



KHANYISA PROJECTS CASE STUDY

ASSESSMENT OF INCINERATION HOUSEHOLD TOILETS

AT A GLANCE

FUNDERS

The Water Research Commission funded this project through the SASTEP programme.

TIMELINE

The project started in early 2021 and will be completed in April 2022..

AREAS

Mzinyathi; Babanango Game Reserve and an informal settlement in East London, South Africa.

"Cinderella Eco Group has worked with Khanyisa Projects during a period of testing and certification processes to determine the compatibility of our sanitation solutions to WRCs specifications for South Africa. We are impressed with their expertise and efficiency and their attention to detail and testing protocol both in the laboratory and in the field".

TRUDE MARGEL

Cinderella (Chief
Communications Officer)
Norway

OBJECTIVES

What: The project is one of the first in the world to apply the new ISO 30500 testing standards for onsite sanitation systems.

Why: The project involved the testing of three household incineration toilets for future compliance with ISO 30500 standards and performance testing against design parameters, operation and maintenance requirements, user acceptance, safety and long-term reliability. The three systems were powered by Electricity, LP gas and Charcoal briquettes respectively.

FINDINGS

- There is low adoption of incineration toilets in South Africa compared to worldwide trends. The high cost of internationally manufactured systems is likely to be a significant contributing factor, as is the lack of local after-sales support for the systems. Locally developed systems have not yet been commercialised.
- There is significant potential for incineration household toilets to become a key part of the suite of non-sewered sanitation solutions available in South Africa, but capital cost reductions need to be achieved and renewable energy sources explored. (Due to high energy needs and associated costs)
- User acceptance of the systems was high, although there were issues regarding service delivery on one of the systems
- The analysed ash was free of pathogens and had a low nutrient content
- One of the systems has generated significant interest from several private game reserves where sourcing water for flush toilets is challenging



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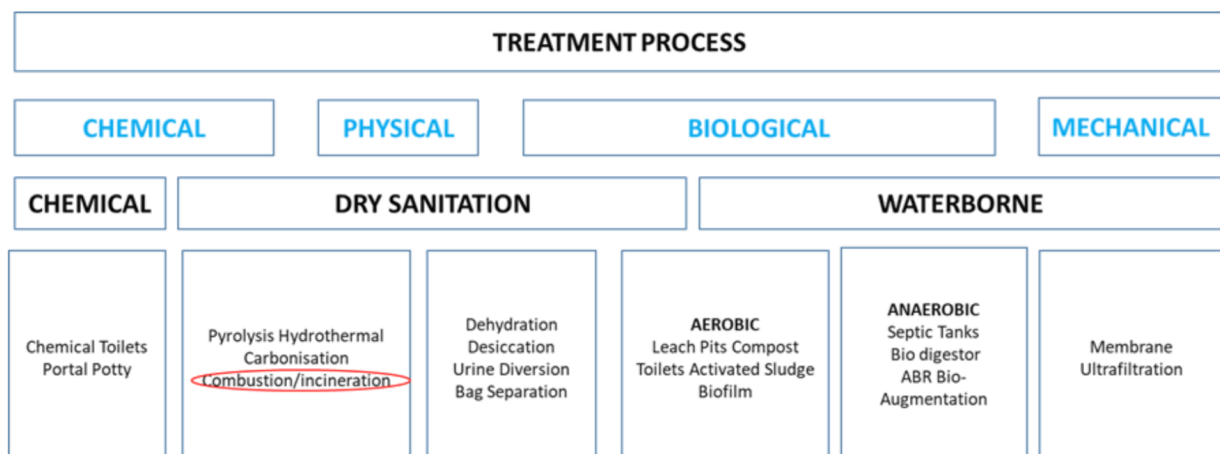
DETAILED OBJECTIVES

- To scan and identify commercially available and developmental-stage household incineration sanitation systems in South Africa and globally.
- To evaluate and assess two incineration sanitation technologies in the SASTEP incineration technology portfolio, using the SASTEP field-testing and demonstration guideline.
- To assess the operation and performance of the identified technologies against the requirements of SANS 30500 and comment on the relevance of this group of technologies in view of next generation non-sewered sanitation systems.
- To carry out a high-level market overview and market entry strategy for household incineration technologies in South Africa. This will include a price point analysis comparing CAPEX, OPEX and lifecycle costs to those of competing technologies and solutions.
- To develop a testing and quality assurance protocol for household incineration sanitation technologies in South Africa.

PROCESS DESCRIPTION

The study focused on household incineration sanitation systems which combust human excreta either within the toilet unit or in backend processes using an energy source. The energy source could be electricity, LPG gas, briquettes or solar. Larger-scale incineration systems treating waste from multiple front ends or centralised incineration plants are excluded from the scope of the study. Systems which use other thermal processes to treat waste, such as pyrolysis and carbonisation, were also excluded from the study.

Categories of treatment processes for human excreta, indicating scope of this study:





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EXCRETA TREATMENT

The household incineration sanitation technologies tested as part of this study are systems where incineration is the single treatment process employed for the excreta. The testing protocols that will be developed as part of this study will be focused on these types of systems.

DELIVERABLES

Deliverable 1

COMPENDIUM OF INCINERATION SANITATION SYSTEMS

The scan was carried out through a literature review and interviews with technology developers, sanitation experts and funders of sanitation technology development (e.g. WRC, Bill and Melinda Gates Foundation,). The resulting compendium will have a detailed description of the products, technical information, value proposition, limitations, and a list of product brands already available or being developed.

Deliverable 2

TECHNOLOGY BRIEF ON INCINERATION SANITATION SYSTEMS

The technology brief was prepared based on the literature review and interviews with technology developers, sanitation experts and funders of sanitation technology development (e.g. WRC, Bill and Melinda Gates Foundation, Toilet Board Coalition). The brief points out the role of incineration sanitation technologies as more high-tech next-generation non-sewered sanitation systems emerge. It also highlights the relevance of incineration sanitation systems to the South African sanitation landscape.

Deliverable 3

EVALUATION AND ASSESSMENT REPORT; PRODUCT AND PERFORMANCE TESTING AND QUALITY ASSURANCE PROTOCOL FOR INCINERATION SANITATION SYSTEMS; HIGH-LEVEL MARKET OVERVIEW AND MARKET ENTRY STRATEGY

Evaluation and assessment of three incineration sanitation systems in the SASTEP portfolio

Three incineration household toilets have been tested - Andyloo, Cinderella Comfort and Cinderella Freedom. The incineration household toilets were tested in East London, Mzinyathi and at Babanango respectively. According to WRC policy, the necessary ethical clearance was obtained to carry out the research. The number of samples collected from the system was not linked to individual users, as samples will be composites.

CASE STUDY UPDATE

The Case Study will be updated when the final evaluation and various reports are completed.