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Advanced Work Packaging

Quantifying the Return on Investment

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Presentation Overview

- Advanced Work Packaging Overview
- AWP Timeline – How did we get here?
- COAA/CII Research Team 272 & CII Research Team 319 Publication
- COAA AWP Research Project
  - Question of study
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Overview of Advanced Work Packaging

The Reason –

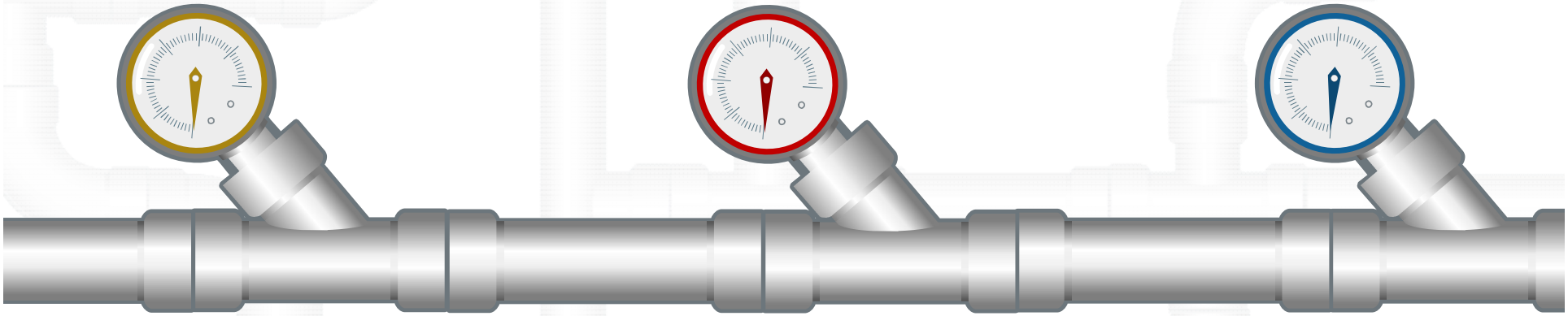
Why do we need Advanced Work Packaging?

AWP Model –

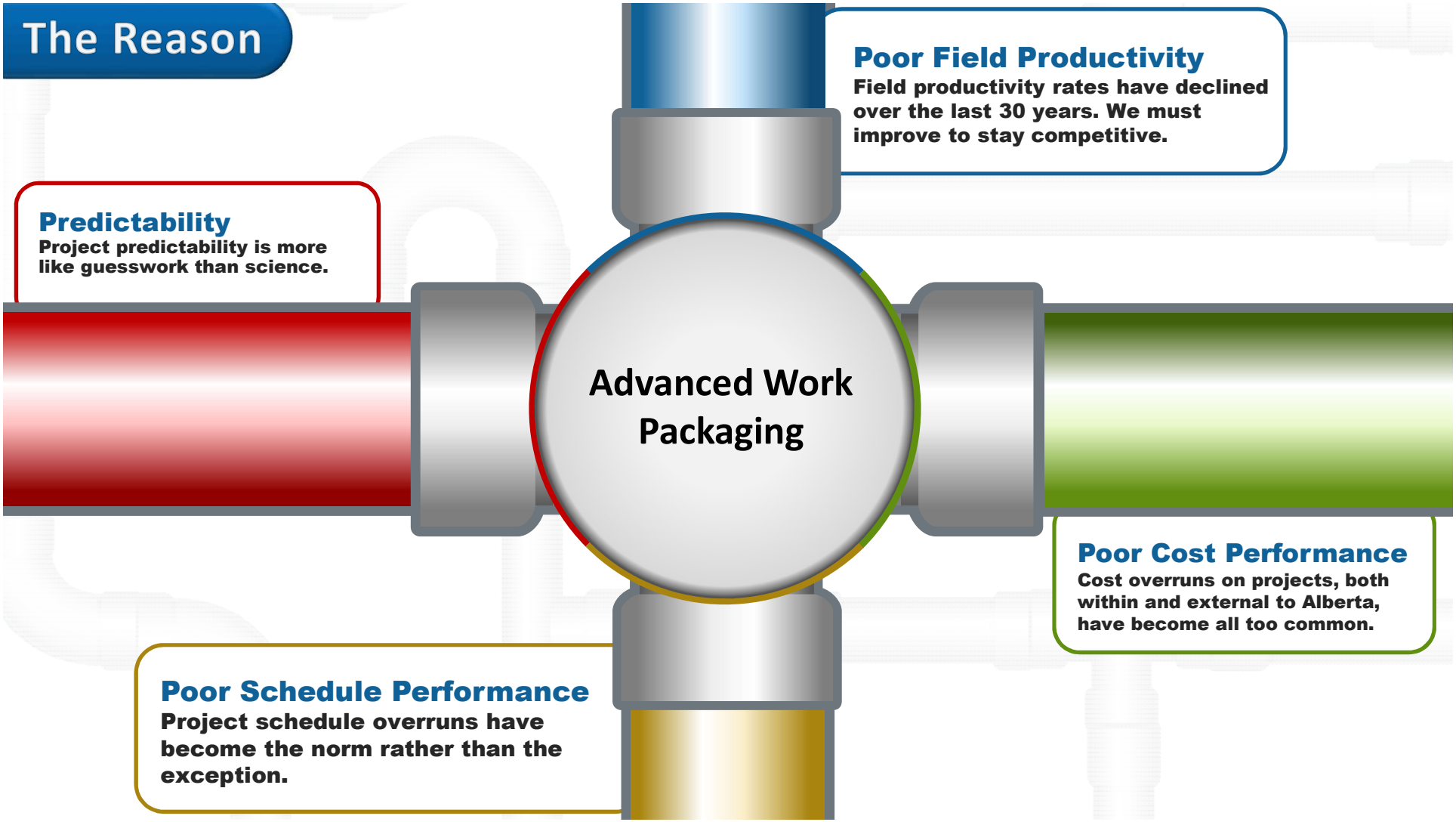
What it looks like and how it works.

