

Housing Scheme in Zambia

Construction Process of the PHI Housing Scheme

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Abstract

In this paper the largest government housing project in Zambia in the recent years is illustrated and analysed paying particular attention to the construction process and compare with the norms of construction process in Sweden and other countries. Different problems in the project are identified and using the experiences in the course a number of recommendations are made to improve the performance and viability of the housing scheme in Zambia.

The problem of housing and housing finance has been compounded by the fact that large number of Zambian people can not afford to pay the economic rent for a decent house while building costs have sky-rocketed beyond the effective demand levels of the market forces. From the time Zambia became independent, housing was regarded as a social right, and management of housing was organised to the large extent by the local government and partly by various State owned companies. The government did not formulate a comprehensive and coherent national housing policy. As a result, there has been no framework for a consistent approach to housing. Investment in housing dropped from about 30 per cent of the GDP in 1969 to less than 0.5 per cent by 1992.

The present government of Zambia initiated the Presidential Housing Initiative (PHI) to spearhead the construction of houses throughout the country. The financing of this project is from the following sources:

- Proceeds from the sale of existing government owned company houses.
- Proceeds from the sale of government owned pool houses.
- Grants from the Central Government.

The planning of the project was divided into two. The first part being the pilot phase and the second part being the actual implementation of the whole project. This was so in that the project is the first of its kind and therefore, there was need for the pilot phase before the actual project is implemented. It was hoped that the pilot phase will make the unforeseen problems resurface and measures will be put in place to prevent future occurrences. The pilot phase will be completed by June 2000.

In the production stage there are various Contractors selected using the government tender procedures undertaking different works. There are three types of Contractor on site. These are roads Contractor, water and sewer Contractor and the building Contractors. Under these Contractors there are different specialised sub-contractors engaged by three types of Contractors. There are four main building Contractors, water and sewer Contractor and one road Contractor. Two hundred houses are under Construction and there are expected to be complete by the end of June this year.

Introduction

Aim of the paper

The aim of this paper is to describe the largest government housing project in Zambia in the recent years, illustrate and analyse the construction process of this project. Being the largest housing project going on in the country, also to evaluate its performance both positive and negative and compare with the norms of construction process in Sweden and other countries. In conclusion make recommendations to improve its performance, management and its viability.

Background

Zambia was a British colony until 1964 when she became independent. From that time, housing was regarded as a social right, and management of housing was organised to the large extent by the local government and partly by the State owned Companies. The government did not formulate a comprehensive and coherent national housing policy. As a result, there has been no framework for a consistent approach to housing finance. Investment in housing dropped from about 30.0 per cent of the GDP in 1969 to less than 0.5 per cent by 1992. This figure is well below the United Nations and World Bank minimum of 5 per cent of the GDP.

The problem of housing finance has been compounded by the fact that large number of Zambian people can not afford to pay the economic rent for a decent house while building costs have sky-rocketed beyond the effective demand levels of the market forces.

Objectives of the housing scheme

The present government of Zambia initiated the Presidential Housing Initiative (PHI) to spearhead the construction of houses throughout the country, with the following core objectives:

- Reviving the country's collapsed construction industry.
- Ease the ever growing pressure on the existing housing stock, which is far inadequate and mostly of inferior quality.
- Increase job opportunities.
- Of the houses to be constructed, 4 000 were planned for Lusaka City and a couple of thousands in other urban areas of the country.
- Create a sustainable revolving fund under the scheme to continue construction of houses and offset the housing backlog.

Actors in the project

The project is implemented by the Presidential Housing Initiative a wing of National Housing Authority, a State owned company under the Ministry of Local Government and Housing in collaboration with the Buildings Department of the Ministry of Works and Supply. The other actors are the Lusaka City Council (local authority), Zambia National Tender Board, Zambia Electricity Supply Company and the Lusaka Water and Sewerage Company.

The various players are playing different roles within their jurisdictions. The National Housing Authority are providing the design services and carrying out part of the construction under its Building Section. The Buildings Department is acting as the overall co-ordinator between the client and the project managers. The local authorities are co-ordinating the provision of the utility facilities. The Zambia National Tender Board is providing the procurement services, while Zambia Electricity Supply Company and the Lusaka Water and Sewerage Company are facilitating the provision of electricity, water and sewerage facilities respectively. The various actors of the project are presented in the chart in *Figure 1* on page 3.

