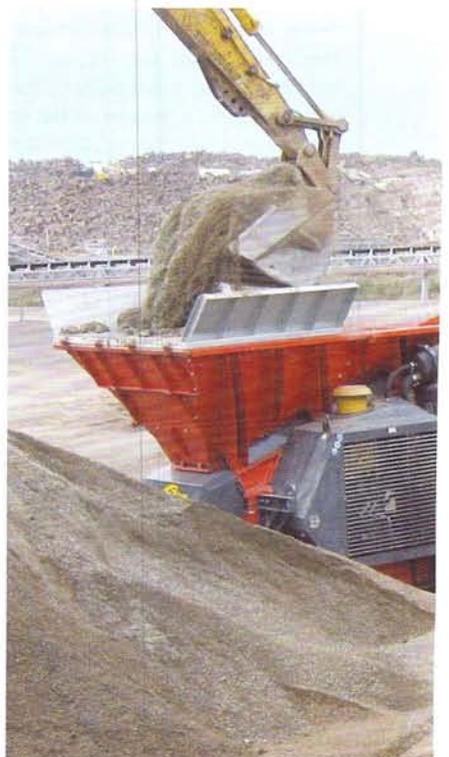


# Glass to sand?

Glass is being turned into sand overseas and at least one local raw-material supplier has expressed interest in this endeavour. *Richard Caldeira* investigates.



Photographs courtesy of Pilot Crushitec

**T**he Alex Fraser group of Australia has been testing the production of sand from crushed glass. The company is well known in Australia for recycling construction and demolition waste to create materials suitable for use in the construction industries. Within the developed economies, there is a concerted effort to recycle building and demolition waste to produce building materials. In countries such as the UK, this makes sense as space is at a premium and buildings are constantly demolished to make way for new structures. However, the South African environment is very different from the building environments of the developed world. Would this approach be suitable in the South African context, bearing in mind that the industry has been slow to accept recycled rubble despite the growing "green building" and sand shortages which have plagued the sector in the past?

#### Comment

South Africa is a leader in the field of crushing mine-waste rock and slag for construction materials. This has been hailed by companies involved in these affairs as a "greener" alternative. However, there has been limited acceptance of recycled building rubble in civil and building programmes. At the height of the building boom, there were reports of limited supply of sand so the manufactured alternative had to be used. Perhaps, there is a solution to the problem, especially when "green building" is the order of the day.

Dave Davel of Stones & Stones, a company which specialises in recycling building rubble at its landfill site in Johannesburg, believes that the concept certainly warrants investigation. According to Davel, government is not issuing any new quarry licences due to depletion of South African sand and rock resources. Stones & Stones is, therefore, enthusiastic about becoming involved in a similar project.

#### Without a shadow of doubt

However, Stones & Stones would not simply start manufacturing sand from recycled glass and offer it to customers. While the company is interested in the idea, Davel says that there would have to be an accepted norm in the market before it could be implemented completely. Following on from this, chemical testing would have to be done to establish the compatibility between



glass, cement and natural stone, as well as other constituent substances found in building material. Davel would like to submit a sample to an accredited laboratory.

Among the advantages in manufacturing sand from recycled glass, Davel recognises the environmental factor. He believes that manufacturing sand in this manner would lessen South Africa's dependence on natural sand and could be seen as part of a company's green initiatives.

However, Davel does expect quarries to resist the concept. Nevertheless, he feels that this is the way forward "without a shadow of a doubt".

According to Davel, Stones & Stones has proven that recycled material is more than adequate for building. He believes that government could drive this initiative in the hope of securing less expensive building supplies for the construction of RDP housing.

**Comment**

SANRAL is just one significant client body which has emphasised the importance of taking a more sustainable approach to construction. Recycled materials have been cited as critical. Major focus, however, has been placed on recycled-asphalt pavements and recycled rubble for layer works. There is, therefore, a strong argument in favour of the use of sand from recycled glass.

