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SERVING THE INTERNATIONAL MARKET FOR SECONDARY RAW MATERIALS / SEPTEMBER-OCTOBER 2014 / www.RecyclingTodayGlobal.com



EXPANDED SCOPE

Ciparo BV, based in the Netherlands, specialises in connecting materials with recycling markets around the world.



Scrap metal recyclers discover ways to better control infeed flows, dust and downstream recoveries at their shredding plants.

Refined Results

Metals recycling is one of the most established recycling industries in the world. Almost 40% of the world's steel and more than a third of its aluminium production is made up of scrap, with steel and aluminium holding first- and third-ranked positions in the global recycling stakes.

Considering the longevity of the industry, it is not surprising that metals recyclers have witnessed major changes in recent decades, as legislation and technical developments have spurred environmental practices and enhanced recovery levels. For those processing end of life vehicles (ELVs) in Europe, recovery targets are set to rise to 95% in 2015. Many smaller operations have invested in shredders and downstream sorting equipment while others have taken things a step further.

Italian recycling company RMB S.p.A., based in Brescia, for example, which began collecting and trading scrap metal in 1985, now processes up to 320,000 tonnes of ferrous and non-

ferrous scrap (ELVs, domestic scrap and aluminium), incinerator bottom ash and inert materials per year.

In 2013, RMB installed a new patented system from Danieli incorporating a preshredder, shredder, on- and offline sorting equipment and a fume treatment system.

For RMB, located in an urban neighbourhood close to Lake Garda, noise and dust are particular considerations. According to Harry Sadler, sales manager at shredder maker Danieli Lynxs, based in Sheffield, United Kingdom, an increasing number of metals recyclers are operating out of urban areas as land for housing comes under pressure.

"Scrap yards are by their nature noisy places," says Sadler, adding that operators need to be responsible in terms of operating hours and sound. "The area around Lake Garda has very stringent environmental requirements," he says. Toward this end, RMB opted for a dust extraction system as part of its operation.

RMB's new plant is located within a completely covered building, which helps to limit escaping noise and dust. Incoming scrap includes a large volume of ELVs, much of which passes through a ZDS 250 800 preshredder before moving to the 2000-horsepower shredder. The shredder is able to produce 60 tonnes of shredded scrap per hour.

Having the preshredder can offer a number of benefits over simply feeding unprocessed scrap. Key among these is its ability to limit load peaks, provide greater control over the infeed material and reduce shredder wear.

When it comes to RMB's downstream process, material is fed into an air triple-drop cascade and two-drum magnet system designed to sort ferrous from nonferrous metals before the separated nonferrous stream is removed to a second building for further sorting.

FUME TREATMENT

Fume abatement is a recent requirement for car recyclers under Europe's

ELV Directive. The system incorporated into RMB's plant processes the primary airflow from the shredder and the secondary flow directed from the fluff separator, using activated carbon to extract organics and reduce dust to a minimum.

The aim was to meet European Union (EU) and local requirements, and the resulting technology significantly outstripped targets, the company says. At 5 milligrams (mg) per normal cubic metre (Nm³), for example, the level of volatile organic compounds (VOCs) recorded was half the required rate of 10 mg. Similarly, dust content was found to be less than half of the target level. Oil mists, polychlorinated



RMB's complete shredding plant.

biphenyls (PCBs) and others followed the same pattern, with hydrochloric acid found at just 10% of the target rate.

While some systems rely on oxidation at high temperatures for fume abatement, in this instance the concentration of VOCs was too low to support self-combustion. Instead, the system employs a cyclone to dedust the primary fumes, followed by a wet scrubber. Meanwhile, the secondary flow is pre-filtered through a bag filter and heated with an external fuel burner so it can be mixed with the primary air flow from the shredder.

A number of considerations were critical to ensure efficiency and safety. Because of the potential risk of fire involved, dry pretreatment with a bag filter was not possible. Flying burning materials needed to be sprayed with water in the wet scrubber. This in turn introduced a risk of water vapour condensation, negating the possibility of direct treatment with activated carbon. Instead, the system was designed to heat the secondary flow with an external fuel burner prior to mixing it with

the primary air flow, both to prevent water condensation in the carbon bed and to maintain the temperature of the mixed flow at a higher rate than the ambient temperature.

Advantages of using this method, says Sadler, are that a free flame can be safely used to heat only the secondary flow of air, which does not contain VOCs. Furthermore, combining the primary and secondary lines—as opposed to running two independent lines—has been a cost-effective strategy.

OPTIMISATION AND MAXIMISATION

While operators may treat the same sorts of material streams, each tends to face different challenges. Ensuring that they have systems that can be customised for the job at hand is therefore an important consideration.

