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Making the Case for Advanced Work Packaging as a Standard (Best) Practice

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Making the Case for Advanced Work Packaging as a Standard (Best) Practice

**Prepared by
Construction Industry Institute
Research Team 319, Making the Case for Advanced Work Packaging
as a Standard (Best) Practice**

**CII would like to express its appreciation to the
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**Research Summary 319-1
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Executive Summary

In its ongoing efforts to increase project performance and predictability, CII recently sponsored research on Advanced Work Packaging (AWP), a disciplined approach to project planning and execution. Most recently, CII chartered Research Team (RT) 319, Making the Case for Advanced Work Packaging as a Standard (Best) Practice, to extend and validate the exploratory findings of RT 272, Advanced Work Packaging. In its four-year research effort, RT 272 provided a comprehensive AWP model, along with definitions, procedures, contracting guidelines, job role descriptions, checklists, and templates. Specifically, the team found that AWP delivers dramatic performance improvements in field productivity, cost and schedule performance, project predictability, and related benefits in safety, quality, and project team alignment. Documented case studies show 25-percent productivity improvements and 10-percent reductions in total installed cost (TIC). Such breakthrough performance improvements have drawn considerable attention from the industry, but reasonable questions have been raised about the generalizability of these initial findings.

The primary objectives of RT 319 were to validate the performance success of the AWP execution model and thereby make the case for AWP becoming a standard (best) practice for the industry. Specifically, the team pursued the following two research goals:

1. Evaluate the relationship between AWP implementation and various dimensions of project performance.
2. Identify typical AWP implementation pathways and levels of AWP maturity.

Using multiple qualitative and quantitative research techniques—such as case studies, surveys, focus groups, and expert interviews—the team collected extensive empirical evidence to validate the causal relationship between AWP implementation and project performance improvement. These findings show that effective AWP implementation produces

consistent improvements across six project performance dimensions: productivity, cost, safety, schedule, quality, and predictability. The research team also documented additional benefits, difficulties, and lessons learned to support practitioners during AWP adoption.

When industrial construction companies adopt AWP, their implementation effort typically follows an S-curve pattern. RT 272 identified three iterative AWP maturity stages—each one building on the one preceding it—and formulated detailed implementation guidance for each stage. Building on these findings, RT 319 provided additional evidence on AWP maturity and also found that the performance of industrial construction organizations adopting AWP typically follows an S-curve pattern—with slow initial improvements, followed by fast growth in the middle phase, and moderate advances in the final maturity phase.

A key finding was that even initial implementations (i.e., projects with low maturity) garner significant benefits from AWP. This is encouraging for organizations that are low on the AWP learning curve. At the same time, benefits increase as AWP implementation matures, which supports further investment. Overall, the data collected by both research teams presents strong evidence that the benefits of AWP are consistent and that there is a compelling case for further adoption by the industry.

Introduction

CII chartered Research Team (RT) 319 to evaluate current Advanced Work Packaging (AWP) benefits and implementation trajectories, in an effort to validate initial claims of improved performance and to capture lessons learned from the field. This research aims to extend and validate the RT 272 findings on AWP implementation. (See Implementation Resource (IR) 272-2, *Advanced Work Packaging: Design through Workforce Execution*.) Readers of this research summary should be familiar with AWP definitions and approaches as presented in Research Summary (RS) 272-1, *Advanced Work Packaging: Design through Workforce Execution*, and IR 272-2 Volume I—two publications in which RT 272 systematically presents its extended AWP practice model, along with definitions, procedures, contracting guidelines, job role descriptions, checklists, and templates.

Briefly, the AWP methodology offers industrial construction projects a disciplined process for project planning and execution that systematically aligns the engineering, procurement, and construction disciplines across the project life cycle. This approach shifts the focus to the early planning stages and incorporates the breakdown structure of project scope into three main deliverables: 1) construction work packages (CWPs); 2) engineering work packages (EWPs); and 3) installation work packages (IWPs). The logical and iterative breakdown of the project into these three deliverables provides a framework for effective and consistent planning throughout the project. Figure 1 shows the timing of CWPs, EWPs, and IWPs across the project life cycle, emphasizing the AWP focus on pulling traditional workforce planning practices into the early planning stage.

