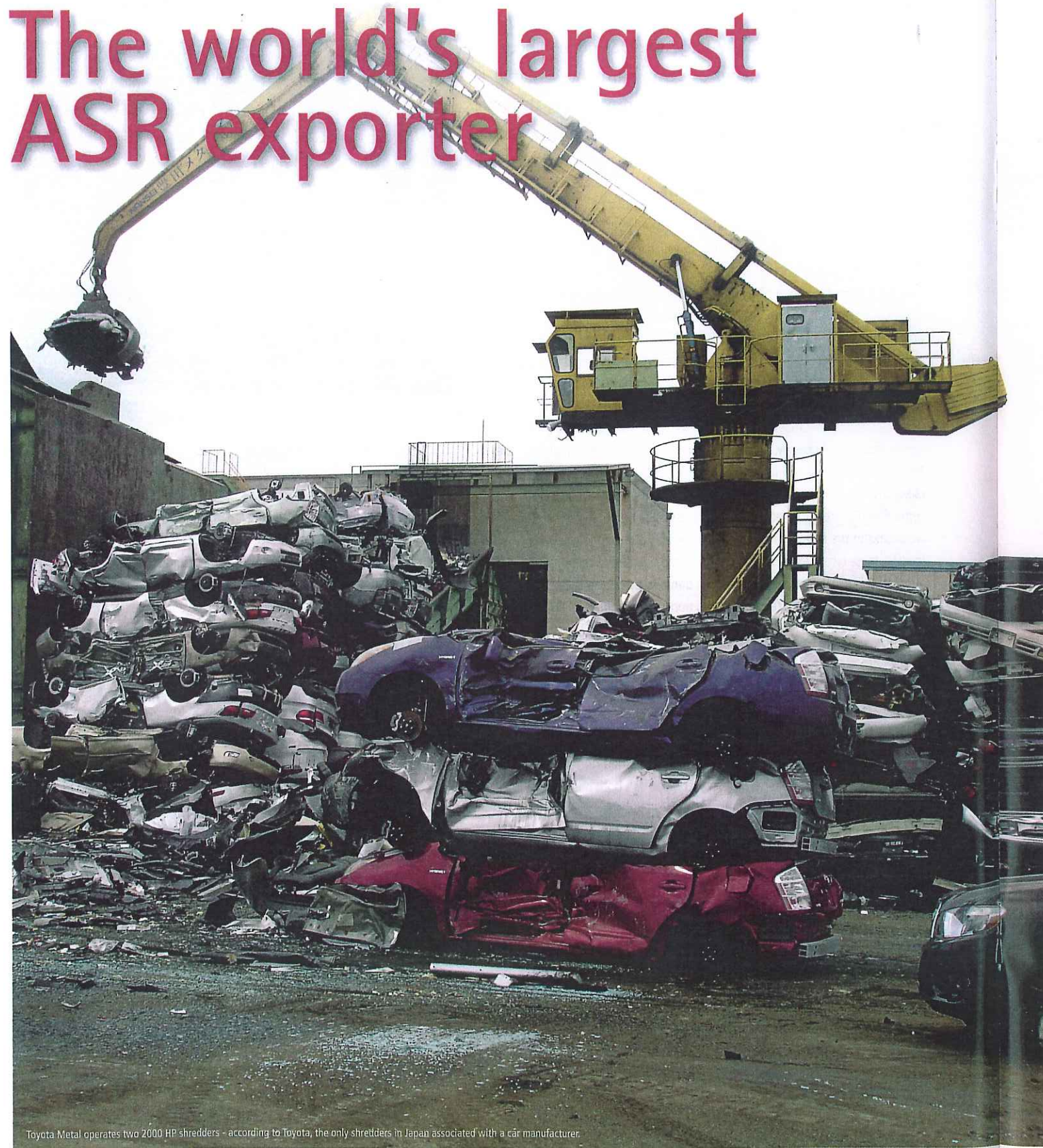


Car recycling at Toyota Metal Co.

The world's largest ASR exporter



Toyota Metal operates two 2000 HP shredders - according to Toyota, the only shredders in Japan associated with a car manufacturer.

In the minds of people throughout the world, the Japanese are synonymous with innovation. And that drive to break new ground is clearly evident at Toyota Metal Co.'s facility near Nagoya where automotive shredder residue (ASR) is converted into a host of useful products, including spray-on sound-proofing.