AWP in 3 –

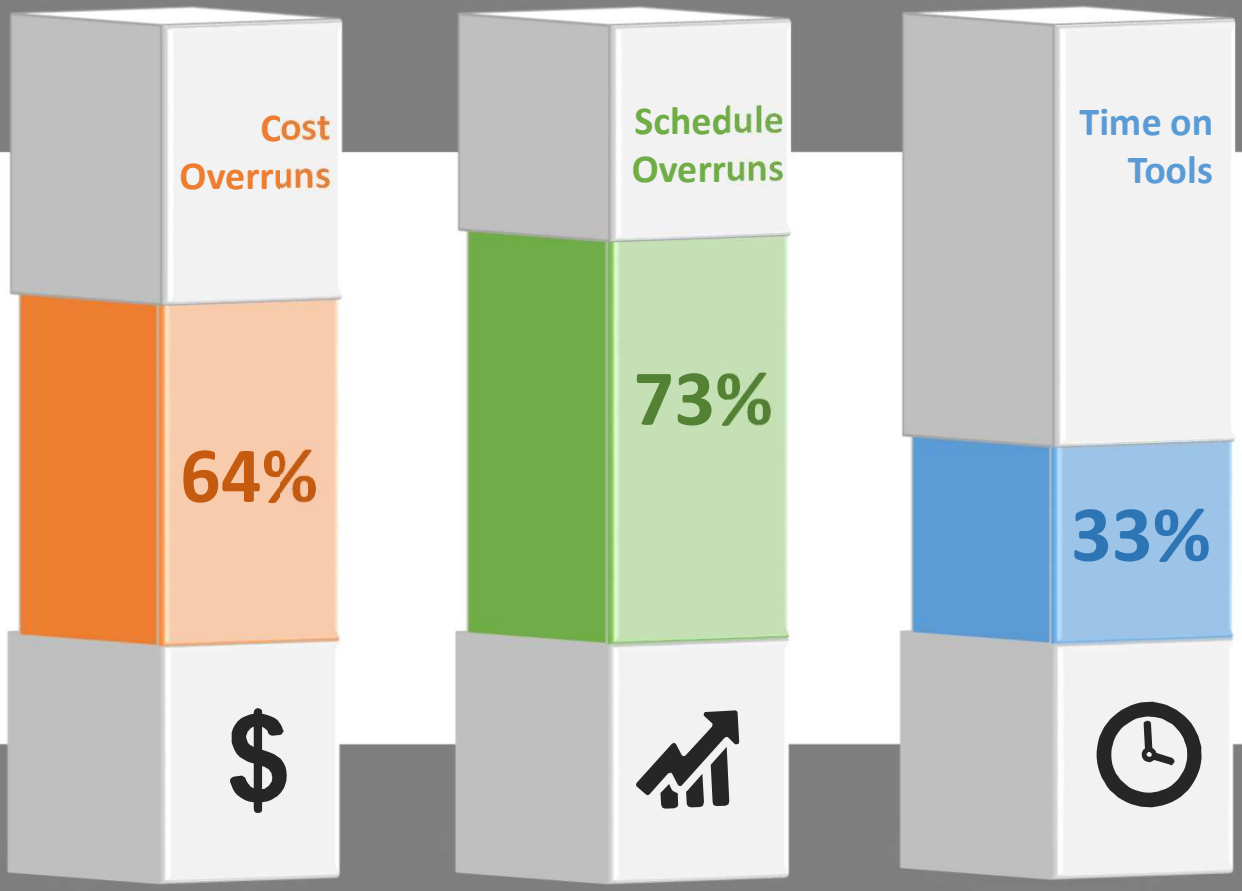
Getting down to the basics. It doesn't have to be complicated.



The Reason


Poor Field Productivity
Field productivity rates have declined over the last 30 years. We must improve to stay competitive.
Predictability
Project predictability is more like guesswork than science.
Advanced Work Packaging
Poor Cost Performance
Cost overruns on projects, both within and external to Alberta, have become all too common.
Poor Schedule Performance
Project schedule overruns have become the norm rather than the exception.

The Reality of Projects Today



Data:
Ernst and Young, 2015
CII, 2013

The Reason

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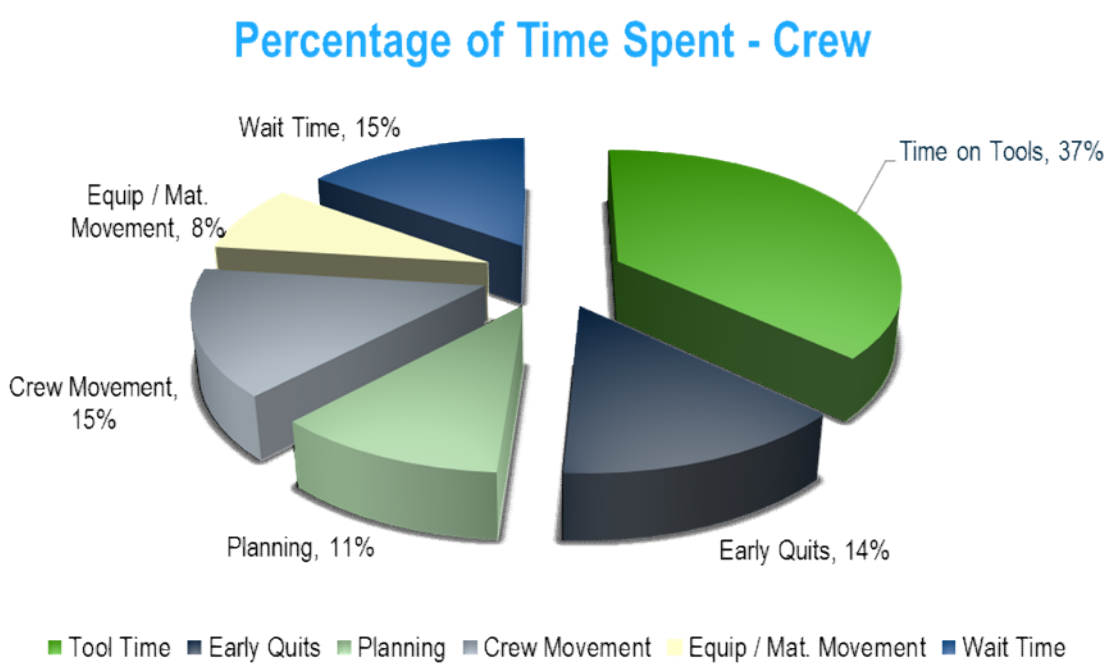

The Reason

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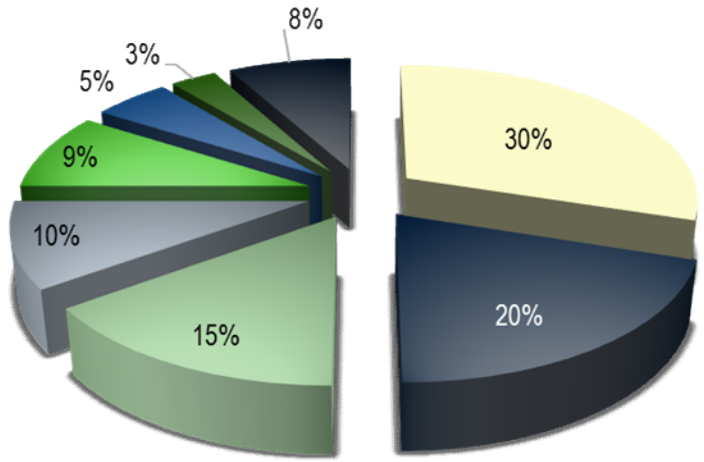
Percentage of Time Spent - Foremen



Travel
Planning
Supervision of Crew
Safety Activities
Paperwork
QA/QC
Meetings (non-safety)
Other

The Reason

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WorkFace Planning

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"WFP is the process of organizing and delivering all elements necessary before work is started, to enable craft persons to perform quality work in a safe, effective and efficient manner."
(Construction Owners Association of Alberta, 2011)

WorkFace Planning

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WorkFace Planning was coined as a best practice by COAA in the early 2000's, and since then has been successfully implemented and executed on a variety of project types and project sizes.

The goal of WorkFace Planning is to improve construction predictability, productivity and performance through early definition of construction needs, improved access to information, and by eliminating roadblocks that would prevent crews from executing work in the field.

Initial WorkFace Planning efforts focused mainly on field level planning, with an aim to increase available work fronts, and therefore decrease the potential for crew downtime.

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Installation Work Packages

The Reason

Engineering

Procurement

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Construction

Advanced Work Packaging

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"Advanced Work Packaging is the overall process flow of all the detailed work packages (CWPs, EWPs and IWPs). It is a planned, executable process that encompasses the work on an engineering, procurement and construction (EPC) project, beginning with initial planning and continuing through detailed design and construction execution" (CII, 2013).

