

A U S T R A L I A N

# BULK HANDLING

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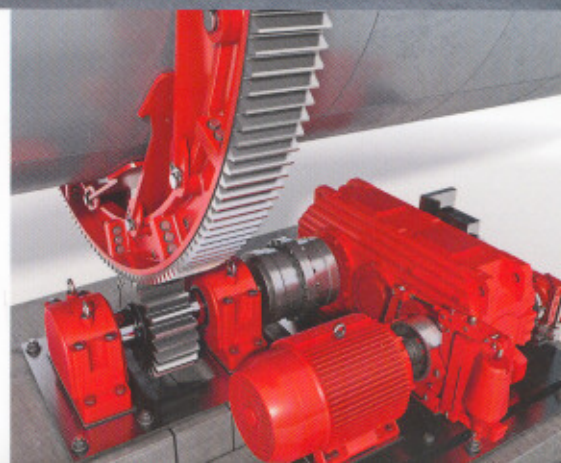
- Grain handling feature:
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  - New Quattro and Bunbury terminals
  - Accurate wagon loading using a camera-based system
- Alex Harrison's 35-year conveyor monitoring journey
- Evaluating transfer chutes for increased throughput
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# Screen classifying cutter replaces hammer mill at US lab

Process machinery manufacturer Munson says its line of screen classifying cutters are well suited to replacing outdated hammer mills in industrial processes. One client, at the University of Maine, is a good example of this.



Screen classifying cutter downsizes raw materials into uniform particles at University of Maine's Process Development Center. In one alternative energy project, perennial grasses and hay are pelletised to make compressed biofuel pellets.



The cutter reduces material into uniform particles with minimal fines or imperfections, and with little to no heat generation, Munson says.

Since 1983, the University of Maine's Process Development Center (PDC) has served the paper industry by providing new, collaborative pulp and paper research for companies throughout the US.

The process lab, originally part of the university's forest and paper industry program, houses a virtual 'mini' paper mill with a broad range of processing equipment. The PDC, self-sustaining by virtue of its contract work with multiple clients, employs 12 people.

"Most of our work is by word-of-mouth from paper and chemical companies who have a problem and need to address their process," the PDC's group leader of engineering, Mark Paradis

said. "Our equipment is flexible and can be adapted in order to provide these companies with a proof of concept."

The PDC is equipped to work with a range of raw materials including wood, bark, herbaceous crops, and agricultural residuals. Available processes include extraction, pulping, bleaching, papermaking, coating, and finishing.

To facilitate its process work, the lab requires efficient size reduction capabilities to downsize materials into uniform particles. At the outset the lab used a hammer mill, a conventional size-reduction method employed for decades, which was inefficient and failed to produce consistently sized

particles due to its crushing and pulverising action.

That's where Munson Machinery came in, and helped the PDC replace its dated hammer mill with a screen classifying cutter model SCC-10.

"We specified that unit because it efficiently reduces materials into uniform particle sizes with a lower energy requirement than the hammer mill," Paradis said.

The PDC leased the SCC-10 for two years before deciding to purchase it, a decision Munson says was made because the unit proved effective at cutting hard, soft, and fibrous materials into controlled particle sizes with minimal fines at high rates for post-usage.

The SCC-10 features a proprietary helical rotor design with dozens of cutter tips attached to a helical array of staggered holders, called interconnected parallelograms, to continuously shear oversize materials against twin, stationary bed knives.

"Unlike conventional granulators containing a small number of angled rotor blades that slice materials into strips in scissor-like fashion, the SCC cutter is configured with cutter tips along the entire shaft, with no gaps between tips, making total contact with the product," Munson says, which results in material being cut into uniform particles with minimal fines or imperfections, and with little to no heat generation.

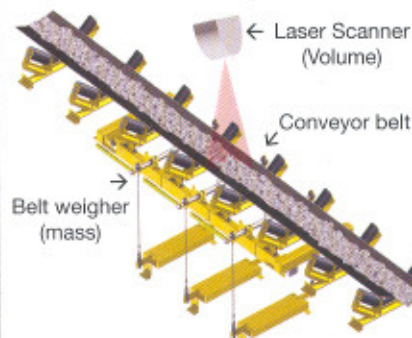
The manufacturer says the rotor design generates six times greater force

