

AVEVA PI WORLD

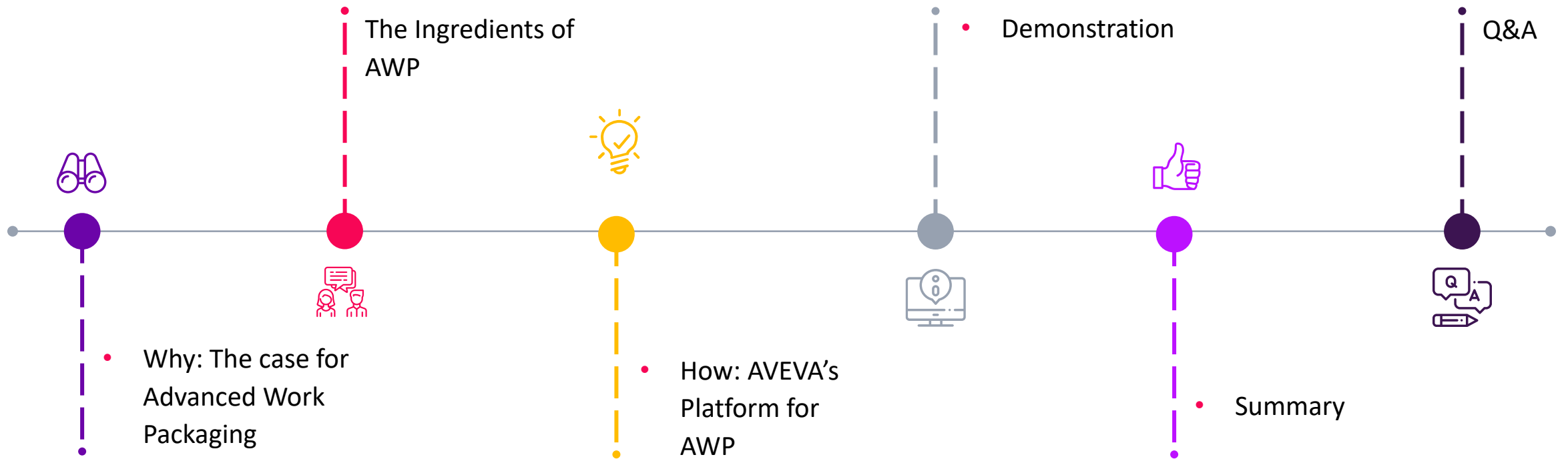
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# Using AWP efficiently with AVEVA Enterprise Resource Management integrated to AVEVA E3D Design

Presented By: Dan Stephenson, Flavio Barbosa, Amonre Chew & MingGyu Kim

**AVEVA**

# Agenda



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# The Case for Advanced Work Packaging



## Why now?

“ Many sectors have transformed themselves and their productivity performance. In comparison, much of construction has evolved at a glacial pace. Construction is among the least digitized sectors in the world ”

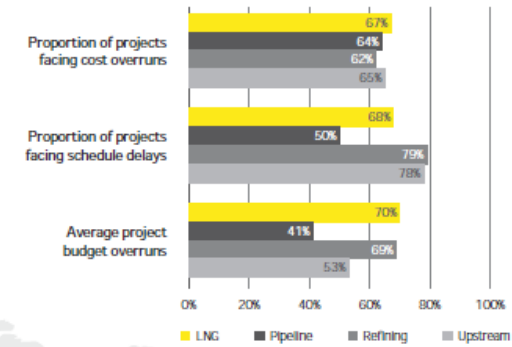
McKinsey Global Institute: Reinventing construction through a productivity revolution

**53%** Proportion of projects facing cost overruns

**74%** Proportion of projects facing schedule delays

**57%** Average project budget overruns

Figure 4: Proportions of projects facing cost overruns, schedule delays and average project budget overruns



**North America**

**58%** Proportion of projects facing cost overruns

**55%** Proportion of projects facing schedule delays

**51%** Average project budget overruns

**Latin America**

**57%** Proportion of projects facing cost overruns

**71%** Proportion of projects facing schedule delays

**102%** Average project budget overruns

**Africa**

**67%** Proportion of projects facing cost overruns

**82%** Proportion of projects facing schedule delays

**51%** Average project budget overruns

**Middle East**

**89%** Proportion of projects facing cost overruns

**87%** Proportion of projects facing schedule delays

**68%** Average project budget overruns

**Asia-Pacific**

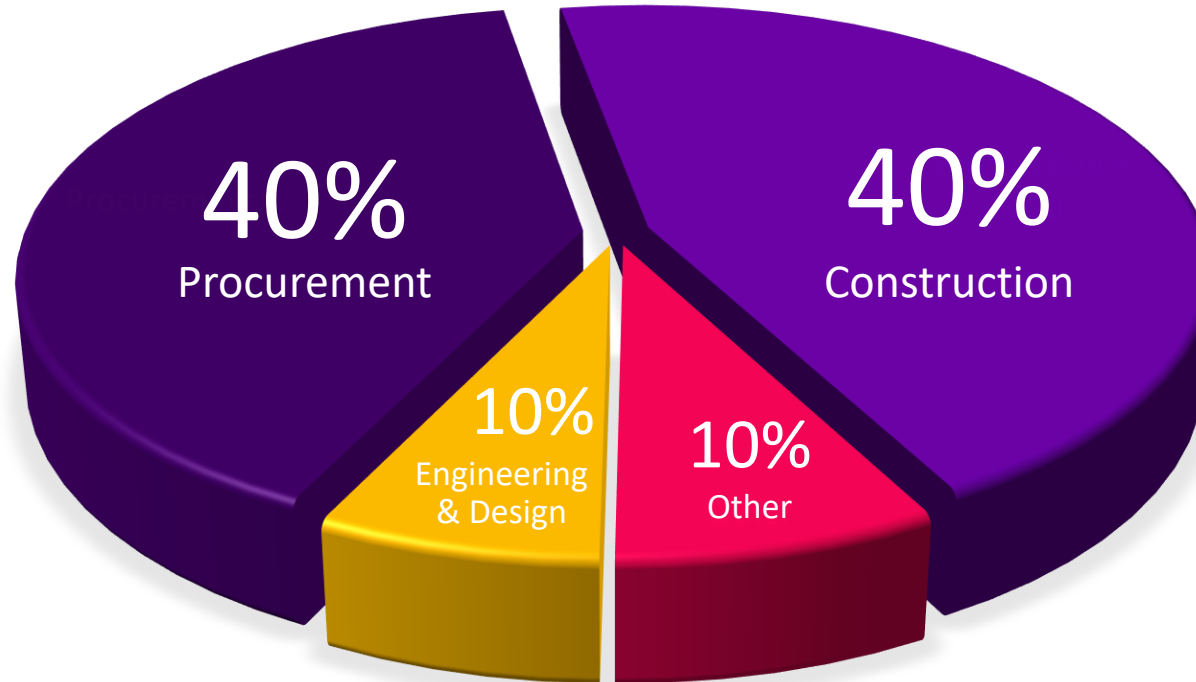
**68%** Proportion of projects facing cost overruns