Advanced Work Packaging

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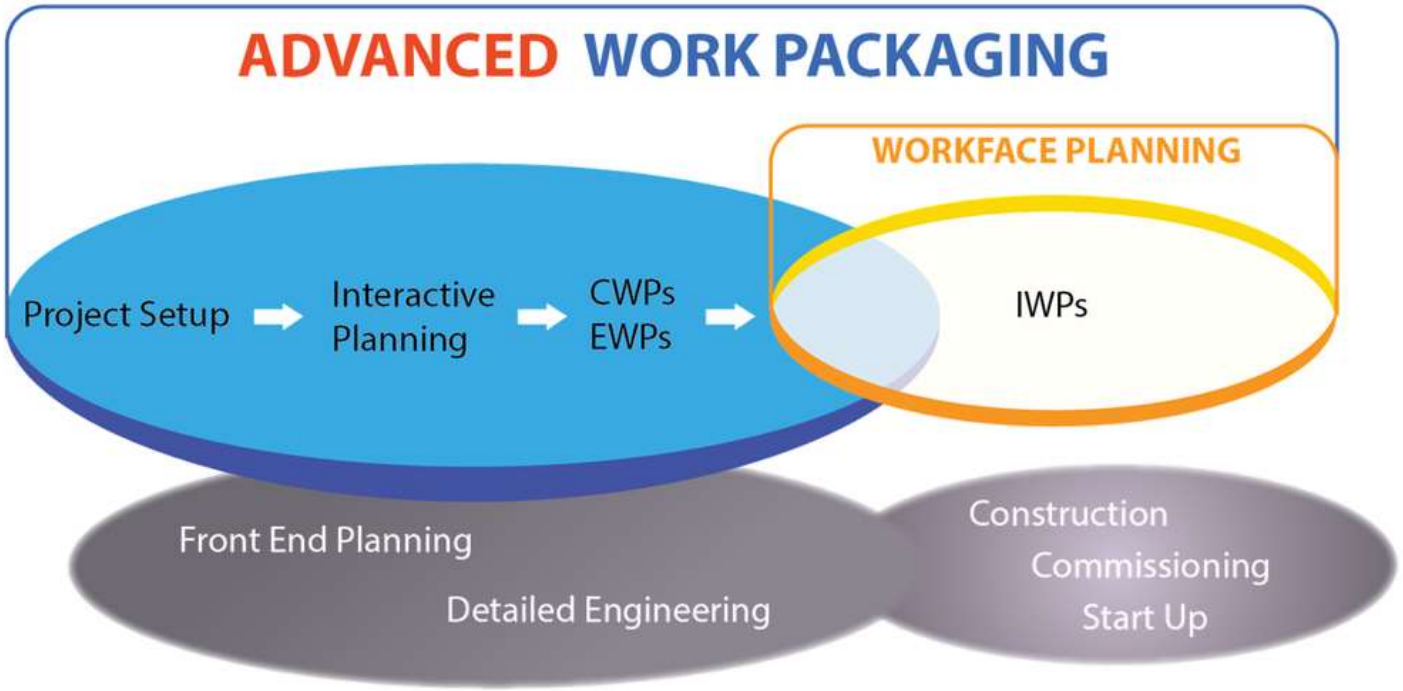

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Define CWAs
CWA boundary definition within the plot plan

Path of Construction
Sequencing of the Construction Work Areas that have been defined

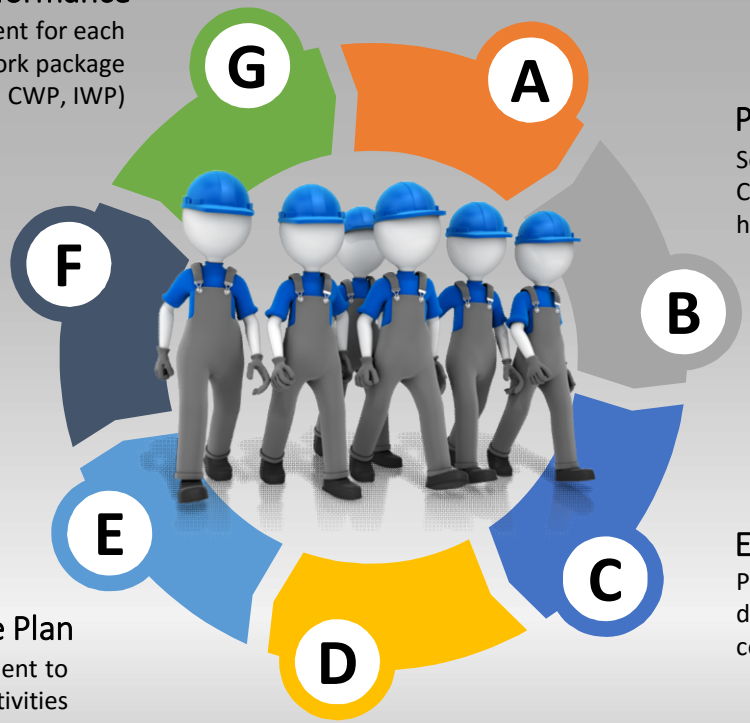
EWP Release Plan
Planned sequence of EWP development to support construction

CWP Release Plan
Planned sequence of CWP development to support construction

IWP Release Plan
Sequence of IWP development to support planned crew activities

Execute Construction
Execution of the overall construction strategy

Measure Performance
Performance measurement for each hierarchical level of the work package breakdown (CWA, CWP, IWP)



IMPROVING ALIGNMENT OF PROJECT STAKEHOLDERS

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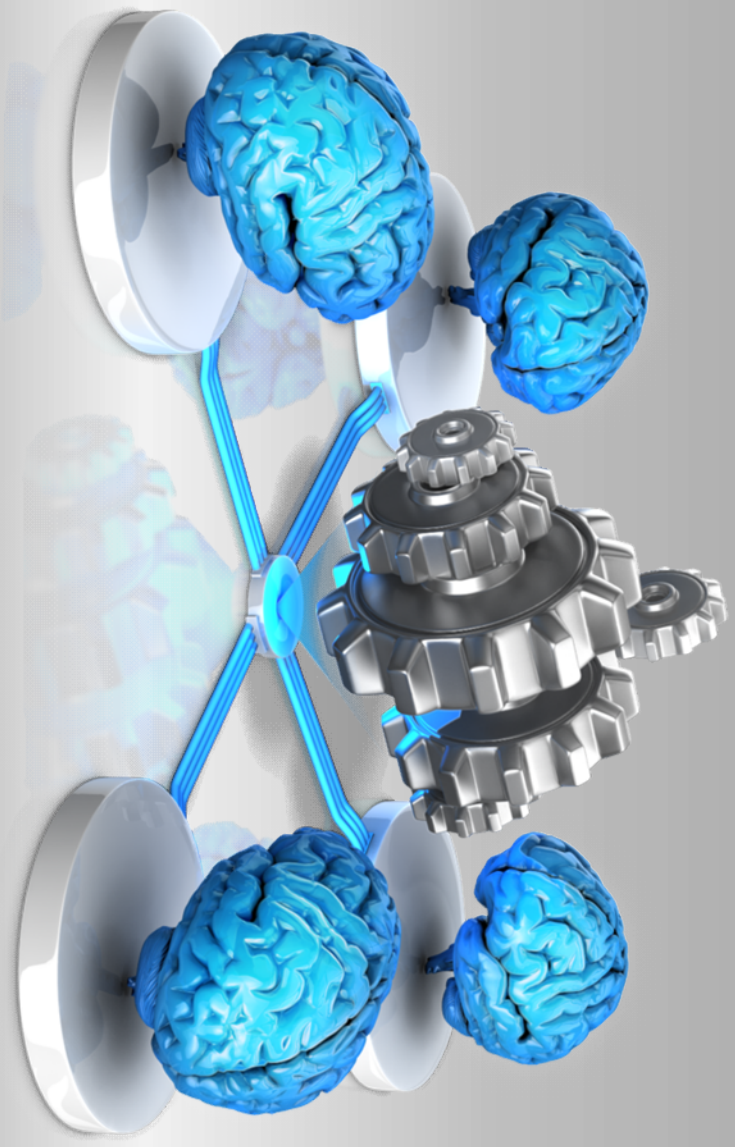
LEVERAGING THE POWER OF COLLABORATION



