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**DELIVERING WATER, SANITATION AND HYGIENE SERVICES
IN AN UNCERTAIN ENVIRONMENT**

**A sanitation technology demonstration centre to enhance
decision making in South Africa**

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Limited understanding of the characteristics of different sanitation technology options may affect acceptance of certain technologies in certain circumstances, as well as lead to little appreciation by the users of the long-term financial, environmental and institutional implications of operating and maintaining the various sanitation systems. In South Africa, this has resulted in disturbing increases in the numbers of poorly operated and maintained sanitation technologies across South Africa. The need to establish a facility where people could acquaint themselves with the various sanitation systems was recognised by the CSIR and WRC who made funding available for the establishment of the Sanitation Technology Demonstration Centre at the CSIR. This Centre is aimed at informing local, provincial and national authority officials, NGO's, CBO's, consultants, schools, universities, and importantly, communities themselves in order for them to make informed and educated decisions and choices regarding sanitation technologies.

Introduction

Sustainable sanitation facilities and their accessibility to people for sustainable lifestyles has become of critical importance in South Africa (Landman, 2004). The Strategic Framework for Water Services in South Africa (SFWS) defines basic sanitation services as the provision of a basic sanitation facility, the sustainable operation of this facility and the communication of good sanitation, hygiene and related practices. However, information regarding sanitation technologies is not always successfully communicated to the end-users - reports are normally aimed at technical practitioners, not decision-makers and/or community members who may not always have sufficient understanding of the reality of the technology and its potential benefits and shortfalls. Sanitation products are often the subject of aggressive marketing by the manufacturers, particularly at local authorities whose decision making officials may not always have sufficient technical background to adjudicate the products' efficacy.

In south East Asia the concept of sanitation technology centres proved very successful in showcasing various technologies where interested people could view full-scale examples to learn about and understand the functions and benefits of these technologies. This demonstrated the need for such a centre in South Africa where communities, councillors, technical professionals and government can be exposed to various aspects of different sanitation systems.

Background

According to the National White Paper on Basic Household Sanitation in South Africa (DWAF, 2001), "sanitation refers to the principles and practices relating to the collection, removal or disposal of human excreta, household waste water and refuse as they impact upon people and the environment. Good sanitation includes appropriate health and hygiene awareness and behaviour, and acceptable, affordable and sustainable sanitation services". Sanitation includes both the 'software' (understanding why health problems exist and what steps people can take to address these problems) and 'hardware' (toilets, sewers and hand-washing facilities). Together, they combine to break the cycle of diseases that spread when human

excreta and waste are not properly managed (DWAF, 2002a). The minimum acceptable basic level of sanitation is therefore:

- appropriate health and hygiene awareness and behaviour;
- a system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible, and which does not have an unacceptable impact on the environment; and
- a toilet facility for each household.

The SFWS (DWAF, 2003) does not define the sanitation technology to be provided as a basic sanitation facility but recommends that the decision be made by the water services authority. Safe sanitation, which includes ventilated improved pit (VIP) toilets, ecological sanitation (such as urine diversion toilets), pour-flush and flush toilets, are about offering people the basic right to dignity and health. Without it, people (mostly children) suffer from incidence of disease and death, women and children remain at risk of attack, school days and work days are lost to the economy, and the environment is increasingly polluted with human waste (The Water Wheel, March/April 2008). A basic level of sanitation is expected to meet policy requirements, as well as adhere to minimum design standards and norms that are applicable to all types of sanitation facilities provided. It therefore has to be a sanitation facility that:

- is safe;
- is reliable;
- is environmentally sound;
- is easy to keep clean;
- provides privacy;
- provides protection against the weather;
- is well ventilated;
- keeps smells to a minimum;
- prevents the entry and exit of flies and other disease-carrying pests
- enable safe and appropriate treatment and/or removal of human waste (as set out in the Strategic Framework for Water Services); and
- is accompanied by appropriate health and hygiene education.

