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## Successful Delivery of Flash Track Projects

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# **Successful Delivery of Flash Track Projects**

**Prepared by  
Construction Industry Institute  
Research Team 311, Successful Delivery of Flash Track Projects**

**Research Summary 311-1  
September 2015**

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The University of Texas at Austin

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## Executive Summary

Speed and quality of construction have always been driving factors in the construction industry, but, over the past decade, they have become increasingly important. Indeed, in the current environment of increasingly complex projects, shorter useful life cycles of products and processes, and the growing need of end users to be first to market, project professionals have developed a variety of concepts and methods to satisfy the ever-intensifying demand for faster project delivery. One such approach—fast-tracking—has become a staple of the construction industry to the extent that most organizations employ some level of it on all their construction projects. Still, the need for even quicker project deliveries is now being driven by a greater demand for emergency rebuilds, by pressing economic need, and/or stricter regulations. Meeting these increasing demands has led to the pursuit of faster fast-tracking or “flash tracking.”

While fast track projects are characterized by inter-phase integrations—achieved through overlaps across different phases of engineering, procurement, and construction—flash track projects demand inter-phase and intra-phase overlaps. This overlapping is enabled by parallel work packaging within each phase. For example, engineering work can be broken down into several work packages that can be performed simultaneously. Such a potentially chaotic approach requires highly coupled coordination and interface management processes.

To facilitate this emerging project delivery method, CII Research Team (RT) 311, *Successful Delivery of Flash Track Projects*, focused on identifying and ranking industry practices essential to the successful delivery of flash track projects. In addition to this extensive exploration of U.S. and international construction practices, RT 311 thoroughly examined project acceleration practices in other industries, including manufacturing, shipbuilding, and software development. The team's methodology entailed a three-round Delphi process, and the use of the Analytic Hierarchy Process (AHP) to produce a comprehensive and robust prioritization of essential flash track practices and implementation

recommendations. The result was a two-tiered structure of 47 essential flash track practices, which mainly emphasizes planning, execution, and organizational considerations, and considers cultural issues, delivery methods, and contractual considerations. The team also developed an Excel-based flash track tool, which includes a metric for assessing a project's readiness for flash tracking.

To help companies with flash track implementation, the team also developed innovative implementation strategies for each of the 47 practices; these strategies include barriers to implementation, identification of heightened risks, and risk mitigating strategies. Integrated into the readiness metric, these guidelines will help eliminate the weaknesses the tool identifies in the flash tracking process.

After studying the 47 practices and implementation concepts, the team re-engineered accepted workflow processes, tailoring them for flash track projects, and proposing an innovative delivery approach that goes beyond the important work of CII Research Team 130, Reforming Owner, Contractor, Supplier Relationships. In its effort to develop a project delivery system to optimize supplier roles in EPC projects, RT 130 formulated the PEpC approach, recommending two parts of the procurement process: big “P” and little “p.” During the big “P” part of the process, the focus is on strategic procurement items, including complex engineered equipment and systems essential for project performance. During the little “p” phase, the team obtains the balance of items to be procured for the project. So, PEpC stands for “Procurement, Engineering, procurement, Construction.” (See the appendix for a summary of PEpC.)

RT 311 added a little “c” before the big “P” to propose the cPEpC approach, which calls for the earlier engagement, commitment, and collaboration of specialty subcontractors at project outset. This earlier involvement of construction personnel will provide their crucial input into scope definition, conceptual design development, and constructability considerations, among other critical project elements. The research team's cPEpC approach incorporates simultaneous inter-phase and intra-phase integration, an innovative concept that can include parallel

engineering and pre-fabrication. Other enablers of cPEpC are such emerging practices as BIM, design-assist services, pull planning, and a co-located integrated teams.

The research team designed the Flash Track Readiness Tool to help project teams determine whether the cPEpC model is appropriate for a given project. The team conducted internal verification and external validation tests to ensure the soundness, relevancy, and quality of the tool. This validation effort asked test-users on 13 projects to confirm that the tool is useful and that it addresses real-world project conditions and needs.