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ADVANCED WORK PACKAGING IS GLOBAL

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Advanced Work Packaging in 3 Minutes Video

https://youtu.be/Z9gnny5aJtQ

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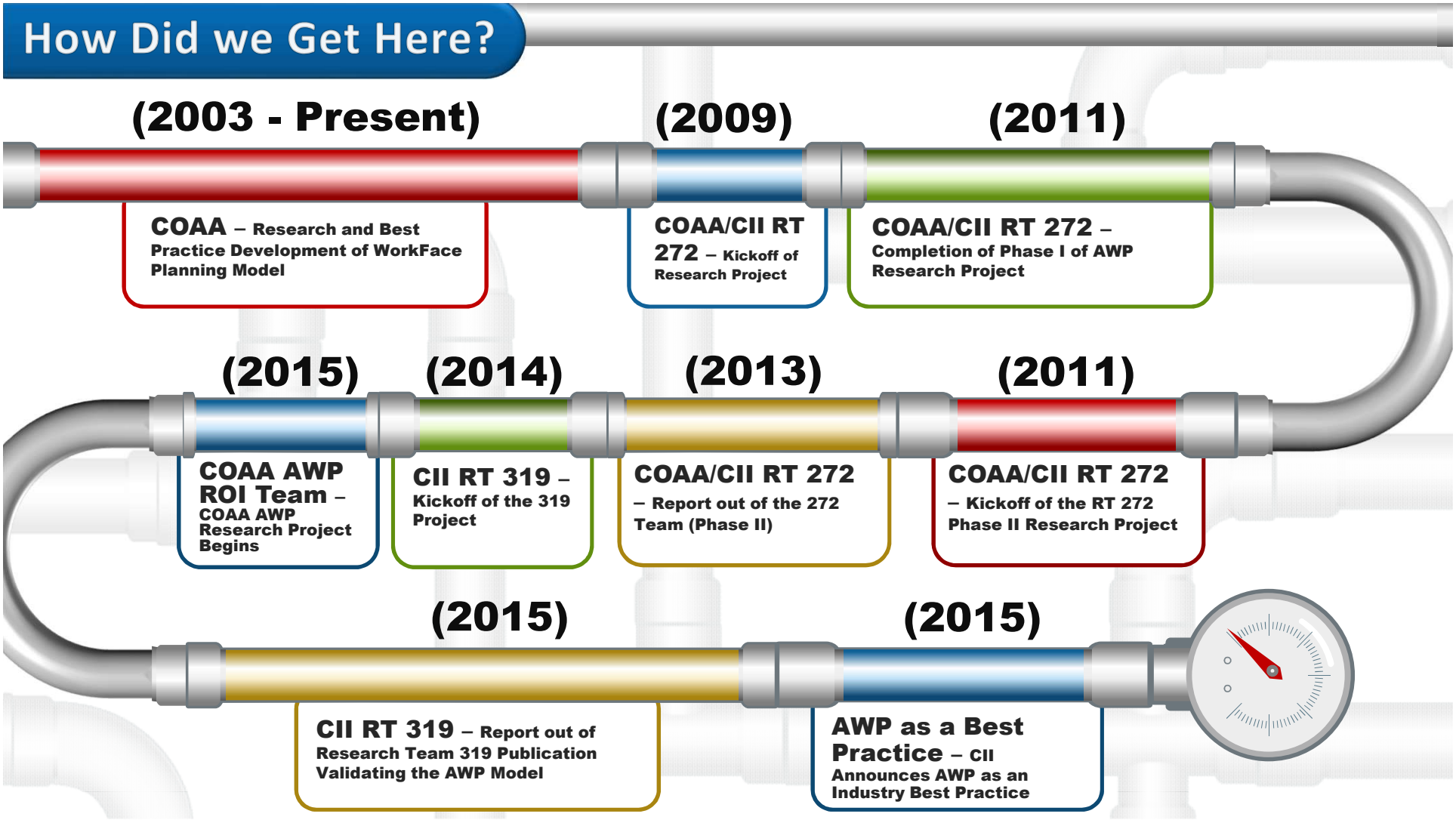
How Did we Get Here?



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COAA/CII RT 272

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Advanced Work Packaging

- Improves productivity
- Improves predictability
- Reduces cost
- Improves safety planning
- Improves housekeeping
- Improves alignment
- Improves craft retention
- Improves Foreman performance
- Improves stakeholder satisfaction

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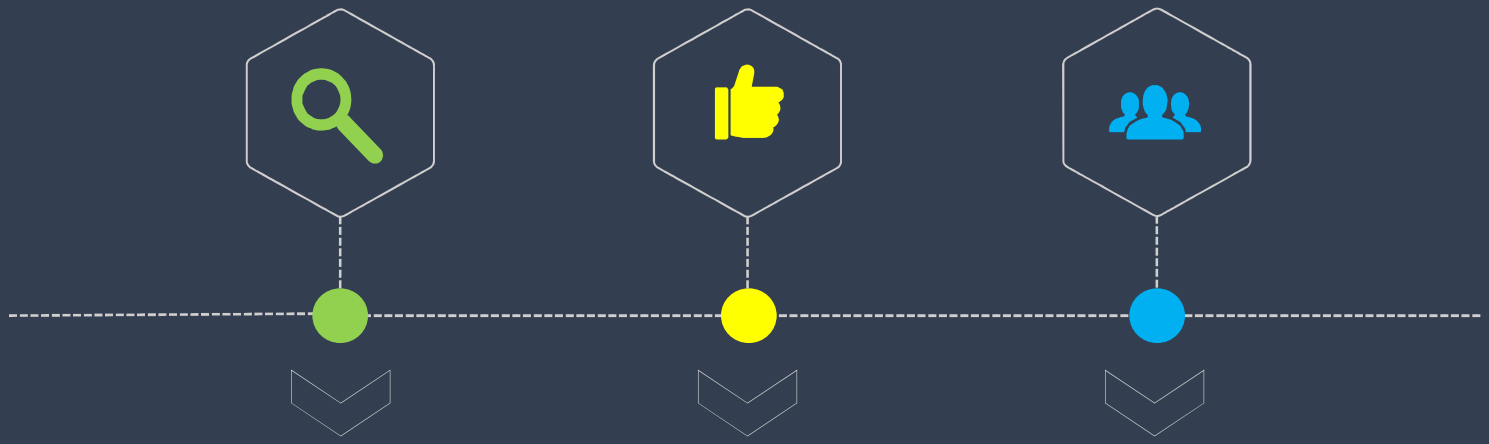


Case Studies

Evaluation of project data to determine benefits of AWP as well as maturity traits.