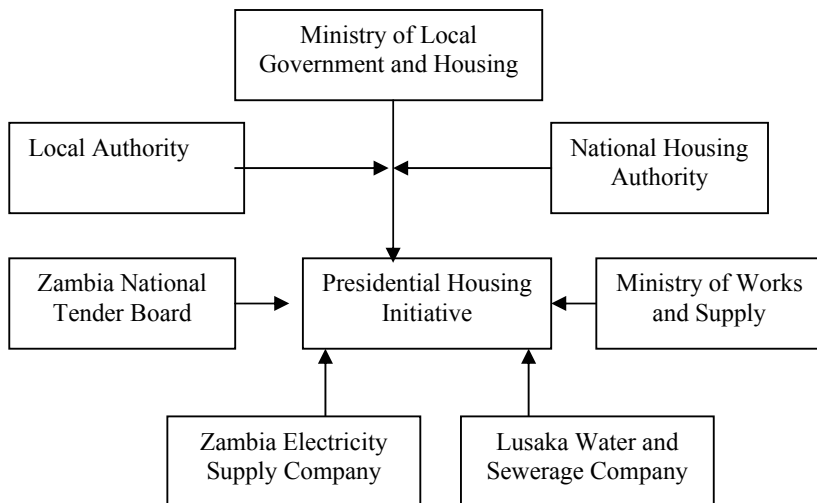


Figure 1: Actors in the Project.

Details of the project

The project is aimed at reviving the country's collapsed construction industry and ease the ever growing pressure on the existing housing stock, which is far inadequate and mostly of inferior quality. This project is to provide affordable accommodation to Zambia citizens. Under the project housing units will be constructed country wide, of which 4 000 are earmarked for Lusaka City on three identified sites. These houses are targeted for low income, medium income and high income. To-date 200 housing units covering the three income groups are almost completed under the pilot phase on one site. This site will accommodate 1,200 houses. Provision of water, sewerage and roads is almost complete in readiness for the construction of the remaining housing units on this site.

About Zambia

Geography and Location

Zambia is located in the southern region of Central Africa, bounded by Tanzania and Democratic Republic of Congo in the north, Malawi and Mozambique in the east, Zimbabwe, Botswana and Namibia in the south, and Angola in the west.

Covering an area of some 750 000 square kilometres, Zambia lies in the tropical belt on a fairly high plateau, averaging 1300 metres above sea level. The climate is thus very temperate, with little humidity. Although land locked and dotted with vast grassy plains, the country boasts many lakes and rivers. The Zambezi, Southern Africa's longest river gives the country its name.

The population stands at approximately nine million of which approximately 43 per cent are in urban areas.

Political

A nationalist party led by activist Kenneth Kaunda won all Zambian elections until the early 1990s, when the opposition movement and its presidential candidate, Frederick Chiluba, won the country's first multiparty elections. Chiluba was re-elected in 1996.

National Economy

Economic growth and development up till 1975 was founded on the export of copper, an asset that made Zambia one of the most prosperous countries in the sub-Saharan Africa that time. Then followed a slump in the copper prices and, with the growing foreign debt, foreign exchange shortages and high inflation rates, a series of measure were needed to restructure the Country's economy.

Under the leadership of President Chiluba the restructuring of the economy included the privatising of the various government owned companies. Under this

programme houses belonging to government owned Companies are sold to sitting tenant in order to empower the Zambian citizens with housing.

Out of the nation’s 1.3million housing units, only 403,000 units or 31 per cent of the total housing stock, were formal and fully approved in 1990. The remaining 897,000 or 69 per cent of the houses were informal and poorly serviced or not serviced at all. About 64 per cent of the nation’s housing stock is in rural areas where the dispersed settlement patterns makes it difficult to provide basic infrastructure and social services. Basic services are therefore generally poor or none existent. Of the remaining 36 per cent in rural areas, approximately 70 per cent are dwelling units, which are equally poorly serviced.

The bulk of the institution housing is occupied at heavily subsidised rentals. Due to poor finance and lack of budgetary allocations for housing, institutional housing, stocks have not increased significantly and existing structures have not been well maintained. Taking into account the homeless families and the need to replace substandard dwelling units the current housing backlog requires optimum management of the project and efficient Contract process by all the key actors. The management of the project and decision-making needs particular attention to Gender Equality to meet the requirements and aspirations of the beneficiaries.