**80%** Proportion of projects facing schedule delays

**57%** Average project budget overruns

# The Goal: Improve Efficiency

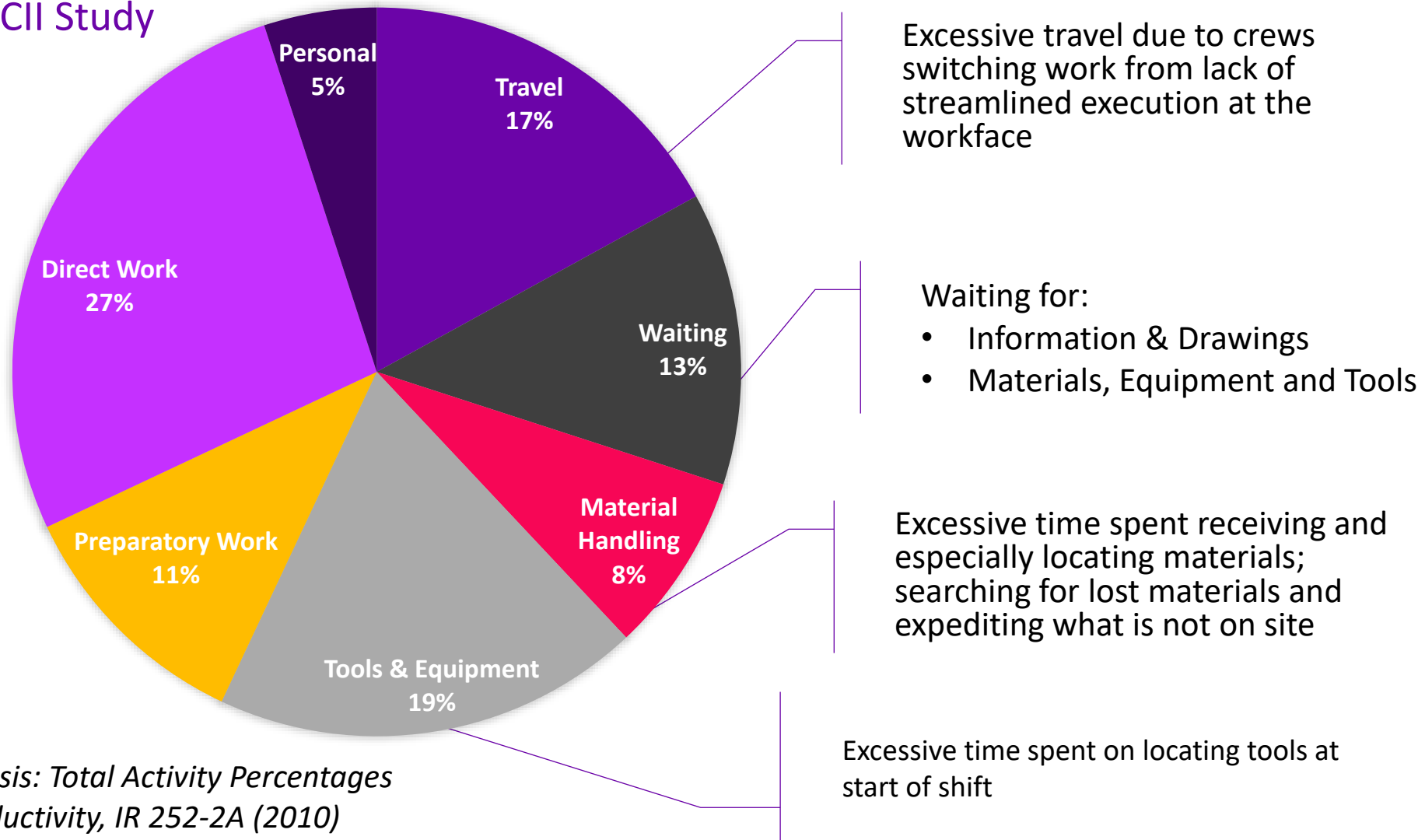
Increase value-adding tool time



CII: "AWP saves 25% Construction Cost which is 10% TIC"

# A Craft persons's Workday

Result of a CII Study



*Activity Analysis: Total Activity Percentages  
CII, Craft Productivity, IR 252-2A (2010)*

# The construction productivity imperative

## Factors that account for poor productivity and cost outcomes



- **Poor organization.** Decision-making and procurement processes do not have the speed and scale required.
- **Inadequate communication.** Inconsistencies in reporting mean that subcontractors, contractors, and owners do not have a common understanding of how the project is faring at any given time.
- **Flawed performance management.** Unresolved issues stack up because of lack of communication and accountability.
- **Contractual misunderstandings.** The procurement team typically negotiates the contract, and this is almost always dense and complicated. When a problem comes up, project managers may not understand how to proceed.
- **Missed connections.** There are different levels of planning, from high-end preparation to day-by-day programs. If the daily work is not finished, schedulers need to know—but often don't—so that they can update priorities in real time.
- **Poor short-term planning.** Companies are generally good at understanding what needs to happen in the next two to three months, but not nearly so much at grasping the next week or two. The result is that necessary equipment may not be in place.
- **Insufficient risk management.** Long-term risks get considerable consideration; the kinds that crop up on the job not nearly as much.

The Construction Productivity Imperative, McKinsey



# Current situation

- Owner operators are worried about the productivity of EPCs and how they run their projects
  - Schedule is king! The asset needs to earn money asap. Cost is secondary
- OOs are beginning to mandate AWP to be applied by EPCs
  - Along with this comes the request for proper progress reports
  - Instead of a beautified P6 plan OOs expect colour coded 3D models showing the true status of the project
- EPCs must show that they have their projects under control in order to win the next one
  - This is probably the biggest driver
  - They do not necessarily see the benefits for themselves, yet which depends a lot on the type of contract



# The Ingredients of AWP



# The Project ...



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If this is all what's in the box, good luck



