

CONSTRUCTION
INDUSTRY
INSTITUTE

PREVIEW OF CONSTRUCTABILITY IMPLEMENTATION

The purpose of this publication is to make available to industry the results of research conducted by the Construction Industry Institute (CII). The publication does not necessarily represent the views of CII member companies, but is offered as a contribution to the industry.

CII was founded in 1983 to improve the cost effectiveness of the nation's largest industry. The members, who represent a broad cross-section of owners and contractors, believe that many of the problems that limit cost effectiveness are common ones, and that real improvements can be best accomplished in a cooperative environment with the benefits being shared by the construction industry at large.

CII uses the acronym TOPICS to describe the research effort. TOPICS signifies the six research thrust areas: Technology, Organization, People, Information, Controls, and Sigma (meaning others). The current task forces for each area are listed below.

Technology

- Advanced Technological Systems
- Computer Integrated Design & Construction
- Design for Safety
- Environmental Remediation Technology
- Technology Strategy
- Technology Survey

Organization

- Partnering II
- Project Change Management
- Pre-Project Planning
- Project Organization II
- Project Team Building

People

- ADA Impacts
- Continuing Supervisory Education
- Drug-Free Workplace
- Multi-Skilling
- Zero Accidents

Information

- 3D CAD Link
- International Construction
- International Standards
- Owner Engineering Organization
- Project Team Communications

Controls

- Change Order Impacts
- Contracting, Phase II
- Dispute Prevention and Resolution
- International Standards
- Predictive Tools
- Quality Performance Measurement
- Schedule Reduction
- Total Quality Management

Sigma

- Barriers to Implementation
- Insurance
- Piping Function
- Retrofit Projects
- U.S. Navy Demonstration Project
- Utility Pilot Projects
- Workers Compensation

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Preview of Constructability Implementation

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Executive Summary

As demonstrated in the case studies summarized in this publication, when methodically implemented, front-end constructability efforts are an investment that result in a substantial return. Documentation of constructability efforts shows that owners accrued an average reduction in total project cost and schedule of 4.3 percent and 7.5 percent, respectively. These savings represented a 10 to 1 return on owners' investment in constructability.

The task force feels that industry-wide constructability implementation is progressing slowly and lacks structure. For example, based on an assessment of 62 companies with a constructability program, only two were found to have a comprehensive, formal program. A need exists for the development of tools to facilitate constructability implementation.

The *Constructability Implementation Guide* meets this need by offering a complete set of 19 tools that address both corporate- and project-level constructability programs. For example, Tool 1, the Constructability Roadmap, offers a comprehensive, integrated overview of constructability. Other tools containing assessment forms are provided to identify and eliminate barriers in constructability. A procedure for the periodic assessment of program effectiveness also is provided. This assessment tool is helpful in maintaining a commitment to the program and ensures continuous improvement, thereby providing a bridge with corporate TQM efforts.

The 14 constructability concepts published in the *Concepts File* are summarized here as a tool. Three additional concepts have been appended to the *Concepts File*. Other tools include the concept application matrices that link concepts to project phases and activities. Individual matrices have been developed for commercial building and industrial projects.

The *Guide* offers comprehensive guidance and specific insights into how project constructability can be implemented. It is targeted to owners, designers, and construction personnel, with particular emphasis on the owner. Senior executives, entry-level project personnel, and project managers in particular can benefit from the tools provided in the *Guide*.

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Introduction

What Is Constructability?

The original CII Constructability Task Force defined constructability as “the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives” (*Constructability: A Primer*, 1986). The CII Constructability Implementation Task Force adopted this definition and postulated that maximum benefits occur when individuals with construction knowledge and experience become involved in the early stages of a project. Conceptually the maximum benefits measured by the ability to influence cost is shown in Figure 1.