"One example of customisation to meet client requirements is in the selection of the shredder drive," says Sadler. "We have developed a solution that uses a low voltage motor and an inverter drive. This means the speed of the motor can be altered to match the material that is fed into the mill, which is useful when processing different materials in campaigns. It is also very useful in developing countries where high-voltage supplies are not installed, or in

built-up areas where the costs to install a dedicated high-voltage power supply would be prohibitive."

Sadler says there are savings to be had in terms of ensuring decent stockholdings and spare parts, appropriate aftersale service and regular maintenance. "Post-commissioning advice, adequate training and correct stockpile maintenance all play their parts," he adds. "There are a world of ways to advise clients to maintain their plants—but the best operators are the ones that love their plants, and the best plants are the ones which are well-maintained."

Legislative demands and economic necessity are increasingly driving processors to maximise recycling rates and the recovery of valuable resource streams. Beginning in 2015, the ELV Directive calls for 95% of the average weight of an ELV to be reused or recovered. One way to achieve this, which also can lead to increased revenue, is to fine-tune the segregation of shredded material.

Finnish company Eurajoen Romu Oy is responding to a prolonged upturn in business with the addition of nonferrous enrichment. The company aims to recover specific metals such as copper in addition to ferrous metal, thereby adding to existing revenue streams, minimising landfill costs and simulta-

WHEELS OF PROGRESS

Investing in a shredder to extract greater value from composite feedstocks certainly helps businesses move up a gear, but those looking to maximise efficiency, safety and profit also may consider adding a preshredder.

At a basic level, the preshredder prepares material for shredding. Breaking up scrap results in material that is more easily picked up by the shredder's rollers and helps to limit load peaks, which in turn reduces energy consumption. The low speed, high torque action of the preshredder is designed to reduce the likelihood of explosions when encountering hollow bodies such as gas bottles.

Christian Rossi of Rossi Recyclage, Montoux, France, says pretreating scrap saves time while allowing operators to control the quality of input materials. The company has utilised a preshredder for more than two years.

"With shredding being done under optimum conditions, you get a better quality of scrap in an environment which has improved from a noise and safety point of view," Rossi observes.

The preshredder can be ideal for operators shredding high-density bales or large volumes of ELVs, as it facilitates a more uniform flow of material. Preshredders also can help increase the life of wear parts.



neously responding to stringent recycling targets.

Based in Eurajoki, on the west coast of Finland, the company shreds a range of scrap materials at a rate of up to 40 tonnes per hour. Installed in 2012, the plant consists of a Danieli Lynxs shredder fed into an air separation system, with eddy current separators and double drum magnets to extract nonferrous scrap metals such as zorba. However, when winter temperatures fall below -20°C, the eddy current separators are temporarily decommissioned and the recovered fractions are stored for reprocessing at a later date.

After extensive testing, the company is now installing an offline plant to process this stored material. A vibrating screen captures fines less than 20 millimetres in size, such as small pieces of



RMB of Italy is utilising a new fume treatment system that processes shredder airflows to extract organics and reduce dust.

nonferrous metal and copper wire. The larger fraction is then passed through a sensor-sorting system utilising both induction sorting and 3D/laser imaging technology.

"The client will be able to operate the offline plant to fit their production schedule, maximising recovery of both the valuable copper wire fraction and also stainless steel or aluminium," observes Sadler. "They are also able to

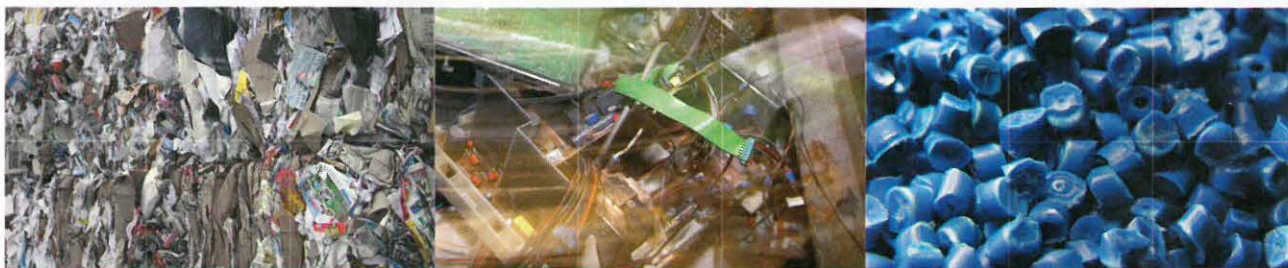
minimise the carryover of organics into their saleable product.

"We expect that in the future, the additional revenue will give them an opportunity to invest more, expanding the plant to recover more metals and reduce landfill even further," Sadler adds.

Juuso Luodesmeri, president of Eurajoen Romu Oy, agrees: "The new system will

help us to sort more material and manufacture new products with the same number of personnel. The company has grown really quickly in recent years and we plan to continue on this trajectory. The plant was planned to enable us to expand and develop more and more in the future." **RTGE**

This article was provided by Danieli Centro Recycling, Buttrio, Italy.



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