Direct Housing Construction Programme in Sri Lanka

Construction Management Aspects

G A Piyal Hemantha Ganepola

Deputy General Manager (Engineering Services)
National Housing Development Authority, Sri Lanka

Abstract

With the inception of the National Housing Development Authority (NHDA) in 1978, a new era of housing development emerged in Sri Lanka. The first development programme undertaken by the NHDA was the Hundred Thousand Houses Programme, which aimed at construction of 100,000 houses in five years. The programme consisted two approaches, (a) Creation of several large and medium scale housing estates directly by the Authority and (b) a self- help approach in the rural sector. The former, known as **Direct Housing Construction Programme** was a new experience to the construction industry of the country in terms of its magnitude and speed. The stimulation created by the programme resulted in a new chapter in the field of construction management. New local consultancy and contracting firms emerged, foreign firms started to appear in the local scene, contract documentation was standardised and different types of contracts from Fixed Price contracts to Cost Plus contracts have been tested in the housing sector. The direct housing construction approach has subsequently consolidated in the NHDA with the lessons learned from the initial programme. The main lessons were; too large scale of the programme to match with the economic strength of the country and unsuitability of some types of contracts, most suitable being the; Measure & Pay type. The approach is still continuing under the same name, the **Direct Housing Construction Programme (DHCP)**, but in a much-reduced scale. Under the programme, the government builds condominiums and other types of houses and is the most popular means for low and middle-income earners of the urban sector to acquire a housing apartment.

The NHDA during the last 20 years has brought numerous improvements to the programme in terms of quality and cost effectiveness to enhance user satisfaction and is committed to improve further through proper management.

This is an effort to examine the Direct Housing Construction Programme in a modern construction management perspective to diagnose any weaknesses and to find remedies.

Introduction

The Paper

This paper is an outcome of the course International Construction Management 2000 held in the spring 2000 in Lund University, Sweden. The author participates as a nominee of the Government of Sri Lanka (GOSL) representing the National Housing Development Authority (NHDA). The paper analyses the process that takes place in design, construction, and property management phases of projects of the Direct Housing Construction Programme of the NHDA in terms of their responsiveness to modern management practices. The programme is named Direct Housing Construction as it involves in construction of houses directly by the NHDA.

The Country

General Information

Sri Lanka, formerly known as Ceylon is an island situated between latitudes 5°55' & 9°55' north of the equator and between eastern longitudes 79°42' & 81°52' in the Indian Ocean, very close to India.

The island is 435 km in length and 220 km in width and has a land area of 65610 sq. km excluding inland water bodies.

Topography changes from plains and lowlands in the periphery to central hills in the centre. The climate is tropical with temperature in peripheral plains ranging between 27°C- 33°C and in central hills between 16°C- 10°C.

The country experiences moderate rainfall at regular intervals throughout the year. The average rainfall varies between 1875 mm in the North, 2050 mm in the central hills and 2232 mm on the West Coast.

According to the 1994 provisional senses the country has a high literacy rate of 90.1%.

Estimated population in mid 1999 is 19.0 Million. Approximately 25% of the population are urban, 67% in rural and 8% in the estate sector in the central hilly areas.

Economy

In the World Bank classification of countries according to per capita income, Sri Lanka falls into the category of 'Lower Middle Income' country group. Per capita GDP in the year 1998 has been Rs.54, 035 (US$ 837).

According to the Central Bank report for 1998, Agricultural sector accounts for 21.5%, Manufacturing 17.1%, Construction 7.1%, Transport & Communication 11.3% and Trade 22.5% of the Gross National Product.

The National Currency Sri Lanka Rupee, at present prevails around Rs.73.50 @ 1US$ and Rs.70.00 @ 100 Yen.

Interest rates for deposits are 9.2–13.0 % and lending rates in Commercial Banks are around 14.9 %.

Housing

The country has approximately 4 million housing units. The average occupancy ratio exists at 4.63 persons per housing unit, with the corresponding ratio in the urban sector being 5.67, showing a housing shortage in the urban sector.

It is estimated that the country will need around 1million more houses by the year 2005 to fill the present deficit and for the projected population growth.

