European Centre for Process Safety

Digital Twin in Process Safety Context

David Bleackley, Vice President Northern Europe

Angeline Chenu, APM Specialist Central & Southern Europe

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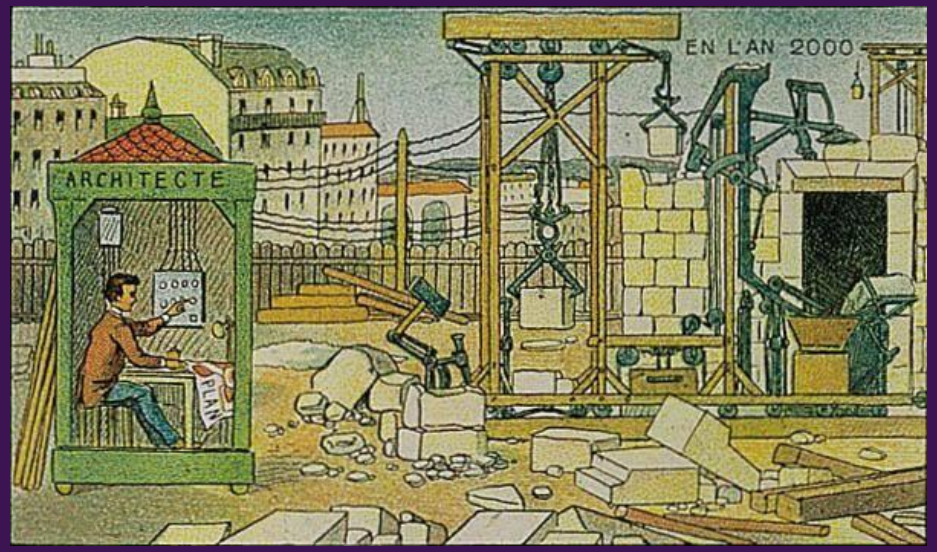

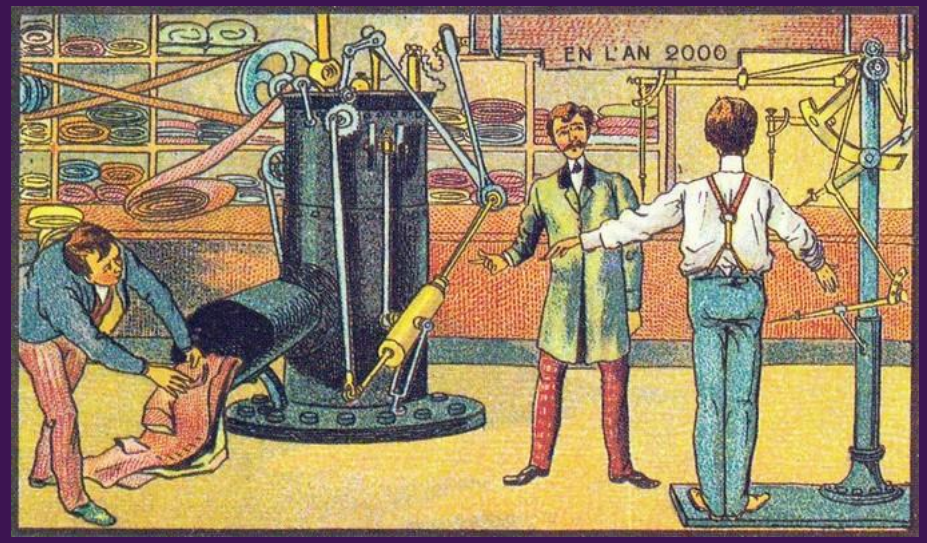

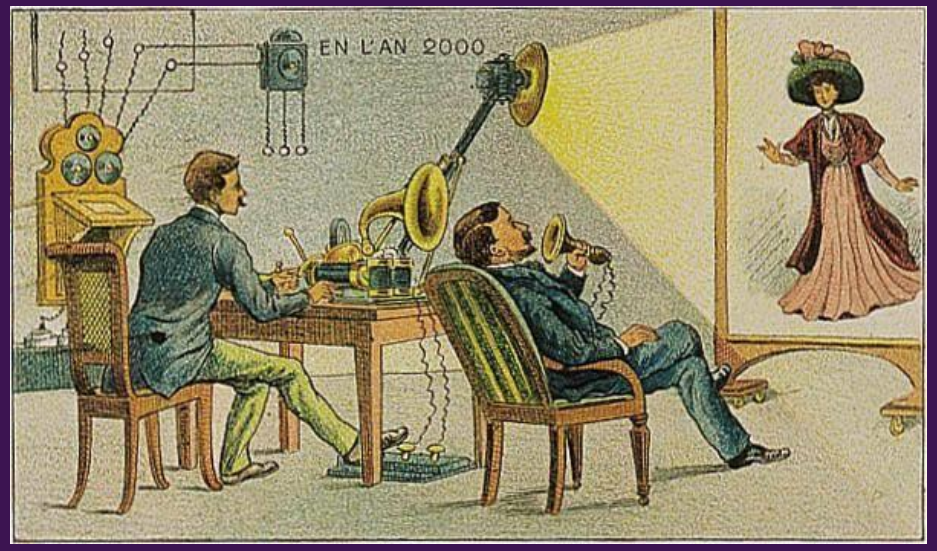

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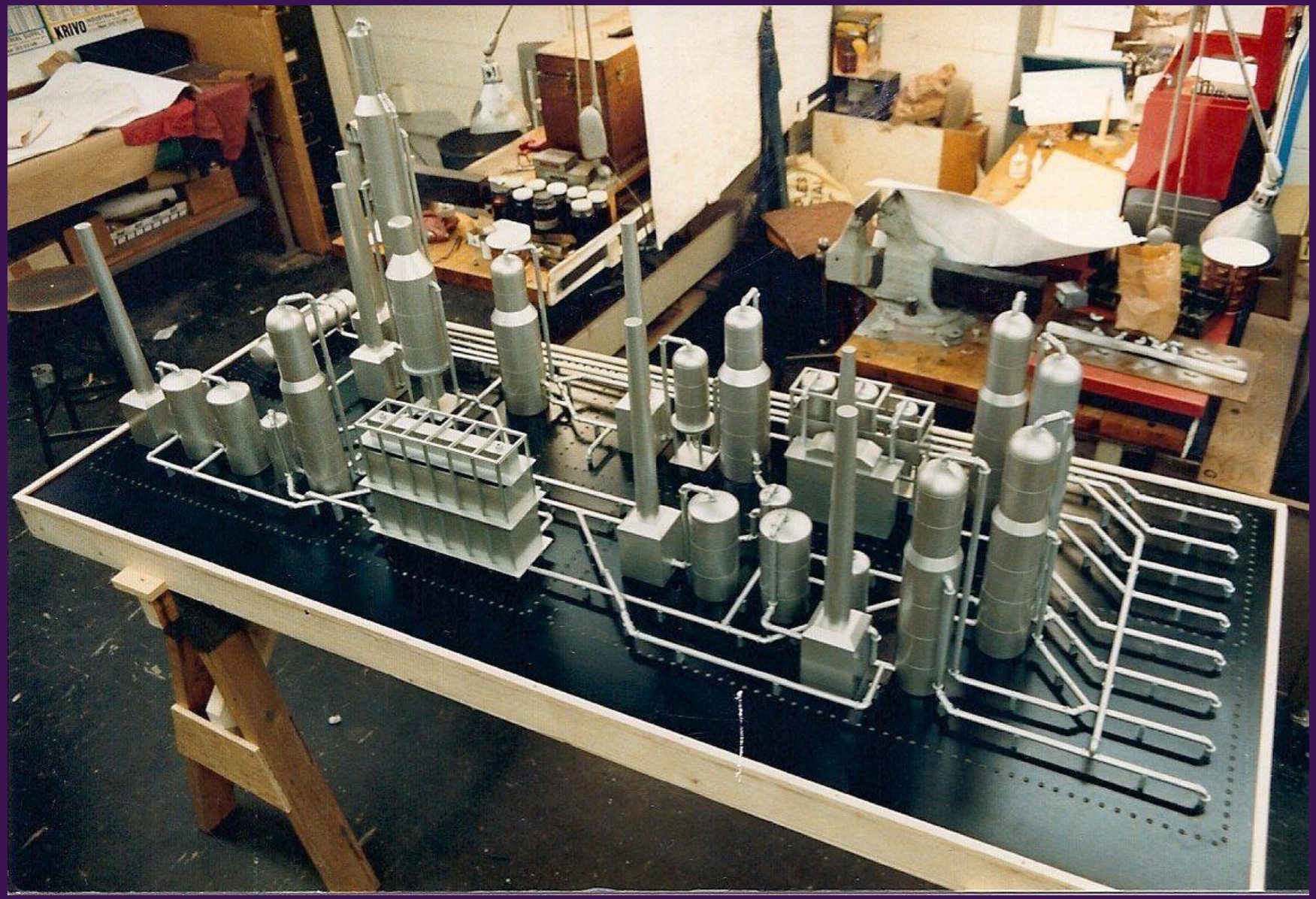

