

## **Generating an improved quality of informal housing in Mamelodi, South Africa**

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### **Abstract**

Human settlements play a central role in determining the progress of a country; housing is an indicator of wealth or poverty. In developing countries, satisfactory housing is often the exception to the rule. The people living in poor conditions are not merely a marginalized part of the population but the vast majority. This housing poverty is best exemplified by the sprawling slums and informal settlements on the peripheries of almost every city and town.

In this paper, a proposition for the improvement of housing quality in one of these informal settlements is made, thus focusing on the poor and informal housing situation of the 1.2 billion people worldwide who are living in poverty – with particular reference to the situation in South Africa. Despite restricted opportunities squatters form an unrecognized, unexploited economic base. The transformation of informal settlements into quality neighbourhoods with socio-economic strength, will not only benefit the target population but will also strengthen society as a whole. This approach supports current policy directions in South Africa, with a view to “in-situ” upgrading of squatter settlements rather than demolishing and relocation and is also supported by global agreements and approaches such as the Millennium Development Goals. Pro-poor policies mean that all efforts are being directed towards a large percentage of the population that is at present being excluded from environmental and economical developments.

Thus, this paper starts by identifying the context, analysing current building techniques and proceeds to offer a proposal of how to develop shacks (or zozos) as they are being constructed in the township of Mamelodi in Pretoria, South Africa.

# 1 Informal Housing

## 1.1 South Africa in the context of Africa and the ‘South’

According to the Census Report of 1996, 1 049 686 households in South Africa lived in informal dwellings/shacks in squatter settlements at the time [1]. This implies that policy and professional efforts need to be re-directed towards the needs of the poor rather than the ideals of the middle class. Patterns of emergent systems in cities become indicators of real need and the imposition of pre-determined plans is then handled with more sensitivity to context. “Small” interventions grow and guide development [2]. Emergent systems would become catalysts for future interventions and a process of “negotiated reactions” – a phrase coined by Dewar & Uytendogaardt [3]. Policies would be flexible enough to allow for this process which might take a longer time, and need more complex systems of coordination between all the role players; it would most certainly challenge the traditional role of the state – this complexity would ultimately generate a complex, multi-layered and vibrant pattern of human settlements that serves a wide variety of needs and lifestyles and makes sense economically and socially [4].

Designed and emergent systems are equally important and it is strongly believed that any approach that does not acknowledge the presence of the ‘informal’ as a force that cannot be eradicated and as a legitimate power, energy and form of expression is doomed to fail. Current debates regarding development, in general, and housing, in particular, attempt to position the issues in the broader perspective of the ‘south’, the African continent and new policy directions in South Africa. A regional focus appears to be the current approach to development and sustainability. In this sense, the ‘south’ and Africa need to set their *own* agenda, based on their *own* understanding of informality and their *own* perceptions. While we need a global understanding of the issues of human settlements, research models need to be specific to a particular country [4]. It is acknowledged that a large percentage of the labour market are from informal settlements and robust, socially inclusive growth is only possible through the development of the informal market and thus of informal settlements.

## 1.2 Relocation versus “in-situ upgrades”

In South Africa, the focus on eliminating informal settlements – from 1994 on – slowly shifted from relocation to upgrading of the settlements [5]. This could ultimately take the pressure off government to produce en masse. It is interesting to note that demand for houses increases proportionately to the government’s subsidized provision of housing [6]. The issue is complicated even further by the fact that the Minister of Housing has indicated that the number of houses the government can build per year is equivalent to the number of people who move to urban centres in the same period [7].

Informal settlements appear to be an undifferentiated zones of squalor, yet closer research has highlighted complex and dynamic contexts with differences apparent in terms of relatively “wealthier” families grouped together on the peripheries, or other groups created due to dependence on shared resources and childminders, etc. [8]. Although the current housing situation is not the ideal one, it is acknowledged that every shack is in reality a home and no one’s home should be put into jeopardy by forced removals or lack of developments. Many times a middle class understanding of “home” is imposed on these settings. It has been debated for decades that “every building is an asset” and “more dangerous than slums are slum shortages”, people still need to be reminded of this. There is a danger of dictating to people what is a decent life – the lifestyles of the rich could be equally challenged.

