Will ABTs hold the public purse to ransom?

Government has shifted its focus to pre-fabricated Alternative Building Technologies for residential and community infrastructure because buildings are faster to erect. Unfortunately the “need for speed” is resulting in decisions that are shown to sacrifice quality, longevity, usability and pupil safety.

**Technical Contributor**

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WILL ABTs HOLD THE PUBLIC PURSE TO RANSOM?

Clay brick has always been the material of choice for sustainable, low maintenance and long lasting infrastructure. Schools, clinics and houses built over the past 100 years all across South Africa, offer a proven track record of lowest lifetime cost.

It is expected that new programs like the ASIDI or Accelerated Schools Infrastructure Delivery Initiative program will stimulate crucial education projects. ASIDI targets over 3000 schools across South Africa for reconstruction or service improvements – great news for local communities.

In the Eastern Cape, 168 000 schools are planned. This will tick some boxes in the region come election time. Unfortunately the "need for speed" is resulting in decisions that appear to sacrifice quality, longevity, usability and pupil safety.

The Presidential Infrastructure Coordinating Commission (PICC) Council resolution (approved by the Cabinet) requires 60% of government’s social infrastructure buildings to be constructed from pre-fabricated ABTs by 2017. This decision is based on the assertion by CSIR Built Environment division that ABTs can offer significant savings in building time and costs”.

The CSIR Built Environment division is claims that Alternate Building Technologies or ABTs, are not only faster to erect, they also offer “significant savings in energy and life-time costs of ownership”.

Dr Llewellyn Van Wyk, CSIR Principal Researcher Building Science and Technology Department is quoted as saying: “Of the 40 systems that have been identified for use in the construction of schools, 32 of them perform better (generally) than conventional buildings”.

The Clay Brick Association of South Africa took a closer look at the performance of five schools built with these alternate building systems to establish the validity of the CSIR’s support of ABTs. These schools were built during the past three years:

- Goodhope Senior Secondary School – Eastern Cape
- Lotus Gardens Primary School - Tshwane
- Gulandoda Junior Primary School – Eastern Cape
- Olivenhoutsbosch Primary School – Gauteng
- Pakamani Senior Secondary School – Eastern Cape

The five randomly selected ABT schools were visited by representatives and a camera crew, and their performance in delivering a superior learning environment was discussed with both headmasters and users. The five ABT schools inspected were selected from the schools identified by the CSIR as “performing better than conventional [clay brick] buildings”.

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MAINTENANCE ISSUES IN NEW ABT BUILDINGS

The photographs show typical cracking and disrepair on both the exterior and interior walls of the five ABT schools occupied less than 3 years. The wall cladding materials of the ABT buildings simply cannot accommodate the movement that results from daily expansion and contraction caused by hot days and cooler nights.

The panel surfaces also struggle to withstand the stresses of normal school activities and show hand marks, chips and scuffing. The result is a shoddy external and internal appearance, clearly visible to any bystander.

Olivenhoutbosch Primary School - The integrity of ABT external walling is visibly compromised. Joins between the panels are now exposed to the weather.

Gulandoda Junior Primary School - the poor acoustic performance of ABTs results in excessive noise echoing through the large, open structures.

Pakamani Senior Secondary School – Extensive horizontal and vertical cracking can be seen.

Lotus Gardens Primary School – uncontrolled cracking between ABT panel sections, windows and foundations.
Will ABTs hold the public purse to ransom?

Extensive repairs are continually undertaken at Goodhope Senior Secondary School – Eastern Cape at a huge cost to the school.

In the case of the Goodhope School shown above, it was evident that there have been extensive repairs to cracks - the scars from these repairs are being covered with 'new' paint. This school, since handover, has reportedly had cracks and scuffing of the exterior and interior walls repaired, and the walls repainted, no less than twice during the last three years.

In comparison, the clay brick and face brick schools in the area are extremely low maintenance, reducing operating costs as well as downtime due to repairing, replastering and repainting.

While initial infrastructure is sponsored by government, it is up to schools themselves to run cost-effectively. Money spent on maintaining existing buildings could be better used for enhancing learning experiences through new facilities and teachers.

**SAFETY & SECURITY**

The visible holes, cracks and scuffing from daily use brings into question the ability of Alternative Building Technologies to provide a secure and healthy learning environment for pupils and teachers.

Schools built with clay brick allow children to learn in safety. The natural structural strength and dimensional stability of clay brick, coupled with its high fire rating ensure that children are well protected against natural disasters as well as civil crime, vandalism and unrest.

This strength and durability leads to a lifespan that outlasts almost any other practical building material – 100 years and more.

Clay bricks are entirely natural, contain no pollutants or allergens and are resistant to ants, borer and termites. Clay brick is inert releasing no VOC’s (Volatile Organic Compounds) or toxic fumes to impact on air quality.
ABT’s are manufactured by a number of different companies, and their components and use of chemical compounds during manufacture are largely unknown. They are not governed by the extensive legislation imposed on the clay brick industry regarding pollutants, health and safety or environmental protection.

**ENSURING AN EFFECTIVE LEARNING AND TEACHING ENVIRONMENT**

Schools operate during the hottest part of the day, and need to be able to regulate both heat and humidity close to the preferred human comfort zone in the hottest months. They need to provide protection against the elements during wet weather at the coast or Highveld thunder storms. They must offer insulation in the cold winter months. This is important as no school can afford heaters and air-conditioners in its classrooms.

Unlike clay brick walls, the insulated lightweight walls in the schools under investigation proved unable to self-regulate temperature - the experience of heat on the inside coincided with the hottest parts of the day outside. The insulation (lacking the thermal mass of clay brick walls) trapped the heat inside making for an uncomfortable and inefficient learning environment for most of the school day.