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2020

Engineering | Operations | Performance

Digital Twin

A simple concept…

Mechanical Integrity

ENGINEER

CONSTRUCT

OPERATE

DECOMMISSION

Data Integrity

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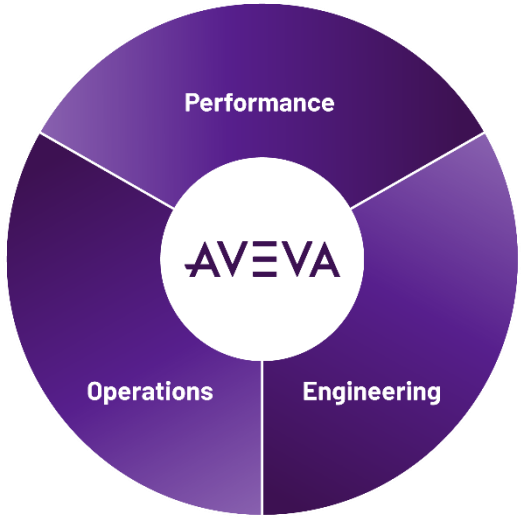
Industry Digital Twin is very similar to AVEVA's view

AVEVA'S DEFINITION OF THE DIGITAL TWIN



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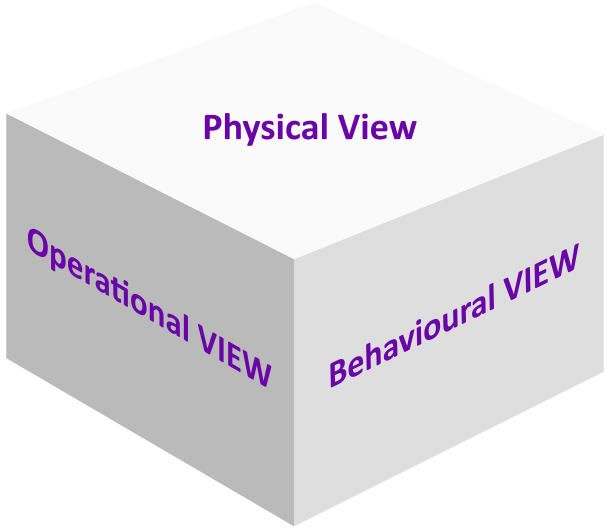

Visualization

Engineering	The model of the physical structure and equipment	Physical
Operations	Plant context, operational status and other information gathered by sensor and real time data	Operational
Performance	Analytical models and algorithms to describe plant past, expected and future behaviour	Behavioural

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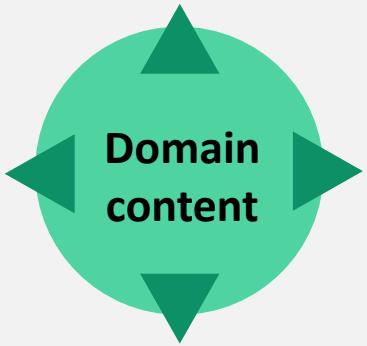
Digital twin and the connected worker - supported by Cloud

Cloud
Ease of deployment, low TCO, collaboration

Artificial Intelligence
Analysis, prediction, guidance, learning

Digital Twin
Multi-discipline
Lifecycle
Personas
Scenarios



Connected Worker
Safe
Reliable
Efficient
Empowered

Big Data
Abstraction, visualization, analysis

Industrial IoT/Edge
Data sources, edge management

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AVEVA

Digital Twin Use Case

In the context of Process Safety Management

Use Case: Digital representation of a Natural Gas facility

- Combines 3D models with Master Engineering & Enterprise data
- Interactive touch-screen display
- Built within 6 weeks

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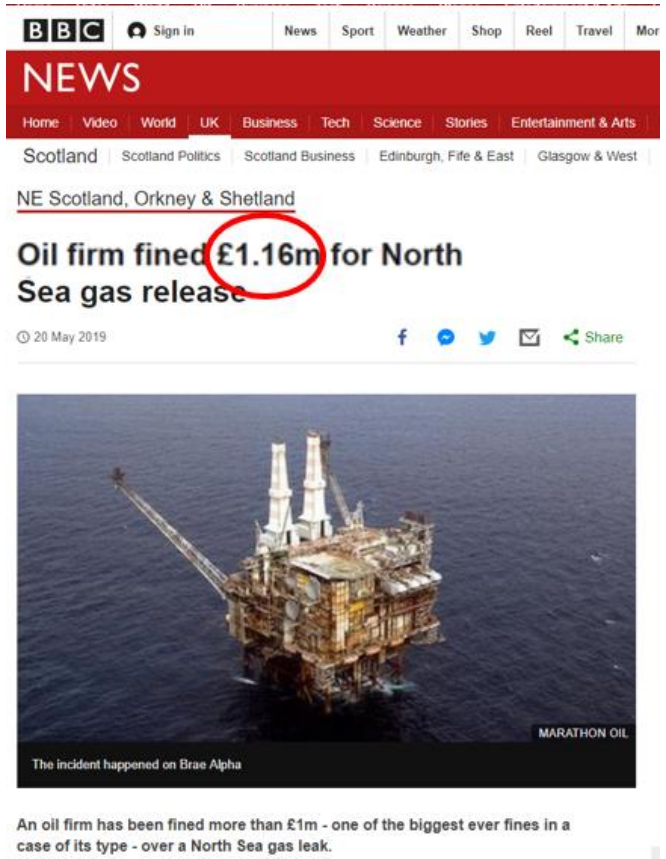
Corrosion Under Insulation (CUI)

An Industry wide Problem

(CUI) is one of the (petro)chemical processing industries worse problems, the cost associated to mitigating it astronomical



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Oil firm fined £1.16m for North Sea gas release

20 May 2019 Share

An oil firm has been fined more than £1m - one of the biggest ever fines in a case of its type - over a North Sea gas leak.