### **1.3 Theoretical premise**

As a conclusion to the above it is recognised that for a place to function as a dwelling, it must first be accessible. It has been argued before that an environment can be “disabling” and can promote exclusion. Issues of access are not just restricted to discussions on the physically disabled [9]. Location is one of the key elements that promote or destroy this disability or exclusion of people. A dwelling must provide secure continued residence for a minimum period, and it must provide a minimum of shelter from hostile elements, whether climatic or social. Other basic human needs important for a person experiencing a qualitative housing environment are the need for temporary escape, the need for experiencing nature, the need for privacy, the need for security and safety for self and family, the need for affiliation and belonging, the need for social recognition and status, the need for physical exercise and the need for tension release. Although these are very subjective needs, that will differ for each person functioning in his or her environment, it is important to keep them in mind and think of planning and design strategies that will be able to integrate at least the possibility of access to these functions of a housing environment. This has to remind designers that housing is more than the provision of an asset, but includes a whole process that is integrated in its environment. For housing to focus on the “qualitative” rather than the “quantitative”, it has to be acknowledged that it is more than a physical shelter.

The focus of this paper will thus be on providing shelter for informal dwellers, more specifically in South Africa, and how to improve on a form of shelter that can evolve and that has the potential to ultimately provide for all of the above-mentioned functions. It is acknowledged that informal housing serves an important purpose – hopefully without overly romanticising it.

## **2 Transformation and mobility: “I will take my house with me”**

The built environment is not static: it is interesting to study the relationship between stability and transformation in the built environment [10]. Changes happen around us all the time: John Habraken continuously insisted on major distinctions between ‘structural supports and detachable units’ [11 & 12]. Many people have experimented with this concept throughout the relatively recent history of architecture [13] and Habraken has explained that this quality of changeability is inherent in houses throughout history and in many places throughout the world [12]. These notions, however, take on a different meaning when speaking of informal settlements. In squatter settlements transformations happen at an enormous rate compared to formal (static) designed environments. Furthermore, the relationship between structural supports and detachable units is unclear. There is a degree of permanency in a squatter settlement – such as the layout of the site, but the overall set up is experienced as short term. The tension between stability and transformation thus gains importance when designing for informal settlements. Any design intervention will need to support a process, which will evolve quickly over a short period. Transformations will not only apply to structural elements but also to location and function. House ownership will change as well as the number of inhabitants or the owner might decide on moving the shelter to another site, which proves to be more beneficial.

Harber [14] explains how a squatter settlement develops in a process that is the exact opposite of a formal settlement: that is the land is occupied, the buildings put up and finally, dependent on the acquiring of legal tenure, the services are installed. He believes this usually generates an environment that is more layered, develops gradually and is less disruptive to the existing features of the site. These are the positive attributes of informal settlements that need to be incorporated into future housing programmes. Thus, alternative methods of housing delivery would allow for choice, variety and full

involvement in decision making regarding every aspect of the environment from location to the design of a neighbourhood or an individual home.

Yet, this volatile nature of squatter settlements also inhibits long-term development. When asked about a possible relocation the inhabitant of a squatter area in Mamelodi, replied simply: “I will take my house with me.” Reflecting on the lack of security in tenure, as well as the abiding hope and expectation that, in the new political dispensation, there may exist opportunities to move into better areas, many shack owners are reluctant to invest substantially to convert an informal dwelling into something more permanent. This often results in people living in structurally compromised buildings for years [15]. Proposing an alternative system of construction that can improve the housing situation could be a viable starting point to address this problem.

### 3 Mamelodi, Pretoria, South Africa

Mamelodi is a large, historically designated black township in Pretoria. It is similar to other townships on the peripheries of all South African cities planned by the apartheid authorities as temporary dormitory zones for black labour. Its problems are typical of other townships that are mono-functional residential areas, isolated from the CBD and job opportunities, with poor quality housing and a large component of informal settlements.

#### 3.1 The shacklands of Mamelodi



Figure 1: Shacks in Mamelodi



Figure 2: Cedric's shack components being sold on the side of a main road in Mamelodi

Many people in Mamelodi live in shacks, either in areas occupied through illegal land invasions or on legalised plots still awaiting the queue for government-provided houses. A shack in South Africa is often built from industrial by-products, scrap and unwanted materials as well as purchased materials or a combination of both. Most shacks are built from either timber, corrugated metal sheets, fibre cement or a combination of the three. Corrugated iron is by far the most popular because it is durable, lightweight and readily available. But the material also has its disadvantages. For instance, its insulation performance is non-existent. Heat streams into the shack during the summer months and out of the shacks during the winter months. Rudimentary systems of heating create safety hazards and raise questions regarding the depletion of natural resources and pollution. Construction yards provide squatters with prefabricated walls that can be put together in more or less standardised sizes of shelters (also known as a ‘zozo’ – which means house).

