

PROJECT PORTRAIT

Low-cost Fencing for a Pre-school in Lavender Hill; #4 (2011)

What is this project about?

This is an engineering project that focused on providing assistance to the New World Foundation's community centre in Lavender Hill in the Western Cape. This community faces many challenges from unemployment to high crime rates. The NWF pre-school faced the challenge of having their fence stolen on several occasions and therefore needed a low-cost, effective solution to this problem.

The research

The research focused on identifying possible ways to provide the pre-school with low-cost fencing that could not be used as fuel (such as wood used for heating), had no scrap metal value (such as steel or wire which could easily be stolen) and the material would not block visibility (which might hide criminal

activity in the area). Plastic lumber and recycled plastic HDPE were considered for the fence material.

What did the researcher do?

The researcher looked at the possible materials to be used for the fencing project after visiting the site and conducting an extensive literature review of materials used in the making of fences in various contexts. The researcher considered several factors in choosing the materials such as the tensile strength of the material, resistance to varying weather conditions, density, water absorption and resistance to organic substances.



Pre-school play area in need of "unstealable fence"

What you need to know:

Socio-economic conditions in low-income communities impact on all aspects of life. In order to design useful Engineering solutions for practical challenges these factors must be considered; e.g. what does a 'good fence' look like where there is a high unemployment rate and drug abuse, as well as gang-related and common crime.

The research findings

The fence material that was selected for the fencing material was recycled plastic (HDPE). It is easily available in South Africa from certain suppliers. If the material is to be selected from a recycled plastic or plastic based composite then plastic lumber similar to that used in benches can be used. It has good tensile strength and additives can be used to retard flammability, reduce creep and add color.

The material can be processed via extrusion. The wind loading calculation and human loading calculations show that the section can be a 100x100mm. It would survive heavy extreme loading conditions if produced from the materials above.

The patent search proved to provide similar simple designs of fences. The chosen patent to base the design upon was the Patent 1.

The cost of the 1m fence is calculated to be in excess of R2000. The total for the 20m perimeter of the play area is R44 500. These prices were

based on the material being imported due to the inconsistency of South African manufactures' prices and properties. It should be possible to source cheaper material locally, reducing the cost of the fencing considerably.

Using the research

Stakeholders such as the Department of Public Works and construction companies could use this information as a starting point to develop solutions to the challenges they experience with having goods stolen or vandalized due to inadequate security fencing around various properties. It also recommends that future research and interventions for these issues encountered consider the use of materials sourced from within South Africa to reduce the cost of production.

The study was completed in **July 2011**. A follow-up study was done in 2013; see **# 30**.

Want to know more?

Research was carried out by Konke Mazwai at the Department of Mechanical Engineering, University of Cape Town. This summary is based on his study "Low cost fencing for a pre-school in Lavender Hill". The project was supervised by Prof. R Knutsen.

Keywords: engineering, affordable, fencing, recycling, crime

To **reference** this Project Portrait, cite UCT Knowledge Co-op as the author.

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know-op@uct.ac.za

www.knowledgedeco-op.uct.ac.za

Tel: 021 – 650 4415

