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COST AND SCHEDULE IMPACTS
OF INFORMATION MANAGEMENT



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Cost and Schedule Impacts of Information Management

**Prepared by
Construction Industry Institute
Information Management Impacts Research Team**

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Executive Summary

CII believes that the construction industry needs to quantify the business impacts of information management strategies and the associated investment in information technologies (IT). Will IT systems result in more efficient business operations and improve the standard measures of business performance? To investigate that question, CII created the Information Management Impacts Research Team.

What information management strategies are most successful? How can companies objectively measure the benefit of information management strategies? The research summarized here provides answers for the construction industry. Three specific information management strategies are proposed. ITs required to enable the implementation of these strategies are also identified. The research team also developed a self-evaluation tool to explore improvements in information management and information exchange. That tool is described in CII Implementation Resource 125-2, *Determining the Impact of Process Change on the EPC Process*.

The research team has demonstrated that, when correctly implemented, information management strategies can provide significant improvement in project cost and schedule reductions. In addition, the research team found that these improvements can occur across organizational and geographical boundaries. Substantial opportunity exists for improving the flow of information in the typical project execution process. It is up to the industry to use the results of this research to improve the information management process.

Introduction

Successful project execution requires the identification of specific project activities that are critical to achieving performance objectives. Practically all such activities require the exchange of information. The exchange may be internal, departmental, or even external to the organization. Often it is impractical to document activity logic such that the exchange “elements” are identified, tracked, and managed. For each exchange, however, project time is used and project resources consumed.

Recognizing the impact of information exchange on project cost and schedule is important. This research provides a methodology to quantify the potential time and cost savings that can occur when information management strategies are implemented successfully. It is important to examine information management strategies at a corporate rather than an individual level, primarily because of the rapidly evolving nature of technology and technology’s dependence on the proper functioning of others.

The goal of the Information Management Research Team was to examine the design and construction process in a comprehensive manner. The ultimate purpose was to provide the industry with a tool to allow users to see for themselves the benefits of using information management strategies to improve project cost and schedule.

Research Approach

The methodology developed by the research team is based on formal modeling, is process oriented, takes a macro or total project perspective, and focuses on an information management strategy rather than a technology approach. Specifically, the research team sought to accomplish the following objectives:

- Identify the principal activities that commonly occur in EPC projects in an hierarchical, structured format.

- Document the duration (time) and resource (cost) requirements for each activity.
- Present a network logic of how these activities are interrelated or interdependent.
- Present an interactive computer simulation model that enables quantification of time and cost performance.
- Provide a methodology for predicting the impact of proposed process changes on project cost and schedule using a flow diagram and a simulation model.
- Provide generic logic diagrams (with associated time and cost data) that illustrate the decomposition of many critical activities of the EPC process into a finer level of detail for process improvement analysis.

The process model adopted for this research is comprehensive. The methodology makes no differentiation of responsibility or reference to organizational structure. To examine the engineer-procure-construct (EPC) process in piecemeal fashion creates the opportunity to be greatly misled regarding the likely benefit of proposed process improvements.

Data Analysis

The research team developed process models at two different levels of detail: macro and micro. The macro model involves descriptions at the *activity* level, where the process is described generically from pre-project planning through startup. The micro level describes process units at the *task* level.

The models developed by this research are not intended to be company, project, location, or situation dependent. Companies may modify the models to represent the unique characteristics of their project processes more accurately.

The macro model consists of two elements, an activity list (see the Appendix) and a logic diagram, which is a schematic representation of a typical project process sequenced from start to finish (included in CII Implementation Resource 125-2). The list shows activities commonly executed in an EPC project; the logic diagram identifies the relationships between these activities. The EPC logic diagram serves as a baseline against which to compare and measure impacts resulting from process changes.

The activity list delineates activities encountered in a typical EPC project execution approach. No relationships are shown between the activities in the list. The list is instead a consolidation of ideas, comments, and suggestions from practitioners.

The activity list contains the following three levels of detail:

- **Level one:** the five primary phases of project execution in an EPC process:
 - Pre-Project Planning
 - Design
 - Materials Management