

Alternative materials used for basic sanitation structures

Dismantling your concrete toilet structure and moving it somewhere else sounds totally improbable, but that is exactly what will happen once a research project into superstructures for on-site sanitation systems, conducted by the Department of Civil Engineering at the University of Pretoria comes to an end.

Considering that 6.5% of South Africa's population uses on-site sanitation systems such as pit latrines the research will go a long way in offering mostly rural people the chance to move their toilet structure once the latrine has filled up or dismantle it and use the material in other building applications.

Prof Elsabe Kearsley, leader of the research project commissioned by the Water Research Commission (WRC) says that creating alternative construction material has been a research focus of civil engineering students for many years but that the WRC project has channelled existing knowledge into prototypes that can now be tested in the field. The three-year project has been running for a year and great strides have been made to come up with a solution.

The contract with the WRC was negotiated by Business Enterprises at University of Pretoria (Pty) Ltd that offers consultative and commercial contract research services and acts as the interface between business and the brainpower and resources of the University.

Flexible applications

The superstructures being researched at present must be able to withstand forces such as wind and rain, as well as normal wear and tear like bumping and door-slamming. They should also be able to be used for different kinds of sanitation systems and be adjustable to accommodate different layouts.

"It is imperative that the community buys into these systems and that they should be able to benefit financially from doing their own on-site construction," says Prof Kearsley.

Two types of systems are investigated at this stage. The one uses high-strength, but extremely thin (16 – 20 mm) concrete panels. The panels can be manufactured in a factory and put together by local labour. An alternative is to provide communities with pre-blended material that can be mixed and cast into moulds on site.

The second prototype put forward by the research team uses lightweight foam concrete blocks that are stacked, requiring very little skill from the person doing the construction. More than 50% of the volume of the blocks is air, making them light and strong at the same time. These blocks, with central holes in them, can be stacked and held together by a steel bar, fixing the roof to the floor structure and adding further strength by covering it with a net or carpet backing.

The plan is to do a pilot study in the near future to test these superstructures and to get input from communities. 📍

Prof Elsabe Kearsley is head of the Department of Civil Engineering at the University of Pretoria, and leader of a research project commissioned by the Water Research Commission with a required prototype where stacked lightweight foam concrete blocks were used to build a sanitation structure.

The alternative materials that are being researched could be used for different kinds of sanitation systems and be adjusted to accommodate different layouts.

→ Prof Elsabe Kearsley with a high-strength, extremely thin concrete panel. The panels can be manufactured in a factory and put together by local labour.