Design stage

Project organisation

The Project Organisation Chart shown in *figure 2* on page 5 was established with most of the supporting staff coming from National Housing Authority, others from Buildings Department of the Ministry of work and Supply, Government Evaluations and Zambia National Tender Board. The Organisation was given the following terms of reference to kick off the project:

- To survey and produce relevant drawings of the site layout.
- To carry out preliminary designs and make cost estimates for the provision of, water, sewage service, and road network and storm water drains.
- To carry out preliminary designs of various types of houses and make cost estimates for the construction of the same housing units.
- Prepare detailed designs and drawings of the water reticulation, sewage reticulation, roads and storm water drains.
- Prepare detailed drawings of various types of houses.
- Prepare the programme for the construction process.
- To see the project through the production stage.

The goal of the project was to construct adequately serviced and affordable houses targeting the low income, the medium income and the high income.

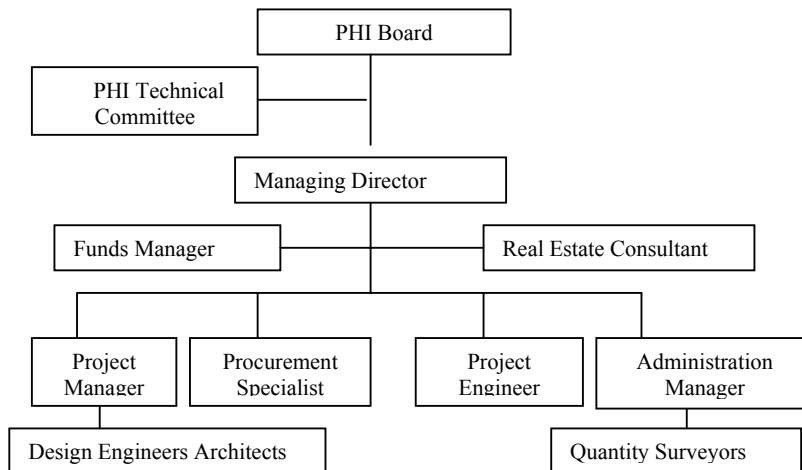


Figure 2: Project Organisation Chart.

In the organisation structure the Board heads the project. The Board has an advisory Technical Committee, which advises on all-technical related matters of the project. The Technical Committee meets more on regular basis than the Board. All policy decisions are passed on to the Managing Director for implementation. The Managing Director has two advisory units, the Funds Manager and the Real Estate consultant. The Funds Manager advises and plans the money matters while the real Estate Consultant manages the properties transferred to Presidential Housing Initiative for sale and the constructed housing units. The Project Manager is responsible for the production of preliminary design, detailed design and receiving of reports on the production, the Project Engineer is responsible for the daily running of the project and ensures quality by studying and interpreting the quality assurance reports. The Administration Manager carries out the contract administration matters, making cost estimates, prepare Bills of Quantities, verification of quantities and certification of payment to the Contractors. The Procurement Specialist is in charge of preparing tender documents and arranging for advertising of bids, distribution of bids, evaluating bid and making recommendations for award of contracts through the Zambia National Tender Board. The Ministry of Works and Supply assists in the daily supervision, construction management and quality management of the project. The ministry has various specialised sections including engineering, architecture, quality control and quantity survey. There are functional actors like the local authority that covers local authority related matters, the wild life, handling the environmental issues and service organisations to facilitate the provision of electricity, water and sewerage and telephone. During the preliminary design stage this actors ensured that the provision of their services did not interfere on each other's activities.

Procurement and contracting

The procurement of consulting services was done through the Zambia National Tender Board, a government institution entrusted with the duty to invite, regulate and control the procurement of goods, consulting services and works.

When the consulting services required had been determined and the terms of reference had been drafted, preparation of tender documents was done. The tender documents were sent to the Zambia National Tender Board who scrutinised the documents and made amendments, and consultants were invited to submit their bids. In some cases consultants were requested to submit the expression of interest, from which a shortlist was made. This was done to eliminate those who were not capable of carrying out the proposed assignment.

Normally the invited consultants are requested to submit their bids using two envelopes system. The first envelope is for the technical proposal illustrating how the consultant intends to carry out the services required. And the second envelope is the financial proposal out-lining the breakdown and the total costs of the consultant fees and other related costs. During submission of proposals, the envelopes are clearly marked to distinguish the technical from the financial proposal.