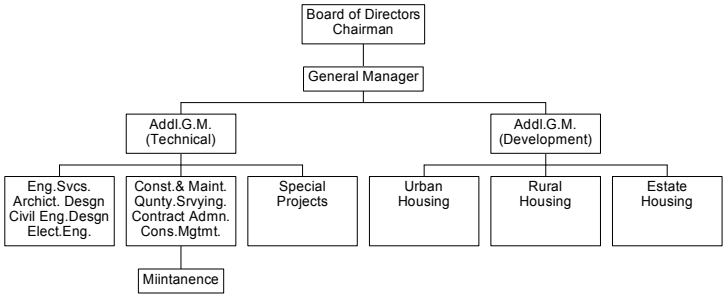
The National Housing Development Authority

The National Housing Development Authority (NHDA) is the main arm of the government in implementation of housing development projects and programmes. The Ministry of Urban Development Housing & Construction (My UDHC), under whose supervision the NHDA functions, is responsible for formulation of policies and over seeing the activities of institutions under it, including NHDA.

NHDA is a partly government funded organisation with powers vested upon it to generate it's own funds to invest on housing and related activities. It is typical for

such an organisation to function under a Board of Directors appointed by the government, comprising of senior government officers including one from the Finance Ministry and one or few political figureheads representing the ruling political party. The President of the country appoints the Chairman of the Board with the concurrence of the Minister. The General Manager (GM) functions as the chief executive of the organisation. Departments to perform different disciplines are headed by the Deputy General Managers (DGMm) who are supervised by two Additional General Managers, one for technical related departments and the other for sectoral development departments.

Organization of the National Housing Development Authority



(The above chart does not show departments relating to Admin., Finance, Legal and Property management)

Development activities of the Authority are decentralised to the hamlet level through a network of District Offices. However, the DHCP, which is being discussed in this paper is confined to few districts of urban nature.

Design Stage

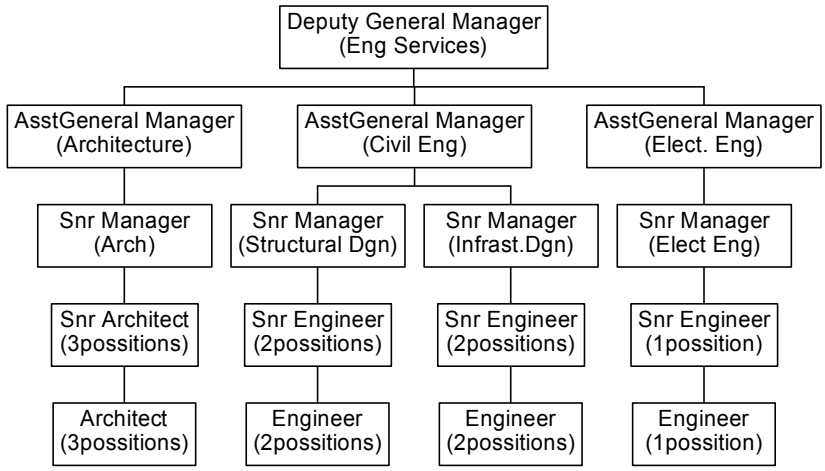
Project Organisation

Mainly three departments of the NHDA are involved in the implementation of projects of the DCHP. The Urban Housing Division (UHD), the Engineering Services Division (ESD) and the Construction & Maintenance Division (C & MD). Support services are obtained from the Finance Division (FD), Legal Division (LD) and the respective District office whenever required. Property Management is divided into two branches, Maintenance Branch handling technical maintenance and Property Management Branch handling legal and tenure matters.

Each project is scrutinised by a special committee appointed by the Board of Directors after the preliminary design stage where the feasibility of the project is reviewed and approval given to go ahead with the project. This committee which is called the Project Appraisal Committee (PAC) is headed by the Chairman and is comprising of a director of the board, the General Manager (GM), Additional General Manager (Tech.), Deputy General Manager (Urban Housing) [DGM (UH)], Deputy General Manager (Engineering Services) [DGM (ES)] and Deputy General Manager (Construction & Management) [DGM(C&M)]. The chiefs of the Architecture branch, Engineering Design Branch (both under the Eng. Services Division) and the chief of the Quantity surveying branch (attached to the Construction Division) who is responsible for the BOQ & the estimate, too also participate as observers.