## Introduction

Construction users today demand increasingly faster project delivery, higher quality, and more complex facilities. These demands only add to the challenges of an industry already perceived to be suffering from excessive cost overruns, late project completions, and deteriorating quality. Reasons for this perception of poor performance range from high industry fragmentation, excessive litigation, a diminished skilled workforce, limited collaboration, and a simple lack of trust.

Since the 1960s, the industry has responded to demands for quicker project delivery by developing fast tracking, an approach first introduced on a multi-campus building expansion at the State University of New York. The project leaders within this program identified opportunities to compress project delivery cycles by overlapping activities that had typically been performed in rigid sequence (Laiserin 2002). Since then, the fast track concept has evolved and matured in the manufacturing industry as a means to meet demands for shorter time-to-market for new products (Eldin 1996). CII Research Summary (RS) 222-1, *Best Practices for Design in Fast Track Projects*, reported in 2008 that fast track's inherent overlapping across engineering, procurement, and construction had become standard operating practice for the construction of industrial projects.

This research explores earlier calls for a new paradigm, as presented in CII RR 271-11, *Starting from Scratch: A New Project Delivery Paradigm*, Research Report (RR) 124-11, *Re-engineering the EPC Process*, and RR 130-11, *PEpC: A Breakthrough Project Delivery System That Improves Performance by Reforming Owner, Contractor, and Supplier Relationships*. Both Research Team (RT) 124 and RT 130 reported reduced schedules and reduced costs on their subject projects. Using these previous research efforts as a point of departure, RT 311 drew on RT member experience on highly successful efforts and documented practices employed from within and outside the construction industry, to catalog and assess current, emerging, and innovative measures—

particularly looking for any new and unanticipated practices with high-impact potential—for successful flash track execution.

Since time is of the essence on flash track projects, they are characterized by a heightened degree of concurrency between scope definition, engineering, procurement, and construction. In such an environment, variability in the pace of decision-making will be naturally high. When these conditions are present in the manufacturing sector, companies find it necessary to have a large capacity buffer to keep utilization low (Factory Physics 2006). In a construction setting, with a business-as-usual approach, the uncertainty, chaos, and risks inherent to flash tracking can generate increased project costs across the board. However, a new take on the flash track method—one that explores business improvement strategies—can lead to the attainment of an owner’s business model. For instance, on some flash track projects, it can be strategic to accept increased costs for such imperatives as increased capacity or availability of project personnel able to resolve open issues immediately. So, rather than optimizing resource use, flash track project leaders should focus on optimizing available personnel capacity. Without this built-in excess capacity, as expensive as it may be, the timely delivery of a flash track project is unlikely.

RT 311 identified a number of flash track approaches for business improvement in the construction industry, as well as practices from other industries applicable to construction. The team made two general observations on the successful delivery of a flash track projects: 1) project teams need to embrace a different and more innovative approach to project delivery; and 2) project teams should understand the need for exceptional execution of normal project activities. (See Figure 1.)



**Figure 1.** Keys to Successful Flash Tracking

The team's search for innovative strategies focused on those used on best-in-class domestic and international construction projects. The search also involved looking for project acceleration practices in other industries, such as shipbuilding, computer industry/microelectronic factory construction, software development, and manufacturing sectors. By conducting a literature review, a series of interviews, research team workshops, Delphi surveys, and an Analytic Hierarchy Process (AHP), the team developed a set of 47 practices essential to the successful delivery of flash track projects.

### **Purpose and Objectives**

The primary purpose of RT 311 was to develop a process enabling CII member companies to assess their readiness to take on flash tracking, and to offer guidelines on implementation and execution of flash track projects which provide answers to the following:

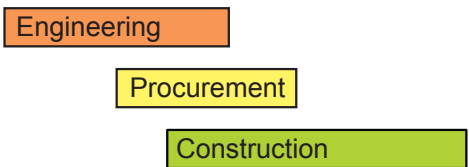
1. Which innovative improvements in project delivery methodology could be made to compress project durations, while maintaining safety, quality, and risk tolerance?
2. How can project teams overcome barriers to delivering shorter project durations?

