Total research investment from all sources: $126,500

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Infrastructure for Innovation
About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost $843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the $2.44 billion in total funding that has been invested in Trust-supported projects.