Additional £470,000 costs for investigation work

Up to $50m per day Production downtime

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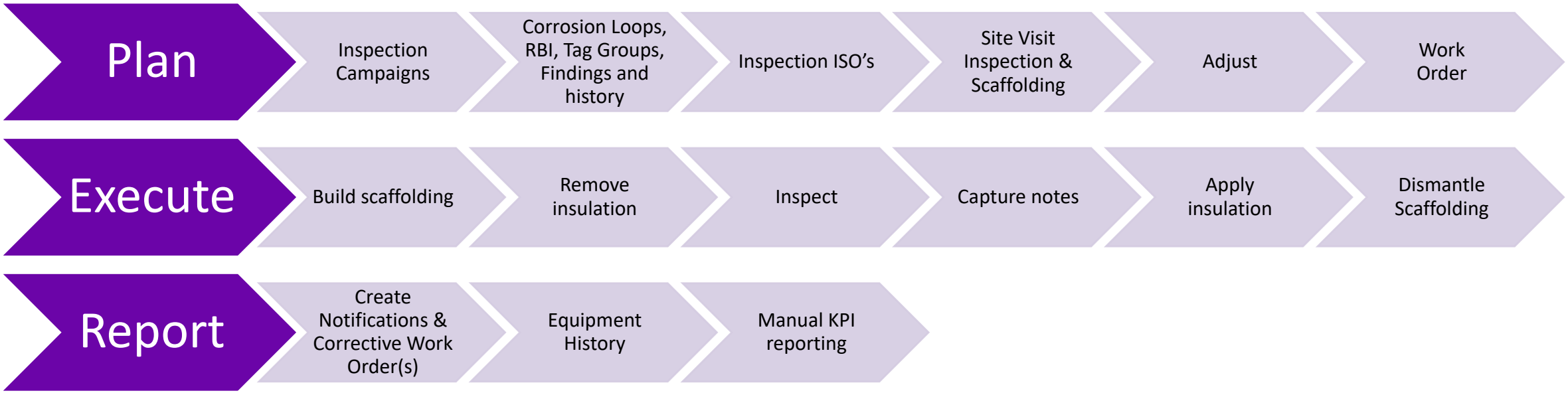
Traditional Process

CORROSION UNDER INSULATION (CUI)



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Leveraging the Digital Twin

- Alert Notification
- Real-Time Diagostics
- Request Maintenance Activity
- Plan Maintenance Activity
- Plan Work Permit
- Pre-Start Up Safety Review & Training
- Execute the Premitted Maintenance
- Review Report & Close Activity
- Enterprise Safety Awareness

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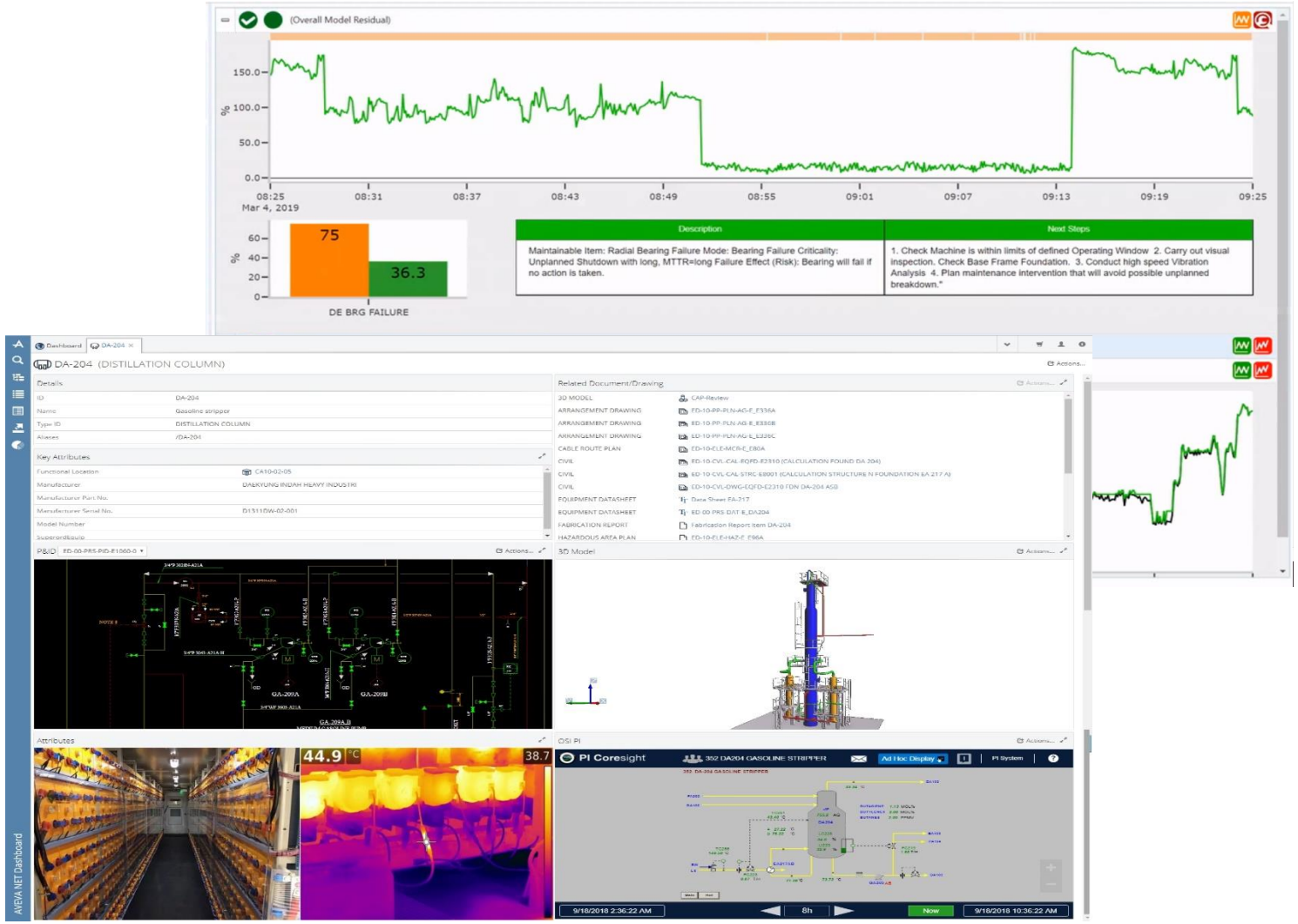

