

Seven Fountains Primary School **Adobe construction in Block B**

Socio-cultural Context

The school is situated in the midst of the concrete block RDP township of Shayamoya. Driving around, one is struck by the fact that almost without exception, all extensions made to the poor quality 'match box' houses, have been carried out with sun-dried adobe blocks. However, what is also most evident is the poor quality of the blocks and their construction detailing. In fact, all the classic mistakes of how not to build with earth abound. The soils are a bit too clay-rich, and save for the addition of some local grass, there is nothing added to improve the strength of the blocks. The blocks are typically not cured sufficiently, leading to differential shrinkage within the walls, and general construction detailing is very poor. The 'hat and boots' principle is generally not being applied, and poor attention to detail at window cill, lintols and roof anchorage is apparent. In addition, cement, which is not compatible with earth construction, is often being used as a mortar or plaster. Thus, as a result, adobe is generally considered by the locals to be an inferior material to concrete block. This is despite wide recognition of its superior thermal performance and much lower cost.

Advantages of using Adobe Brick

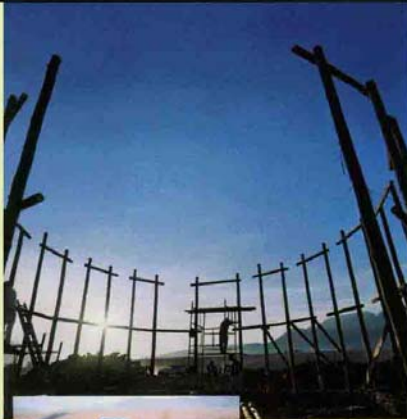
From an environmental angle, adobe construction contains little embodied energy. This is because it uses locally available 'red Hutton' clay bearing-soil, thus reducing transport costs. Furthermore it avoids the high levels of carbon emission, commonly associated with fired-brick or concrete-block construction.

Thermally, when compared with the conventional material of choice, concrete block, earth construction has been found to perform to a much higher standard, helping to keep houses cool in summer and warm in winter.

Culturally, the preference for adobe construction is mainly economic, and carries a stigma that is typically associated with poverty. By using adobe for Block B, it was hoped that the status of this building material would be elevated.

By setting a good example of adobe construction, as well as through the hosting of a series of adobe building-workshops, the project is also intended to help in the upgrading of local adobe-building skills, which could have wide-ranging benefits for the community.

There are also a number of financial benefits. Firstly the bricks themselves were less costly, with most of the material freely available on-site. The additional straw and sand used in the mix, was all locally procured and inexpensive. However, crucial to this equation is the fact



that the international donors had a keen appreciation for the training-approach of the project. Thus the funds needed to finance the adobe

training component, came out of a separate skills-development fund. If this were not the case, it is unlikely that the blocks would have been financially viable. Another factor to consider is that, instead of using money to buy and transport material from a brick or block factory to site, that money went towards the employment of ten previously unemployed women from the local community, who worked for three months to make over 15000 bricks that were needed for the construction.

Block Production — training course: Ten local unemployed women with prior earth-building skills or interest were sourced. The women were taught how to test the soil and improve

its qualities for earth-building by adding sand and wheat straw. Additional quality-measures like sieving, good mixing, pre-soaking, proper curing and storage were also introduced. The end-result was a markedly improved quality adobe block. The local masons were visibly impressed, commenting on the block's improved strength. The structural tests yielded a crushing strength of 2,3 MPa.

Block Technology — Training Course: The original ten women together with an additional four women and four brick masons joined the second workshop. Good construction detailing was taught and demonstrated through the building process. Walls were built 3-brick thick, using an English bond pattern, set in a clay-sand mortar of similar mix as the blocks. A further plastering workshop is envisaged.

Trainee Contractual Arrangement

The women making the blocks were paid per block and all worked on a co-operative basis. This enabled the women to work at their own pace, as many had families to look after, and avoided complicating the contractor's labour-relations which did not make provision for flexi-time. The additional trainees worked under the main contractor on a daily-wage basis.