The NHDA possesses a fully-fledged Architectural and Engineering Design Office under the Engineering Services Division. The DGM (ES) has the overall responsibility of quality and timely delivery of the designs. The three branches representing the main deciplines Architecture, Civil Engineering and Electrical Engineering are managed by three Asst. General Managers, who are experienced designers in their respective fields. They oversee Senior Design Engineers (4 positions)/Senior Architects (3 positions) with the assistance of one Senior Managers. Each Senior Engineer or Architect is assisted by a junior Design Engineer /Architect who is often a young graduate.

Organization Chart of The Engineering Servises Division



Design Process

The Architectural and Engineering design of housing projects is done through an in-house process involving several departments within the NHDA. The steps involved in the process are as follows:

Site Selection

Lands for housing development are usually selected from the NHDA Land Bank by the Urban Housing Division in compliance with the relevant development master plans of the Urban Development Authority. District Offices may also select (otherwise) unproductive lands belonging to private or state sectors for the acquisition by the NHDA for housing development. Such lands selected by the District offices are referred to the UHD. For the each sites the Planner of the UHD, in-charge of the area in which the site is located, prepares a Design Brief. This Design Brief, after being approved by the DGM (UH) is communicated to the ESD for Architectural and Engineering design, together with the survey plan and the contour plan.

Preliminary Design

On receipt of the Design Brief by the ESD, a site inspection is held by the Architect and the Engineer to whom the project is assigned by the chiefs of the respective branches. Depending on the importance or magnitude of the project, the chiefs of Arch. and Eng. branches and /or the DGM may attend the inspection. Often the Planner of the UHD and the Manager/ Technical Officer of the District office are invited to participate. At this inspection important site parameters are recorded and based on them a site inspection report is prepared. The report contains information necessary for a most preliminary decision on the selection of the land and those required for the feasibility report. The information includes the details of access roads, the location of the site in reference to strategic urban centres, topography, soil (superficial judgement), water table, vegetation, neighbourhood, infrastructure availability, availability of building materials locally, land price of the locality, demand for housing and any other relevant information. The report will finally propose recommendations for furthering the project. The recommendations will include preliminary technical feasibility of the project, suitability of the location for housing and if selected, type of housing proposed and a preliminary cost estimate (approximate) to check the financial feasibility. The initial decision whether to go ahead the project or not will be taken by the DGM (ES) and DGM (UH) at this stage based on the inspection report. The inspection report is jointly prepared by the Architect and the Engineer with necessary inputs from the other participants.

Taking into consideration the Design Brief and the recommendations of the Inspection Report the Project Architect will prepare a Preliminary Lay Out Plan showing how he perceives the arrangement of houses and ancillary buildings on the survey plan. He/ She shall consult the Project Engineer on his requirements in terms

of infrastructure facilities and arrive at compromises. He/ She shall also comply with the Planning Regulations of the respective local authority.

A middle-income house built based on a type plan

The design of the housing unit however will be selected by the Architect among nearly 50 type plans. The NHDA's ES division in the past has developed these type plans to suit different income levels, different levels of urbanisation and different site conditions. Only the foundations are to be custom designed to suit soil conditions of the particular location. The type plans are available for different types of individual houses, twin houses, row houses or blocks of flats. Flats are generally limited to 4-storey height, to evade expensive lifts. The selection for a particular site may be from several types to meet the requirements of different target groups as spelt out in the Design Brief. When it comes to sites involving resettlement of families the house plan is shown to the resettlers and their consensus obtained. In no other type of project the Architect has the privilege to get the client's requirements, but to use his/ her desecration, as the clients are not known in the design stage.

Feasibility Report

After finalisation of the preliminary design, the project Engineer will prepare a feasibility report. It will include technical feasibility, to an extent possible with the data so far collected and the tentative cost. The tentative cost will include land cost (as revealed from inquiries with neighbours), cost of any access road improvements (a guesstimate), land preparation cost, construction cost of houses (updated type plan cost), on-site infrastructure cost (as a % of housing cost revealed from past similar projects), off-site infrastructure cost (a guesstimate), land survey costs and the overhead costs (as a % of construction costs).

Preliminary Approval

The Preliminary Design and the Feasibility Report together are forwarded to the Project Appraisal Committee (PAC) by the DGM (ES). The PAC is convened by the Addl. GM (Tech) when a project is ready for submission. At the PAC meeting the design is critically reviewed from different viewpoints relevant to the different members and compromises arrived on any changes necessary. Changes necessary for type planes to fine tune to the locational requirements are also agreed in this forum. Estimated costs are reviewed in relation to the affordability of the target groups. Finally, the PAC either turns down the proposal or approves subject to any amendments. Further action on turned down proposals is terminated forthwith with information to all the involved branches and approved projects are continued further.

