CASE STUDY

Automated dust capture leaves no STONE unturned

To improve materials efficiency in its paving stone business, STONE Outdoors maximised the reuse of the fine concrete dust (regrind) created during production of its concrete pavers by modernising its dust capture system. The result has been significant cement savings, reduced bin costs and handling times, plus the added bonus of improved plant cleanliness and staff morale.

Business snapshot

Established in Melbourne in 1995, Carrum Downs-based STONE Outdoors' aim was to create a handmade range of pavers with attention to craftsmanship. Starting with individual grains of sand, the company blends granulated stone and natural colour pigments using a unique wet cast production method to create their quality pavers and accessories from locally sourced materials.

The project

It's not too much of a stretch of the imagination to picture how crafting and honing concrete pavers into works of architectural-quality art can be a downright dusty business.

The materials used and hands-on nature of STONE’s manufacturing process means staff were involved in the messy task of emptying the dust extraction unit and it was affecting their work environment and their comfort levels. The process needed overhauling says Director Craig Bourne.

"While our industry has been facing some tough times we want to keep the business moving forward and a key part of our long-term plan was to reduce the amount of dust in the plant," says Bourne. "We wanted to automate the process we had been testing manually, as the results we’d achieved showed it could work."

The solution

A regrind capture and auto-dosing project was established, and driven by internal expertise, to create a system that would capture the fine dust created during the manufacturing process and automatically dose it back into new mix batches. The aim was to reduce the amount of cement used in each batch. This would bring about a domino effect reduction in waste disposal costs, cleaning costs and material handling time.

The project involved several components, the key element of which was the installation of a fully enclosed dust extraction unit, funded partly through STONE’s successful application to Sustainability Victoria’s energy and materials efficiency capital funding program. The new unit was custom made to automatically transport dust captured during the manufacture process via a screw conveyor, to a new hopper and onto a new dosing unit to be fed back into the mixer.
The results

The project has resulted in significant materials, time and energy savings as well as boosted staff morale says Bourne: “Cement savings have been on target and we expect that we may make further savings in the near future when optimal regrind ratios are confirmed by product testing. There has also been a reduction in bin costs, as was expected, and in handling times.

“Importantly, our staff are reporting a significant improvement in comfort as the new regrind capture and auto-dose system has removed the unpleasant task of manually emptying the dust extraction unit and binning the dust. The knock on effect has been more time, and greater incentive for staff, to keep working areas cleaner, leading to a significant improvement in overall plant cleanliness. We expect this to have a long term impact on staff morale and maintenance costs.

“And, while we delivered the project with internal expertise, the rigour of providing progress reports to Sustainability Victoria as co-funder helped us to deliver on time and on budget.”

A related chemical and waste water treatment project has also borne exceptional results for the business. Rather than treat waste water in-flow, STONE is now storing the low pH acid plant waste and the high pH wash water and combining the two to neutralise waste for safe disposal. This has reduced the amount of caustic agent used to treat the waste water by 60% and STONE is working on further reductions.

Future plans

STONE has several key materials efficiency projects earmarked for the future including a project to crush solid concrete waste (broken product, batch errors, etc.) on site for resale. This will save on bin costs and should create revenue.

One other unanticipated possibility of the materials efficiency assessment is a potentially new revenue source from on-selling bagged excess regrind, which STONE is still exploring.

“Staff are reporting a significant improvement in comfort as the new regrind capture and auto-dose system – made possible with assistance from Sustainability Victoria - has removed the unpleasant task of manually emptying the dust extraction unit and binning the dust. The knock on effect has been … a significant improvement in overall plant cleanliness.”

Craig Bourne, Director