DESIGN AND CONSTRUCTION TEAM

Architects and Project Managers:
East Coast Architects

Quantity Surveyors:
Mike Royal Quantity Surveyors

Civil Structural Engineers:
Gavin Brown & Associates

Electrical Engineers:
BFBA Consulting Engineers

Passive Solar Design Consultant:
Paul Carew Consulting

Earth Building Workshops:
Eco Design

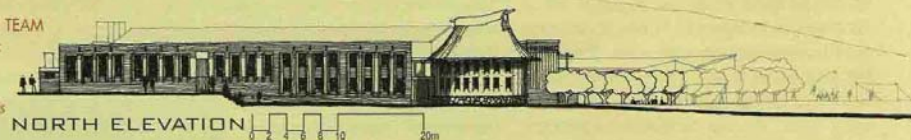
Environmental & Landscaping Consultants:
Geoff Nichols Horticultural Services

Main Contractor:
Owen Peters Construction

Electrical Sub-Contractor:
Bradcor

Steelwork Sub-Contractor:
IFS Steel

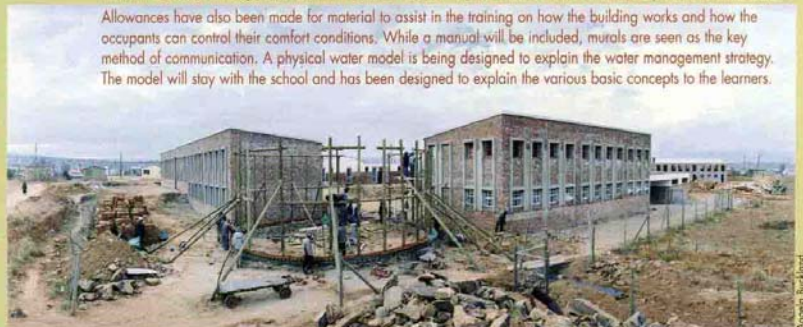
Safety Officer:
C & M Safety Consultants



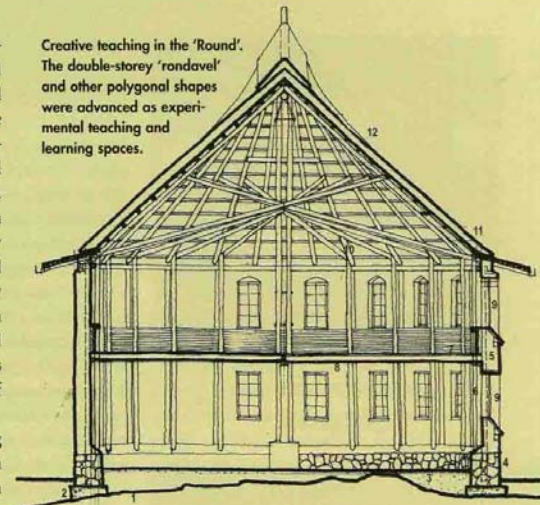
Post-Occupation and Monitoring

A budget has been allowed to closely monitor the building in regard to thermal comfort, energy consumption and water use. Various sensors and measuring equipment will be placed around the school to monitor performance. This will be done in co-operation with the Science teacher and the results shared with the Department of Education.

Allowances have also been made for material to assist in the training on how the building works and how the occupants can control their comfort conditions. While a manual will be included, murals are seen as the key method of communication. A physical water model is being designed to explain the water management strategy. The model will stay with the school and has been designed to explain the various basic concepts to the learners.



Creative teaching in the 'Round'. The double-storey 'rondavel' and other polygonal shapes were advanced as experimental teaching and learning spaces.



BLOCK B DETAIL SECTION

- | | | | | | |
|---|-----------------------------|----|--------------------------------------|----|------------------|
| 1 | ROCK PROFILE | 8 | DOUBLE POLE STRUCTURE | 11 | 250 THICK THATCH |
| 2 | FOUNDATION ON ROCK | 9 | 32 UNPLY ON POLE JOISTS | 12 | MORTAR ROOFING |
| 3 | DUNG FLOOR ON CRUSHED STONE | 10 | 3MM PLY CEILING WITH 1:1:6 CLAY FILL | | |
| 4 | ROCK STEM WALL | | HARDWOOD WINDOW FRAMES | | |
| 5 | 450 THICK SUN-DRIED ADOBE | | | | |

Conclusions

The private sector has an important role to play in shaping aspirations, and high-profile buildings built of locally appropriate materials like adobe, can help raise the status of what is typically perceived as a poor person's building material. Within this equation, it is critical to set high or improved construction standards.

Andy Horn

Mr Horn is a UCT-graduate who practices as Eco Design Architects in Cape Town.
— Editor