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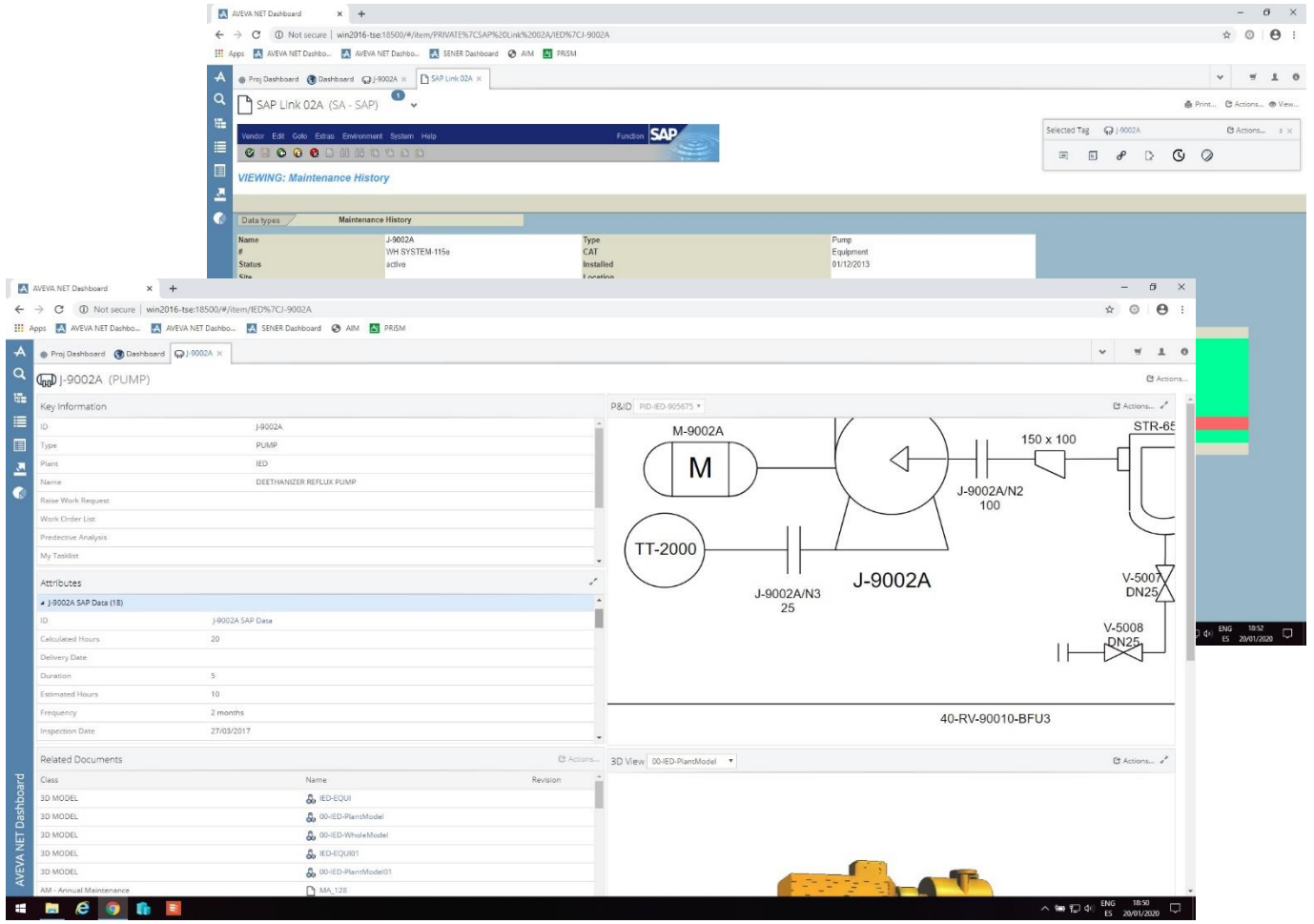

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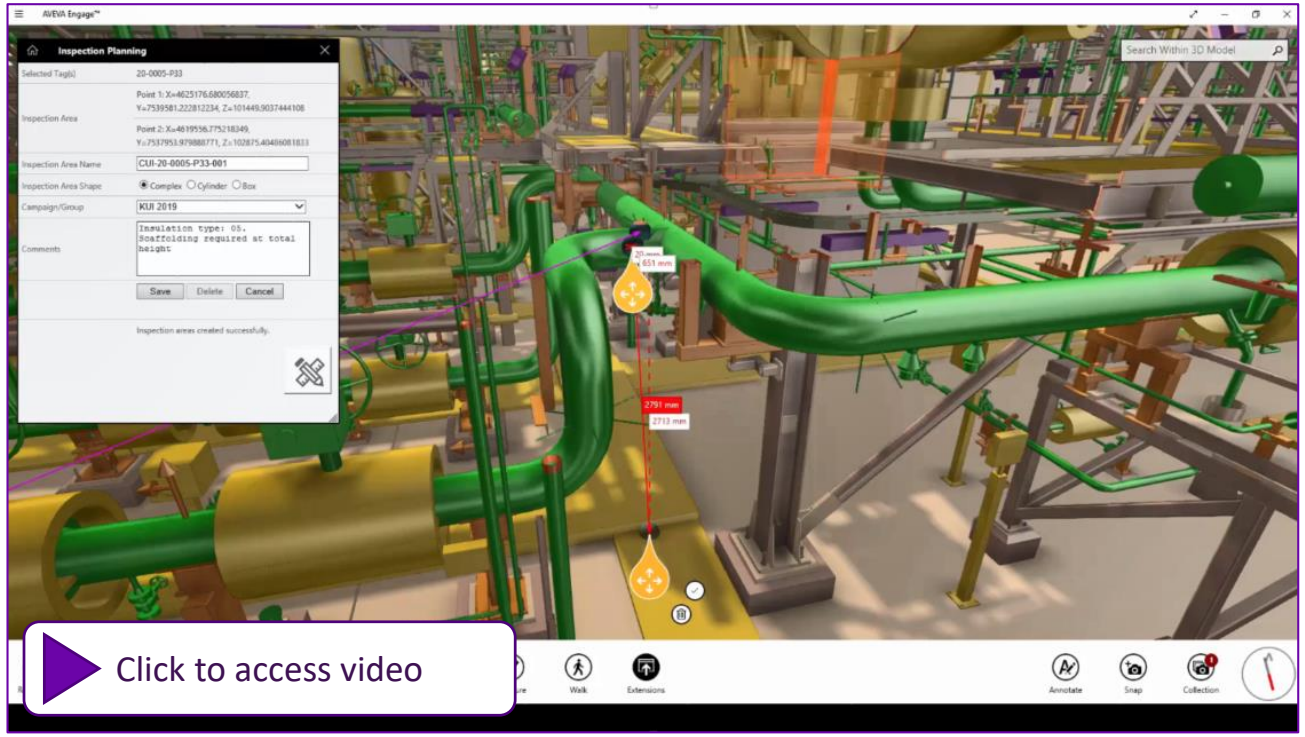