When a house is bought, the prefabricated walls and the roof are transported to the plot of the new owner, where it is assembled first, then the floor is finished with a sand cement mix. It lays on the ground surface with no foundations. A simple roof of corrugated sheeting is nailed on purlins and the

gaps between the walls and the roof sheet are filled in with a plaster mix – this is according to Cedric who sells his zozo components on the side of a main road in the area.

### 3.2 Paulos Novela’s Zozos

The construction yard used as a case-study belongs to Paulos Novela. Paulos sells zozos – flimsy shacks of timber frames and sheet metal that can be found all over the landscape of Mamelodi. These zozos, however, are built differently depending on the construction yard and the availability of materials. Despite this, one can assume that the sizes of the zozos are similar – and thus basically standardized; and although the types of materials used may not be exactly the same, the basic features are similar.

The price of a zozo depends on the size. Paulos sells his one room house (3m x3 m) for R900 (app. \$140) a one and a half room house (3m x 4m) costs R1150 (app. \$177) and the two roomed house (3m x 6m) costs R1500 (app. \$230). The materials that are used for the construction of the zozo are the following: galvanized corrugated metal sheeting, coated metal sheeting and timber frames. Some of these are purchased from stores, such as the corrugated galvanised sheets, the rest is discarded material , such as the coated metal sheeting which is comes from a refrigerator factory close by – it is bought as scrap metal (priced per kg).



Figure 3: Novela’s sign with shack prices in Mamelodi.

The authors tried to contact one of the material suppliers on a number obtained from a receipt found with Paulos Novelas – none of the numbers were working. Most of the timber is bought, but smaller pieces are waste material from the crates of the Ford factory in the neighbourhood; this is obtained for free, thus only transport costs need to be covered. It must be noted though, that those were the materials that were being used at the time of visiting the construction yard. It seems that those also vary, depending on availability of material at any particular time.

### 3.3 The current building system: construction principles

Since it is not possible to rely on the strength of the metal sheeting (firstly due the qualities of the material and secondly because it is relatively more expensive), the current building system relies on a timber frame as the basis for stability of the zozo. Corrugated sheets are nailed onto the frames to form an exterior barrier. The assembling of the four “walls”, and only in conjunction with each other, creates a relatively stable structure. Windows and a door are only made in the front side of a zozo, which is generally higher than the back side – so that a slightly sloped roof is formed.

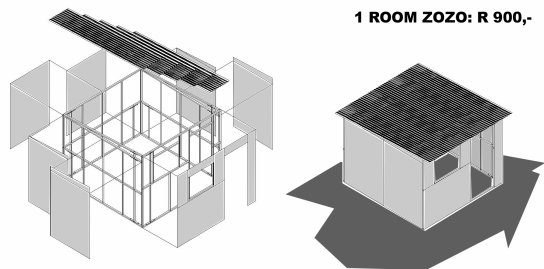


Figure 4: 1-roomed zozo as it is being constructed now.

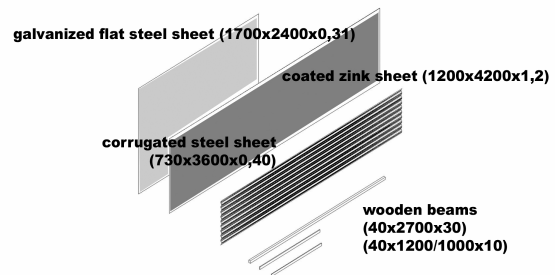


Figure 5: Materials used at the construction yard (information as obtained from Paulos Novela).

### 3.5 A proposed new system

An analysis of the building system that Paulos uses to produce his shacks guides the proposal below to implement modifications to the system in order to improve the quality of the shelter. The materials that are used for the design of the alternative shack are the same materials Paulos uses for the construction of the zozos. It is proposed that the panels be broken up into smaller modules which are then staggered to achieve more stability. They are also easier to transport in this way, and easier to use for alternative combinations which may ultimately offer more variety. The modules are, as far as possible, based on the dimensions of existing materials in the workshop or yard.

The juxtaposition of the smaller panels offers more stability and allows for space for insulation or various coverings to be applied. At the junctions of these panels a hollow column is formed which may be filled with loose sand which offers more stability without losing the potential to move the structure easily. The main aims of a new optimized building system are increased stability and insulation, whilst respecting the current entrepreneurial initiatives of the so-called secondary market, addressing demand and achieving economic viability. By achieving this, other benefits are gained such as flexibility and variety. The shelters maintain the benefits of existing zozos by being easily transportable, re-sellable, extendable and adaptable. The proposed system may ensure a better quality shelter immediately that also has more potential to be up-graded into a more permanent house with complete facilities and services.