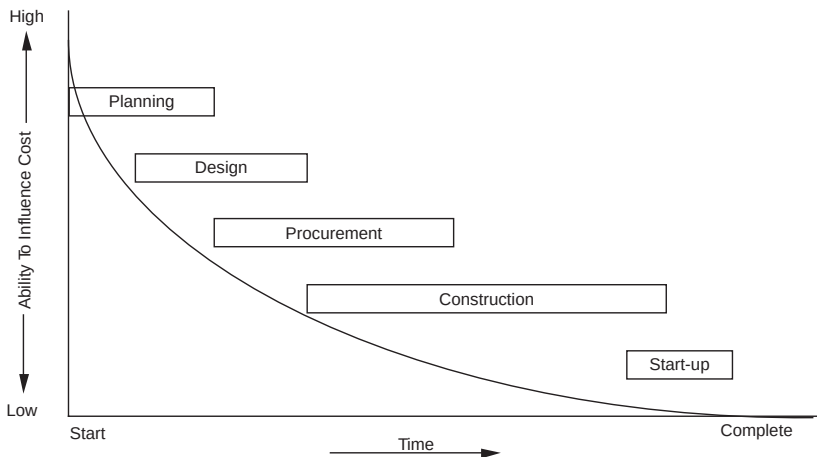


Figure 1. Ability to Influence Final Cost over Project Life

Figure 2 presents a graph of the quantified savings documented in one of the four case studies conducted by the task force. As indicated, 73 percent of the constructability savings had been obtained by the time approximately 20 percent of engineering was complete. Ninety-one percent of the savings had been accrued by the time 50 percent of engineering was complete. The largest savings originated from construction input addressing issues such as construction methods, sequencing, and procurement strategies.

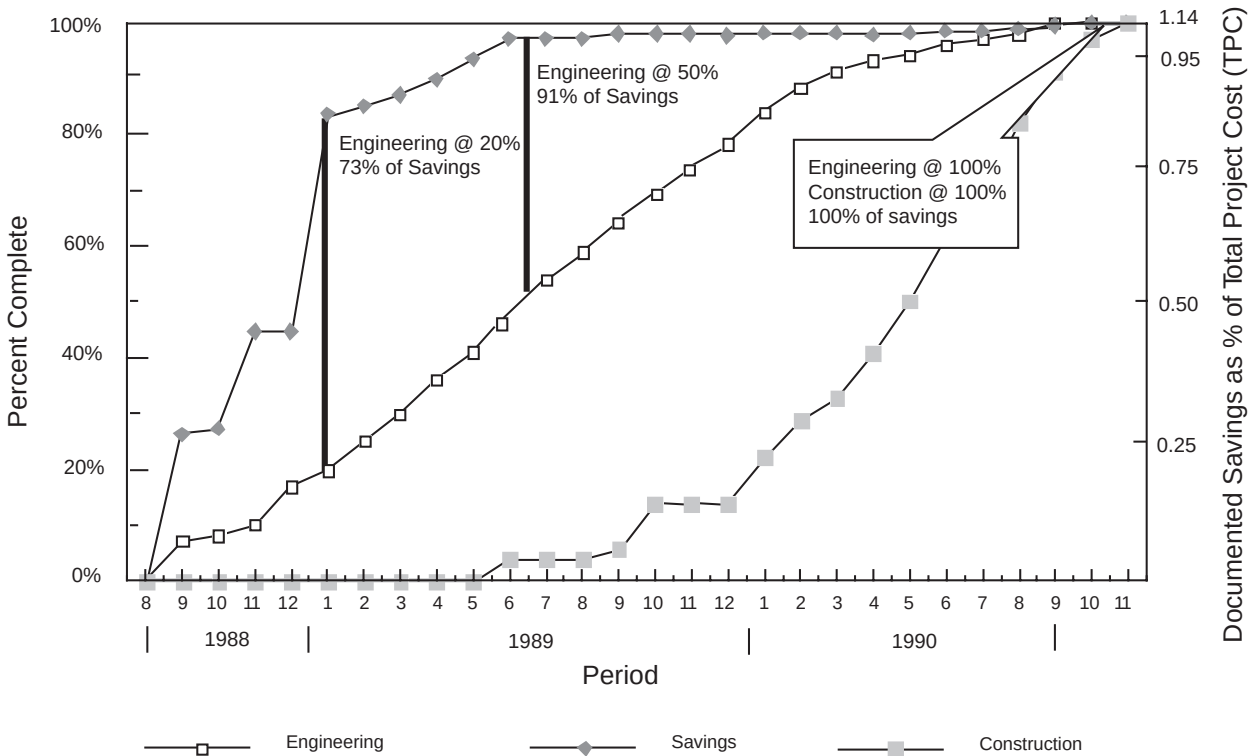


Figure 2. Documented Constructability Savings

The original Constructability Task Force also established that constructability is not just:

- Determining more efficient construction methods after field forces have mobilized
- Allowing construction personnel to review engineering documents periodically during the design phase
- Assigning construction personnel to the engineering office during design
- A modularization or preassembly program.

These activities are only part of a constructability effort. Only through the effective and timely integration of construction input into planning and design as well as field operations can the maximum benefits of constructability be realized.

Presently many capital projects are separated into individual phases. The design phase tends to place emphasis on minimizing design costs. During the construction phase, efforts focus on minimizing field costs. Constructability integrates these phases and is an effective means to achieve overall project objectives.