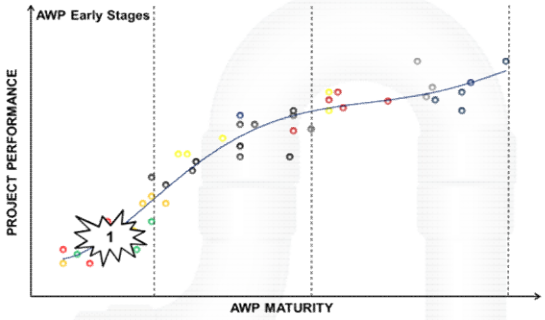
Survey

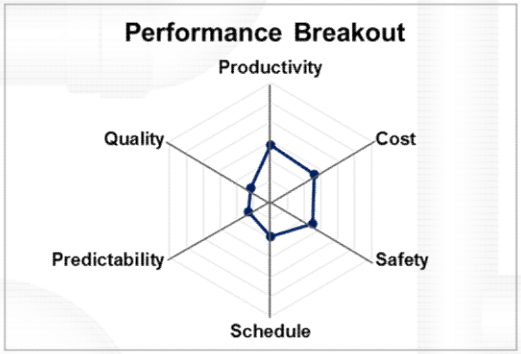
Survey of conference attendees to validate the benefits of AWP.

Expert Interviews

Also included focus groups. Enabled the team to analyze specific processes and complete maturity level ratings.

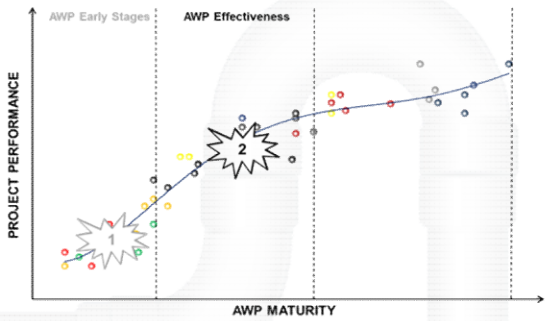
RT 319 Publication

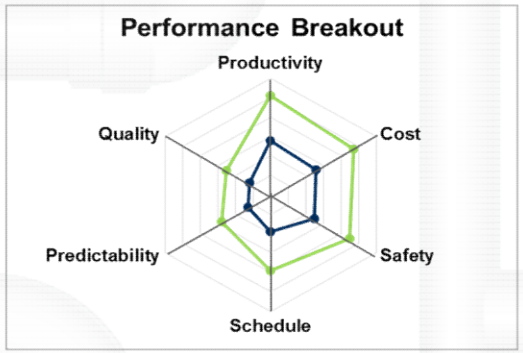




Performance Dimension	Maturity Stage		
	1 – AWP Early Stage	2 – AWP Effectiveness	3 – AWP Business Transformation
Productivity	Around 10% improvement	Around 25% improvement	Around 25% improvement
Cost	Project on budget	Around 10% below TIC	Around 10% below TIC
Safety	0 lost-time accident (TRIR below company average)	0 lost-time accident (sporadic first-aids and near misses)	0 lost-time accident (sporadic first-aids and near misses)
Schedule	Project experienced minor delays	Project slightly ahead of schedule during execution	Project slightly ahead of schedule during both planning and execution
Predictability	Not very satisfying (major changes to estimates)	Moderately positive (minor changes to estimates)	Completely positive (full alignment to estimates)
Quality	In line with previous quality performance	Reworks slightly below company's average	Reworks and RFIs substantially below company's average (negligible impact on IWP execution)

RT 319 Publication





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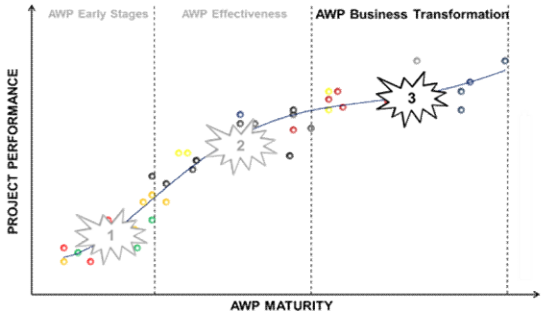

