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Revalidation of P&IDs: Introducing AR into Oil and Gas with ReCap and AutoCAD Plant 3D

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Learning Objectives

- Understand the safety benefits of having better data
- Discover new workflows for capitalizing on information to improve safety and operations in a process plant
- Learn how to implement better solutions in your own plant environment
- Discover industry case studies with detailed benefits

Description

Every day 14 people die in job-related accidents in the United States. Safety is the top concern of any process plant operation. Using ReCap Pro software, Navisworks software, and AutoCAD Plant 3D software from the Architecture, Engineering & Construction Collection, Environmental Intellect (Ei) has increased worker safety by minimizing time in the field in harsh and dangerous environments. The following downstream benefits have been realized by using these integrated, intelligent solutions: evergreen P&IDs; better management of change (MOC); more-informed process hazard analysis (PHA); and improved process safety management (PSM). We will present how these, and other benefits were successfully achieved at several oil refineries, chemical plants, and other industrial process facilities within the last 18 months.

Speaker(s)

Shale K. Robison has more than twenty-three years of professional experience as a drafter/designer and as a sales & management executive using several major CAD/BIM platforms including AutoCAD, Revit, Civil 3D, Plant 3D, Navisworks, Microstation, OpenPlant, Pipe Designer 3D, SketchUp, and Solidworks, plus point cloud applications; ReCap, LFM, PPiMMS, and CloudCompare, as well as Bluebeam software. He has worked in Structural, Mechanical, Piping, and Civil disciplines for consulting engineers and owner operators at processing plants for Food & Beverage, Oil & Gas, Chemical, Water and Wastewater; and in the Semiconductor, Utilities, and Transportation industries with extensive multi-discipline and multi-platform experience on large projects. His passion is to minimize duplication of digital data, facilitate efficient integration of technologies, and to complete projects successfully. His career started out using manual drafting techniques then quickly moved to CAD and BIM and finally

business ownership of an authorized Autodesk reseller and consulting firms for technology integration.

Michael Johnson has more than twelve years of experience related to computer-aided design as well as utilizing intelligent BIM platforms, such as Revit. As the Quality Assurance Manager and Technical Subject Matter Expert, he is responsible for training our entire CAD team, as well as ensuring the end product meets/exceeds Ei Company standards. By implementing thorough Standard Operating Procedures, Mike helps our teams minimalize the human error aspect when using CAD.

Benefits of having better data

Compliance and Profitability – easily achieve corporate-driven digitization and compliance priorities bringing profitability and next-generation plant operations.

What We Deliver

Visualization
Of the plant (3D, visual, and maps) overlaid with plant data (asset + data silo integration)

Communication
Streamlining existing channels and building missing channels

Collaboration
Between plant workers using visual and data-driven integrations delivered in a "user-first" format

Why We Deliver It

Safety
To minimize unsafe conditions, unnecessary work, and process hazards minimizing near-misses, incidents, and fatalities.

Empowerment
Empower your most valuable asset (your employees) to make the most-informed decision at all levels.

Compliance and Profitability
Easily achieve corporate-driven digitization and compliance priorities bringing profitability and next-generation plant operations.

PLANT DIGITIZATION by Ei
a better way to operate

Ei's Digital Twin

1. Ei's 4-Step Digitization Process

2. 5 Videos to Share Ei's Vision

3. Questions?

Step 1: Convert & Revalidate P&IDs
What continues to guide our technologies for retags and revalidations?

P&IDs are foundational to the site and must be the backbone of any consolidated plant digitization master strategy. iPIDs are Ei's Intelligent P&IDs.

More than just a drawing, the iPIDs are linked to the DATA that informs every aspect of Maintenance, Operations, Safety, Turnarounds, Compliance, Administration, and Projects (MOSTCAP) by facilitating Correlation, Coordination and Communication between all stakeholders and removing unnecessary and problematic copies of the same disconnected information

- PSM compliance and risk evaluation require accurate documentation
- LDAR inventory-related issues are caused by are the tools and approaches that are accepted as industry standard.
- On these projects, paper and manual data entry are the enemy - waste of time and introduces chances for error.
- Modern hardware and software can be leveraged to empower personnel in the field - giving them access to the information they need to do their job more accurately and efficiently.

Step 2: 3D Laser Scan

Ei Combines 3D Photos and 3D Laser Scans to mm Accuracy
Markup and Measure Capabilities of Point Cloud and 3D Photos

3D laser scanning is not new (for CapEx)
1. Ei laser scans for OpEx (Maint, Ops, Eng, QHSE, etc.) at other plants
2. Ei's scan approach captures as-built information:
3. 3D photos and point cloud data (in color)
4. mm accuracy + 350m range
5. Ei's laser scanning engineers...
6. Reduce rework/virtually double check
7. Reduced elevated/piperack work
8. Fewer field personnel required

Optional Step 3:
Leverage 3D Models for Isometrics

Step 4: Integrate Data

Better Tools for Safety
Pre-Plan JSAs
1. Identify safety hazards throughout the unit
2. Pinch-points, "head knockers", potential hazards
3. Locate ALL safety showers, goggle areas, double hearing protection areas, etc.

Emergency Response
1. Daily "live" mapping of confined space/critical work
2. Tier I/II localized damage incident reporting

Compliance Inspections
1. Daily "live" mapping of confined space/critical work

    2. Tier I/II

Better Tools for Operators
Search and Locate Equipment Digitally
1. Search for vessels and other equipment with ID tags
2. Incorporate car-seal and other equipment inspections
3. Reduce exposure time spent in the field
4. Locate valves in the pipe rack without leaving grade

LOTO (Lock Out Tag Out)
1. Communicate with Maintenance to complete LOTO
2. Identify blind points
3. Identify safety hazards
4. Identify necessary personnel/equipment required to complete the LOTO

Communicate with Maintenance to complete LOTO
1. Assist in the permit writing process
2. Identify Safety Hazards
3. Communicate with the craft person to discuss job scope
4. Locate process drains (Hot Work/Low Energy)

Better Maintenance Planning Tools
Maint/Turnaround Planning
1. Scaffold planning
2. Reduce exposure time spent in the field
3. Identify tools required to complete the job
4. Measure distances without being in the field

Management of change
1. Identify blind points and LOTO
2. Verify equipment and area impacted by MOC
3. Identify staging areas for equipment, scaffolds, etc.

Pump Maintenance
1. Communicate with Operations to plan/complete job
2. Communicate with the craft person to discuss job scope

Better Tools for Risk Management
Process Hazard Analysis (PHA)
1. P&ID revalidation (additional slides attached)
2. PSM Compliance:
3. Reduced time for PSM compliant P&IDs - Could re-scan and revalidate more often
4. Process Safety Information - Central source of truth. PSI lives in the iPID
5. Mechanical Integrity information - centralized and accessible

Better Compliance
Safe work execution
1. Clearly communicate DORs in areas where hot work may be permitted
2. Minimize at-risk elevated work (tagging DTMs)

Revalidate/Modernize Inspections
1. Reduce time to inventory DTM FUGEM components

2. BWON, RCRA, SPCC, etc. inspections

T/A Planning
1. List DORs on "Live" Ops Map
2. Suggest proactive elimination of DTMs (high points to be removed/plugged)

In conclusion …