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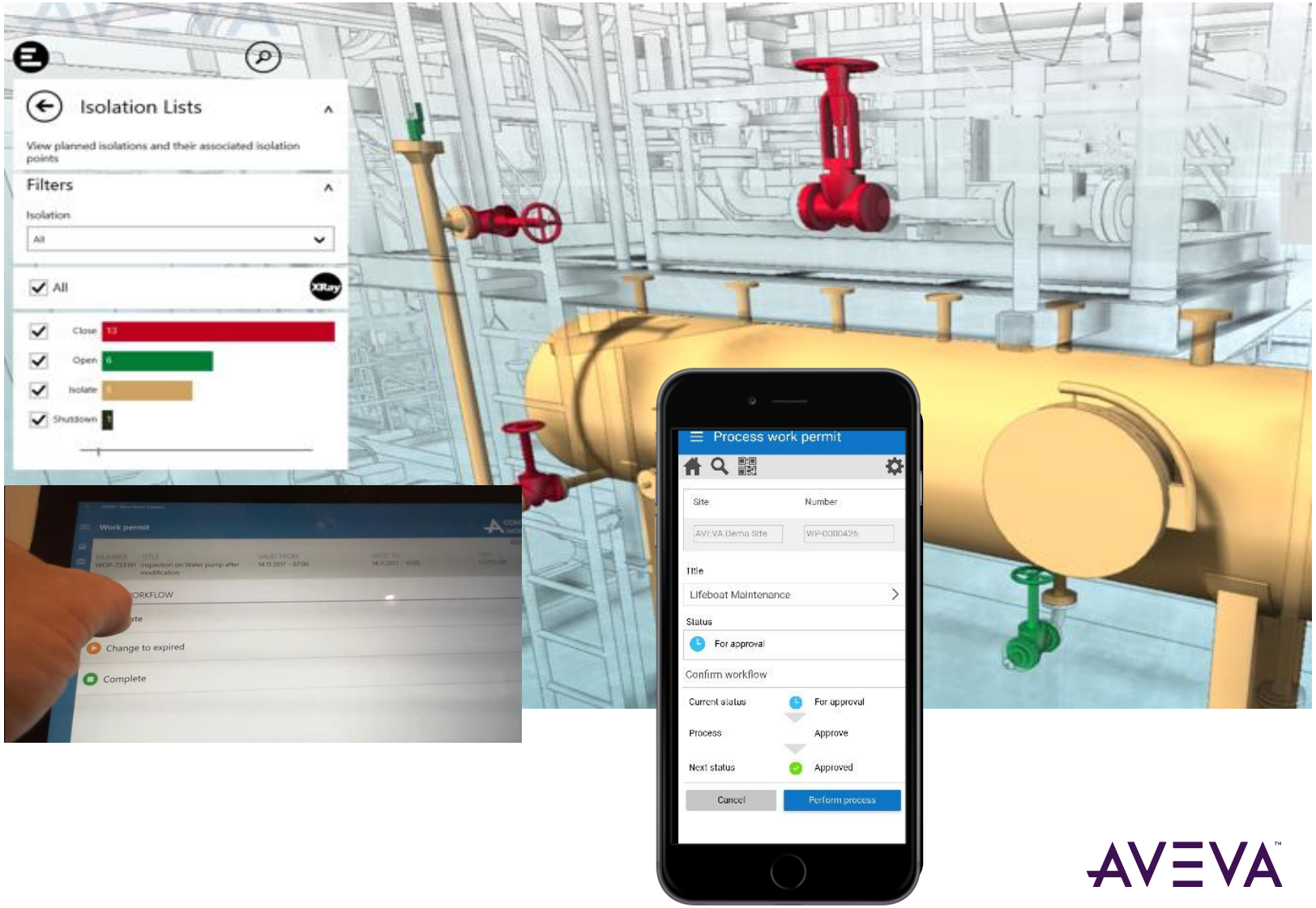

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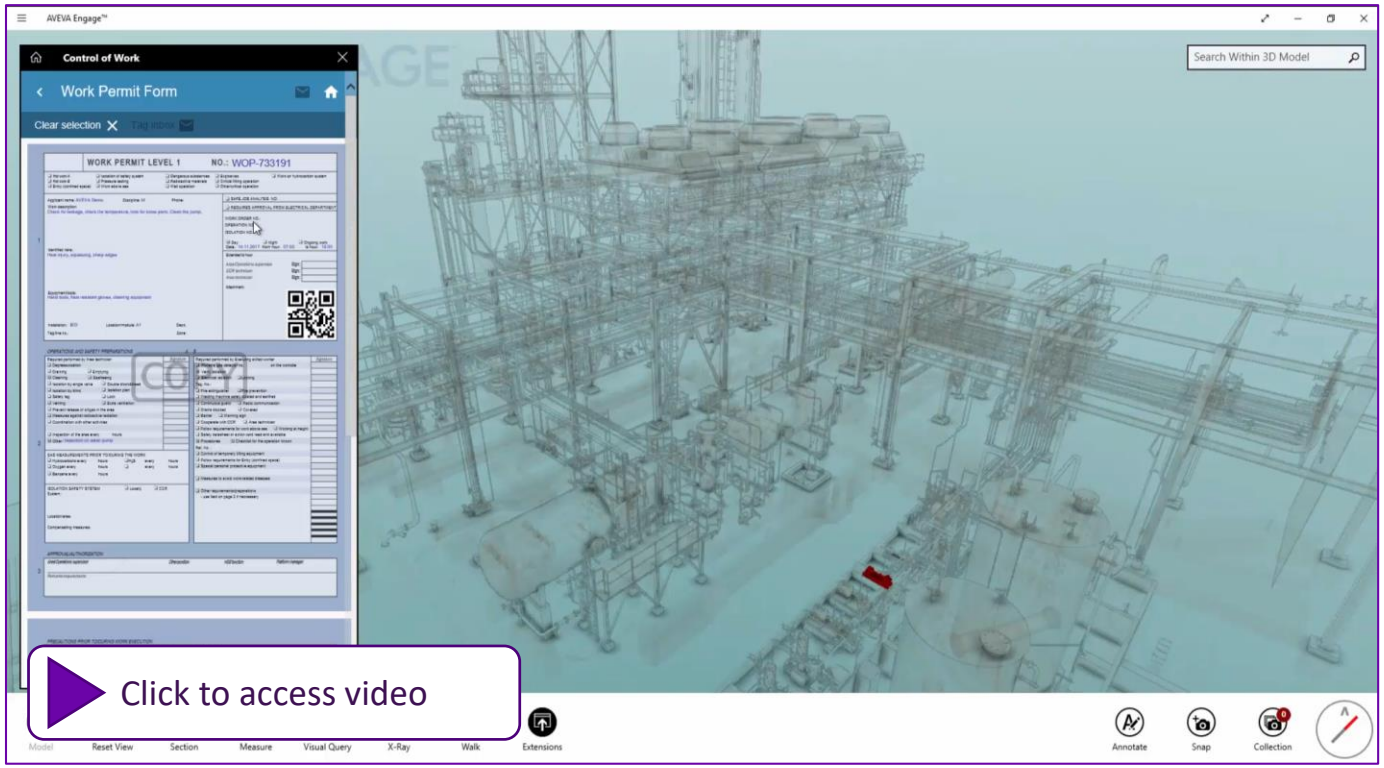

