

an entirely different scale of magnitude. An average sample weight for an experiment is a ton of material, rather than a few grams, since the original material from a car is so heterogeneous."

Intermetco's preliminary work indicated that it would be possible to develop a satisfactory commercial process and the resulting concept for a pilot plant was submitted to the federal Department of Industry, Trade and Commerce for assistance under its PAIT program (Program for the Advancement of Industrial Technology). This was approved, and a pilot plant was built in Laprairie, Québec, on the premises of Fers et métaux recyclés limitée, a company operated as a joint business venture by Intermetco and the Steel Company of Canada. The Laprairie site was chosen because of its proximity to suppliers of scrapped cars and users of recycled steel and non-ferrous metals.

"As things now stand," says Mr.

Vig, "our pilot plant, which has been in operation since September 1977, processes non-magnetic material generated by shredding up to 1,000 cars in an eight-hour shift every day. Every 45 seconds a whole car, with its engine block and everything but the gas tank (which might explode if left in place) is fed into our shredder. This machine is a hammer mill that chews the car up in a few seconds and breaks everything into small pieces. What comes out is a mixture of steel, various non-ferrous metals, plus diverse non-metallic debris such as glass, plastic, textile and rubber, sand, etc. The shredded material varies in size from fist-sized chunks to fingernail-sized fragments.

"The first processing step is an air separation system on the shredder itself. This is simply a strong blast of air that removes most light material, such as plastic and textile. Next, a series of strong magnets pick up the steel, which is the main target of our operation since it represents up to

80 per cent of a car's weight."

According to Mr. Vig, the Company's new AMRS (for Auto-Metal Reclamation System) begins at this stage. The starting material represents what is left when the steel is removed, the non-ferrous metals along with non-metallic junk. This is first pre-cleaned in a "rising current separator", basically a big tank with a controlled upwards flow of water that carries most light materials away while the metals and heavy solids sink to the bottom.

The next step involves so-called heavy media separation (HMS) in which a big tank is filled with a liquid of adjustable density. The principle used is familiar to anyone who has noticed the buoyancy difference between salt and fresh water swimming. Because ocean water contains salt, it is denser than fresh water and the human body floats better in it. In the AMRS process, a suspension of a compound called ferro-silicon in water is used. The density of the suspension depends upon the percentage of ferro-silicon, and it can be adjusted to any value between 1 (pure water) and 3.5. Getting the density at about 2.0 removes all remaining non-metals (they float to the top), leaving essentially a mixture of aluminum, copper, zinc and stainless steel. The density of the medium is then increased to 3.2 causing all metal to sink except aluminum which floats and is recovered for melting in ingots and shipment to buyers.

After a water wash, the remaining metal is conveyed past a magnetic separator to remove any remaining iron and then into a "sweating furnace" in which the temperature is maintained at 593°C (1100°F). Zinc melts and flows out into molds, while the small remaining quantities of copper and stainless steel are removed by manual sorting.

In the new recycling plant, considerable emphasis has been placed on environmental protection and recycling of the operating supplies.

The entire water treatment process, for instance, is a closed loop, with all the water and media being recovered and recirculated. The sweating furnace also has built-in environmental controls that eliminate waste gases through combustion in afterburners. Filters catch particulate matter so that only clean gases are vented to the atmosphere. The plant not only recovers valuable, non-renewable resources, but contributes to the protection of the environment as well, removing unsightly junk yards that mar the landscape. □

Michel Brochu



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Aluminum ingots awaiting shipment to users. These valuable materials were previously discarded as landfill.

Lingots d'aluminium prêts à être expédiés aux utilisateurs. Ce métal très utile était auparavant utilisé comme matériau de remblayage.