



CONSTRUCTABILITY IMPROVEMENT
DURING
FIELD OPERATIONS

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and
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A Report To
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The University of Texas at Austin

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EXECUTIVE SUMMARY

Constructability issues still exist during field operations, and once in the field, constructors can still reap constructability benefits from their actions alone.

The objective of this research is to explore the ways in which construction knowledge and experience can enhance constructability during field operations. The scope of this research is strictly limited to field operations issues. While previous constructability research efforts have been primarily directed toward owners and designers, this research is primarily directed toward constructor organizations.

The employed research method was an iterative process of issue identification, literature search, site interviews, and analysis. Ultimately, a single prime concept for field operations constructability was concluded:

Constructability is enhanced when innovative construction methods are utilized.

Innovative construction methods may involve innovations related to sequencing of field tasks, temporary construction materials/systems, hand tools, construction equipment, constructor-optional preassembly, temporary facilities directly supportive of field methods, or post-bid constructor preferences.

Beyond addressing each of these in detail, in this document "innovative" construction is also analyzed in terms of related prompters or drivers. The linkage between field operations constructability and construction technology is also addressed.

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CHAPTER I

INTRODUCTION

Objective of the Research

The objective of this research is to explore the ways in which construction knowledge and experience can enhance constructability during field operations.

Background of the Study

The Constructability Task Force of the Construction Industry Institute defines *constructability* as follows:

Constructability is the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives. (*Constructability: A Primer*, 1986, p. 2.)

As stated, constructability issues still exist during field operations, and thus constructors can still reap constructability benefits from their actions alone. This belief is graphically depicted in Figure 1.1 (*Constructability: A Primer*, 1986, p. 2), in which the ability to influence final project cost during field operations is still considered significant, albeit substantially less significant than during the prior phases of procurement, design, and conceptual planning. While decisions related to field operations constructability tend to be relatively low-leverage decisions, collectively they offer substantial benefits. A secondary purpose of this research, then, is to determine the nature of field operations constructability issues/decisions.

The scope of this research is strictly limited to field operations issues. Issues that are most beneficially addressed during conceptual planning, design, or procurement have been discussed in other publications (Tatum, Vanegas,

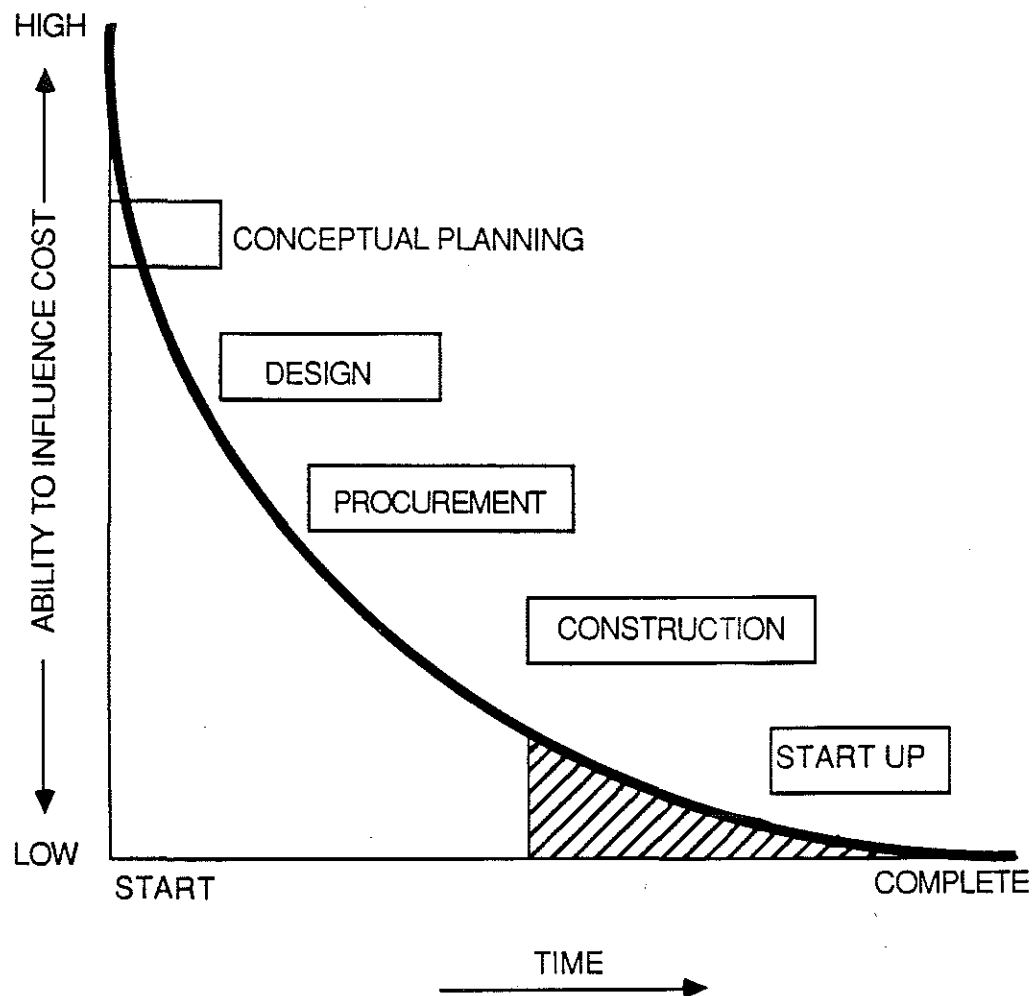


Figure 1.1 Ability to Influence Final Cost
over Project Life

1986; O'Connor, 1986). Readers are encouraged to review these documents prior to in-depth analysis of this report.

As they serve as an important point of departure, the previously determined concepts related to constructability during conceptual planning, design, and procurement are presented here:

Conceptual Planning:

1. Constructability programs are made an integral part of project execution plans.
2. Project Planning actively involves construction knowledge and experience.
3. The source and qualifications of personnel with construction knowledge and experience varies with different contracting strategies.
4. Overall project schedules are construction-sensitive.
5. Basic design approaches consider major construction methods.

Design and Procurement:

6. Site layouts promote efficient construction.
7. Design and procurement schedules are construction-sensitive.
8. Designs are configured to enable efficient construction.
9. Design elements are standardized.
10. Project constructability is enhanced when construction efficiency is considered in specification development.
11. Module/preassembly designs are prepared to facilitate fabrication, transportation, and installation.
12. Designs promote construction accessibility of personnel, material, and equipment.
13. Designs facilitate construction under adverse weather conditions.

Beyond the issue of scope, this research differs from previous constructability research activities in its exploratory nature. For this research into field operations the research team had no preconceived notion of its thrust or message, as might not have been the case for the research into constructability during design and procurement (O'Connor, 1986). While there was general agreement that field operations constructability was not simply a repackaging of "good construction management," exactly what it was remained initially unclear to both the university research team and the industry liaison subcommittee. Accordingly, detailed research scoping demanded a substantial amount of attention from the outset.

Structure of the Report

The structure of the remainder of the report is briefly presented here:

Chapter II. Research methods are discussed, including the refinement of issues, data collection, and data analysis.

Chapter III. A single constructability concept related to innovative construction methods is analyzed in detail.

Chapter IV. Major research findings are reiterated and recommendations for industry action and additional research are identified.