This is what you should find



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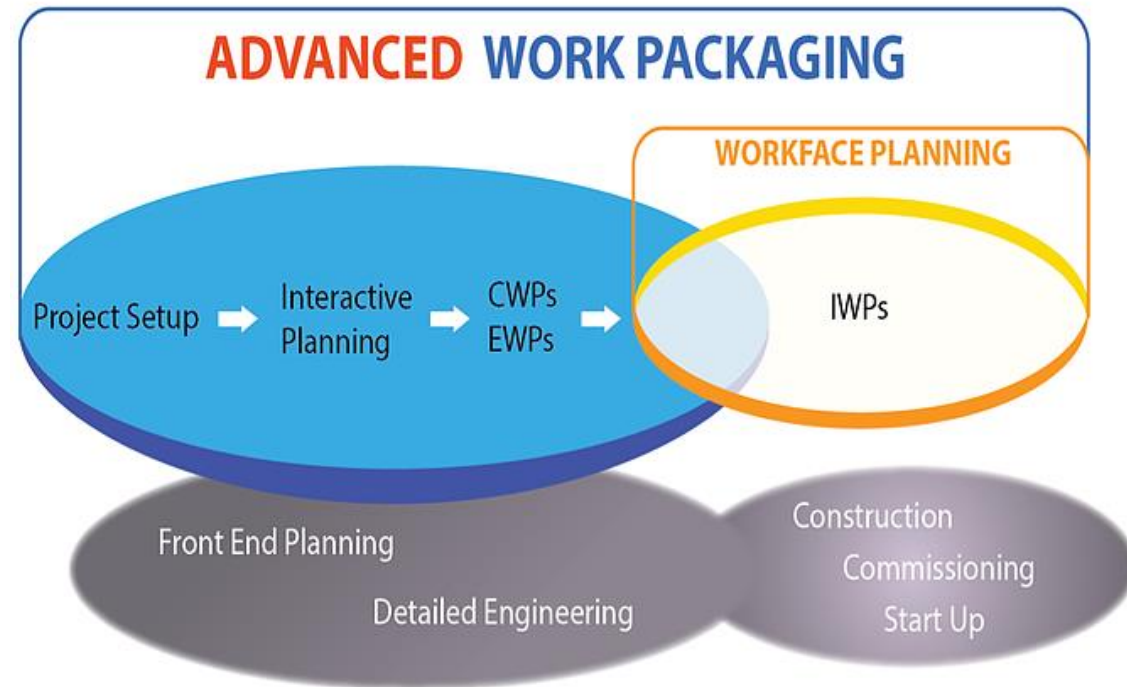
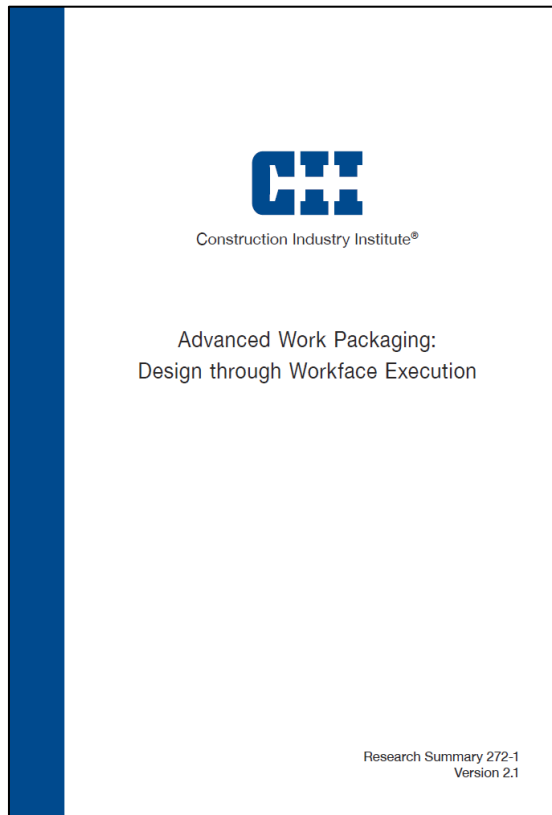
# Work Packaging Fundamentals

## Exploring the “**HOW**”



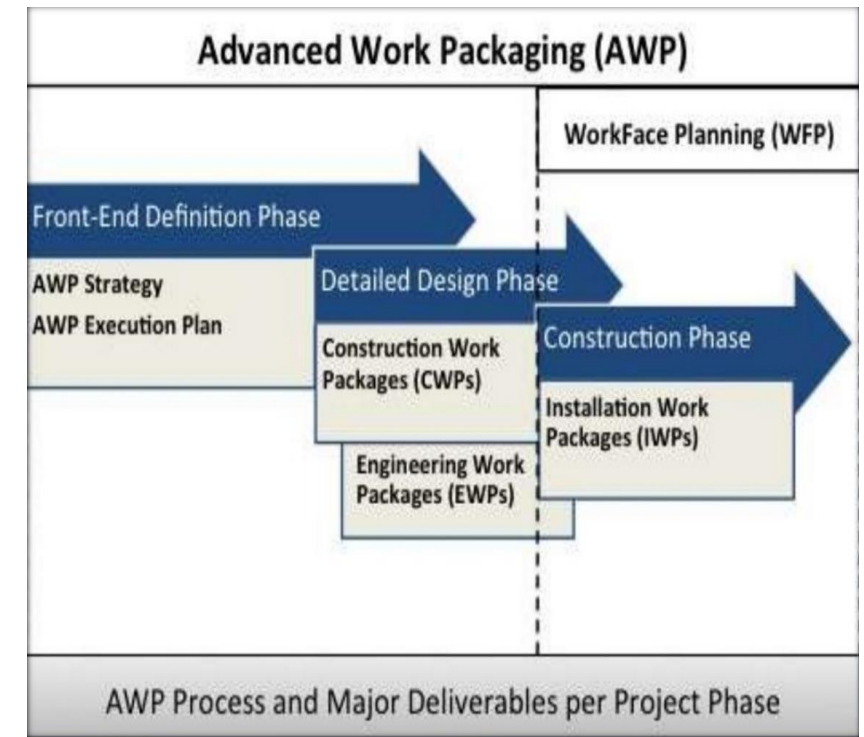
# Advanced Work Packaging

## CII Best Practise Methodology



# Key Concepts of AWP

- AWP is founded on the concept of defining the path of construction at the very beginning of a project and then re-structuring Engineering, Procurement & Construction activities all in line with the construction plan – via a Work Package methodology
- Typically, the plant is divided into “**Construction Work Areas**” (CWAs)
- The construction within each CWA is broken down into several “**Construction Work Packs**” (CWPs) – which are normally specific to a given discipline
- Engineering execute their work to create all the required engineering information for each CWP using “**Engineering Work Packs**” (EWPs)
- A “**Work Face Planner**” divides the CWP into a number of separate “**Installation Work Packages**” (IWPs) – each of which represents the work for a foreman and crew for 1-2 weeks
- Savings in schedule and cost are achieved by:-
  - Ensuring everyone is working to the same schedule/priorities as Construction
  - Ensuring that every work pack is 100% complete and accurate – so that there are no avoidable delays or re-work