A plethora of toilet technology types are currently used in South Africa, including buckets, chemical toilets, simple pit toilets, ventilated improved pit toilets – with the possible addition of micro-organisms to reduce cleaning frequency, dehydrating and composting toilets, urine diversion toilets, vacuum technology toilet systems, anaerobic toilets, aqua-privies, flush toilets with septic tanks or conservancy tanks, flush toilets that recycle water, flush toilets with small bore solids free sewers, and flush toilets with full waterborne and linked to central treatment works.

The Sanitation Technology Demonstration Centre

A Sanitation Technology Demonstration Centre has been established by the Council for Scientific and Industrial Research (CSIR) as a national and African resource centre to increase knowledge and understanding of sanitation technologies. The Centre, a first in South Africa, was conceptualised and jointly funded by the Water Research Commission (WRC) and the CSIR Built Environment unit. This open-air, permanent display centre at the CSIR in Pretoria, which displays various on-site sanitation technologies, was opened on 27 May 2010. It is the only centre of its kind in South Africa (as well as the African continent) that focuses on on-site sanitation technologies.

Objectives

The objectives of the Sanitation Technology Demonstration Centre (dubbed the SanTechCentre) are to showcase, demonstrate and provide training on various sanitation technology options. The establishment of this centre consisted of several phases, i.e.:

- planning phase, which included a literature review, development of selection criteria, selection of technologies and planning of the construction;
- construction phase, which included the construction and documentation of the construction of several sanitation technologies;
- the information dissemination phase, which included the development of audio-visual information material and the establishment of a website;

- the advocacy phase, which included the organisation of the relevant advocacy, promotion and demonstration events, such as a formal opening ceremony to introduce the selected sanitation technologies at the demonstration centre to the public; monthly events, such as tours for schools, universities and other educational institutions; and annual events, such as conferences, workshops, seminars and exhibitions.

Selection criteria

The sanitation technologies needed to be selected for maximum effect within a limited project budget, therefore selection criteria were developed taking into consideration the national imperatives of the country, the policy context regarding sanitation provision, the minimum design standards and norms for sanitation technologies and the characteristics of the CSIR site. Our national imperatives include (i) meeting the needs of the people, (ii) the nation's growth and development imperative, (iii) statutory requirements, (iv) health imperatives, (v) gender mainstreaming, and (vi) water for growth and development initiatives (CSIR and DWAF, 2007).

Technologies displayed

A comprehensive range of sanitation technologies and products are on display at this open air facility, including systems that could be regarded as conventional, as well as some alternative approaches. Amongst the exhibits, examples can be viewed of dry sanitation, urine diversion and/or separation technologies, water-borne systems, ecological sanitation and hand washing facilities. The SanTechCentre includes examples provided by commercial suppliers (subjected to the selection criteria), as well as exhibits constructed and/or developed by the CSIR. All the exhibits are life-size/full scale and functioning but cannot be used; i.e. in most cases the technology part is in the open. In the case of the top structures ("huts") for the technologies, the pedestals, doors, hand washing facilities, etc all work but without the necessary pit/tank underneath the pedestal. The technologies are displayed in this way to enable visitors to see, measure, touch, try out and understand the different components of sanitation technologies, from the dimensions of a pit for a VIP toilet to the size of a solar panel to drive a small pump for recycling flushed water.

The exhibits are grouped into five areas as depicted in Figure 1 and explained below.

- Exhibit area A: This area deals with sanitation technologies that dispose of human waste without the use of water as a carrier, i.e. pits and slabs for Ventilated Improved Pit toilets, Fossa Alterna, etc. The purpose of the exhibits in this area is to display some of the technology components that would normally be concealed and/or underground, but is now visible.
- Exhibit Area B: Included in this area are examples of various top structures from various construction materials that could be constructed over the technologies demonstrated in exhibit area A and hand washing facilities that could go with the top structure. This area shows everything from the floor up.
- Exhibit area C: In this area the focus is on sanitation technologies that dispose of human waste by diverting and/or separating urine from faeces and re-using the nutrients in the excreta as fertiliser, i.e. urine diversion sanitation, Enviroloo, Ecosan, etc. The purpose of the exhibits in this area is to display the technology components that would normally be concealed and/or underground, but is now open and visible.
- Exhibit area D: This area contains examples of various top structures ("huts") that could be constructed over the technologies demonstrated in exhibit area C and hand washing facilities that could go with the top structure. These technologies could also be built as part of, or inside, a house.
- Exhibit area E: In this area, technologies that dispose of human waste by using water as a carrier are on display and hand washing facilities that could go with it. These technologies are mainly focussed on on-site treatment by recycling water. Three of these technologies are working models and can be used by visitors to give them a 'feel' for the technology.