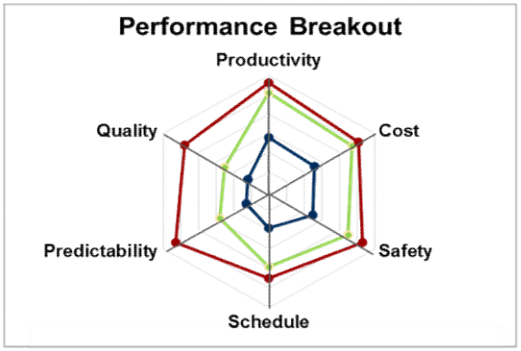

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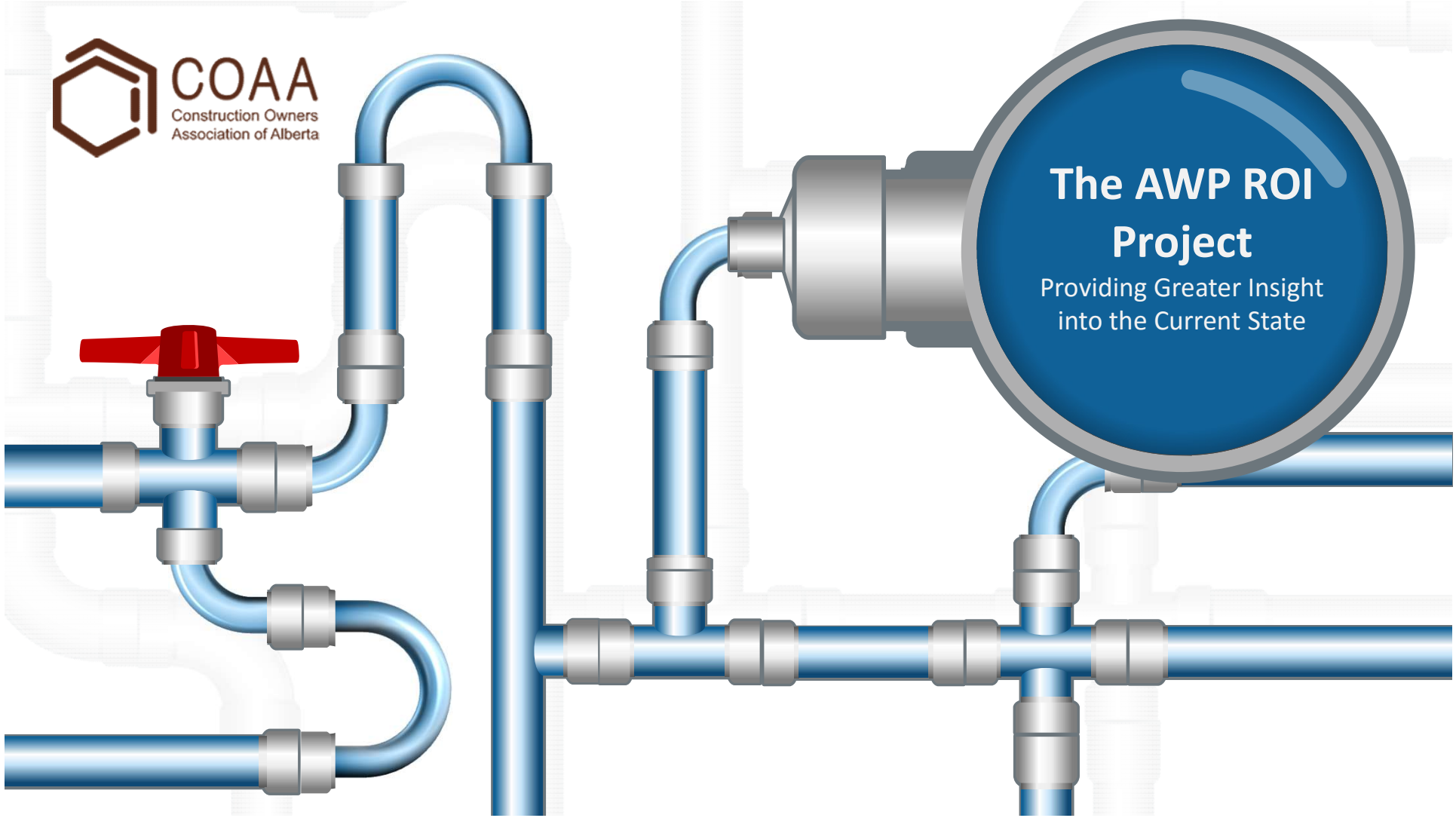
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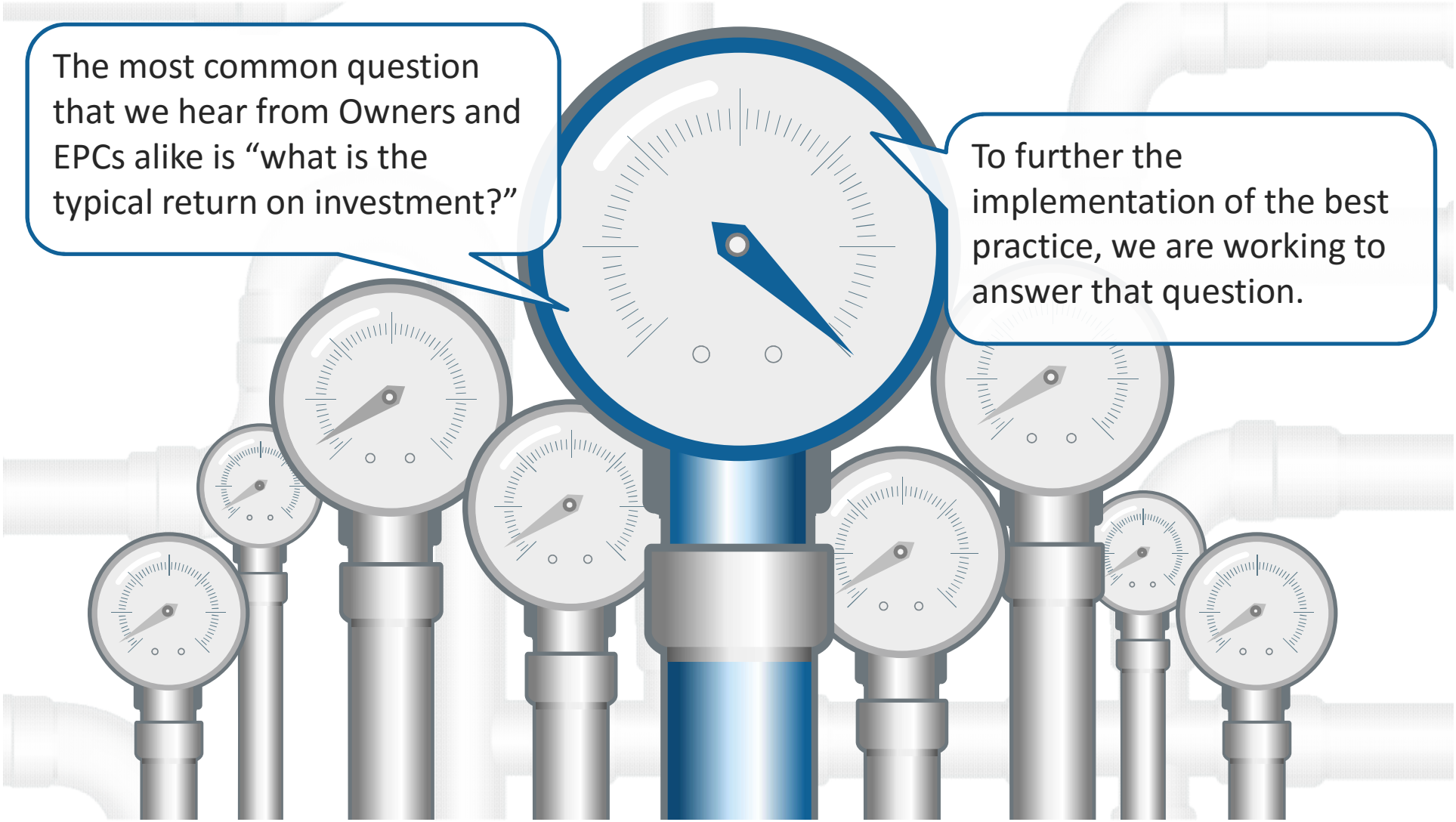
The AWP ROI
Project
Providing Greater Insight
into the Current State


The most common question that we hear from Owners and EPCs alike is “what is the typical return on investment?”
To further the implementation of the best practice, we are working to answer that question.

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The Need for Further Research

- RT 272 and RT 319 laid a great groundwork for the value of AWP and WFP
- The COAA research team aims to build upon COAA and CII's advances
  - Additional quantifiable metrics
  - Deeper look at the stages of maturity within organizations and the impact on AWP/WFP success

The Project

Industry Support

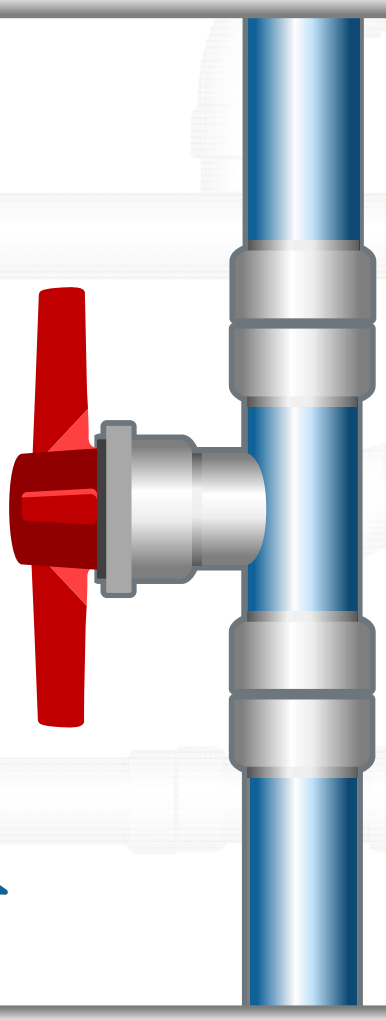
The Team requires organizations with projects and project data that can be analyzed for the research