A coffee table-sized automobile frame is displayed behind glass in a conference room at the Toyota Metal Co., Ltd offices in Handa, Japan, just south of Nagoya. One half of the miniaturised frame is painted black and the other is covered in flecks of orange foam that appear to have been sprayed upon the metal. Yoichi Takagi, a company scrap buyer and the Sub-Group Leader for the company's Sales & Business Development Group, walks over and points at the orange half. 'Automotive shredder residue,' he says. 'That's what we do with it. We turn it into sound-proofing.' In a country of innovative end-of-life vehicle (ELV) recyclers, Toyota Metal might exceed everyone. Subsidised and supported by the world's largest automobile manufacturer, and encouraged to find cost- and environment-saving solutions to ELV recycling, this plant serves as both a company ELV laboratory and in-house ELV processing centre.

Founded in 1970, Toyota Metal quickly became an important regional ELV shredder with contracts to handle the ELV stream of industrial and rapidly-expanding Nagoya. In 1981, it processed its one-millionth ELV, and in 1985, it processed its two-millionth. Through the 1980s and 1990s, the business continued to thrive, despite high landfill costs for automotive shredder residue (ASR) and increasing pressure from the Japanese government and from concerned environmentalists about ELV-related pollution. Still, the company was far from oblivious to the looming problems, and in 1994 it undertook research into alternative applications for ASR, resulting in the current, one-of-a-kind facility opened in 1999.

Efficient operation

Mr Takagi leads me out the back door of the Toyota Metal offices and towards one of the

company's two 2000 HP shredders - according to Toyota, the only shredders in Japan associated with a car manufacturer. Above us, a conveyor drops clean shredded ferrous onto the ground from where it is lifted and loaded by magnet into waiting trucks destined for Aichi Steel, Toyota's 1.7% partner in Toyota Metal. We walk around the shredder and pause beside stacks of flattened cars sourced from nearby ELV collection points. A little further away,

'Toyota Metal processes 100 tonnes of ASR per day, resulting in some 10 tonnes of sound-proofing material.'

Toyota test-cars - some of which look to have been crashed but none of which have been flattened - await dismantling in a nearby garage. As we watch, a grapple crane lifts flattened vehicles into a 1300 HP pre-shredder. It is an efficient operation capable of handling 1000 ELVs in an eight-hour period. Meanwhile, behind the shredder, a conveyor sends still-hot shredded ferrous past two gloved labourers who pick out motors and cables that weren't captured by a magnetic sorter. And in an adjacent space, three additional hand-sorters are stationed just past a non-ferrous metals separator where they sift through fragments greater than 35 mm in size. The smaller fragments are run through a metal separator and sent to yet another hand-sorting station, along with the non-ferrous from the first hand-sorting station. The smaller material will be run through the system again - a process which, Mr Takagi acknowledges, is expensive. On average, hand-sorters can make the rough equivalent of US\$ 2000 a month; on the day that I visited, I counted more than ten. 'We use the metal inside of Toyota,' Mr Takagi explains. 'So that's why we can do the hand-sorting. If we didn't do it, the quality of the metal would fall off.' He shrugs. 'It's a different standard if you are doing it for yourself.'



A conveyor drops clean shredded ferrous onto the ground from where it is lifted and loaded by magnet into trucks.



This frame is covered in flecks of orange foam that appear to have been sprayed upon the metal. It is in fact shredder residue which is turned into sound-proofing.



Workers are draining Freon from air-conditioners and refrigerators before the appliances are shredded.



The remaining material from ASR - primarily a mixture of plastics and dust - is heated, reduced and extruded into a thick, heavy substance called a melt-brick, suitable for safe landfilling or as fuel for steel mills.

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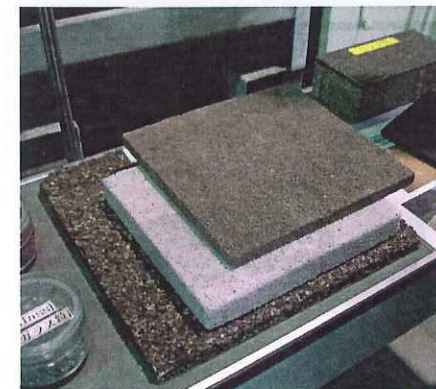
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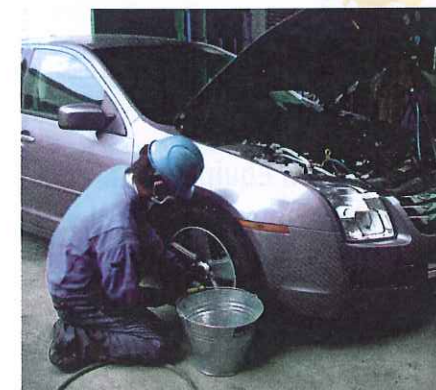
Hand-sorters are stationed just past a non-ferrous metals separator where they sift through fragments greater than 35 mm in size.