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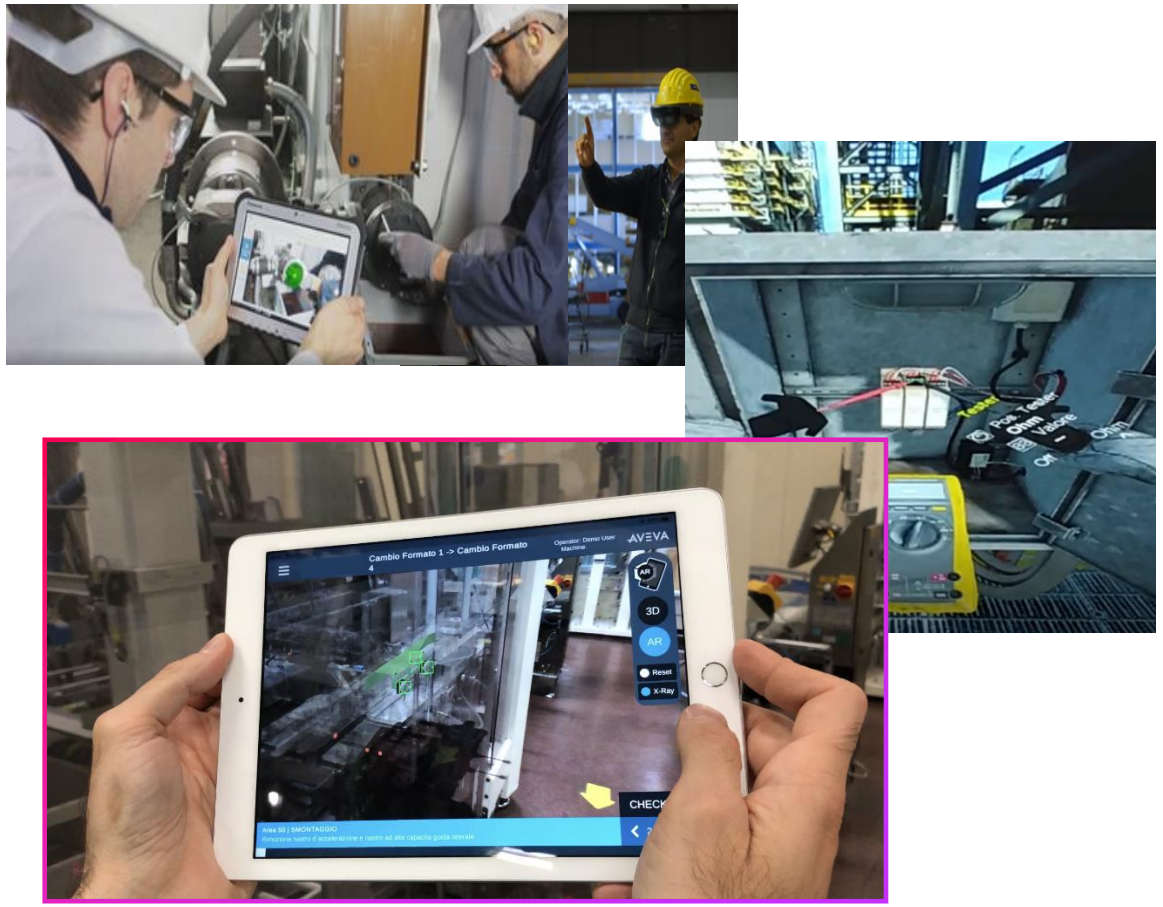

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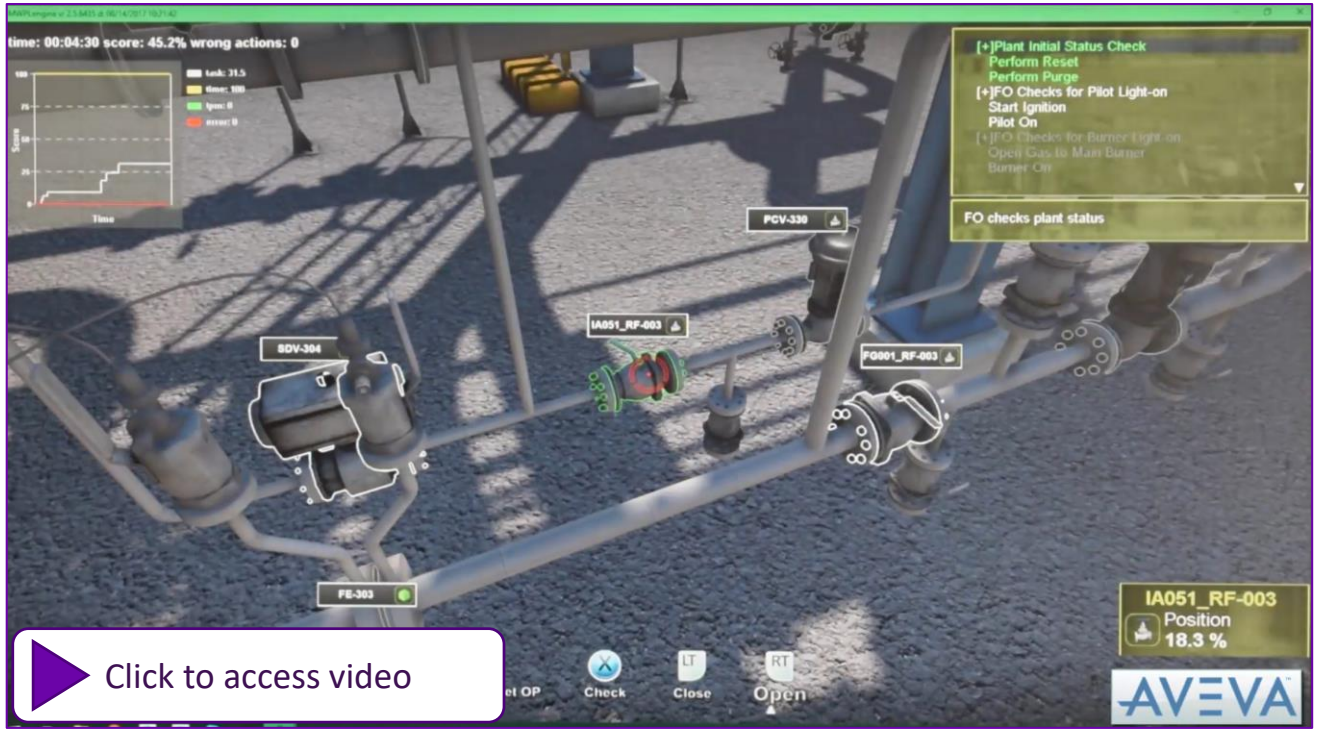

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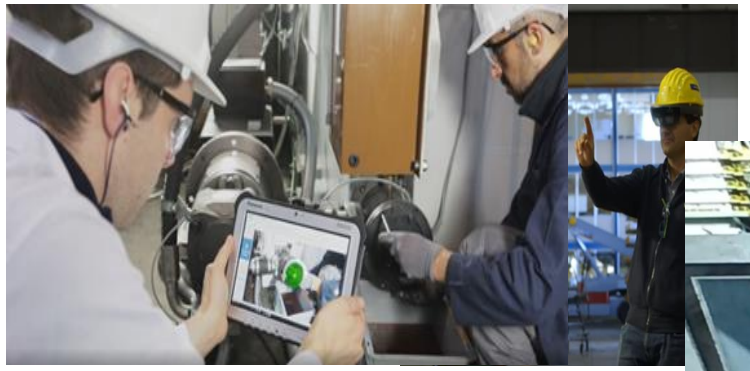