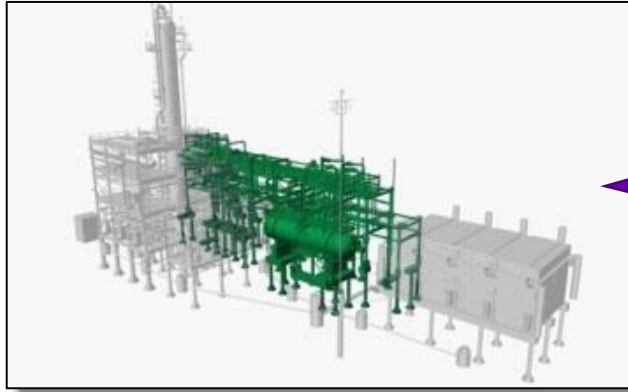
“Begin with the end in mind”

**AVEVA**

# Project

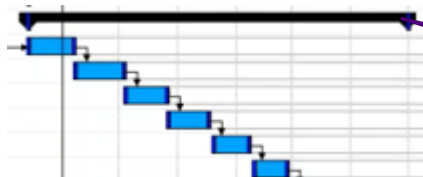


## CWA Construction Work Area



- Major work area within a site plan
- Includes all disciplines
- Defined by physical boundaries that typically do not overlap

A CWA shall usually be represented by a WBS element

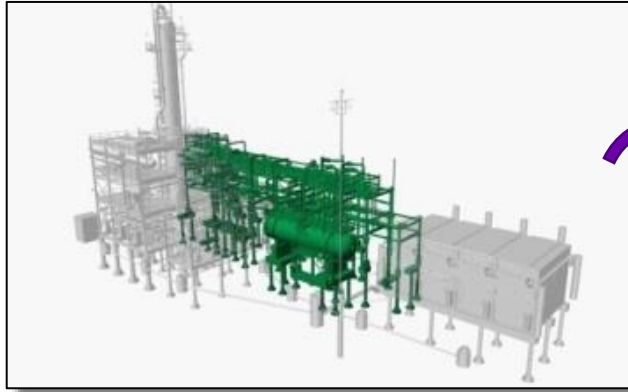


CWA

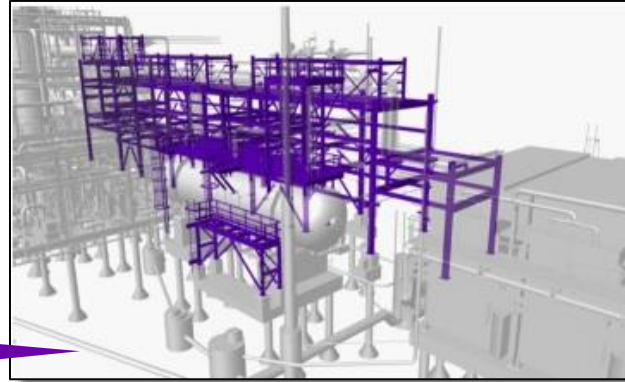
# Project



**CWA**  
Construction Work Area

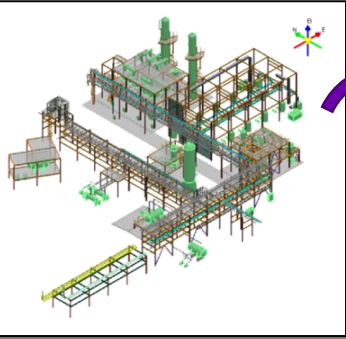


**CWP**  
Construction Work Package

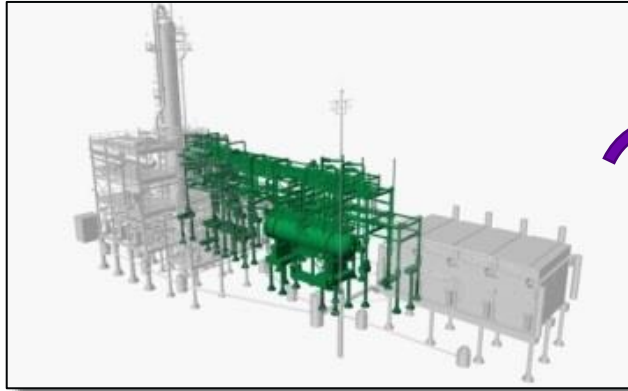


- *Single discipline*

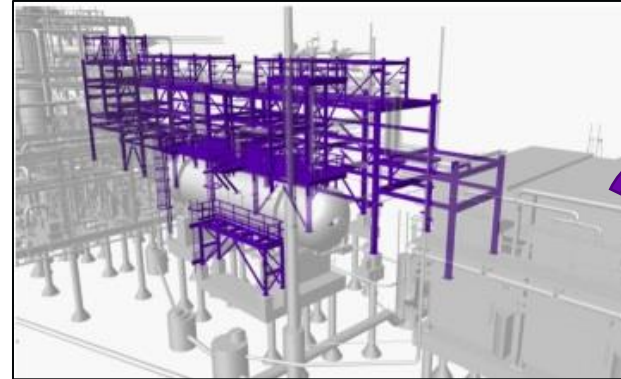
## Project



**CWA**  
Construction Work Area



**CWP**  
Construction Work Package



**IWP**  
Installation Work Package



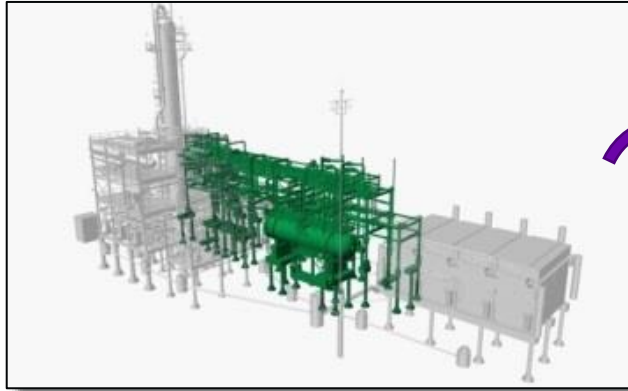
- *One-crew one-week scope of installation work*
- *Package contains all necessary drawings, materials, tools, safety requirements, quality requirements to fully complete the work*