Design

The final architectural design will incorporate any changes suggested by the PAC on the type plans. Subsequently the architectural drawings are communicated to the Engineering Design Office. Foundation, any structural changes resulting from PAC meeting and on-site infrastructure services such as water, sewerage, waste disposal, electricity, roads and community buildings will be designed in there. The complete

architectural and engineering design, after approval by the DGM (ES) will be communicated to the estimating section of the Quantity Surveying branch.

Estimating

Estimating including production of the BOQ, is a function of the QS branch, which is headed by the Asst.GM (Contracts). The BOQ is prepared following the British Code: Standard Method of Measurement No.7 (SMM7). Resource requirement for each activity is drawn from the Building Schedule of Rates (BSR) updated with current list prices in the market. The rates of BOQ items are derived from the BSR, which gives a break up of different resources that, goes into the particular item.

Preliminaries including financial costs for insurance, performance bonds and advance guarantees are considered in a separate bill without interfering with the construction activities.

A factor is added at the end of the estimate to cover the overheads and profits of contractors. This factor is common to all the organisations within the Ministry of UDH&C and is decided by the Technical Committee of the Ministry, each year.

For any necessity of external infrastructure, the DGM (ES) will write to the respective agency for requesting an estimate.

Project Planning

A tentative Implementation Calendar for all the projects, for the following year, stating the target dates of activities such as completion of the design, tender awarding, commencement of construction and completion of construction along with a tentative cash flow fore-cast is prepared jointly by the Addl. GM (Tech) with the assistance of the DGM (ES) and the DGM(C&M), in the month of July, every year. This is to facilitate the Finance Division to prepare the budget for the following year. However, at this early stage, accurate cost and other details are not known and the costs are computed on approximate basis using early estimating methods.

Quarterly Plan for Design Stage

Based on the above Implementation Calendar, the DGM (ES) would prepare the quarterly plans for the design stage. Often, the plan for the first quarter is prepared at this stage, and others are prepared in the middle of the preceding quarters after reviewing the changes take place with time.

QUARTERLY IMPLEMANTATION PLAN-DESIGN STAGE (FORMAT)										
PROJECT	TARGET COMPLN	MILESTONE DATES								
		ARCH. DESIGN			ENG. DESIGN					
		concept	sketch	drwg	struct	struct	servs	servs	inf dsgn	inf drwg
A										
B										
C										

The quarterly plan will specify target dates for completion milestone events of each project and will be in the above format.

Based on the above stated Quarterly Plan, each AGM in the ES Division would prepare an implementation plan relevant to his/ her own sector with names of staff attached to each of the project.

The quarterly plan is monitored at two levels. On the first Friday of each month the DGM (ES) will review the progress with AGMs. Each AGM will report the progress in a format similar to the above with an additional column at each milestone activity to report actual completion dates. In a separate remarks column, reasons for any delays or any relevant information will be reported. At this progress

review meetings the original plan would get revised if the reasons were justifiable. Subsequently, the progress report of the Division is sent to the Board Secretary with a copy to Corporate Planning Division. This report, together with reports of the other Divisions would be reviewed in the monthly Board Meeting.

Determination of Contract Period
Prior to calling of tenders, the AGM (Contracts) will decide the contract period for each project for the purpose of inserting it in the tender documents. The decision is based on certain thumb rules. Firstly, the value of the project estimate is divided by a value corresponding to an average monthly output of a contractor in the particular grade to arrive at a period roughly. (Contractors are registered in a National Register in grades corresponding to the value of work they are capable of handling) Then adjustments are made to incorporate site conditions, number of floors, etc. Timing is also influenced by the requirements of the client such as importance and urgency of the project, which are sometimes political in nature. It is note worthy that no planing exercise considering logical sequence of activities is taken place at this stage.

Project Financing

The Direct Housing Construction Programme of the NHDA has two avenues of financing depending on the type of target beneficiaries of the each project.