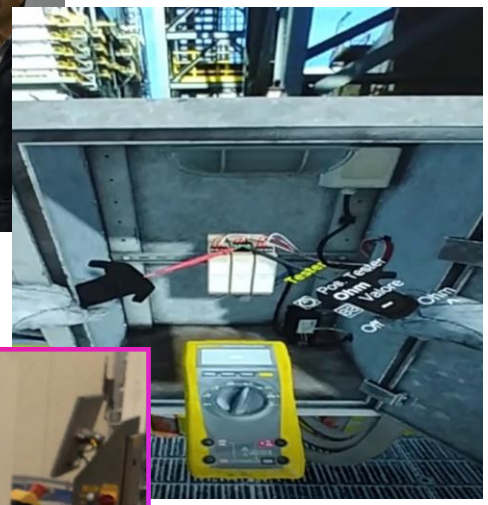

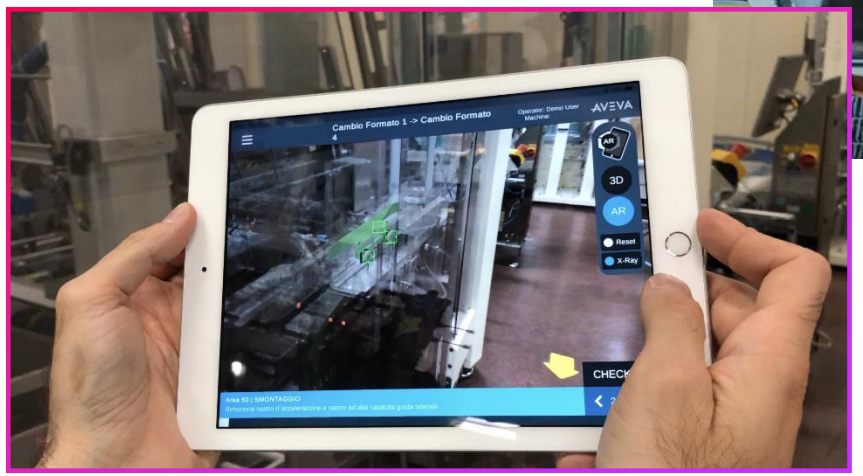

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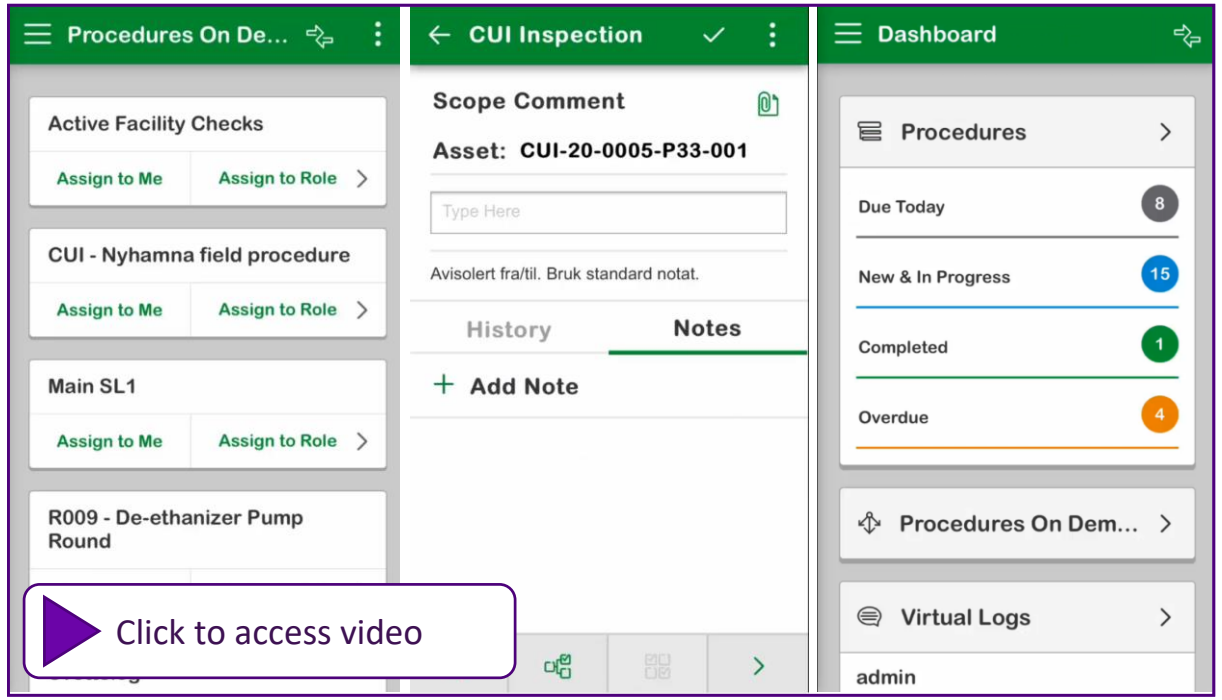

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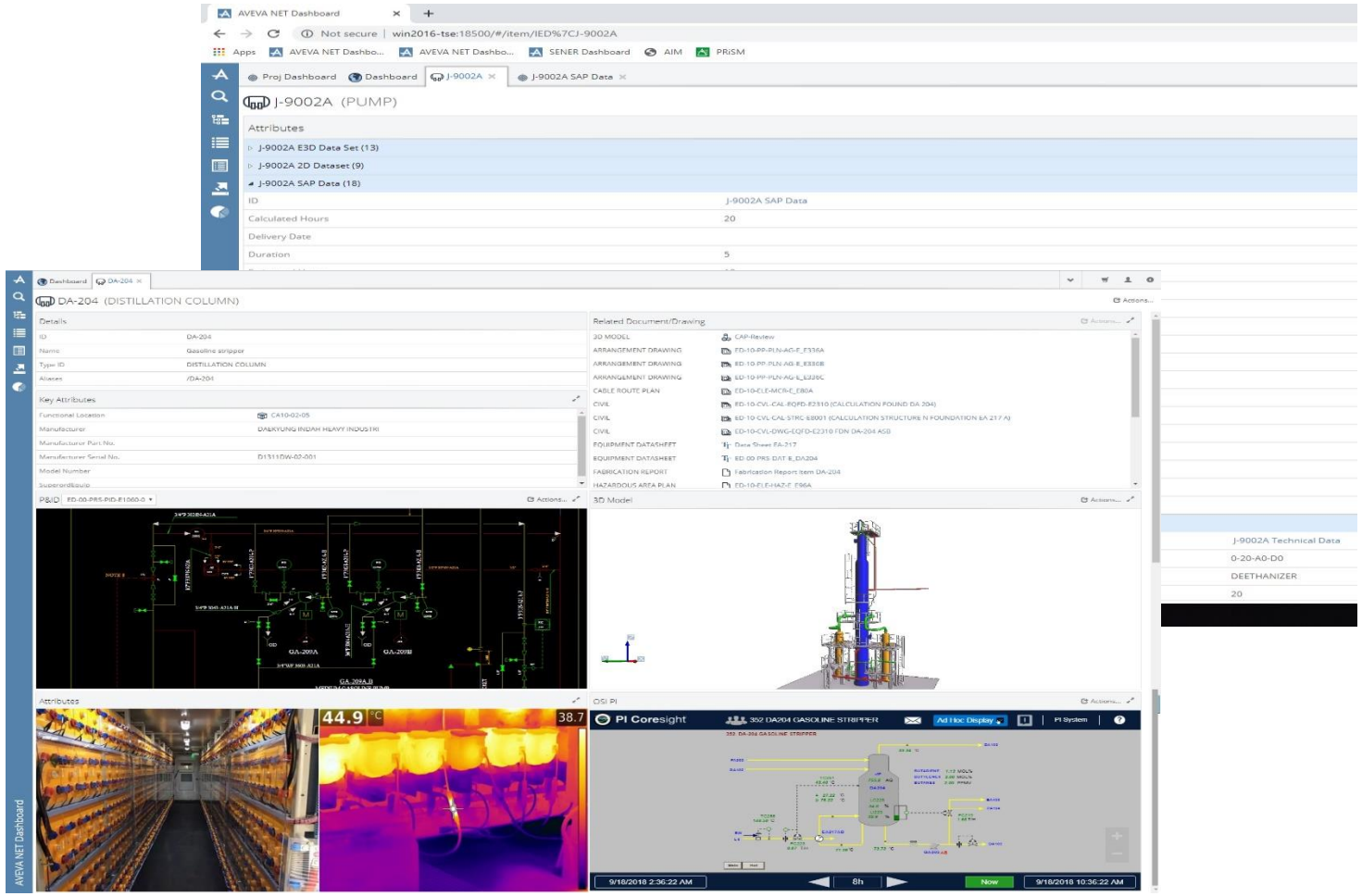