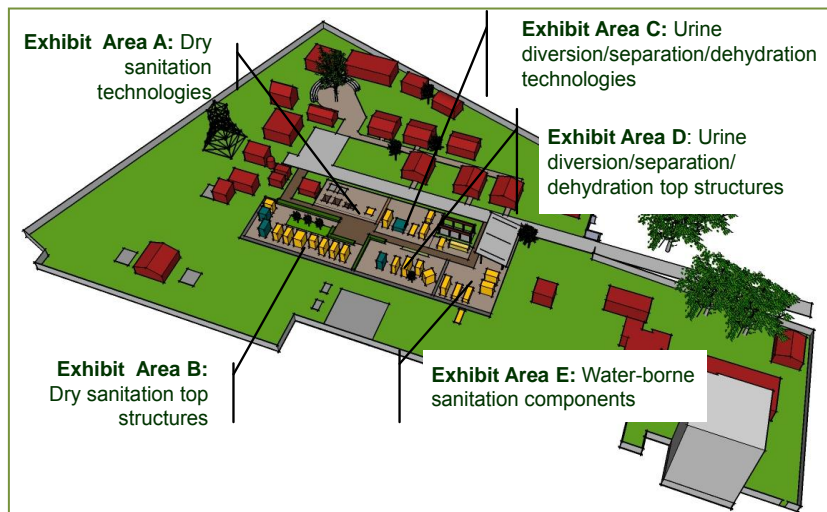


Figure 1. Graphic of the SanTechCentre

The SanTechCentre opened in May 2010 with a total of 21 exhibits of different sanitation technologies in South Africa and Africa. Through word-of-mouth the popularity of the Centre grew and 9 more exhibits were donated by manufacturers of sanitation technologies (see figures 2 and 3). More manufacturers are interested in exhibiting their sanitation products on the SanTechCentre, but unfortunately we have run out of space. Funding will need to be obtained to expand the Centre to accommodate more exhibits.

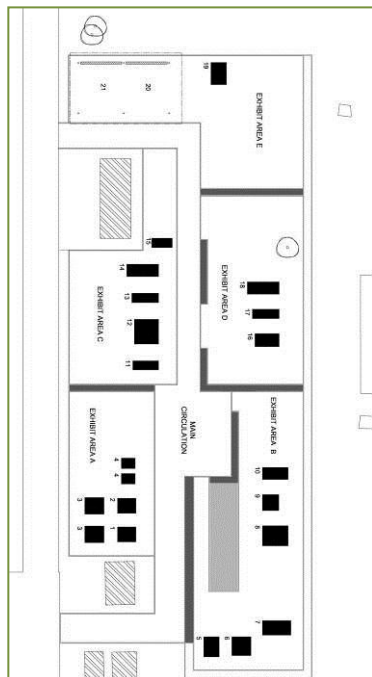


Figure 2. The SanTechCentre in May 2010 with space for more exhibits

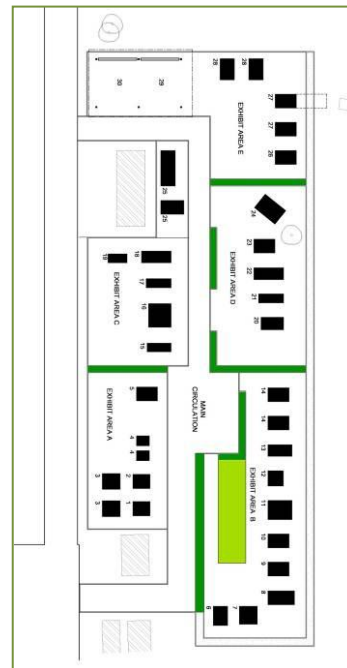


Figure 3. The SanTechCentre in December 2012 with no more space for exhibits

Photograph 1 and 2 show some examples of sanitation technologies on the SanTechCentre and a demonstration of a sanitation technology to visitors at the Centre.