**This subset of AWP is also called Workface Planning, or WFP**

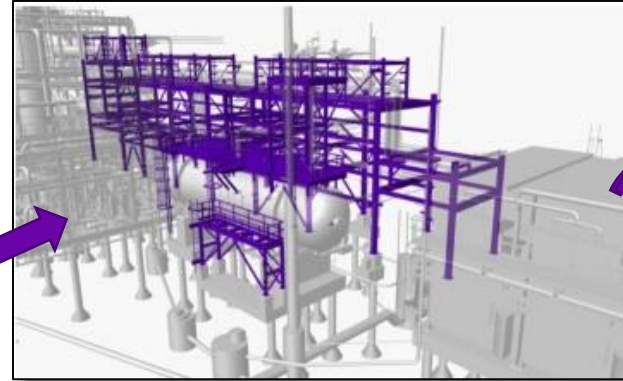
# Project



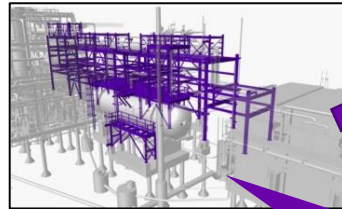
**CWA**  
Construction Work Area



**CWP**  
Construction Work Package



**EWP**  
Engineering Work Package



**IWP**  
Installation Work Package

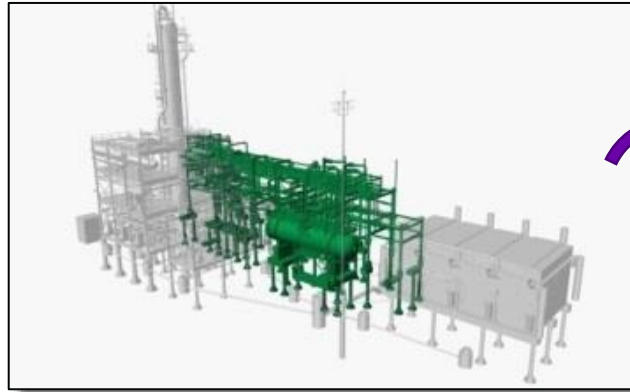


- *Engineering deliverables required for the scope defined by the CWP*

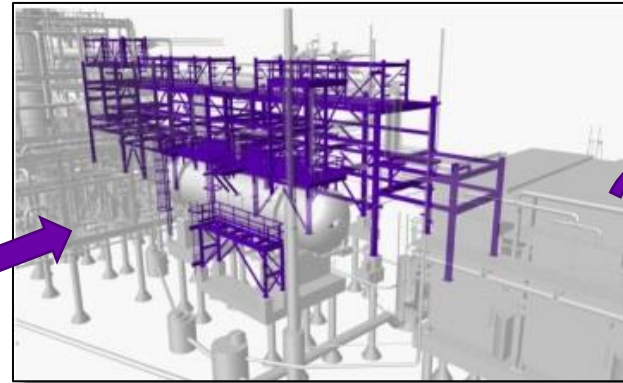
# Project



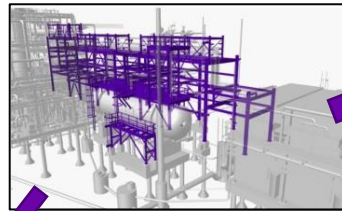
**CWA**  
Construction Work Area



**CWP**  
Construction Work Package



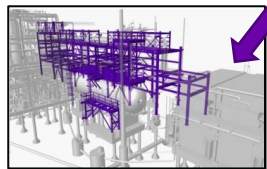
**EWP**  
Engineering Work Package



**IWP**  
Installation Work Package



**PWP**  
Procurement Work Package



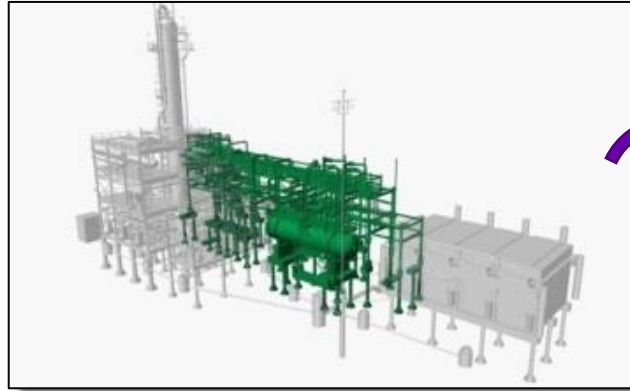
- The deliverables required to procure material designed within the EWP

