

Milk bottle reincarnation

words Mark Lawson, general manager, SULO Talbot

A new project is underway to give kerbside-collected milk bottles a second – and long – life as mobile garbage bins.

Milk bottles and janitorial (cleaning) bottles generate almost 23,500 tonnes of high-density polyethylene waste in New Zealand each year. Most of this waste (81 percent) is currently shipped overseas as very low-value export product – either as flattened, baled bottles or as re-granulated material from recyclers. Just 3 percent (650 tonnes) is recovered as post-industrial waste, while the remaining 16 percent (3,800 tonnes) ends up in our landfills.¹

The plastics technology and manufacturing industries have also long been grappling with a separate environmental challenge: how to increase the recycled plastic content in mobile garbage bins (MGBs).

As the only New Zealand-based company dedicated to the manufacture of MGBs, SULO Talbot aims to maximise use of domestically sourced, reprocessed high-density polyethylene (HDPE) in its products. A typical wheelie bin manufactured by the company contains up to 35 percent recycled-HDPE content. Sourced from both New Zealand and overseas, the recycled-HDPE is added during manufacture in a production process known as injection moulding.

As part of its commitment to sustainability, the company's challenge has been to increase the proportion of recycled material sourced from within New Zealand.

ONE COUNCIL'S CHALLENGE

A catalyst to propel the project forward came in April last year, when Palmerston North City Council awarded SULO Talbot the contract to supply some 30,000 wheelie bins and a similar number of crates to service their new recycling programme. The Council asked that the bins be manufactured to maximise the use of reprocessed plastic materials sourced from within the council's catchment area.

This posed two challenges for SULO Talbot and their partners for the project, Palmerston North's Budget Plastics Limited.

SEEKING RETIRED WHEELIE BINS

Firstly, New Zealand does not have a large supply of suitably-

1 Source: Plastics New Zealand Material Balance Survey 2009

graded reprocessed plastic material for injection moulding. Overseas, injection moulded wheelie bins have been extensively used for automated refuse collections for decades. They are commonly broken down at the end of their service lives and used as a source of HDPE in new bins.

In New Zealand, however, rubbish bags have historically been used and our wheelie bin 'market' is still relatively young. With the supply of 'retired' wheelie bins constrained, the project partners had to look to other waste streams for a supplementary source of suitable material.

AND MILK BOTTLES?

The second challenge was a sticky one. Milk bottle plastic has not previously been widely used in the manufacture of injection-moulded products such as wheelie-bins and crates because it has a high melt viscosity. In other words, it simply doesn't flow well enough for injection moulding.

Nevertheless, for the Palmerston North contract, significant quantities of reprocessed milk bottle- and wheelie bin material were sourced from the Palmerston North area and surrounds². Process modification enabled the milk bottle material to contribute eight percent of the bins' plastic content. However, the high viscosity of the milk bottle plastic precluded a higher recycled content being achieved.

Other contracts that SULO Talbot was subsequently involved in during its successful partnership with Budget Plastics were similarly constrained. Yet SULO Talbot had a strong desire to increase the percentage usage of milk bottle material beyond this eight percent 'limit'.

MOVING FORWARD WITH THE WMF

A break-through came when SULO Talbot successfully applied to the Waste Minimisation Fund for a grant to work in collaboration with other industry partners. The application, 'Milk Bottle Reincarnation', was a new collaboration with the Plastics Centre of Excellence (a joint venture between the New Zealand Plastics Industry and the University of Auckland) and Clariant New Zealand.

The project aimed to investigate whether the plastic

2 Most of the milk bottle plastic was sourced from the Palmerston North area, whilst the wheelie bin material came from the lower North Island.

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A Waimakariri recycling bin alongside a hopper of the milk bottle material used in its manufacture. Comspec supplied the milk bottle material.

recovered from milk bottles could form a suitable replacement for the expensive, imported virgin plastic used in the manufacture of plastic mobile garbage bins and recycling crates. Could the molecular structure of the plastic be altered to make this possible?

PROMISING PROGRESS

The research began in early 2010 with some positive initial findings.

In parallel to this scientific research, SULO Talbot developed and tested some innovative processes which have allowed developmental wheelie bins and crates to be made with significantly increased levels of milk bottle materials (up to around 50 percent recycled content). Testing to SULO

Talbot's certified AS4123 standard has shown that product containing the higher percentage of milk bottle material significantly out-performs the standard's specifications. This requires passing severe drop- and impact-testing requirements.

The combined results of these process developments have been used in SULO Talbot's manufacture of wheelie bins for the Waimakariri District Council. The result? Milk bottle material is being incorporated at a rate of over 20 percent, with much of this material sourced from the Waimakariri region via Christchurch reprocessor Comspec.

Since SULO Talbot began incorporating milk bottle material in manufacture in April 2010, it has used around 170 tonnes of reprocessed milk bottle material (to February 2011). At current levels of utilisation and production, the plant uses more than two tonnes of milk bottle material per day.

PROMOTING CONSUMER RECYCLING

The Milk Bottle Reincarnation project has developed the capability to use up to 50 percent milk bottle material in the manufacture of wheelie bins and crates. SULO Talbot is currently sourcing more than 60 tonnes of this material each month, and has the ability to more than double this volume.

Alongside councils and other major customers, we are now actively promoting this ability to use New Zealand's milk bottle material for the supply of wheelie bins and crates to the domestic market.

If this promising project proves successful, consumer recycling of milk and cleaning bottles will be a viable economic proposition. And mobile garbage bins and recycle crates will showcase the value of recycling, incorporating a high percentage of recovered material. The innovative process technology being developed also has the potential to be applied to many other injection moulding applications, both in New Zealand and internationally.

The joint venture company of SULO MGB Australia Pty Ltd and Talbot Technologies Ltd combines the internationally renowned plastics capabilities of plastics technology partner, Talbot Technologies, with the waste industry and MGB manufacturing expertise of SULO. The partnership has the combined capacity to produce over 1.5 million MGBs per annum.

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