

ABSTRACT

The problem of time and cost overruns on construction projects is a constant source of concern to the Managers in the industry. More importantly, it impinges on the national development by absorbing resources which could be directed to new projects. This thesis identifies the factors causing these time and cost overruns with particular reference to the construction industry in the Republic of Trinidad and Tobago. It sees the role of planning techniques as a pivotal one if the causes are to be anticipated and remedial action taken to avoid time and cost overruns.

It is pointed out that the conventional planning techniques, such as: bar chart, link bar charts and the line of balance method, have major shortfalls primarily related to their inability to reflect the strategy for executing the work and the absence of the concept of criticality. The critical path methods (CPM) meet these shortfalls. Emphasis is placed on one critical path method, the precedence diagram, since it is felt that it will apply to most construction projects in the local industry. CPM is seen as a suitable tool for planning and control for the following reasons:

- It provides schedule dates (start and finish dates of activities).
- It reflects strategy by activity interfacing.
- It incorporates the concept of criticality.
- It provides a common base for relating all resources.
- It can be modelled mathematically.

In order to conceptualise the function of time and cost controls, the resources involved in construction are separated into two sets, the independent resources: manpower, machines and materials and the dependent resources: time and cost. The function is now summarised as the control of expenditure of the independent resources within the constraints set out for the dependent resources. Because CPM provides a common basis for relating all the resources, it is seen as a suitable tool for planning and control. However, auxiliary techniques are required for ensuring a high efficiency output from some of the resources. These techniques are discussed in Chapter 5.0.

Two factors are considered which are seen as necessary for the success of the technique. In the first place, the technique is not considered suitable for manual application on any project of scale. In this respect, the role of the computer is discussed. Secondly, the use of CPM requires that the organisation itself is geared towards its use. Specific and timely input are required from various departments. The use of a project manual is proposed to ensure that the departments have guidelines on their functions and input. The capabilities of the CPM, the computer and the project manual provide a sound basis for developing an interactive system.

A survey carried out to determine the level of usage of CPM in the local industry revealed that less than five percent of the projects are planned and controlled using CPM. This is not totally unexpected since a similar percentage use computer techniques for planning and control. In fact, the use of the bar chart is limited to providing

target dates. It was not used in other areas of management such as the settlement of claims.

The thesis concludes that the diffusion of CPM depends heavily on the older professionals who direct the course of the project. In most cases, the younger professionals are well versed on the theory of CPM. The main recommendation is therefore an education programme geared at encouraging the older professionals to adopt the technique.

1.4 Income

1.5 Financial Planning

1.6 Cost Control

1.7 Cost Codes

1.8 Summary

1.9 FACTORS AFFECTING PROJECT SELECTION

2.0 Introduction

2.1 Pre-construction Phase

2.2 Construction Phase

2.3 Post Construction Phase

2.4 Claims

2.5 Other Factors Affecting Project Selection

2.6 Summary

1.10 INTRODUCTION TO CPM

3.1 Introduction

3.2 Theory of CPM

3.3 Types of Critical Path Methods

3.4 Application of CPM

3.5 Information Required to Develop Critical Path Network