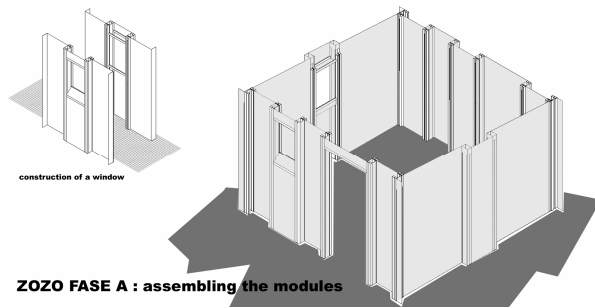


Figure 6: New system based on modules and window construction.

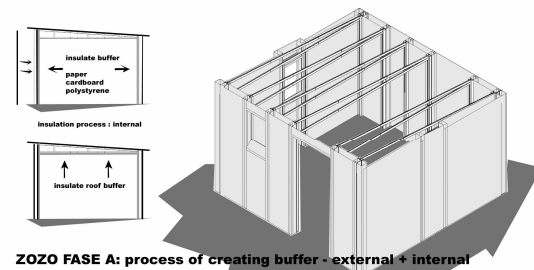


Figure 7: Easy-to-implement possibilities for insulation.

It is however not enough to just improve the walls and roof structure – issues such as enhanced thermal insulation have to be further investigated. It is not possible to suggest a conclusive solution: solutions need to be proposed for a specific “yard”, at a specific time, depending on availability of materials and need at any specific time. In this context, a pre-determined and measured response may be inappropriate. The cost implications of this system still have to be researched.

## 4 Informing target groups

In order to implement a successful project in squatter settlements, it is necessary that dwellers as well as constructors understand the advantages and principles of a new building system. It is thus important to educate dwellers about the possibilities of improvement inherent in a system that they are familiar with. Both parties, yard owners and dwellers, need to be informed of the advantages of change in the existing system, the former benefiting by reaching more potential buyers and perhaps increasing profits, the latter benefiting from better housing quality and more diversity. A careful and integrated approach is thus required to encourage the beneficiaries.

A few, understated interventions such as applying paint to the outside of their shack, not only adds colour but also decreases the radiation through the steel sheeting; the application of (discarded) insulation material on the inside of the shack will contribute to a higher insulation level; etc. Simple variations may offer solutions to increase the energy efficiency of the shack: The use of different building materials, building orientation, window size, exterior colour, ventilation and the application of insulation are all possible means to achieve this. Extensive research on how shacks are built in informal settlements – by dwellers or construction yards – will lead to viable and sustainable solutions to improving the housing quality of many people.

One way to implement this is by providing squatters with an illustrated folder. Easy to access information can be compiled in such a way so that people can be guided through some measures of improving their home. Research on engaging with the community to inform a possible illiterate target group should be undertaken and convincing communication methods developed. This is not a new approach, but its success still has to be tested in the transformation of living environments. A similar initiative could inform construction yards of the various possibilities of developing their construction systems.

Active engagement may lead to better results – for example, workshops could be organised that inform the constructors on different building concepts. It will be important to work together with them on site so that it becomes a mutual learning process. This is research in action – or action research.

## **5 Conclusion**

The modularisation and improved stability of building components is investigated, yet issues of enhanced thermal performance, improved floor construction and adaptation to accept services need to be further explored in a future study. The intention of the study is to propose an approach to the problem rather than to suggest a conclusive resolution. A calculated and precise response would be inappropriate in this context.

The implementation of a pre-defined modular system may prove problematic and must be approached with caution in order to be sensitive to the realities of local conditions. Various approaches are possible but it is important not to be confined to one kind of solution. Therefore, the proposal is made to engage with the target community by means of an illustrated folder, indicating measures of improving living conditions within informal constructions. This becomes a valuable mode of implementation and also needs to be investigated further regarding appropriate communication methods aimed at a possibly uneducated target group.

The proposal also needs to be tested through actual application, a response from the community needs to be obtained and perhaps an assessment tool could be developed or an existing tool be adapted to allow for a holistic evaluation of the proposed interventions. The opportunities that become available through the development of the corrugated panels are numerous – one of them being the development of partitioning and facade systems for future higher density residential developments. This study believes that enterprises emerging from informal settlements are more suitable for low-income groups and that support of the informal sector better addresses the urgent need for poverty eradication.

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