At a Glance

Crumb Rubber Ireland Ltd. worked on improving the environmental performance of their activities through focussing on particular process areas where cleaner production opportunities had been identified.

Improving the steel cleaning process

This involved refining the operation of magnets and screens to maximise recovery of ‘clean’ steel without extensive recirculation of the materials. Implementation of this new process will mean a 20% increase in tyre shred throughput in the facility, and more than doubling of the amount of steel recovered. Additionally, it is expected that electricity consumption spiking (and the associated charges) will be eliminated. Potential savings combined with additional revenues from increased production and steel recovery amount to ca. €35,000 per month.

Improving the quality of the crumb rubber fines

A series of trials were undertaken to optimise removing steel and fibre contamination from the dust to enable the material, which had heretofore been used as a filler, to be sold as a new high value product. A number of potential high value domestic and export markets have been identified.

Energy and resource tracking programme

This included the determination of the organisational carbon footprint for both 2010 & 2011 and a system was put in place to measure it on an ongoing basis.

The concept of cleaner production was introduced to staff resulting in a greater ownership of environmental performance at the company and its importance for the image of the company’s products.

2010-ET-CP-24

Eco-efficiency & upcycling in Crumb Rubber manufacture.

Crumb Rubber Ireland Ltd, Dromiskin, Dundalk, Co. Louth, Ireland

www.crumbrubber.ie

Crumb Rubber Ireland Ltd. is the only Irish facility producing a full range of rubber granulate and matting products in Ireland. The raw material comprises used tyres from which crumb rubber is produced through the use of mechanical processes (e.g. grinding and shredding, granulation, compaction). This cradle-to-cradle process produces eco-innovative products for the agriculture, horticulture, construction, childcare, equestrian, leisure, golf and sports industries.

In addition, as part of this process, Crumb Rubber Ireland Ltd. produces two valuable by-products, namely recovered steel (sent for recycling) and fibre (used for equestrian gallops).

Aims of this project

The main aims of this CGPP project were:

- To develop a steel cleaning process which would operate without recirculating steel through the production system, thereby increasing capacity and reducing energy demand
- To develop a system to separate fine crumb rubber from the fibre and steel particles within the dust from the production process;

Project Description

Crumb Rubber Ireland Ltd. recovers steel as a by-product of its process - to maximise the return for the steel it is imperative that the level of rubber contamination on the steel be minimised. Existing practice involved recirculating the steel through the process to achieve the low level of contamination required by customers.

The first aim of this project was to test the capability of magnets, gyratory screeners and granulators in novel configurations and variable operating settings to produce ‘clean’ steel and to recover crumb rubber and fibre. Trial processing of steel was carried out at different configurations, screen sizes and load conditions.

This stage proved quite problematic as the steel kept clogging the screen and on a number of occasions damaging the screen. This problem was solved by placing a large magnet just after granulation to capture and remove the steel prior to the gyratory screener.

The second objective of the project was to increase the value of the dust produced by the system, as existing practice saw the dust used as filler material of practically no value. This work involved designing and optimising a system to separate the three constituents of the dust, i.e. very fine crumb rubber, small fibre particles and very small pieces of steel.
A related task in the project was to identify potential routes to market for the fine crumb rubber. The dust separation system was designed and fabricated onsite, based on a vibratory conveyer over-band magnet and a multi-level screener.

Trials with the initial system proved unsuccessful: Firstly, the holding time of the tray and simple movement of the screener proved insufficient to separate the dust. Secondly, the over-band magnet was not strong enough to capture the steel particles. Following a number of redesigns a working system was achieved using a gyratory screener and a drum magnet.

A parallel work package involved the measurement of the organisational carbon footprint of the company and the establishment of a systematic approach to tracking energy and resource consumption. This work served to develop a cleaner production mentality within the company and raise awareness of environmental performance.

Outcomes
The following is a summary of the environmental and economic benefits from this project:

*Increased production and steel recovery*
Designing and testing of a steel cleaning process, which will enable the facility to:
1. increase throughput of tyres processed by 20%;
2. double the amount of steel recovered; and
3. enable the company to eliminate electricity consumption spikes.

Potential savings combined with additional revenues from increased production and steel recovery amount to ca. €35,000 per month.

*Value added product from a formerly worthless waste product.*
- Design and optimisation of a working dust separation system resulting in valuable products, ca. 1 tonne per day of very fine crumb rubber and 2 tonnes of fibre, thereby deriving value from a formerly worthless material. Potential worth of new fine product is ca. €420 per tonne.

*Company implementation of an energy and resource tracking programme*
- Determination of the company's organisational carbon footprint for 2010 & 2011 and the development of a system to measure and track it on an on-going basis. To date, it is estimated that a 3.8% reduction in carbon intensity has been achieved.

*Potential New Markets*
A number of potential high value domestic and export markets have been identified.

*Increase in Staff Awareness*
- Due to involvement in cleaner production project and carbon footprinting.

*Lessons & Observations*
- The efforts required to collect and analyze the data to determine the carbon footprint of the company’s activities proved a most worthwhile exercise, in that it focussed the minds of the project team and the carbon footprint metric assisted them to communicate environmental performance to their colleagues.

- Projects don’t always run to plan and the importance of making appropriate contingency cannot be overstated. This is particularly the case with staff, having suitable replacements for the project team is important in the event of personnel changes, illness etc.

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The Cleaner Greener Production Programme (CGPP) of the EPA is funded under the National Development Plan 2007-2013. The CGPP was launched in 2001 as a grant scheme to fund Irish organisations to implement cleaner greener practices while achieving significant cost savings.

Cleaner Greener Production is the application of integrated preventive environmental strategies to processes, products and services to increase overall efficiency and reduce risks to humans and the environment.

- Production processes: conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes
- Products: reducing negative impacts along the life cycle of a product, from raw materials extraction to its ultimate disposal.
- Services: incorporating environmental concerns into designing and delivering services.

The programme aims are focussed on avoiding and preventing adverse environmental impact rather than treating or cleaning up afterwards. This approach brings better economic and environmental efficiency.

The CGPP is funded by the EPA STRIVE and NWPPP programmes

Additional case studies from companies that participated in CGPP are available on our website (www.cleanerproduction.ie), including:

- Programme brochures, summarising all projects funded under CGPP

More information on CGPP is available from the EPA:

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