At the tender opening ceremony only the technical proposal is opened and the name of the Bidder is announced. Evaluation is done in accordance with the set criteria in the tender document. The scores are ranked in the manner pre-set at the preparation of tender documents. Of the total score the technical proposal carries 60 – 70 per cent. The tender document clearly states that only those who have qualified technically will have their financial proposals opened. The financial proposal carries 30 - 40 per cent of the total scores. During the financial proposal evaluation the least expensive Consultant is ranked as the highest while the most expensive is ranked as the lowest. The two scores (technical and financial) are combined to get one with highest score (most competitive) and is the one who is usually awarded the contract. In many cases negotiations are done with the one with the highest score before the contract award.

However on this particular project a different approach was used for the selection of the Architects. Consultants were asked to submit preliminary designs based on the site lay out. This was considered as design competition. Various designs were submitted, however the contract was not awarded to the best Consultant because none of them met the aspiration of the Client. For this reason it was decided that the designs would be done in doors.

However for the procurement of Project Managers, the two-envelope system was used. The design and construction of roads was on Turnkey basis.

Project Planning

The planning of the project was divided into two. The first part being the pilot phase and the second part being the actual implementation of the whole project. This was so in that the project was the first of its kind and therefore, there was need for the pilot phase before the actual project is implemented. It was hoped that when this is done, the unforeseen problems will resurface and measures will be put in place to prevent future occurrences. For the purpose of this paper only the project planning for the pilot phase is discussed. In the pilot phase the project was to be done under the following activities:

1. Identification and acquisition of land.
2. Survey of the first site.
3. Production of designs for sewer, water and roads.
4. Production of designs for the three types of houses.
5. Obtain the building permits.
6. Tendering.
7. Construction of services.
8. Construction of 200 demonstration houses under the pilot phase.
9. Evaluation of pilot phase.

The project planning was done as indicated in *figure 2* on page 7.

Project Planning Chart for the pilot phase

Item	Details	1999 Quarters				2000 Quarters	
		1	2	3	4	1	2
1	Land acquisition.	-----					
2	Site surveying.	-----					
3	Design of services.		-----				
4	Design of houses.		-----				
5	Acquisition of building permits.			-----			
6	Tendering & contracting.				-----		
7	Construction of services.					-----	
8	Construction of houses.					-----	
9	Project evaluation.						-----

Figure 3: Project Planning Chart.

Project Financing

The task to mobilise the required resources to keep the momentum of the project is an enormous one considering the current economic status of the country. Due to high inflation and interest rates (interest rate is about 38%) it was not possible for any Bank to undertake the financing of the project either in full or partially.

However the initial injection of funds was from the following sources:

- Proceeds from the sale of existing government owned company houses.
- Proceeds from the sale of government owned pool houses.
- Grants from the Central Government.

Funds from these sources are not however enough, therefore the Government has embarked on resource mobilisation from other sources including co-operating partners. No subsidies are put in place for the people to buy the houses. The money

raised from the sale of completed houses will be reinvested back in the construction of more houses.

Budget and Budget Control

As mentioned earlier the purpose of the project is to make available well serviced but affordable housing units to the low, medium, and the high-income groups. Therefore budget control is of prime importance. The budget for services and the houses were to be strictly controlled if the intended goals were to be achieved.

The provisions of services on the first site were to cost US \$2.5 million for roads and US \$3.0 million for water and sewerage. Construction of houses was to be in the range of US \$8,000 for low income, US \$15,000 - US \$20,000 for the medium income, and US \$25,000 - US \$30,000 for the high income. In order to control the budget, various measures were taken such as selection of materials and suppliers of different building materials were invited to register with the PHI. The registration had to include the list of materials the supplier would supply, the capacity, delivery periods, warranty, terms of payment, price list, registration with Tax authorities, Bankers and financial capabilities. For the roads, the contract was based on design and build Contract to ensure no cost overruns were encountered.

Information Technology

Though housing construction had not been active for a number of years, construction of schools, clinics, hospitals and rehabilitation works have been going on in government projects and in private. The Zambia National Tender Board and Buildings Department of Ministry of Works and Supply have database related to the prevailing market prices of building materials, consultant services and labour costs. This information is up-dated from time to time to march inflation levels and other prevailing economic factors.