## Project



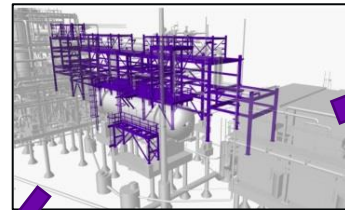
## CWA

Construction Work Area



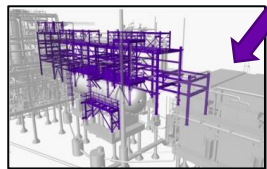
## EWP

Engineering Work Package



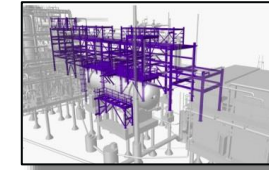
## PWP

Procurement Work Package



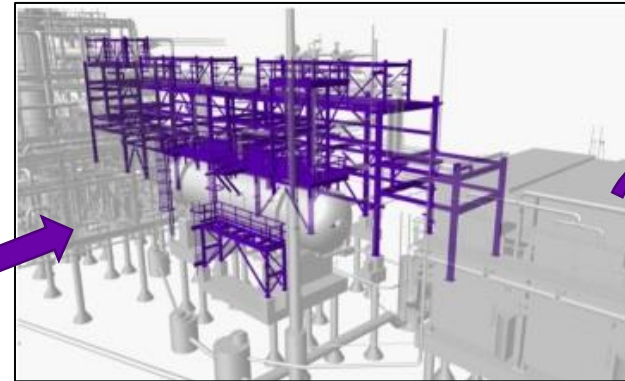
## FWP

Fabrication Work Package



## CWP

Construction Work Package



## IWP

Installation Work Package



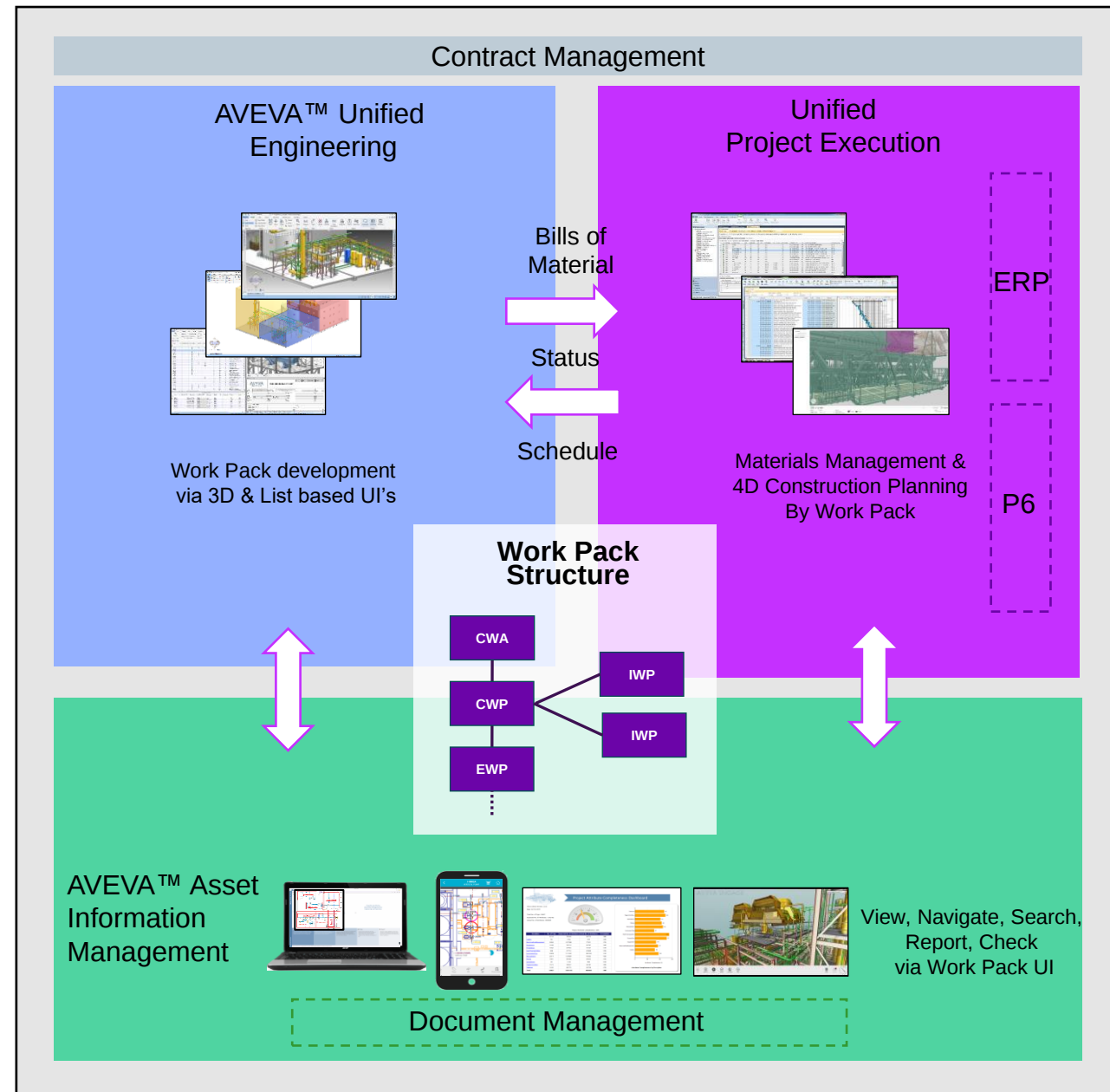


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# AVEVA's Platform for AWP

The “**HOW**”

# Advanced Work Packaging with AVEVA



Open, Flexible, Configurable

**AVEVA™**

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# Major Solution Concepts

## 1. Plan the Work

- Plan the scope of work
- Simulate Execution

## 2. Constraints Monitoring

- Ensure that constraints are managed

## 3. Work the Plan

- Provide required Information
- Capture Progress and Status an roll-up
- Visualize Progress and Status

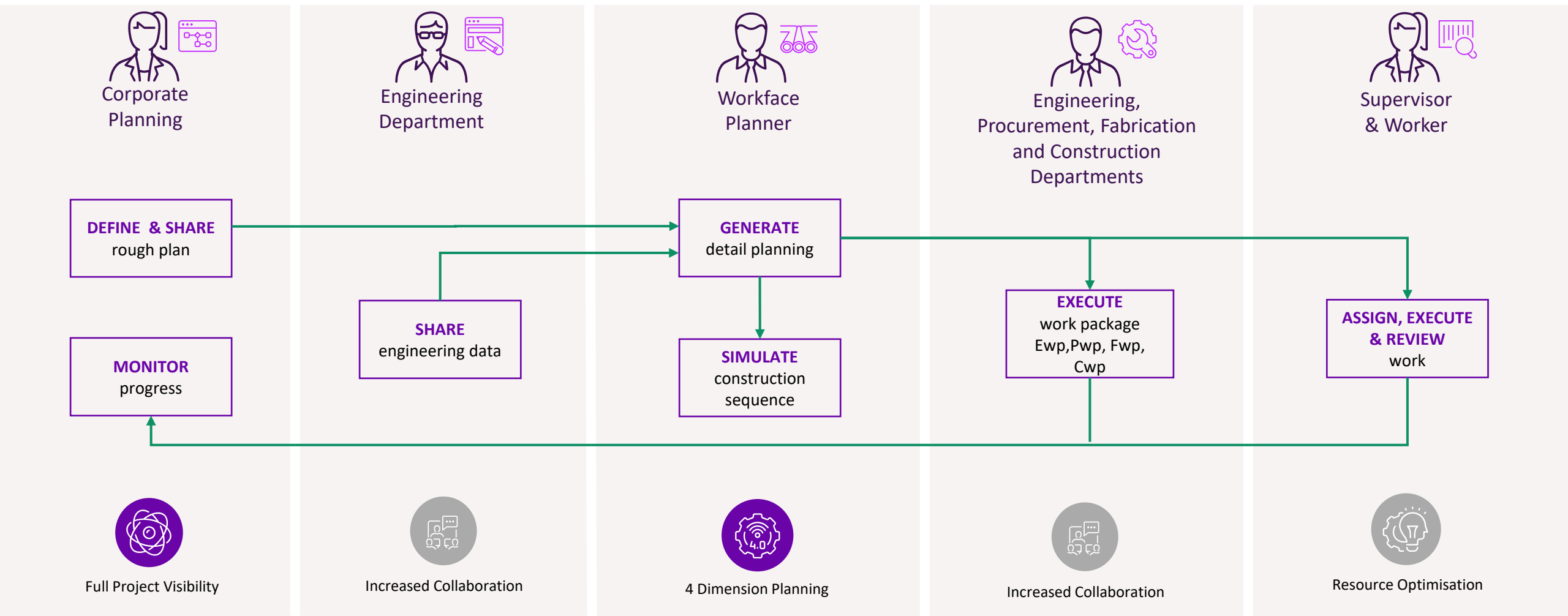


# Construction Management Solution Features

## Basic Functionality

- Basic Work Packaging
  - Combination of a 3D model with a schedule
    - 3D Model can come from various vendors
    - Schedule could come from AVEVA ERM, Primavera, MS Project or simple Excel sheet with activities and dates
    - 3D model items can be automatically extracted from model and assigned to work packs
- 4D Timeline Simulation shows construction sequence over time
  - Simulation is part of AVEVA ERM
  - Work packs linked to 3D model items can be visualized over time (beginning to end)