Low Income Category
The capital cost of the projects implemented for low income people are funded by the State and recovered through periods as long as 30 years in monthly instalments. For the families who are resettled from shanty settlements, a rebate equivalent to the nominal value of property they occupied is given, over the value of the new house and only the balance amount is recovered, and that too without any interest. For others qualifying under the low-income category, an interest of 12% is levied. The recoveries of this low-income sub programme are accumulating in revolving fund for investing in future projects.

Middle Income Category
The funds required for the projects for the middle-income category are generated through a pre-sale process. After the designs are over, houses are advertised in public media and advance money is collected from prospective buyers in two stages. Initially, a sum equivalent to 25% of the estimated value of the property (land and house) and a further 25% on completion. For the remaining 50%, the beneficiaries are allowed to raise a loan from a lending institution.

Budget and Budget Control

Annual budget of the NHDA is prepared by the Finance Division in the 3rd quarter of the each year and submitted to the Treasury, in anticipation of the funds for the following year. However approved budget is only known after the approval of the government budget by the Parliament, towards the end of the year. Each division has to prepare it's own budget and submit to the Finance Division. The budget consists two main sections namely (a) The capital budget (b) The recurrent budget. The sections are then subdivided to sub-sections; Manpower budget, Equipment Budget, Development budget and Maintenance budget. Together with the budget of the Division a Cash Flow Statement is also submitted. However both the project costs and cash flows given at this stage are tentative and are based on Early Cost Estimations.

Early estimating in this stage is generally done on the following basis, using the actual costs of recently conclude similar projects with a factor for inflation of costs ;

- Building costs including internal services –Cost per unit gross area.
- On site infrastructure – As a percentage of building cost.
- Off-site infrastructure – Cost per unit length

The project estimate prepared by the QS Branch, after completion of the design, is taken as the project budget for all project management purposes in the production phase. Generally adopted contract type being Measure & Pay the estimate provides a list of costs for each sub item of work, facilitating easy budget control.

Budget control is generally governed by the Financial Regulations of the government and the Limits of Authority of the NHDA. Government Financial

Regulations in terms of the budget control is on the control of total budget of the project. The Head of the institution is responsible for controlling the cost within the project budget. This responsibility is often delegated downwards. In the case of NHDA the DGM in charge of construction is vested with this responsibility. However, a cost overrun up to 10% of the total budgeted cost is entertained subject to the approval of the Tender Board.

Information Technology

The main branches involved in the project implementation, the Architectural branch, Engineering design branch, Estimating branch and the Construction branch are independent identities in terms of information flow. AutoCAD design software has been introduced to the design office recently but majority of the drawings is still done manually due lack of trained personal. Engineering design packages are more commonly used in performing design calculations. Estimating is done using an Excel based software package. Each key professional is equipped with an independent personnel computer without facility for interacting among them through a network. Therefore, flow of information is through documentary files, meetings and minutes of meetings. The information flow between construction site and the design office are rather poor and more dependent on informal contacts between personalities than on formal means.

Conclusions

The organisation dealing with the projects seems to be well equipped with all the professional sectors that includes Planners to perform overall planning in terms of urban development, Architects and Engineers for designing and engineers with project management background for construction. Locating the ES Division handling the designs and the C&M Division handling construction under one Addl GM within the Organisation Structure is also logical in terms of better control and inter communication. Planners are physically located in a remote location attached to the UHD under a different Addl GM and communication at different stages of project is difficult and often neglected. This could be overcome to a reasonable level by locating them closely.

In general Sri Lankans have the habit of exhibiting one's own identity through the facade of his/her house. This inspiration is often disturbed by Type Plan designs implemented by NHDA. Although a range of type plans are being adopted to overcome this problem, as the client is not known to the Architect in the design stage in most cases, it is not possible evade it completely.

The contract period is determined in a rather adhoc manner. This time is very crucial in terms of all the future activities of the project. It will have an influence on costing of the project by the tenders, level of resourcefulness of tenders to meet the time target etc: from the point of view of the tenderers. It too will have a great influence on the contract administration when it comes to time extensions and liquidated damages. Therefore, the arbitrary manner that the contract period is determined will negate the influence of many other management efforts. It is very essential to introduce a project planning software package to perform this activity.

Use of Information Technology in the process stands at a preliminary level. More emphasis must be given to training of staff to handle available software effectively. Introduction of a networking arrangement among the branches involving project implementation to interact effectively at all stages of implementation is a need of the day.