Conclusions

Some of the measures under taken did not yield the intended results in most cases due to various factors resulting into high cost overruns. For instance the designs of the houses were not in line with the budget figures to serve the low, medium and high income. Use of in door designers resulted in the client not having done a thorough and careful job in terms of using more economic ways of designing to achieve well serviced but affordable housing units. None use of available information on the market prices of building materials and labour costs available at the Zambia National Tender Board and Buildings Department of Ministry of Works and Supply resulted in the inaccurate estimates of the production costs of the houses. For a more careful cost estimating, use of consultants who are aware of the market prices. Further are able to carry out investigations and make most accurate estimates at the briefing stage and lock the cost at this stage would have made the client aware of the more accurate costs closer to the true or actual production cost. The costing information should have been based on the actual data from the past projects. Computer-based estimating systems and instruments for economical analysis should be used in future.

The registration of suppliers had a negative effect in that in most cases suppliers failed to supply because the prices given during registration did not take into account the inflation levels, and the suppliers did not consider specifications. If supplier registration were left to the Contractors, the Client would not taken responsibility for failure by the Suppliers to supply.

In order to enhance the home ownership and establish a stable revolving fund, methods such the Innovative Management of Organised Self-help Housing scheme in Costa Rica should be explored. This will go a long way in the project financing.

Production Stage

Tendering

The tendering for works commenced with the preparation of the tender documents. The tender document contained all the vital information for the purpose of tendering

and contracting. The information included were the conditions of contract, bills of quantities, specifications and the drawings.

The mode of tendering is normally by either National Competitive Bidding or International Competitive Bidding. This depends on the magnitude, overall objectives, financiers and the circumstances prevailing. Tenders are advertised in the local newspapers, national gazette, and international journals. The duration of the floatation period ranges from four weeks for local tenders to eight weeks for international tenders.

Experience has shown that for major projects and those involving international competitive bidding, pre-qualification of tenders is desirable since it enables the employer to establish in advance, the competence of the firms he is inviting to tender. Open tendering or unrestricted tendering does not always facilitate appropriate competition because the number of tenders may be so high that it becomes impossible to provide the required number of tender documents. Further evaluation of a large number of tender submissions where a single submission run into hundreds of pages in the required validity period is not possible. The following information is provided during the pre-qualification:

1. The names of the Client and the Consultant.
2. The estimated cost.
3. Outline of the project including scope, location and program.
4. Enquiry issue.
5. Instruction for applying for pre-qualification.
6. Submission date for Contractor's pre-qualification data.

The firms being pre-qualified are asked to provide the Client with the following information:

1. Organisation and Structure.
2. Experience in the intended type of work as well as working in the Country.
3. Firms resources categorised under
 - a. Management.
 - b. Technical.
 - c. Labour.
 - d. Plant.
 - e. Financial statements.

In this project, National Competitive Bidding was used. The pre-qualification documents were issued and received by the Zambia National Tender Board, checked for completeness and correctness, and then they were forwarded to the Presidential Housing Initiative for evaluation and recommendations. The tender documents were only issued to the short-listed or pre-qualified contractors. A site pre-tender visit was arranged by Bidders, to allow resultant data to be incorporated in the tender.

Amendments to the Inquiry Document

Addenda were issued to the tender documents to all bidders when there was a change, deletion or addition to the tender document. The addenda were issued to reach the bidders not later than two weeks from the date of closing the tender. Bidders were allowed to raise questions through written submissions that had to reach the Zambia National Tender Board at least two weeks before date of tender closing.

Tender opening

Tenders were opened in public on a day, other than a public holiday or a day following a public holiday. These tenders in addition to being opened in public, any other interested person other than the Bidders were however allowed witnessing the tender opening. The list of all the present persons was taken and the minutes of the tender opening were carefully taken and later considered as part of the evaluation report. During the tender opening the following details were announced:

- The name of the Bidder and the tender number.
- Description of work and related services offered.
- The tender sum and the completion period.
- Offer for alternative solutions or conditions other than those stipulated in the tender document.

Tender evaluation

After the receipt of tenders, the tender opening report was prepared. Every page of the tender document was embossed and signed. The tender documents were then forwarded to the Presidential Housing Initiative for evaluation. The Consultant carried the arithmetical checks and established whether each tender was arithmetically correct or not. Tenders were then checked for responsiveness, that all required information had been provided and that every thing was consistent with the instructions in the tender documents. The evaluation was divided in three main areas namely: Administrative, Technical and

1. Commercial Evaluation.

The Administrative Evaluation formed a basis of pre-qualification exercise were it was not done before tendering. This involved the examination of supporting documentation presented with the bid. The documents showed the proof of eligibility of Bidders, Bid Security, and Company profile, Certificate of incorporation, Value Added Tax (VAT) registration, and completeness of the Form of Tender and any other information considered relevant.