Even when ventilated and insulated, the lightweight ABTs result in a ‘hotbox’ indoor environment. This is in stark contrast to clay brick schools where the thermal mass of clay bricks provide for cooler and more comfortable day-time classroom conditions conducive to better teaching and learning.

**EXCESSIVE NOISE**

In addition to structural integrity issues and poor thermal comfort, there was a noticeable transfer of noise from the outside to the inside and between classrooms. The lack of density of ABT panels means they allow the transmission of airborne sound waves.

Due to these acoustic properties, pupils and teachers are subjected to excessive noise from adjoining buildings or classrooms, which then echoes and reverberates around the large, open structures.

**ABT’S FAIL REAL WORLD PERFORMANCE TESTS**

Why do these products that have Agrement certification perform so far below below specification and expectations? Agrément South Africa is a national centre for the assessment and certification of non-standardised construction products, systems, materials, components and processes, which are not fully covered by SABS standards or codes of practice.
These products need to be re-evaluated under real world conditions rather than computerised simulations in a laboratory or test structures built in perfect conditions that have never been used. Investigations of built schools demonstrate that even after just 3 years of use, ABTs do not deliver the promised benefits of high quality structures comparable to traditional clay brick and cement structures.

Even the supposed fast erection time is in doubt since only 12 of the planned 300 schools could be built during the time allocated. Complications with foundations and delivery on rural roads were cited amongst the reasons.

**Socio Economic Impact**

Prefabricated panels designed in Europe and Asia and placed on site in a finished state by a small group of 3rd party installers, is the very antithesis of Government's economic policy objective to broaden the economic empowerment opportunity of communities where infrastructure building takes place.

In comparison, 20,000 people are directly employed in brickmaking in South Africa through formal and informal brick makers – it is a huge contributor to local job creation. Currently 3.5 billion bricks are manufactured and sold per annum with more than 220,000 workers employed across the building industry (brick makers, brick layers and plasterers and resellers). Initial research indicates that more than one million people benefit from clay brick manufacture, making this industry a major socio-economic contributor in the building sector.

Due to the low capital cost requirements and the common use of masonry materials in both urban and rural areas of South Africa has resulted in more entrepreneurs being involved in brick and block laying than any of the alternative wall construction types.

Alternative building technologies that cannot be made, installed or even repaired by local contractors will have a severe detrimental effect on both local job creation as well as the transfer of construction skills to local residents.
THE CASE FOR CLAY BRICK SCHOOLS

A well-built school is much more than a shelter from the weather. For many older South Africans, their school is a family legacy; children proudly attend the same school as their parents and grandparents.

A school should be the embodiment of stability, permanence and strength. It should protect children from the dangers of the world at large, while providing an environment that supports teaching and learning.

Based on the incontrovertible evidence of the 10 schools reviewed under real world conditions, the ABT schools are a distinct and clear compromise. The clay brick schools provided safe and secure, unquestionably superior quality built environments for teachers to teach and scholars to learn, study and play.

ASSESSING THE REAL ROI OF ABTs

What is the REAL cost to the taxpayer of the government’s new enthusiasm for factory-built modular building technologies for schools, clinics and low cost housing?

It would be sensible for decision-makers responsible advocating ABTs over clay brick construction for schools infrastructure to take the time to see the schools that have already been been built, and compare for themselves.

The sole objective of a school is to provide a safe, comfortable and secure learning over decades. Teachers and communities alike question if ABT systems can begin to meet these critical requirements.
QUOTATIONS FROM INTERVIEWS WITH LOCAL STAKEHOLDERS

**Gordon Madolo, Finance Secretary, Rosedale Location**

"Initially these ABT schools they are actually looking beautiful in the beginning, but they've got a very short-term life and they start falling apart and imposing a threat to the kids. Well, the problem is that the community doesn’t know what kind of school they will be getting. They only see it when it’s getting built. We don’t get approached as to what type of school we’re going to be given. When we say “life” we mean a long time. But these schools they actually fall apart within 3 or 4 years when other schools that we used to get actually [last] 20 years upward."

**Nelson Mavume, Building contractor**

"Today we’re having what we call alternative building technology, ABT. Beside unemployment, government is talking about skills [development] but coming up with all these ABTs. Clay bricks are made in South Africa. We don’t doubt that. Why must we import? You don’t need a bricklayer, you need a labourer. When we grew up we had training of the artisan. We had good bricklayers, good carpenters, good plumbers. Where are those people today. There is no work for trained people."

**Surita Hamilton, Deputy Principal, Umtata High School**

"This used to be actually an Afrikaans school. These [brick] buildings have been standing for for than 100 years. You might need to paint every 5-10 years. But the Grade 4 buildings are pre-fab buildings that we’ve had to erect, not very comfortable for the children, very cold in winter, very hot in summer. And not very solid. I don’t know our town planners are very clever, they chose to build the high court right opposite [the school] and I don’t know if you saw the news about 3 weeks ago we had a shooting. Now since I’ve been teaching this has been the third incident where a convict has escaped, gotten hold of a firearm."

**Luleka Mhlontlo, Deputy Principal, Umtata Community School.**

"This school was built in 1980. As you can see we are close to the police college so the first learners were from those of the police. The old school is from blocks. Last year in April because we have got 1 413 learners we went to the department seeking additional classrooms but we got the pre-fabs instead. At least it has alleviated the problem of overcrowding, but when it is cold, it’s COLD. When it is hot, it’s VERY hot. Yes, it really affects the learners. They get drowsy. When the learners are in the classroom... you can feel that there is this big noise. I’m sure they will not last as the permanent structures. We wanted permanent structures, but we just accepted what we were given."

**For further information:**
The Clay Brick Association of South Africa
Website: [www.claybrick.org](http://www.claybrick.org)