Production Stage

Tendering and contracting

NHDA, being a government organisation, has to follow the 'Guidelines of Government Tender Procedure' published by the General Treasury. The latest version is the one published in 1997.

The tender process of the construction projects commences after the Quantity Surveying Branch finishes the BOQ and the Project Estimate. The Project Estimate is kept in confidential custody of the AGM (Contracts), until the tenders are opened at a later stage. The Tender Document contains the following;

(i) The Notice of Tender
(ii) Conditions of Tender
(iii) Form of Tender with Appendix to Tender
(iv) Form of Agreement
(v) Conditions of Contract Part I & II
(vi) General Specification for Building Works
(vii) Schedule of Contract Drawings
(viii) General Notes & Preambles for BOQ
(ix) Bill of Quantities (in duplicate)
(x) Annexes of Formats of Bid Bond, Performance Bond and Advance Guarantee.

The Tender Notice is published in the newspapers, inviting contractors to collect tender forms on payment of a refundable fee. To become entitle for tendering, a tenderer should be registered in the national list of contractors under the Institute of Construction, Training & Development (ICTAD) under the particular category applicable to the magnitude of the tender and should be a member of the Association of Construction Contractors. Tenders should be submitted prior to the date and time specified in the notice and is opened immediately afterwards in the presence of tenderers. The figures quoted are announced. Tenders submitted without the specified bid bond are rejected.

Tenders, depending on the estimated project estimate fall into 3 categories. Different levels of Tender Boards (TB) are specified by the Govt. Tender Procedure for these categories:

Departmental Tender Board	up to Rs.10 Million
Ministry Tender Board	up to Rs.20 Million
Cabinet* Appointed Tender Board	above RS. 20 Million

Note: 1 US$ = Rs.75.00 approx.

(* Cabinet of Ministers)

Accordingly, evaluation of tenders too is performed by Technical Evaluation Committees (TEC) appointed by different levels of authority in par with Tender Boards.

Tenders received are evaluated by the TEC to select the 'Lowest Evaluated Tender'. Except in tenders for infrastructure components involving mechanical/ electrical equipment where Life Cycle Cost is considered for evaluation, in general lowest corrected bid conforming to the tender conditions is recommended for acceptance. However the bids substantially lower than the estimate may also get rejected. The decision regarding the award is taken by the Tender Board based on the recommendations of the TEC.

Decisions of the Cabinet Appointed Tender Boards shall be confirmed by the Cabinet of Ministers prior to the award.

When all the bids are substantially higher than the estimate, the estimate is reviewed and if found to be correct, Tender Board may decide to re-tender.

After the decision of the Tender Board is made, the DGM(C&M) sends a 'Letter of Intent' to the selected tenderer, informing the desire to accept the tender, subject to attending to the following within 14 days:

- Mutual adjustment of rates that are unusually high or low.
- Submission of Performance Bond. (5% of the contract sum).
- Submission of the Construction Programme.

When the above requirements are met, the formal letter or award is issued and agreement signed.

After the agreement is signed, the contractor is entitle for a Mobilisation Advance amounting up to 20% of the contract sum, on submission of a guarantee in the form of a Bank or Insurance Bond.

Prior to the commencement of work the contractor shall, according to the Conditions of Contract, insure all the workmen, third parties and works.

Conditions of Contract are a standard document, published by ICTAD. It is adopted for all Measure and Pay building and civil engineering works of the

government institutions. It is in two parts; Part I describing conditions common to any contract and the Part II describing conditions specific to the particular contract.

Production Planning

Production planning, in the context of building and civil engineering works is a complex affair dealing with many activities and large number of resources. Project planning computer software available today has made this task relatively easy. Multitude of activities of a project can be put into a logically framed network, which could respond to changes take place in the process instantly. This facilitates the managers to visualise the critical activities and concentrate on them and to see the net effect of any delay of an activity. Also the resource management and budget control are made very much easy by these software packages.

In the NHDA's Direct Housing Construction Programme, production planning is considered a responsibility left with the contractor. The contractor is responsible to work out a realistic plan usually known as a Construction Programme at the inception. This is normally presented as a Bar Chart. Engineer reviews this at site meetings, usually held once a month and in crisis situations more frequently. These reviews enable the both parties to agree upon any remedies to catch up delays and/or to revise the time targets.

Using the Construction Programme for planning the resources is seldomly practised by the contractors, except for few relatively large-scale contractors, who posess computers.