The Technical Evaluation made assessment of the capacity of the Bidder to execute the works in accordance with the specifications as designed and outlined by the Consultant. The assessment included experience in the similar projects, availability of the required equipment, availability of key technical personnel, contract period, suitability of the work programme and ability to adhere to specifications.

The Commercial Evaluation made the assessment of the suitability of the financial proposal. In this evaluation the tender sum, payment terms, discounts offered, applicability of preferences, credit lines, bank reference, company accounts, currency of payment and other financial requirements were examined referring to the requirement of the tender documents.

The recommended Bidder was the one who had fulfilled all the requirements stated in the tender document. This Bidder was considered to be the lowest evaluated. He was not necessarily the cheapest in terms of price, but cheaper in terms of all other aspects of the project including contract period, workmanship, contract sum, payment terms, experience in the similar project and capacity to adhere to the specifications.

When the Consultant had completed the evaluation of the tenders and had obtained the necessary clarifications he made recommendations to the Presidential Housing Initiative on the award of contract. If the Presidential Housing Initiative was satisfied with the recommendation, it further forwarded the recommendation to the Zambia National Tender Board for authority to award the tender to the recommended contractor.

Contracting

On the receipt of the authorisation, the Presidential Housing Initiative issued a *Letter of Acceptance* to the successful Bidder. The Letter of Acceptance advised the contractor to furnish the Performance Security, confirm the clarifications and amendments to the tender. The Contract was prepared for signing. The Contract was signed between the Presidential Housing Initiative and the Contractors. The Contractors had the following obligations under the Contract:

- To execute and complete the works within the time specified in the Contract.
- The Contractor has responsibility of the defects, which appears during the defect liability period.
- The Contractor is responsible for his own staff and work force, and for the taking out social and other insurance in respect of his personnel.
- To comply with all applicable laws, by-laws and regulations to ensure that all those whom he is responsible also comply.
- Normally there is one main or principal Contractor who signs the Contract and has overall responsibility for the execution and completion of the project.
- There are usually a number of Sub-contractors working on site undertaking specialist contracting activities; these are responsible to the main Contractor for materials, workmanship, performance and the Contract.

The form of contract used was fixed price contract, the measure-and-value contract.

Production planning

The production planning went on parallel with the tendering process and continued through to the Contract signing. In-fact the contract documents had the work programme prepared by the Contractor as part of the production planning.

In the tender document, the Bidders were asked to prepare the work programme. This work programme was analysed during evaluation to ensure that the recommended Bidder's (the lowest evaluated) programme fits into the production programme and in the overall project programme prepared at the inception of the project. Big discrepancies on the work programme meant the Contractor did not understand the scope of work. However minor discrepancies were negotiated for or ignored. All negotiations were done before the contract signing.

Once the Contract was signed the Contractor moved on the site, within the specified period after the contract signing or receiving the advance payment, whichever was the case. It was mandatory that the performance grantee and the insurance were submitted before the commencement of works. In the case were advance payment was given to the Contractor, an Advance Payment Grantee was furnished before any payment was effected. The Client facilitated the provision of water and electricity on site for Contractor's use at the Contractor's cost.

All Contractors are responsible for the organisation and the planning of plant and equipment on site. The planning by all Contractors was to be within the work programme given during the tendering stage. Though all Contractors are responsible for the provision of materials, the Client negotiated with the various building materials manufacturers and suppliers for better prices of those materials bought in bulk such as cement, roofing sheets, doorframes and other installations.

Every Contractor is expected to met certain target at any given time during the production stage, and progress reports are prepared monthly in order to keep record of the happenings and as well as future reference.

Upon completion, each house is inspected all installations and services are tested. A snag list of all items that needs to be rectified is prepared. The Contractor makes good all the fault areas and final inspection and testing are done followed by the hand over. Then the client takes over the responsibility and the house is read for sale. An evaluation of the whole pilot phase is to be done at the end of the pilot phase. The evaluation will include the final production cost, economy, budget control, designs suitability and the response from the market in terms of meeting their needs. The pilot phase is expected to be complete by June 2000.



High-income house under construction.



Completed High-income house.



Low-income house under construction.



Completed Low-income house.

Figure 4: Pictures of houses.