In a holding room, conveyors of ASR are dumped into piles, and then eventually weighed and loaded into the processing line.



Toyota has developed a special, light-weight and porous tile ideal for roof-top gardens and roads.



Toyota test-cars are being dismantled.

Multi-layer system

We walk from the sorting area and along an enclosed chute that runs from the shredder's dust collection system to the building that contains the ASR processing facilities. There, we are met by Michihiko Hamai, Project Manager for the Planning & Development Department of the Plant Engineering Division. He leads us into a holding room where conveyors of ASR are dumped into piles, and then eventually weighed and loaded into the processing line.

It is a complicated, multi-layer system that incorporates rotary screens, multiple pneumatic separators, granulators, non-ferrous separators and magnets. Multiple passes are common. The plant itself is a well-tended maze, constantly humming. Windows reveal the popcorn-like jump of the urethane and other resins as they undergo pneumatic separation. Mr Hamai pauses beside a stream of copper dropping into a plastic sack. 'Our copper reaches 95% purity,' he tells me, 'and we usually sell it outside of the company.'

Close by, another sack collects the urethane, cotton felt and other soft materials that are later manufactured into sound-proofing materials, including mats that line car frames and the spray-on sound-proofing on display in the conference room. Toyota's plant is capable of processing 100 tonnes of ASR per day at a rate of 7.5 tonnes per hour, resulting in, on average, 10 tonnes of sound-proofing material. 'Toyota uses it in half of its domestically-produced vehicles - maybe 2 million vehicles, many of which are being exported,' Mr Takagi adds. In other words, in a development that might be expected to horrify environmentalists, Toyota is almost certainly the world's largest ASR exporter! No doubt, it is also the world's largest ASR re-user and, as Mr Takagi happily points out, ASR sound-proofing can be recycled over and over - so long as it's recycled at Toyota Metal.

Particularly pesky

The heavier components of Toyota's ASR have proven more difficult and expensive to recycle. The significant quantities of glass are particularly pesky, and they are typically landfilled - the only component of the ASR stream to be treated in such a manner at Toyota. But in recent years, the company has developed a special, light-weight and porous tile ideal for roof-top

gardens and roads. Several are on display in the ASR plant, and to hold them is to wonder how such materials are possible: they feel impossibly light, and coarse. Currently, they are utilised within the company, but Mr Hamai expects to see them on the market soon. The cost of manufacturing, however, remains a concern. Finally, the remaining material - primarily a mixture of plastics and dust - is heated, reduced and extruded into a thick, heavy substance called a melt-brick, suitable for safe landfilling or as fuel for steel mills. Most of the Toyota melt-bricks are now shipped to Aichi Steel, which has had to alter its furnaces to handle them. Still, the melt-bricks are so successful that Toyota now packs them into steel bundles, also

'The shredding business is profitable; the ASR business is not.'

shipped to Aichi, to promote efficient melting. 'Five, six years ago, we had to pay for melt-brick disposal,' Mr Takagi tells me, 'but now companies pay us. This is a good path for this business, but it takes time.'

Requiring support

On the way back to the office, we pass the company's second shredder, devoted to appliance scrap, and a pile of refrigerator casings. 'The shredding business is profitable,' Mr Takagi tells me. 'The ASR business is not. It requires support from the company and the government. Same with the appliance business.'

We stop inside a hard-surfaced shed where workers are draining Freon from air-conditioners and refrigerators. Like other ELV recyclers, Toyota has recognised the synergies between ELV and appliance recycling, and has taken advantage of them. 'We are constantly looking for ways to recover more material more profitably,' says Mr Takagi. 'That's our company's purpose.'

Adam Minter is a Shanghai-based journalist who writes about business and culture for US and European publications. He also maintains a blog at: www.shanghaiscrap.com