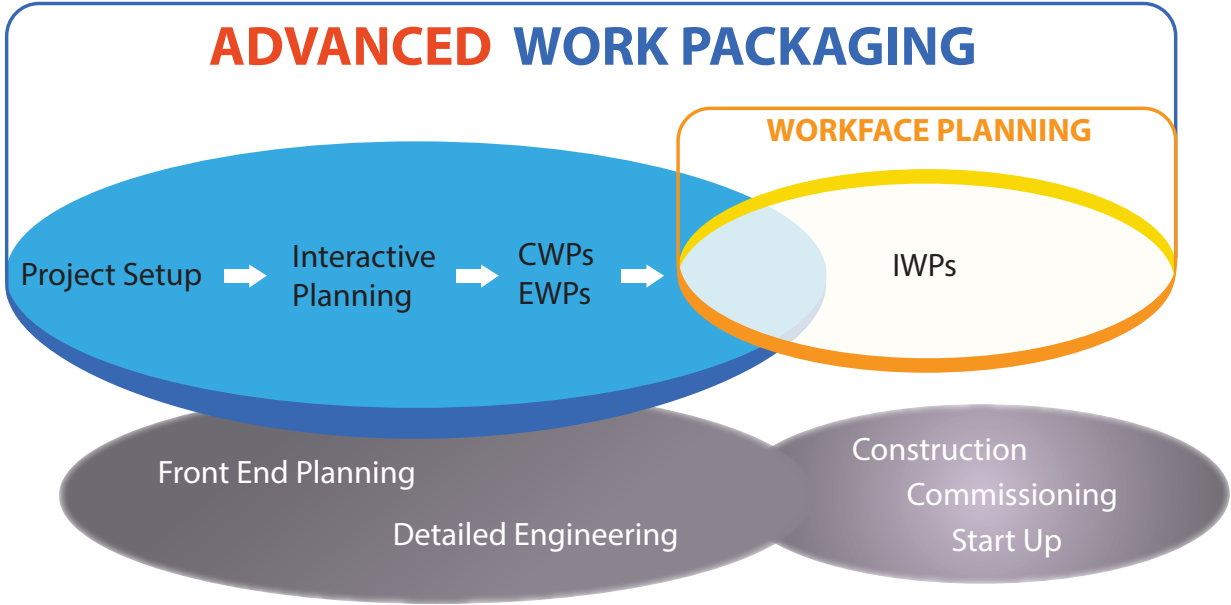


Figure 1. AWP and the Project Lifecycle

AWP holds the promise of fundamentally transforming the capital project delivery process. Early evidence from RT 272 indicated the following benefits of AWP implementation:

- up to 25-percent increases in field productivity
- up to 10-percent decreases in total installed cost (TIC), with increased savings for owners and increased profitability for contractors
- improved schedule performance, with projects delivered on schedule
- improved safety performance, with zero lost time accident records
- increased quality, with reduced construction rework
- increased predictability, in terms of cost and schedule estimates.

Because CII recognized the potential of these dramatic performance improvements to transform the industry, it formed RT 319 to conduct further evaluation and validation.

To pursue this mandate, RT 319 developed two specific research goals:

1. Evaluate the relationship between AWP implementation and various dimensions of project performance. To this end, develop a validation framework that includes a set of AWP prerequisites for successful implementation and improved performance.
2. Identify typical AWP implementation pathways and common levels of AWP maturity. This will provide detailed insight into determining the right approach to implementation and lessons learned to support future implementation.

Figure 2 shows how the team's research methodology was based on a mixed qualitative/quantitative approach. Taking this approach, the team sought to increase the validity and reliability of the findings by collecting data from multiple sources (i.e., 20 case studies, three expert interviews, surveys, and focus groups).