Quality Management

Day to day quality assurance is carried out by the private Consultant in conjunction with the Buildings Department of the Ministry of Works and supply. Zambia is a former British colony and therefore the British Standards (BS) are widely used. The ISO and the South African Standards have been adopted by the Zambia Bureau of Standards, which is the national accredited standards' body and are becoming more and more popular. The testing of building materials such as, blocks, bricks and concrete are done by the Contractors and the supervising Consultants who takes samples to bodies certified to undertake such tests. The Buildings Department takes random tests from time to time. Other installation materials are inspected prior to their installation. Any materials which are defective or do not conform to the specifications are not allowed to be installed or used. Better or equivalent materials are substituted with the approval of the supervising Consultants with permission from the Client. A record of all tests is kept for future reference. More often than not, the materials used are environmental friendly except for the use of asbestos roofing sheets, which are still widely used.

Economic Control: Budget Review and reconciliation

The objective of the project is to provide a well serviced, but affordable housing units to the Zambian citizens under the house ownership scheme. Therefore economic control is of prime importance and of great essence. During the design stage the selection of materials and the design techniques were to lower the initial capital investment to make the people afford the cost of the houses without compromising quality.

Materials with long life span and minimal running and maintenance costs were selected. For facades burnt bricks are being used due to their resistance to the climatic conditions, long life span and low maintenance costs. However the cost of brick production is higher than the concrete blocks, hence the use of bricks is restricted to the houses for the high income. For the low and medium income concrete blocks are being used, with low income having clear wash and medium having plaster on the facades. This has relative high maintenance costs in terms of painting, but in order to lower the initial capital investment and make the houses affordable by most people these materials were preferred. Wood is also being used for internal fittings due to its abundance, durability and more importantly for the low costs and being environmental friendly. Both for the window and door frames steel is being used as it was considered to be very durable and has low maintenance costs though the initial capital investment is a bit high.

In the review of the budget in relation to the production costs, the economic controls put in place at the design stage is having very minor influence on the final production cost depicting lapses on the measures taken and the design considerations.

Conclusion

The tendering and contracting procedures at the production stage was well handled. Contractors with capacity to undertake the works were selected. However the project lacked efficient planning of equipment, materials, resources and the selection of the project managers. A number of problems have arisen, the project would be better improved if the following were done:

- The client is involved in the planning of equipment, materials and resources.
- A careful selection of project managers is done. This would grantee not only the successful completion of the project but also quality.
- Careful selection of procurement method would make the client avoid unnecessary variations and cost overruns.
- Analysis of the whole construction process should be done in the early stages in order to identify all the critical stages of the contract before the commencement of the production stage.

Property management

Life cycle economy

As indicated in the previous chapters, the overall goal of the project was to empower people with housing. This means that as soon as the houses are ready, they are sold to individuals and families, and they become private property owners. Therefore particular attention in the design stage was given to the climatic conditions of the Country and the inability of the people to maintain these houses. The materials selected are those with low maintenance and running costs.

However there is no deliberate policy by the government or the building authority to pay particular attention, and make design consideration to have life cycle economy on these projects. The project authority and the government has not put the up the mechanism of how the people will access the borrowed capital or subsidies to finance the acquisition or maintenance of these houses. Mortgage loans are available from the Banks and the Building Society, but due to high inflation levels and the interest rates most people cannot access these loans.

Maintenance planning

The constructed houses under this project will be sold as soon as there are ready to individuals and families and become private properties. The ownership will be transferred to the private owner who will take up the responsibility for maintenance planning, the actual maintenance and property running. Therefore no maintenance planning for the houses has been incorporated in the project. However the respective companies responsible for such utilities in the city will do the running and maintenance of the services. The Lusaka Water and Sewerage Company will do the maintenance of Water and sewerage services, and electricity by the Zambia Electricity Supply Company. The road network will be run and maintained by the municipality.

Connection to the design stage – feed back

One of the main activities of the of the Pilot phase is to do an evaluation of all the activities under this phase one by one and step by step. The purpose of this activity is to make analysis of the performance of the project and the measures taken. This is to adjust anything considered not to be working in line with the intended objectives and the interest of the project. This will in future prevent the similar occurrences and will certainly form the basis for decision making as the project progresses.

No long-term consideration has been given to the connection to the design stage and the life cycle of the houses up to its demolition time.

