



CONSTRUCTION INDUSTRY INSTITUTE®

OPTIMIZING
CONSTRUCTION INPUT
IN FRONT END PLANNING

Construction Industry Institute

The AES Corporation	AMEC
Abbott	AZCO
Air Products and Chemicals	Adolfson & Peterson Construction
Alcoa	Aker Solutions
Amgen	Alstom Power
Anheuser-Busch	Atkins Faithful & Gould
Aramco Services Company	Autodesk
Archer Daniels Midland Company	BE&K
BP America	BIS Frucon Industrial Services Inc.
Bristol-Myers Squibb Company	Baker Concrete Construction
CITGO Petroleum Corporation	Barton Malow Company
Cargill	Bateman Engineering N.V.
Chevron	Bechtel Group
Codelco - Chile	Black & Veatch
ConocoPhillips	Bowen Engineering Corporation
DFW International Airport	Burns & McDonnell
The Dow Chemical Company	CB&I
DuPont	CCC Group
Eastman Chemical Company	CDI Engineering Solutions
ExxonMobil Corporation	CH2M HILL
General Motors Corporation	CSA Group
GlaxoSmithKline	Day & Zimmermann International
Hovensa L.L.C.	Dick Corporation
Intel Corporation	Dresser-Rand Corporation
International Paper	Emerson Process Management
Kaiser Permanente	Fluor Corporation
Kraft Foods	Foster Wheeler USA Corporation
Eli Lilly and Company	GS Engineering & Construction Corporation
Marathon Oil Corporation	Grinaker-LTA/E+PC
NASA	Gross Mechanical Contractors
NOVA Chemicals Corporation	Hargrove and Associates
Naval Facilities Engineering Command	Harper Industries
Occidental Petroleum Corporation	Hatch
Ontario Power Generation	Hill International
Petroleo Brasileiro S/A - Petrobras	Hilti Corporation
Praxair	Hyundai Engineering & Construction
The Procter & Gamble Company	JMJ Associates
Progress Energy	Jacobs
Rohm and Haas Company	KBR
Sasol Technology	Kiewit Construction Group
Shell Oil Company	J. Ray McDermott
Smithsonian Institution	M. A. Mortenson Company
Solutia	Mustang Engineering
Southern Company	R. J. Mycka
Sunoco	Parsons
Tennessee Valley Authority	Pathfinder LLC
Tyson Foods	Pegasus Global Holdings
U.S. Architect of the Capitol	Primavera Systems
U.S. Army Corps of Engineers	S&B Engineers and Constructors
U.S. Department of Commerce/NIST/ Building and Fire Research Laboratory	SNC-Lavalin
U.S. Department of Health and Human Services	The Shaw Group
U.S. Department of State	Siemens Power Generation
U.S. General Services Administration	Technip
U.S. Steel	URS Corporation
Vale	Victaulic Company
	Walbridge
	The Weitz Company
	WorleyParsons
	Yates Construction
	Zachry
	Zurich



Optimizing Construction Input in Front End Planning

**Prepared by
Construction Industry Institute
Optimizing Construction Input in Front End Planning Research Team**

**Research Summary 241-1
July 2008**

© 2008 Construction Industry Institute™.

The University of Texas at Austin.

CII members may reproduce and distribute this work internally in any medium at no cost to internal recipients. CII members are permitted to revise and adapt this work for their internal use provided an informational copy is furnished to CII.

Available to non-members by purchase; however, no copies may be made or distributed and no modifications made without prior written permission from CII. Contact CII at <http://construction-institute.org/catalog.htm> to purchase copies. Volume discounts may be available.

All CII members, current students, and faculty at a college or university are eligible to purchase CII products at member prices. Faculty and students at a college or university may reproduce and distribute this work without modification for educational use.

Printed in the United States of America.

Contents

<i>Chapter</i>	<i>Page</i>
Executive Summary	v
1. Introduction	1
2. Data Analysis and Findings	3
3. Application/Implementation	13
4. Conclusion and Recommendations	17
References	19

Executive Summary

Many projects do not include adequate construction input during front end planning (FEP), resulting in projects falling short of their goals. Historically the primary stakeholders in a project (i.e. owners, designers, and constructors) are not aligned and tend to operate in their own domains. As a result the needed collaboration is not obtained and projects do not achieve the level of success that is possible.

CII established the Optimizing Construction Input in Front End Planning Research Team to investigate the problem and determine ways in which construction input can be optimized during the front-end stage of projects. The research shows a strong and indisputable correlation between early construction input and project success.

CII has emphasized the use of constructability (one of the original research topics undertaken by CII in 1983) as a Best Practice since the late 1990s, when CII Best Practices were first established. The emphasis of this research, however, is to provide guidance on the *timing* and *nature* of the construction input to be provided *in the FEP process* — which is materially different from constructability. Most constructability exercises are carried out *after* the design has evolved, and sometimes even at the end of the design development phase. This research places the emphasis of construction input on the early, FEP stages of a project.

The research team has developed an Excel®-based decision aid — Construction Input Assessment Tool (CIAT). CIAT provides project stakeholders with a means of determining project items and activities that require construction input during front end planning. It also will assist in evaluating if adequate construction expertise is available or if outside sources are needed.

This publication summarizes the efforts of the research team and briefly describes the development of CIAT. The team recommends the use of CIAT to measure and improve the use and timing of construction input during FEP, which ultimately will enhance the probability of project success.

Introduction

Front end planning is the process of developing sufficient information for stakeholders to address risk and to commit resources to maximize the probability of success. One common occurrence during FEP is that the owner does not seek nor receive sound construction input. While it is a commonly held belief that sufficient collaboration in a timely manner leads to successful projects, these actions do not always occur on all projects. When they do occur, the results can be impressive. When they do not occur, the results can be disastrous.

CII's Optimizing Construction Input in Front End Planning Research Team was tasked with investigating this problem and providing solutions. The team had five main objectives for the research:

1. Develop a metric for measuring the level of construction expertise needed during FEP.
2. Identify and prioritize practices that optimize the involvement of construction resources.
3. Identify barriers/trade-offs (such as contract procurement issues) to integrating construction resources in FEP.
4. Develop a user-friendly decision tool to assist project teams in focusing on key construction items and activities during FEP.
5. Validate the decision tool.

The scope of this research included a literature review, case study investigations, CII member surveys, and analysis of recently completed successful projects. The research team also examined projects that faced significant challenges and evaluated the level of construction involvement during the FEP phase. All of these activities were carried out to determine whether the involvement of construction expertise in FEP leads to significant improvements in overall total project cost and schedule.

Many of CII's Best Practices and products such as Alignment and the Project Definition Rating Index (PDRI) address the front end planning phase of projects. The research team examined the PDRI, a widely used FEP tool, to determine if it could provide the necessary framework to help measure and predict the level of construction input needed for successful projects. The team's findings are described in subsequent chapters.