With these questions in mind, the research team established the following research objectives: 1) develop useful, user-friendly tools for successful execution of flash track projects; and 2) re-engineer the project delivery process specifically for flash track projects. The focus then shifted to building on past studies on fast track practices and principles, assessing their applicability and adaptability to flash tracking. Using a process that identified, prioritized, and explored the inter-relationships of various practices and concepts, the team developed a re-engineered project life cycle model for successful flash tracking. The model incorporates relational contracting methods, advanced technologies, and collaborative work processes. With the model complete, the team was then able to develop tools to implement it. The RT 311 Flash Track Tool, with its flash track readiness metric and implementation guidelines, enables project teams first to determine which projects to flash track and then how to incorporate the model into project practices and procedures.

### Scope Limitations

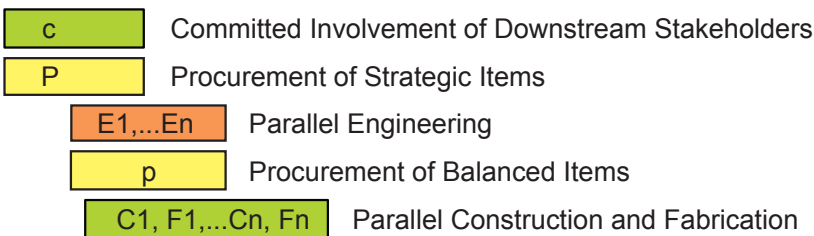
RT 311 assumes that users of its readiness tool and implementation guidelines already have some prior experience with fast track projects and with the PEP delivery model. Figure 2 defines and contrasts fast track and flash track, showing how the team's cPEP approach consolidates and permits a higher level of concurrency of work packaging tasks, and combines early FEP gates. Furthermore, the team takes as given the users' fundamental ability to execute normal project activities effectively. Users should also understand that, while the readiness metric and implementation guidelines will help make projects successful, they do not replace proper due diligence in a company's project preparations.

### Fast Track: Inter-phase Integration



**FAST TRACK:** A time-driven project which, by necessity, requires some degree of concurrency between engineering, procurement, and construction.

### Flash Track: Intra-phase + Inter-phase Integration



**FLASH TRACK:** A time-driven project which, by necessity, requires a heightened degree of concurrency between engineering, procurement, and construction.

**Figure 2.** Fast Track vis-à-vis Flash Track

## Methodology

The research team divided its methodology into three phases: data collection, data analysis, and tool development. In the first phase, the team conducted an extensive literature review, structured interviews of personnel on three EPC flash track projects, and a number of case studies of EPC flash track projects. From this initial research, the team identified 66 practices with the potential to be classified as essential to flash tracking. In Phase 2, the researchers performed a three-round Delphi process and an Analytic Hierarchy Process (AHP) to analyze and rank these 66 practices. Finally, the team developed the Flash Track Tool, which includes a readiness metric, implementation guidelines for industry practitioners, and a re-engineered workflow process.

### Phase One – Data Collection

The goal of Phase 1 was to identify fast track practices that are also applied to flash tracking. The first step was to review and analyze more than 150 papers—including several CII publications—in search of fast track practices pertinent to flash tracking. (See Figure 3.) Next, the team conducted structured interviews of personnel on three successful flash track efforts: the 2007 emergency rebuild of the Saint Anthony Falls I-35W Bridge in Minneapolis; a contractual Integrated Project Delivery (IPD) project for the Maine General Medical Facility in Augusta; and a hot dip galvanizing line project at a Thyssen Krupp steel processing facility in Alabama. Finally, each research team meeting included the review of one flash track project case study, such that, at the end of this phase, the team had studied 10 flash track projects. From these efforts, the team was able to identify 66 possible essential practices, grouped into the following six categories: contractual, delivery, organizational, cultural, planning, and execution.