# Advanced Work Packaging



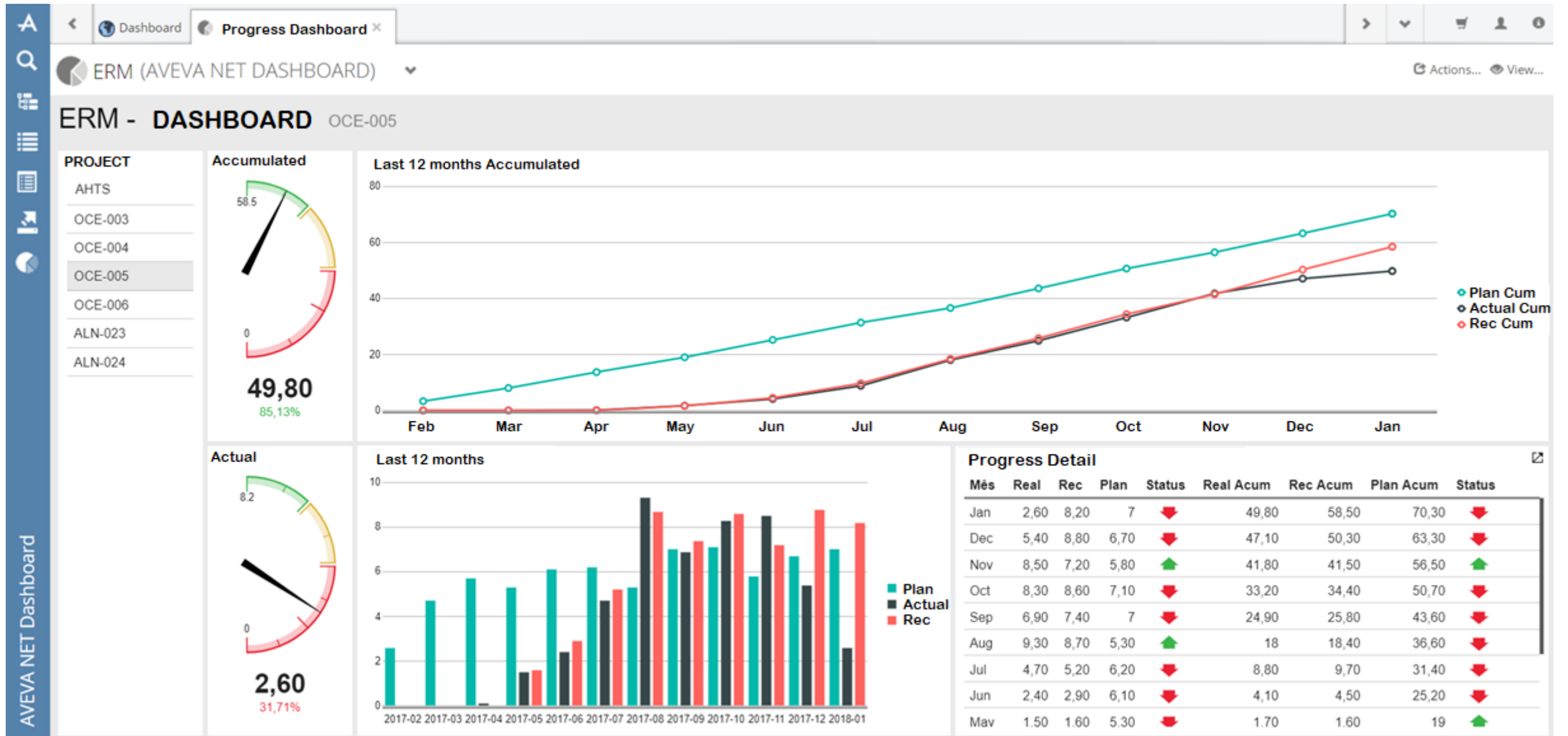
# Project Planning

## My Challenges

- Project Control
- Workforce availability
- Plan the work and work the plan
- Predictability
- Fast access to project data

Give me **access to information, knowledge, and insights** and I **will thrive**

# Asset information management - Dashboard



# AVEVA Solution building blocks

The dashboard is the window into the information source for monitoring and control

Dashboard - AIM

Work Packaging - ERM

Advanced Work Packaging is the underlying concept to manage the actual construction process

Construction Model - E3D

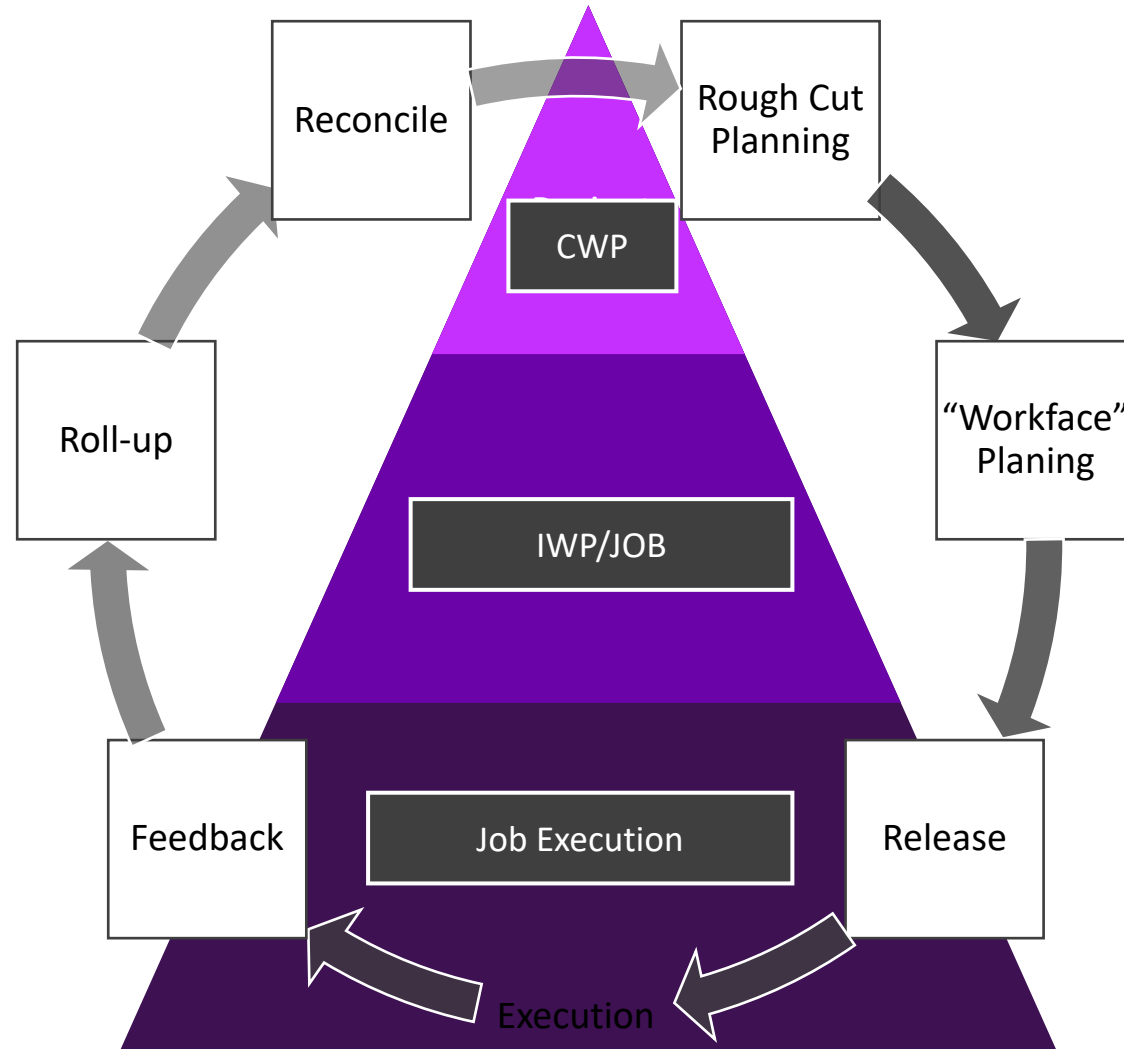
The construction model is the foundation of AWP  
Here we gather all relevant information from various sources