Four storey walk-ups in finishing stage

Quality Management

Quality of works and construction materials is specified in three documents in the contract folder namely, General Notes & Preambles for BOQ, the BOQ itself, and the General Specifications of Building Works. In addition they are subject to be complied with relevant Sri Lanka Standards or British/ ISO standards (in the absence of Sri Lanka Standards) referred in the above documents. Major construction materials are covered by compulsory standards stipulated by the Sri Lanka Standards Institute.

In respect of skills of tradesmen involved in construction there exist no stipulated qualifications or skill levels in spite of the existence of a National Grading Scheme operated by ICTAD.

In the absence of handy quality manuals at site level, the Quality Management is rather an adhoc activity left to the experience of site supervisors. Prior approval of the Engineer for steel reinforcements & form work, compulsory presence of the client's supervisor during concreting and testing of test cubes of concrete, pressure testing of water pipes are some of the steps taken to ensure quality.,

Budget Review and Reconciliation

Controlling the budget through out the production process is an important task in management of civil engineering and building works as there could be many changes that had not been anticipated at the time of planning and design. This is often met in underground works and foundations of buildings due to unexpected subsurface conditions. When such a situation is encountered the project manager would be in a position to select among several alternatives for which he should be aware of the final effect to the project budget. Review and Reconciliation is important in terms of making necessary adjustments to the budget or taking corrective measures. Modern project planning software is geared to assist the managers to perform such tasks efficiently and accurately.

Use of project management software in budget control in the NHDA is yet to be introduced. The budget control during production stage in the DHCP is done manually using the Contract Sum as the reference. It becomes the responsibility of the Senior Project Engineer (SPE) in-charge of the project to manage the project within the budget. The SPE will interpret the contract to determine extra additional works or variations leading to any cost over runs. The Quantity Surveying Branch will report to the DGM, of such cost variations when the contractor's progress bills are processed. If any cost overun is unavoidably exceeding 10% limit the procedure for approval is very cumbersome. It would have to be taken up to the level of the Secretary of the Ministry after the Tender Board approval. The most common remedy taken to avoid such cost overruns is curtailing some items of work from the scope of the current contract and completing them through another contract at a later stage.

Conclusions

When it comes to procedure adopted for tendering, the NHDA follows a uniform system described in the manual of Government tender procedure, which can be considered as a positive factor to ensure smooth tender administration. However the procedure described in the manual for large contracts is extremely time consuming especially when it comes to the level of Cabinet Appointed Tender Boards. It may be worthwhile to consider creation of a Cabinet appointed high-powered committee, dedicated to tender approvals.

It is also note worthy, the existence of a National Registration Scheme of Building and Civil Contractors, which eliminates the need of pre-qualification of contractors.

Contract documentation is made easy with the adoption of the standard contract document of ICTAD, which has a separate section for project specific conditions. It makes the task of tenderers easy, too.

Availability of standard formats for tender evaluation reports, Letters of Intent/ Award etc. helps to save time, energy and ensures quality.

Production planning is an area demanding lot of reforms. Use of computer software based planning tools in production planing to integrate project progress to timely resource supply and financial control is to be encouraged. These planning tools also will eliminate the situation that makes it necessary to wait until the last part of the project to take reconciliation measures as a result of changes taken place during construction.

Introduction of a 'Quality Culture' by way of creating handy procedure manuals for the day to day use at site level and specifying minimum skill levels for the tradesmen involved in production will enhance the present poor quality levels found in many projects. Institution of Construction Training & Development (ICTAD) has the mandate to develop such manuals and insist upon agencies to adopt them.

Rejection of unworkably low tenders and thereby elimination of over competition among the contractors too would help to improve the quality.

Property Management

Policy

Until 1995, major percentage of houses built for low-income earners, under the DHCP was given on rental basis. In terms of laws governing tenancy rights in Sri Lanka, the owner is responsible for overall maintenance of the house including payment of property taxes to the local authorities. However, the electricity and water consumed is payable by the tenant but electricity consumed at common installations too is paid by the owner. When it comes to the NHDA houses, maintenance of internal roads, drains and garbage collection within the boundary of housing scheme, also became a responsibility of the NHDA. In the mean time rents were heavily subsidised and not even sufficient to cover the maintenance costs. Increase of rent was not possible due to political pressure. NHDA received a grant from the government annually for the maintenance of these housing schemes, which was hardly sufficient to cover the cost of garbage removal and urgent running repairs. Residents were totally depending on the government on management of the properties.