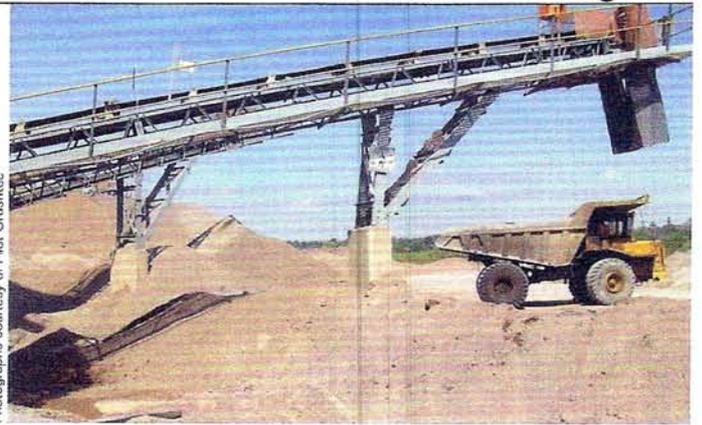
**Sand in the making**

The advantages of recycled sand for the Melbourne recycling operation include:

- **Transport** – the closest sand deposits are more than 50 km away whereas the glass-recycling plants are situated not more than 5 km away.
- **Landfill** – if the glass waste was not recycled into sand, it would be buried as landfill which is not favourable for the environment.
- **Similarities** – recycled sand has all the physical characteristics of traditional quarried sand.

As far as Stones & Stones is concerned, the change to producing sand from recycled glass would be relatively easy. The company estimates that it would only require two hours to retool in order to do this.

Photographs courtesy of Pilot Crushtec



**No replacement?**

Some believe that recycled glass could never replace virgin aggregate.

**Old perceptions dictate**

Ultimately, there is an even greater challenge to overcome within the South African context. "Recycled building materials are perceived as inferior to their preferred virgin counterparts," says Pienaar. While he concedes that the concept could become suitable in future, considering government's need to provide inexpensive housing and infrastructure, in particular, the concept has not yet featured in any discussions with ASPASA.

**Nice to have**

According to Hubert van Zandvoort, an associate engineer at SSI, it would be possible to use manufactured sand from recycled glass as an aggregate. Sand manufactured in this manner could easily be used within the South African environment. However, Van Zandvoort would use this type of sand in projects but not as a replacement for traditional aggregate. He says that the most prominent benefit of using this sand would be to accommodate architectural features such as colour or finish within the finished concrete surface.

**Quality concerns**

However, according to Van Zandvoort, the chances of large-scale manufacture of sand aggregate from recycled glass are not very high. This is due to a number of factors. Firstly, there are quality issues and concerns about the durability of concrete manufactured with the silica found in recycled sand. There is also the question of contamination. Engineers cannot guarantee that concrete blended with recycled sand will remain durable over time. This is largely due to the silica content of recycled sand. It seems that extensive testing would be required before any engineer could guarantee that concrete made with recycled sand could stand the test of time. The danger of contamination is also real. Manufacturers would have to ensure that the bottles are cleaned thoroughly before crushing which would require quality control at the recycling plant. Ensuring that the bottles are clean before crushing would be a costly exercise which would affect affordability significantly. Van Zandvoort believes that recycling glass would be better served within the glass industry. Using recycled glass to manufacture sand, and then virgin sand to make new glass bottles and products, would amount to wasteful expenditure of resources and energy, he believes. While the concept is possible and has some merit, there are better opportunities for recycling glass within the glass industry, he adds.

Clearly, manufacturing sand from recycled glass is a divisive subject at the moment. While the technology exists, the desire for laboratory-accredited proof is valid. Consulting engineers are willing to explore the concept for civil projects if there is scientific proof that the sand would bind adequately with other building materials. If the manufactured sand is tested, it might not be too long before the concept takes off. Just ask Stones & Stones. ■