# Solution Features

## Extended Functionality

- Work Packaging and Workface Planning
  - Solution allows to manage various types and hierarchies of work packages such as
    - **Construction Work Packages**
      - CWP get detailed further down to **Installation Work Packages** (IWPs) and jobs
      - Actual progress and status can be reported on job or IWP level and aggregates up to higher levels
    - **Engineering Work Packages**
      - Managing status of engineering deliverables such as drawings
    - **Procurement Work Packages**
    - **Fabrication Work packages**
  - Work Packages can be imported if i.e. contractors manage the details
  - Progress and Status can be visualised against the 3D model (4D/5D)

# Vertical Planning and AWP



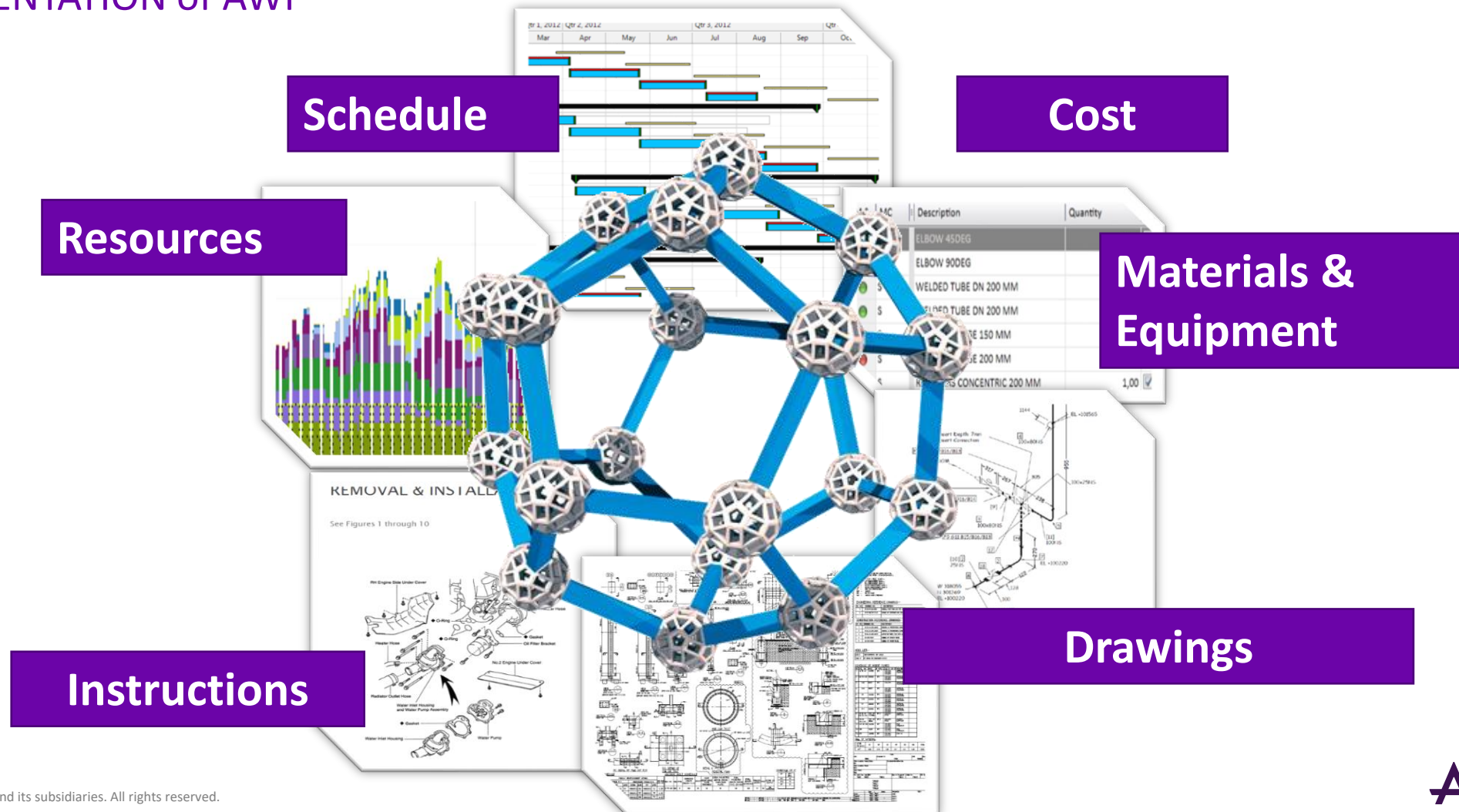
1. Plan the Work

2. Constraints Monitoring

3. Work the Plan

# Work Packages – Putting It All Together

## IMPLEMENTATION of AWP





# Summary

## The Why

- OOs are worried about ROI – Schedule is King!
- EPCs need to improve efficiency and competitiveness
- AWP promises to allow EPCs to improve their efficiency, having better control over project execution
- OOs are mandating AWP



# Summary

## The How – AWP with AVEVA

### 1. Plan the Work

- Build CWP, EWP, FWP, IWP. Plan with the end in mind

### 2. Constraints Monitoring

- Holistic view to make sure that everything required to do a job is available

### 3. Work the Plan

- Execute the work and collect, roll up and visualize progress

Questions?

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#### ABOUT AVEVA

AVEVA is a global leader in engineering and industrial software driving digital transformation across the entire asset and operational life cycle of capital-intensive industries.

The company's engineering, planning and operations, asset performance, and monitoring and control solutions deliver proven results to over 16,000 customers across the globe. Its customers are supported by the largest industrial software ecosystem, including 4,200 partners and 5,700 certified developers. AVEVA is headquartered in Cambridge, UK, with over 4,400 employees at 80 locations in over 40 countries.

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