Conclusion

Though the project is for the construction of houses to be sold as soon as there are built, the government and the building authority needs to consider seriously the introduction and enforcement of regulations pertaining to the:

- Life cycle economy of the constructed properties and the old ones.
- Poor maintenance planning has lead to dilapidation of most public properties. Unfortunately, even the public buildings such as schools and hospitals being built with funds from the local resources, international organisations and the donor community have no maintenance planning. Therefore it is recommended that that a deliberate policy be formulated to undertake maintenance and prolong the life span and maintain the functions of these properties.

Experiences to be used in future

Experiences from the course which can be used in Zambia

I have found the course to be very beneficial and a lot of experiences can be drawn from it to improve the on going project as well the future construction projects to come. The experiences below can be employed in Zambia.

The construction process needs to be adopted, is were the early cost estimates at the briefing stage are investigated and the cost estimates made are accurate enough for the client to know costs which are closer to the true or actual production cost. More often than not, cost overruns in the building industry in Zambia are in the average of 40 – 50 % though the contingency is usually only 5%. This has led in some cases to the abandoning of the project before completion. Computer-based estimating systems and instruments for economical analysis should be used extensively.

In order to enhance the home ownership, establishment of a stable and viable revolving fund and accelerate the whole housing scheme, methods such the Innovative Management of Organised Self-help Housing scheme in Costa Rica should be explored. Further the people being empowered with houses should participate fully at every stage for them to appreciate and be able to manage the houses.

Maintenance planning is one part of the property management, which has not been taken care of for a long time in Zambia. These results in the dilapidation of both public and private buildings, eventually culminating into high maintenance costs or become non-maintainable. Therefore adoption of property management will save both the government and the private a lot of money.

Experiences from my country to be used in other countries

Having a pilot phase for a big project such as this has assisted in identifying problems, which were not seen from the onset. Therefore this can be used in other Countries in that the likely problems to be encountered in future can be seen and remedies can be sought on the early stages of the project. Waiting for the problems to occur at the later stage can be very costly if the project is in the advanced stage. Therefore I recommend that pilot phase be used for building projects of large magnitude.

Appendix

1 Form of Tender

To:

GENTLEMEN,

1. Having examined the Drawings, Conditions of Contract, Specifications and Bill of Quantities for the execution of the above-mentioned Works the undersigned, offer to execute complete and maintain the whole of the said Works in the Bill of Quantities for the sum of
(SEK.....)
or such other sums as may be ascertained in accordance with the said Conditions.
2. We undertake if our tender is accepted to commence the Works withindays of receipt of the Engineer’s order to commence, and to complete and deliver the whole of the Works comprised in the Contract within days calculated from the last day of the aforesaid period in which the works are to be commenced .
3. If our tender is accepted we will, if required, obtain the guarantee of an Insurance Company or Bank or other sureties (to be approved by you) to be jointly and severally bound with us in a sum not exceeding per cent, of the above-named sum for the due performance of the Contract under the terms of Bond to be approved by you.
4. We agree to abide by this tender for the period ofdays from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
5. Unless and until a formal Agreement is prepared and executed this Tender, together with your written acceptance thereof, shall constitute Contract between us.
6. We understand that you are not bound to accept the lowest or any tender you may receive.

2 Form of Agreement

THIS AGREEMENT made the day Of
20 BETWEEN
Of (hereinafter called “the Employer”) of the other part and
.....(hereinafter called “the contractor”) of the other part
WHEREAS the Employer is desirous that certain Works should be executed,
viz.....and has accepted a
tender by the Contractor for the execution, completion and maintenance of such
Works NOW

THIS AGREEMENT WITNESSETH as follows:-

1. In this Agreement words and expressions shall have the same meaning as the respectively assigned to them in the conditions of contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:-
 - (a) The said tender.
 - (b) The drawings.
 - (c) The conditions of contract (Part I, II, and III*).
 - (d) The specifications.
 - (e) The Bill of quantities.
 - (f) The schedule of Rates and Prices (if any).
 - (g) The Letter of Acceptance.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned the Contractor hereby covenants with the Employer to Execute complete and maintain the works in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution, completion and maintenance of the Works the contract price at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused their respective Common Seal to be hereunto affixed (or have hereunto set their respective hands and seal) the day and year first above written.

The Common Seal of Limited

was hereunto affixed in the presence of :-

or

SIGNED SEALED AND DELIVERED by the said

In the presence of:-

* Delete where inapplicable.

References

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