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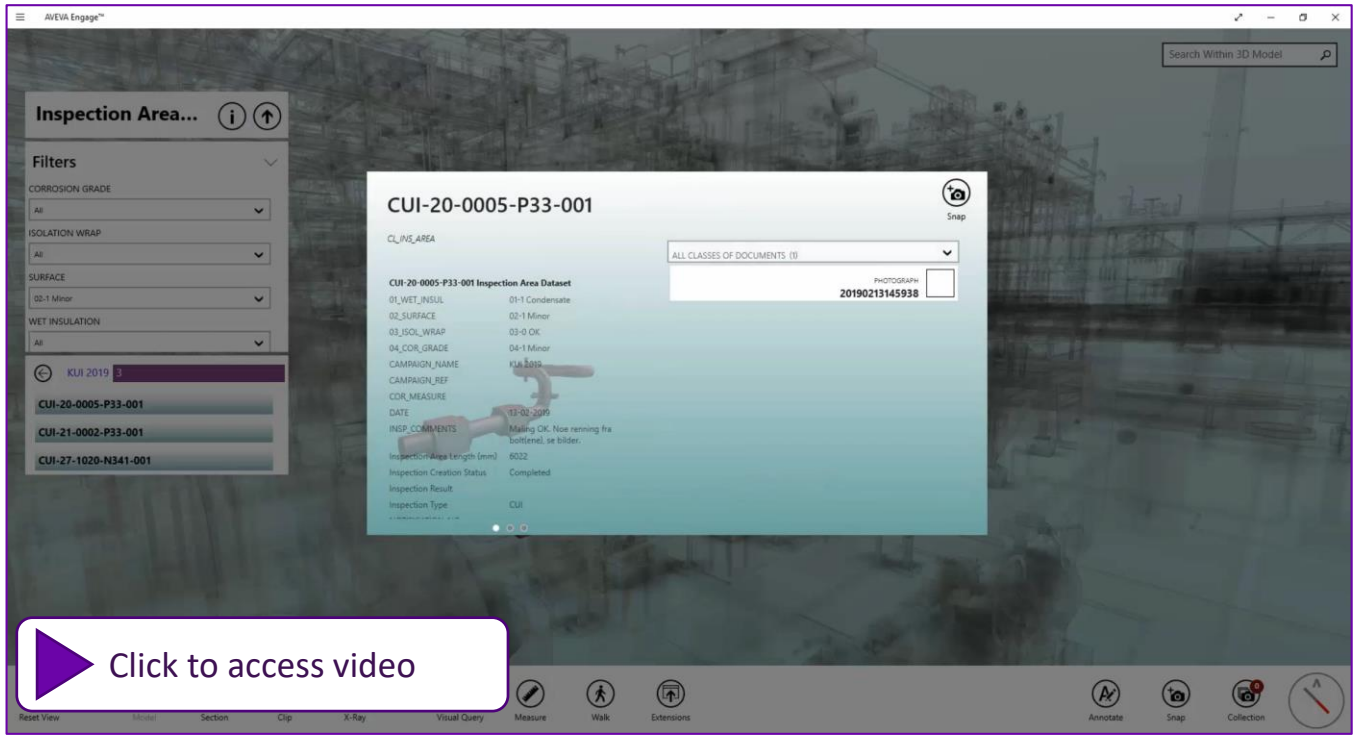

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Digital Process

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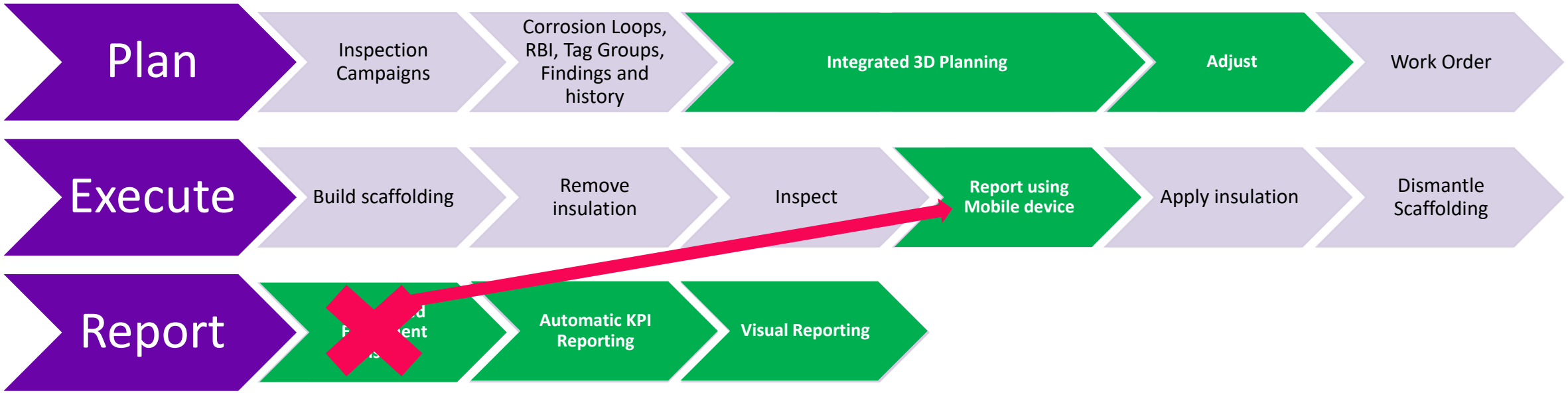

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Digital Twin Process Safety Use Cases

Information Management **Situational Awareness** **Procedures** **Simulation** **Analytics**

- **Training & Competence**
- **Pre- Start Up Safety Reviews**
- **Employee Participation**
- **Mechanical Integrity**
- **(Hot) Work Permits**
- **Emergency Planning & Response**

- Process Safety Information
- Process Hazard Analysis
- Operating Procedures
- Contractors
- Management of Change
- Incident Investigation
- Compliance Audit
- Trade Secrets

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Q&A

Thank You

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