Research Proposal is Developed

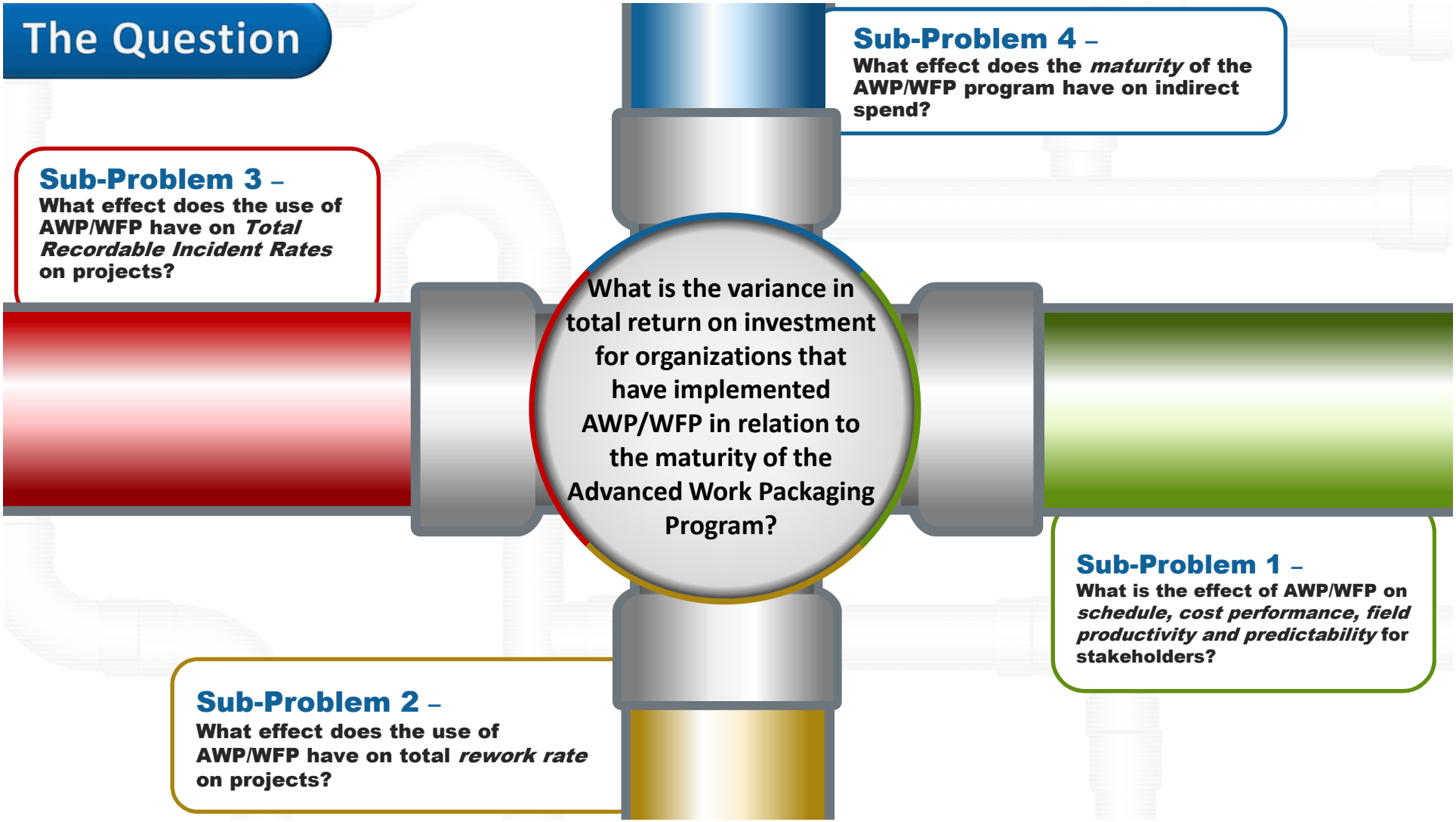
The research proposal has now been drafted and is being peer reviewed by industry subject matter experts and Academic advisors.

Sub-Committee Formed

- Tannis Liviniuk (Bentley Systems)
- Ryan Posnikoff (Posnikoff Project Consulting Ltd)
- Petra Polster (AECOM)
- Craig Boudreau (AECOM)
- Roger Ellenberger (Consultant)
- Bevin Braganza (Imperial Oil)
- Doug Hill (Hilldale Services)
- Stephen Atkinson (KPMG)



The Question



Sub-Problem 4 –
What effect does the *maturity* of the AWP/WFP program have on indirect spend?

Sub-Problem 3 –
What effect does the use of AWP/WFP have on *Total Recordable Incident Rates* on projects?

Sub-Problem 1 –
What is the effect of AWP/WFP on *schedule, cost performance, field productivity and predictability* for stakeholders?

Sub-Problem 2 –
What effect does the use of AWP/WFP have on total *rework rate* on projects?

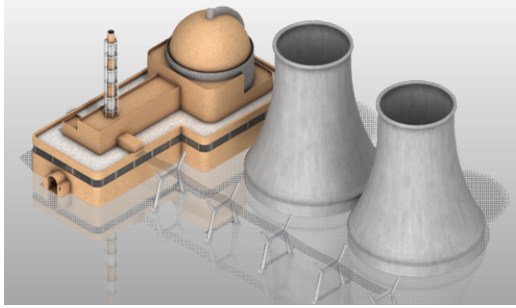
Request for Participating Organizations

The project requires industry participants:

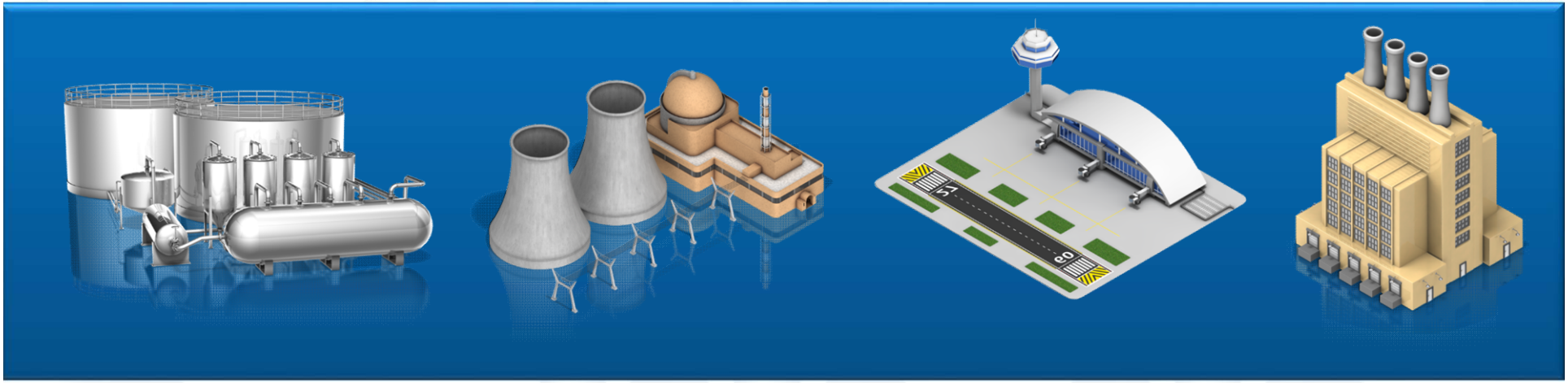
- EPCs, EPCMs, Engineering firms and Contractors
  - Utilizing either AWP & WFP, or only WFP
- Able to provide significant data points for analysis
- Interested in advancing industry knowledge, understanding and best practices

Project Sizes

- Advanced Work Packaging is an industry best practice that may be leveraged for projects of any size or type (sustaining project, green or brown field, etc).
- The Research Team is interested in projects of varying sizes from $5 million and greater in value.