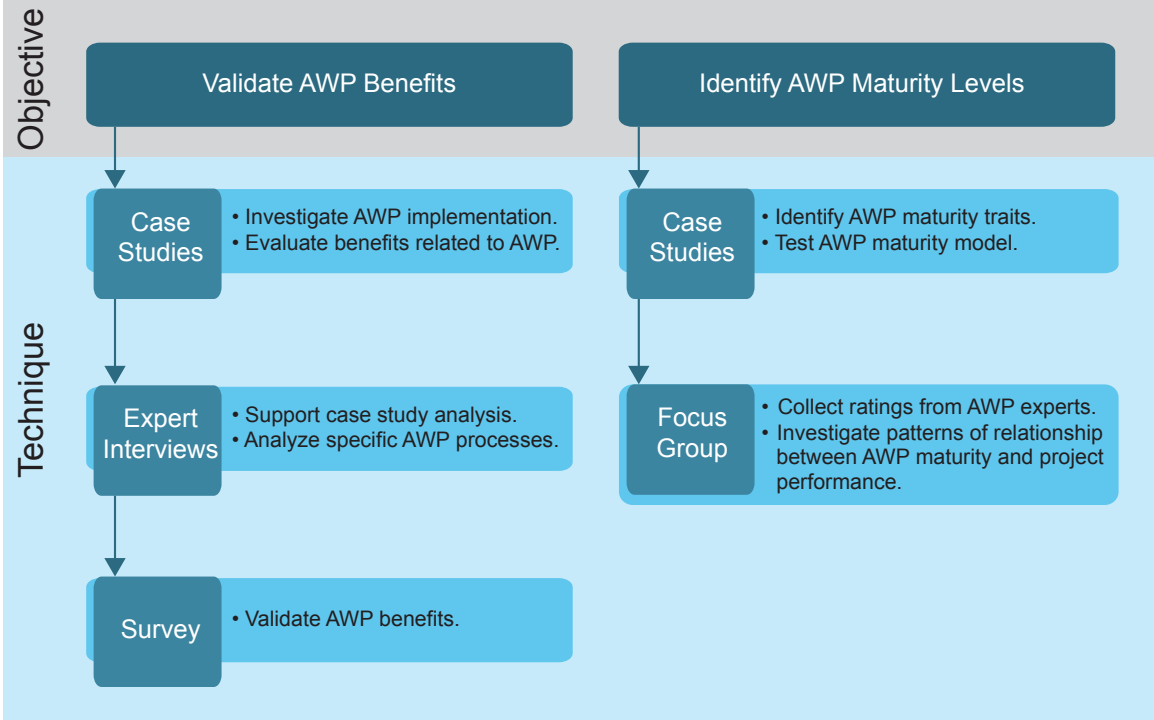


Figure 2. Research Methodology

Specifically, the case studies, expert interviews, and surveys were designed to meet the first research objective of validating AWP benefits. The intent was to collect enough additional in-depth qualitative implementation evidence from the case studies and expert interviews to extend the preliminary RT 272 findings. Through the survey, the team hoped to gather quantitative evidence of the generalizable nature of the findings.

To pursue the second research objective of identifying AWP maturity levels, the team chose to conduct expert focus groups and to again draw on the case studies. The rationale was to explore and empirically validate the AWP maturity model, by asking independent AWP experts (in the focus group) to evaluate documented AWP implementations (recorded in the case studies). The following chapters of this research summary provide an overview of the evidence collected.

In addition to this research summary, RT 319 produced Research Report (RR) 319-11, *Transforming the Industry: Making the Case for Advanced Work Packaging as a Standard (Best) Practice*, and Implementation Resource (IR) 319-2, *Validating Advanced Work Packaging as a Best Practice: A Game Changer*. IR 319-2 presents detailed descriptions of AWP adoptions at various levels of maturity and within different project contexts. These are provided to support any organizations planning their own implementations and as a supplement to the detailed guidance in IR 272-2. RR 319-11 presents the research findings in technical detail and provides additional recommendations on metrics for AWP assessment.

Chapter 2 of this summary discusses the relationship between AWP implementation and project performance within an AWP evaluation framework. Chapter 3 describes and tests a maturity model for AWP implementation, showing the evolutionary path of AWP over time. Finally, Chapter 4 presents the research team's conclusions and recommendations.

The AWP Implementation Framework

The results of the RT 272 study showed that, when properly implemented, AWP supports substantial project performance improvements in the industrial construction sector. The RT 319 challenge was to determine how to measure AWP implementation consistently to assess performance results. The research team developed an assessment framework to serve as a basis for data collection and analysis. (See Figure 3.) Figure 3 shows that AWP implementation depends on the accomplishment of three prerequisites, or antecedents, during the implementation process: 1) process adherence to prescribed AWP guidelines; 2) organizational alignment within the project management team on AWP deliverables; and 3) contract integration of AWP procedures among key project participants.

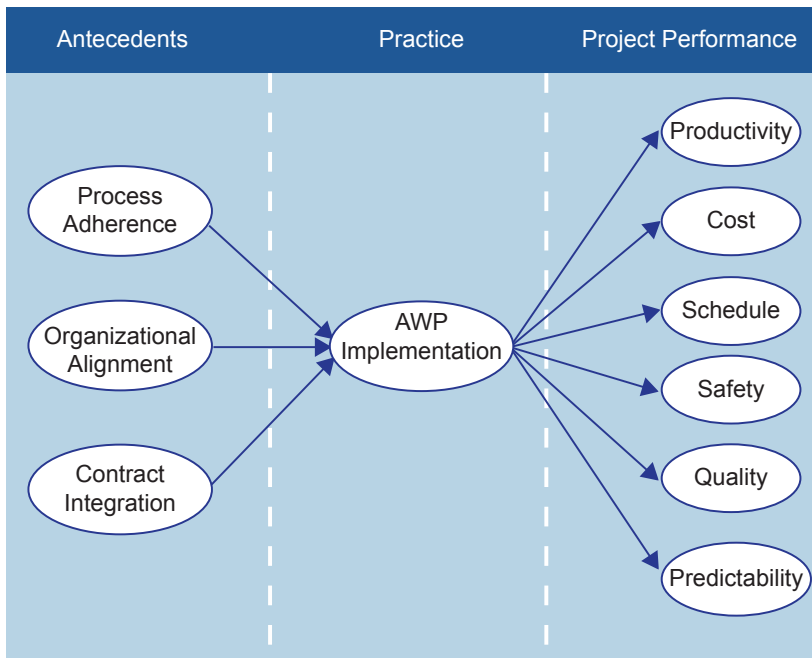


Figure 3. AWP Implementation Framework