

ABSTRACT

Trinidad, because of its high per capita income, has its attendant problems associated with high expectations of its populace. One significant problem of the oil boom period is the great demand for houses. It is estimated that the housing demand is approximately 10,000 units per annum. This figure represents new stock as well as replacement stock. Present supplies have only been approximately 3,000 to 4,000 per annum at 1984, with a seventy percent (70%) figure provided from Government financed ventures.

Government financed projects range from 500 to less than 1,000 units. These conservative housing figures for a project must be considered large by third world standards. The resulting drain on the Nation's financial resources, especially in the light of exalating construction costs and acute cash flow problems to meet its current commitments, is a cause for review. In addition, these projects have strained the human and material resources of the construction industry over the oil boom years of the 1970's. This trend is expected to continue. The results have left several major problems which are listed as -:

- a. Severe shortage of basic building material;
- b. Shortage of skilled tradesmen;
- c. An acute shortage of competent managers;
- d. Steep escalation in the prices of building materials;

Government is presently reviewing the whole housing development programme. It is obvious, in these recessionary years of the 1980's, that present expenditures on housing will be severely cut. Government has hinted this with the plans to formalise a mortgage finance bank in 1984. It is anticipated that this bank will decentralise Government's financial and administrative involvements. The public will have to carry their share of the responsibilities for searching and acquiring houses. Further, local contractors are expected to provide the expertises of house construction and other supportive works. Also, the size of projects will be significantly scaled down. This has raised several questions for the continued viability of existing firms. In particular, there will have to be serious scrutiny of the following: -

- a. the suitability of the designs for the local conditions;
- b. the cost effectiveness of the method of construction employed; and
- c. the affordable cost of the unit offered.

The factor of affordable cost will have serious considerations for the prospective home owners. Already, local house construction cost is one of the highest in the world. It is estimated at \$1200 (TT) per square metre in 1984 figures. This fact has put owning a basic house unit beyond the reach of the low income groups.

This report analyses one of the many mass housing delivery systems. It proposes how construction costs can be reduced and how to improve the efficiency of the delivery system in a two phase analysis. Firstly, the inherent constraints of the Trinidad Home Developers Limited delivery system are reviewed for their impacts on construction cost. In particular, the design consideration of -

- a. the structural requirement for the substructure,
- b. the quality of material specifications,
- c. the durability of the finishes recommended and
- d. the environmental factors as they affect the design built structure, are reviewed for their cost impacts. Also, the subcontractual arrangements and the patent rights are listed for the effects on the final construction cost.

Secondly, the operating parameters for the method of construction are reviewed with the aim of improving the levels of efficiency. This latter analysis is achieved by presenting a qualitative and quantitative review of the interactions of the erection and casting yard departments.

A macro look at these departments is presented. Operating factors and their impact on efficiency are discussed. Values of Operating Parameters are introduced to quantify past, present and future work progress. The use of specific construction planning and control techniques is emphasised. In the erecting operation, the use of daily pre-planning of the site works, by load sequencing and the proper management of time, are important aspects for improving efficiency of the operation. While in the casting yard, the importance of resource scheduling techniques and a pouring strategy cannot be over-emphasized. the use of the queuing theory and simulation in the transportation mechanism give the construction method those needed tools for intergrating the casting yard and the erection department operations.

Always, the motive is to improve the efficiency of the operations. This is no simple matter with an operation of this magnitude. Basically, the delivery system's smooth operations depend on the implementation of appropriate and timely corrective actions. This is the responsibility of management and the supervisory field staff. These actions are effected through the development of a feedback information system, the concepts of which can be studied (1,2). The use of activity sampling, work study measurements and statistics in collecting, testing and verifying data, proved to be invaluable aids in processing data for feedback action.

Finally, the report is presented as a case study aid which puts forward an approach in analysing projects on stream.

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CHAPTER I

The complex nature of projects and the governing budgetary constraints will force management to be more innovative and scientific in implementing the construction process (3). The approach utilises an information system to streamline the decision-making process of the construction phase, This approach is expected to become the trend for future projects.

The rapid increase in incomes, over the oil boom years has given rise to a demand for housing (19). This development strained the existing technologies and construction methods to achieve modest results. The housing demand after 1970, was conservatively estimated at ten to fifteen thousand units per annum, while supplied units were of the order of 3,000 to 4,000 per annum.

The National Housing Authority, the sole Government agency for housing in the past, was overheated to the point where radical re-thinking and planning were a necessity to solve the problem.