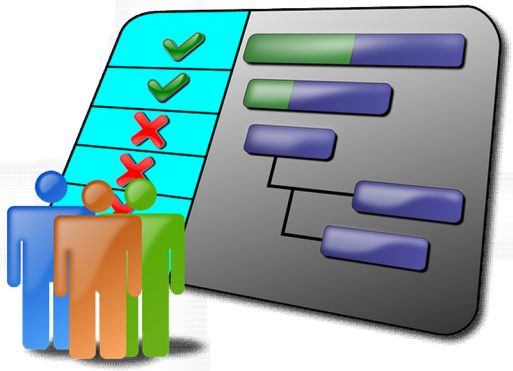


Industries



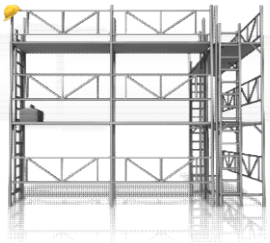
What is Required from Participants?

- Fully or substantially completed project
- Organization representative to answer a series of short surveys
- Provide metrics on:
  - Productivity
  - Cost
  - Schedule
  - Predictability
  - Rework
  - Safety
- Data required for all categories



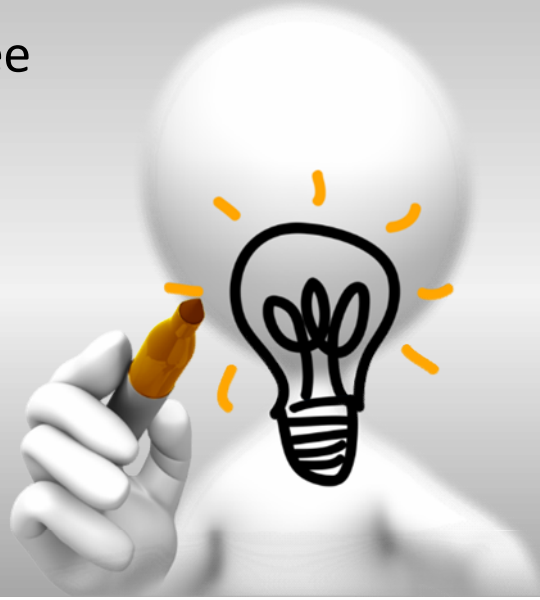
Disciplines to be Studied

- Piping
- Electrical
- Structural Steel
- Scaffold



Participant Anonymity

- The Committee will have academic support
  - Participant organizations will communicate only with an academic, who signs a non-disclosure agreement.
  - Any information shared with research committee will be stripped of all identifying information
  - Participants will not have to worry about proprietary information being shared with competitors



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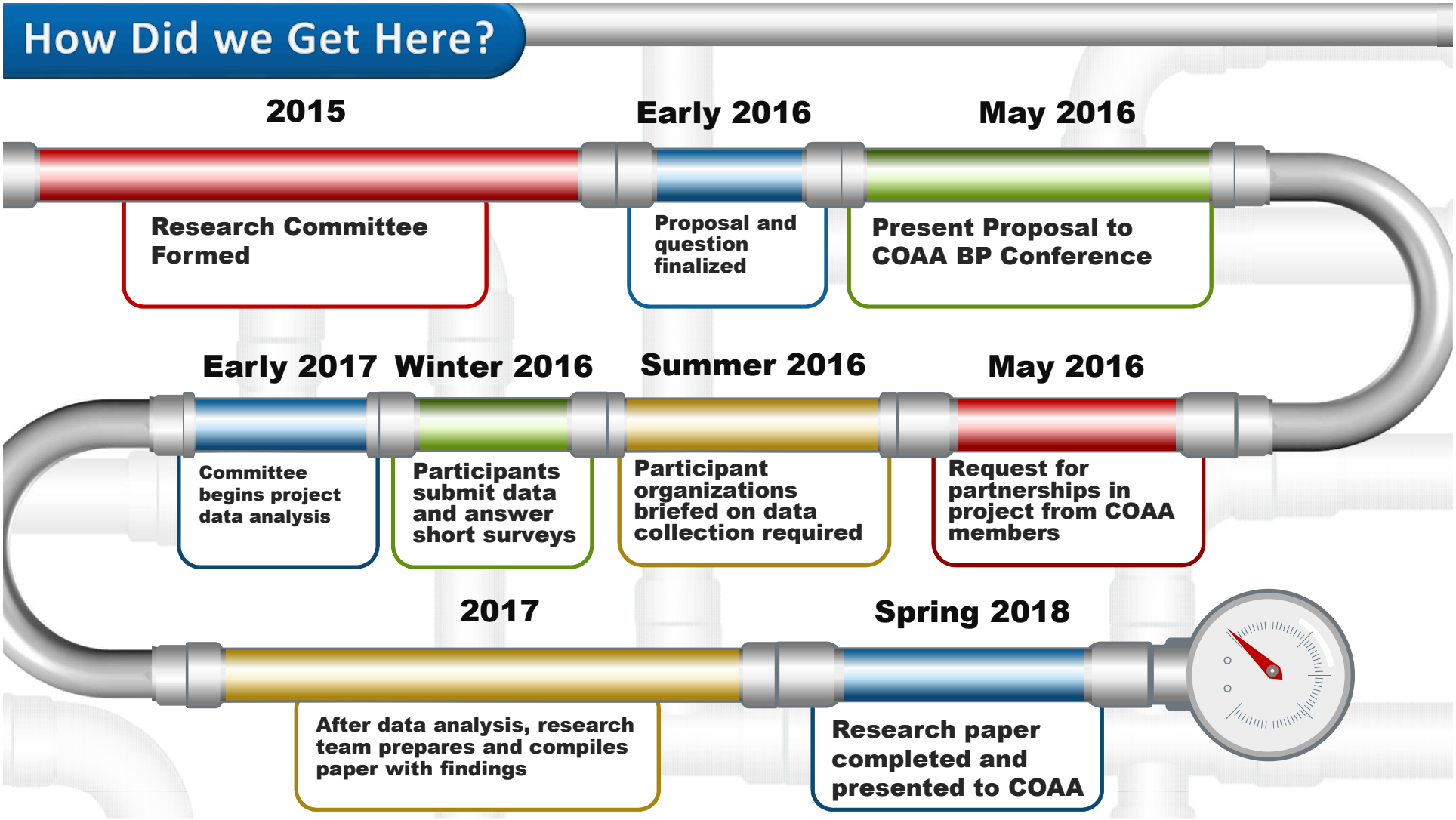

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The Key to AWP ROI

While the research has not yet been completed, we want to send you away from this session with some key takeaways in improving your return on investment from the subject matter experts of this research team.

In the following slides, we have identified a series of key points through evaluating successes and failures of Advanced Work Packaging and WorkFace Planning best practice implementation by our research team members.

While not all encompassing, these points will give you some tips to evaluate the performance of AWP on your project, which will help to ensure that you are getting the best value for your dollar.

Write it into the Contract

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Tailor your Program to your Needs

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Collaboration is Key

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You DON'T Need an Army

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Analyze Program Reports

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Conduct Regular Audits

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Talk to the End User

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