

Task Group #5: Improve Construction Document Completeness and Coordination

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Task Group #5 Members:

- Rashid Ahmed, Chair, Walker Consultants
- Mike Eads, GH Phipps
- Mike Hernandez, ASCC
- Doug Karn, United Forming
- Don Kline, Kline Engineering
- Scott Meyers, Conco

Task Group #5:

- Group formed in June 2024
- The group had 2 brainstorming sessions
- Presented updates to the PRO Board of Directors in September 2024

Resources Reviewed

- McKinsey Global Institute: Reinventing Construction: A Route to Higher Productivity
- New York Times: The Story Construction Tells About America's Economy is Disturbing by Ezra Klein, February 5, 2023
- ASCC Guidelines to Design for CIP Concrete Constructability
- 2023 FMI Labor Productivity Study
- Council of American Structural Engineers (CASE)
 - CASE 962-D, "Guideline Addressing Coordination and Completeness of Structural Construction Documents"
 - CASE Tool 9-1, "Quality Assurance Plan"
 - CASE Tool 9-2, "Quality Assurance Plan"

Resources Reviewed cont.

- Construction Specification Institute (CSI), “Project Delivery Practice Guide”
- ASCE, “Quality in the Constructed Project: A Guide for Owners, Designers, and Constructors”
- American Concrete Institute
 - ACI 318-19, “Building Code Requirements for Structural Concrete and Commentary
 - ACI 301-20, “Specification for Structural Concrete”
 - ACI 117-10, “Specifications for Tolerances for Concrete Construction and Materials”
 - ACI 117.1R-14, “Guide for Tolerance Compatibility in Concrete Construction”

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- McKinsey Global Institute: Reinventing Construction: A Route to Higher Productivity

Construction is a key industry in countries across the world, but one that has struggled to evolve its approaches as other industries have done, and one whose productivity has suffered as a result. Even while other sectors from retail to manufacturing have transformed their efficiency, boosted their productivity, and embraced the digital age, construction appears to be stuck in a time warp. In the United States since 1945, productivity in manufacturing, retail, and agriculture has grown by as much as 1,500 percent; productivity in construction has barely increased at all. This not only represents a lost opportunity for the industry but costs the world economy.



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- New York Times: The Story Construction Tells About America's Economy is Disturbing by Ezra Klein, February 5, 2023

Here's something odd: We're getting worse at construction. Think of the technology we have today that we didn't in the 1970s. The new generations of power tools and computer modeling and teleconferencing and advanced machinery and prefab materials and global shipping. You'd think we could build much more, much faster, for less money, than in the past. But we can't. Or, at least, we don't.

Throughout the 1950s and 1960s, productivity in the construction sector — how much more could be done given the same number of workers and machines and land — grew faster than productivity in the rest of the economy. **Then, around 1970, it began to fall, even as economywide productivity kept rising.** Today, the divergence is truly wild. A construction worker in 2020 produced less than a construction worker in 1970, at least according to the official statistics. Contrast that with the economy overall, where labor productivity rose by 290 percent between 1950 and 2020, or to the manufacturing sector, which saw a stunning ninefold increase in productivity.

Task Group #5: Improve construction document completeness and coordination

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- ASCC Guidelines to Design for CIP Concrete Constructability

ASCC Constructability Survey Summary			
	AVG	Points	#10
Completeness of drawings	7.2	352	19
Coordination of drawings	6.7	328	7
Coordination of drawings and specifications	6.0	295	1
Tolerance compatibility	5.7	281	3
Dimensions	5.6	274	1
Concrete	5.5	271	5
Clash detection	5.0	247	3
Standardization	4.8	237	4
Deflection compatibility	4.7	229	1
Building information modeling	3.9	189	6

A constructability survey was sent in August 2020 to 526 ASCC contractors. They were asked to rank the ten items with the highest priority for constructability



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- 2023 FMI Labor Productivity Study

4 of 5 Contractors said low-quality design/construction documents are a top external factor stunting productivity.

CONSTRUCTION LABOR PRODUCTIVITY: THE \$20 BILLION OPPORTUNITY



\$30 Billion to \$40 Billion lost annually to poor productivity.	3 of the Top 4 internal factors affecting productivity are related to planning, communication and collaboration.	11% or More of field labor costs are wasted, said 60% of respondents.
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4 of 5 Contractors said low-quality design/construction documents are a top external factor stunting productivity.	79% of Contractors could improve labor productivity by 6% or more with better management.	50% Average Increase in profitability from a 6% productivity improvement.
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2023 FMI LABOR
PRODUCTIVITY STUDY



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 - CASE Tool 9-1, “Quality Assurance Plan”
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The guidelines discuss the important aspects of design relationships, communication, coordination and completeness, guidance for dimensioning of structural drawings, and the effects of various project delivery systems and document revisions. It closes with recommendations for development and application of quality management procedures, internally within the design firm and externally between disciplines. After preparation of organized and clear calculations, the drawings must be coordinated with the calculations, the specifications must be coordinated with the structural drawings and calculations, and the “general notes” must be coordinated with the specifications.

Resources Reviewed

- Construction Specification Institute (CSI), “Project Delivery Practice Guide”

The guide recommends design team coordination with sufficient time dedicated to performing coordination tasks. It states that a well-planned, well-executed, and well-enforced coordination program can result in fewer addenda items, fewer requests for interpretation, fewer change orders, fewer disputes, and reduced project costs.

Ideally, the documents for construction prepared by the architect and the other design team members will be as consistent as if they were prepared and produced by one source. The guide notes that incomplete coordination results in:

- Duplications;
- Omissions;
- Discrepancies; and
- Terminology differences.

Resources Reviewed

- ASCE, “Quality in the Constructed Project: A Guide for Owners, Designers, and Constructors”

The guide discusses the roles, responsibilities, requirements, and limits of authority of participants in the design and construction process, highlighting concepts and practices that are valuable to each in achieving project goals and objectives.

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ACI 318-19, Chapter 26, confirms the statement from IBC 1603.1 by establishing the minimum requirement for information that must be included in the construction documents. Section 26.1.1 addresses items that the design professional shall specify in the construction document, if applicable.

ACI 301-20 contains a Mandatory Requirements Checklist which lists information that must be specified in the project documents.

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Brainstorming sessions outcome (work in progress):

- Develop a design checklist to serve as a resource to the industry.
 - Take it to the next level, develop training and education around that checklist.
- Define the percent of conceptual drawings. Define for each drawing percentage and what it should include for each percentage.
- Coordination among SEs/ Arch/ MEP
 - One of the key issues during construction
- Designing for constructability
 - Lack of coordination among different disciplines is one of the key issues during construction
 - Different trade tolerance
 - Labor vs technology
 - Review ACI 318, chapter 26
- Encourage adequate fees and schedules to produce final drawings.
- Evaluate the potential of AI to improve constructability.

Thank You!

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