Photograph 2. A section of the SanTechCentre



Photograph 2. Demonstration to visitors at SanTechCentre

Advocacy and information dissemination

Visual material (info sheets, posters) was developed for disseminating information about the SanTechCentre. Information material (pamphlets, brochures and CDs) regarding the sanitation technologies that were donated by the commercial companies on the Centre was provided by these companies. A website has been designed and can be accessed on http://www.csir.co.za/Built_environment/santechcentre. All the dissemination material and the commercial companies are accessible from this website. The website has been available to the public since the opening ceremony of the Sanitation Technology Demonstration Centre on 27 May 2011.

During visits to the SanTechCentre, the exhibitors are usually present to answer questions from the visitors regarding the functioning, operation and maintenance, cost per unit and typical repairs of their technology.

Impact of the Sanitation Technology Demonstration Centre

The sanitation sector is rapidly becoming a major factor in terms of the prevention of contamination of scarce drinking water and global warming issues in South Africa. These challenges need to be addressed to eliminate the sanitation backlogs in our country to improve the quality of life of all South Africans. Awareness about sanitation and the sanitation technologies available in the country, as well as the innovations in the sanitation sector, needs to be raised and strengthened in order to create sustainable human settlements. The Sanitation Technology Demonstration Centre intended to have an impact on a variety of aspects in South Africa, which include; (a) communicating information about sanitation technologies, and (b) providing a means for decision making regarding the selection of sanitation technology options for implementation in South Africa.

The SanTechCentre is a success as is demonstrated by the media coverage and the number of visits from key role players and community members in the sanitation sector from across the globe since the opening of the Centre. It has fulfilled its goal of raising awareness and increasing knowledge about sanitation and what types of technologies are available, specifically for on-site sanitation. The number of visitors to the SanTechCentre is increasing at a steady rate as access to the Centre is free of charge. To date, about 200 officials from various departments of national and local government in South Africa and Africa, as well as various Parliamentary Portfolio Committees, have visited the SanTechCentre. In addition, hundreds of university students and high school-level learners, as well as community members of tens of villages have visited the Centre to acquaint themselves with sanitation technologies. A significant number of local municipalities and service providers brought along members from their communities to the SanTechCentre for them to gain knowledge about different kinds of sanitation technologies and to assist them in making choices and decisions on the spot. Feedback from exhibitors and visitors, especially community members, showed that the SanTechCentre has given them the opportunity to see different full-scale technologies and that it improved their understanding and knowledge of sanitation and its implications.

The SanTechCentre now also provides opportunities to conduct research on various aspects of sanitation. No research is currently being conducted at the SanTechCentre, but research projects could include, amongst others, the following:

- The social acceptability of different sanitation technologies.
- The impact of a sanitation technology where it has been implemented.
- The impact of a technology centre, such as the SanTechCentre, on the dissemination of knowledge.
- The development of a decision-making tool for choosing an appropriate sanitation technology.

The SanTechCentre so far provided the opportunity to strengthen links with the leading departments, stakeholders and role players in the sanitation sector, such as the Dept of Sustainable Human Settlements, Water Research Commission, the Department of Rural Development, the South African Local Government Association (SALGA), Water Institute of South Africa (WISA), International Research Centre (IRC), leading NGOs in the sanitation sector, various university departments and various international funders. But most importantly, it provided a platform from where community members could make informed decisions regarding sanitation options for their people.

The presentation of this paper will show more photographs to show the extent and the impact of the SanTechCentre on decision making from grassroots level to Parliament level. To arrange for a visit to the Centre or to obtain more information, please go to:

www.csir.co.za/built_environment/santechcentre

Acknowledgements

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