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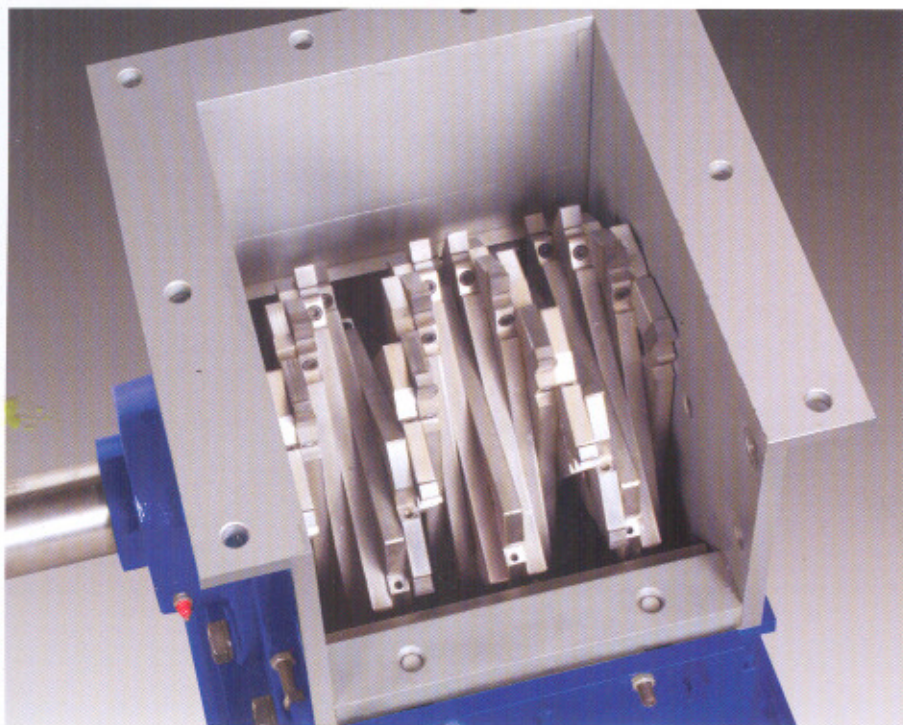
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The rotor contains dozens of cutter tips attached to a helical array of staggered holders, to continuously shear oversized materials against twin, stationary bed knives with minimal fines or imperfections, and little to no heat generation.

per centimetre with each cut than conventional knife-type cutters of equivalent power, contributing to uniform size reduction and reduced energy use.

While the lab's primary work is still focused on the paper industry, new projects target alternative energy and recycling involving paper, wood, carpet, plastics, and other materials. Recently, the PDC expanded its scope into bioplastics, solid and liquid biofuels, nanomaterials and other technologies.

Munson's SCC cutter is also being used in an AU\$1.76m alternative energy project, according to the manufacturer, which says perennial grasses and hay are being pelleted to make compressed biofuel pellets.

"Grass pellets are said to have the potential to establish a new bioenergy industry in Maine, creating a valuable crop for Maine farmers and reduced energy costs for residents," Munson says.

"Several companies have expressed

interest in operating biofuel production facilities and licencing the technology."

Munson says its SCC cutter plays a key role in the initiative, reportedly funded by the Maine Technology Asset Fund. The cutter takes one-quarter of the hay or grass bale and reduces the material to 3.2mm particles.

"Similar biofuel projects are underway in the Northeast and Midwest involving pelletising of corn stalks and converting of hay bales into fire logs."

In another project, a University of Maine chemical engineering professor is developing a biodegradable golf ball partially composed of lobster shells. The SCC-10 cutter reduces the shells to powder form.

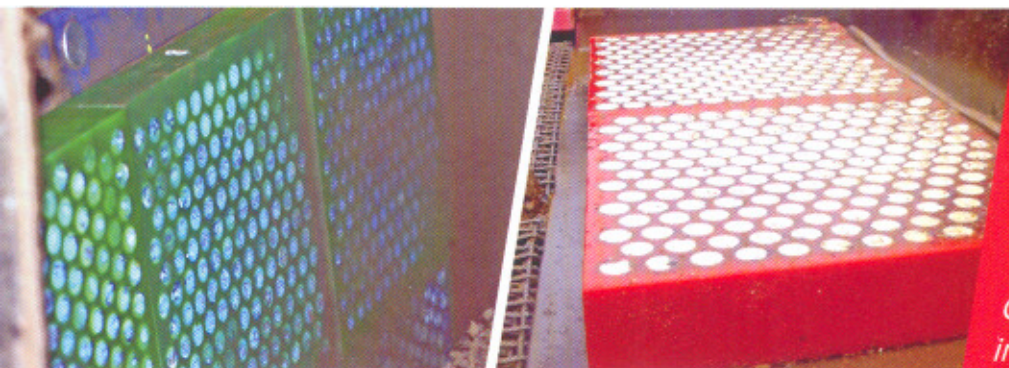
The PDC is also working to develop cellulose insulation as a replacement for fibreglass in residential construction. The lab has developed unique systems to clean and process recycled newspaper and cardboard before it is reduced.

Both Munson's SCC cutters and its Attrition Mills are being considered as size reduction solutions. The Attrition Mill granulates by means of a disk rotating against a circular grinding plate, producing particles within a relatively narrow size spectrum down to 200 mesh (75 microns). It is employed primarily for reduction of fibrous materials, but is also suitable for friable products.

Paradis said the PDC is leaning toward the Attrition Mill because it can produce a fibrous, fluffy, "cotton candy" type product with an excellent R-value. ■

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