The above situation resulted in the housing stock produced investing vast amount of state funds to deteriorate. Realising this situation the NHDA took a decision in 1995, to change the tenure policy to out-right ownership. All new houses built thereafter under the programme are allocated on out-right basis to the buyers. For apartments sold on out-right basis, the 'Apartment Ownership Law' is applicable and the residents are bound to form 'Management Corporations' to take over the function of property management.

Efforts are underway to encourage the tenants of formerly constructed schemes to buy their housing units at heavily subsidised prices. The package includes a mortgage of the same property for a period of 30 years at a low interest rate with a nominal down payment with a grant to the newly formed Management Corporation to meet the initial expenses. Due to the political environment of the country this home ownership scheme will take some time to gain momentum.

Life Cycle Economy

Principle of life cycle economy forms the basis of evaluating a property considering capital investments made during design and production phases (or when buying a property) and estimated operation (running) and maintenance costs. These financial transactions occurring at different times over the life cycle of the property are brought to a common time scale considering interest rates, inflation and depreciation of the property, for the purpose of analysis. Life cycle economic analysis can thus be used in cost benefit analysis and determining monthly rentals of houses in a logical basis.

The rentals of NHDA flats had previously been fixed based on affordability considerations, regardless of costs. As the present policy does not any more permit rental housing life cycle analysis will only be applicable in occasions such as in comparison of alternative proposals, in the Direct Housing Construction Programme.

Maintenance Planning

Planned maintenance system comprises two basic components namely: Running maintenance and Planned maintenance. The former will handle routine operations such as cleaning, garbage collection etc. and emergency operations in a failure situation. The latter is to ensure smooth operation of components and thereby to reduce emergency failures and will handle preventive activities like regular servicing and long term planned renovation activities.

For the maintenance of former rental housing schemes running into about 15000 units, the government has established a separate entity called the Common Amenities Board (CAB). Maintenance of all the rental schemes constructed by the NHDA was handed over to the CAB. NHDA releases the expenses of running maintenance activities monthly based on cost plus percentage basis. Preventative maintenance is not normally done on a planned basis due to lack of funds.

Feedback to the Design

Feedback to the designers on the property management aspects is an essential feature in a progressive organisation. It paves the path to learn from mistakes and correct the future. Also it's a way for the designer to feel the customer satisfaction, which brings him job satisfaction.

In the NHDA organisation structure the Maintenance Branch is located under the same Addl. GM who supervises the Design Division. Only official interaction between the two branches occurs when the maintenance branch requires expert design assistance in a major maintenance activity. The maintenance branch of NHDA performs a supervisory and co-ordination function in connection with the maintenance of the schemes of the DHCP, which is performed by the CAB.

Conclusion

The NHDA as the owner of the rental properties, used to shoulder heavy responsibility in terms of property management on one hand and to face resource constraints to perform its duties on the other hand. The tenants in the meantime enjoyed extremely low rentals but had no mechanism to maintain their properties to an acceptable level even if they were willing to invest. The prevailing political and socio-economic situation of the country does not permit the NHDA, as an organisation to apply market economic policies to operate on it's own. Under the circumstances, the decision taken to offer out-right ownership to the tenants appears to be a clever strategic move to come out of the above vicious circle. It will liberate both parties: the owner from maintenance responsibilities in a situation with meagre resources and the tenant from his dependency syndrome, leaving him to take his own decisions regarding his house.

It is observed that there isn't a formal feedback arrangement for an effective technical reconciliation between property management and design. The situation can be improved by introducing a co-ordination meeting at Addl. GM level among key actors involved in all three phases to review projects at different stages in the implementation process and maintenance issues of completed ones. It is also important to create a database of actual maintenance expenses to make use the data for future planning. With the realistic maintenance cost data available the Design Branch would be able to introduce Life Cycle Costing to perform cost benefit analysis of different alternatives, in future.

References

Central Bank Report
1998 *Ministry of Finance & Planning, Sri Lanka*

Ganepola, G.A.P.H.
1999 Housing in Sri Lanka with Special Emphasis to Operation & Maintenance

Guide Lines of Government Tender Procedure
1997 General Treasury, Sri Lanka.