

Chapter 3

The Role of Software in Construction Management

ABSTRACT

Civil construction projects not only need to be executed on time; these also require that budgetary overruns are not allowed to take place needlessly. The traditional constraints involving time, quality, and money must always be paid close attention for a project to be considered commercial and engineering success. In this chapter, the authors discuss the role of project management software and the various commercial options available in the software market for entrepreneurs, engineers, and project planners to explore. They also discuss the need for activity codes and project scheduling types and the significance of these in civil construction engineering. The importance of planning and scheduling cannot be overestimated in a world where competition is high and civil construction companies often find themselves on razor's edge to stay afloat and remain profitable.

The construction industry has been subjected to complex changes over the past decades. Industrialization, mechanization and infusion of Information Technology has transformed the way civil construction companies do business today. Global competition has long prodded construction companies to adopt sophisticated operational and business practices. Given the complexity of civil construction projects, no longer is the term “construction” associated just with human resources, material resources and machinery. The term today has grown synonymous with initial conception, planning, materials

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and resource management, and execution. It is well understood that for a civil construction project to succeed, planning processes must take into account market surveys, negotiations with vendors, contract management, choosing the method of construction, arranging for finances and cash flow at critical phases of construction, and all related sub-activities covering supply chain management.

The nature and level of complexity involved in executing civil construction engineering projects are far too complicated to solve using traditional methods of yesteryears. The only route for civil construction engineering companies to thrive and flourish in the modern competitive world, is to adopt newer Information Technology tools and techniques as these become available. Planning and scheduling are the most important features of any project planning. Sequencing of activities and monitoring progress as project execution continues is another vital aspect in project planning.

CONSTRUCTION MANAGEMENT – A BRIEF HISTORY

Construction Management as we know today has evolved from a merger of associated concepts, practices and ideas stemming from construction, engineering and defence. It is said that construction management is the child of Henry Gantt, who is the USA first developed a bar chart as a tool for managing and monitoring construction activities. His work gave rise to the important work breakdown structure (WBS) among many other modern construction management techniques and tools known today. Progressively, a novel approach known as the “milestone method” was developed to gauge accurately progress of a project. The individual bars on a progress chart were referred to as milestones which gave rise to the “milestone method”. To assist in handling serial methods of production as in a production line, a “line of balance” technique was developed to handle repetitive tasks.

Sometime in 1957, a critical path scheduling (CPS) technique (Bennett, Laurence, 1977) was developed that could be supported by computers and latest advancements that were then being made in the field of Information Technology. Later, the CPS was modified to form critical path method (CPM). At around the same time, two important mathematical models were developed for project scheduling:

1. Booz-Allen & Hamilton developed the Program Evaluation and Review Technique (PERT) in association with the Lockheed Corporation for

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