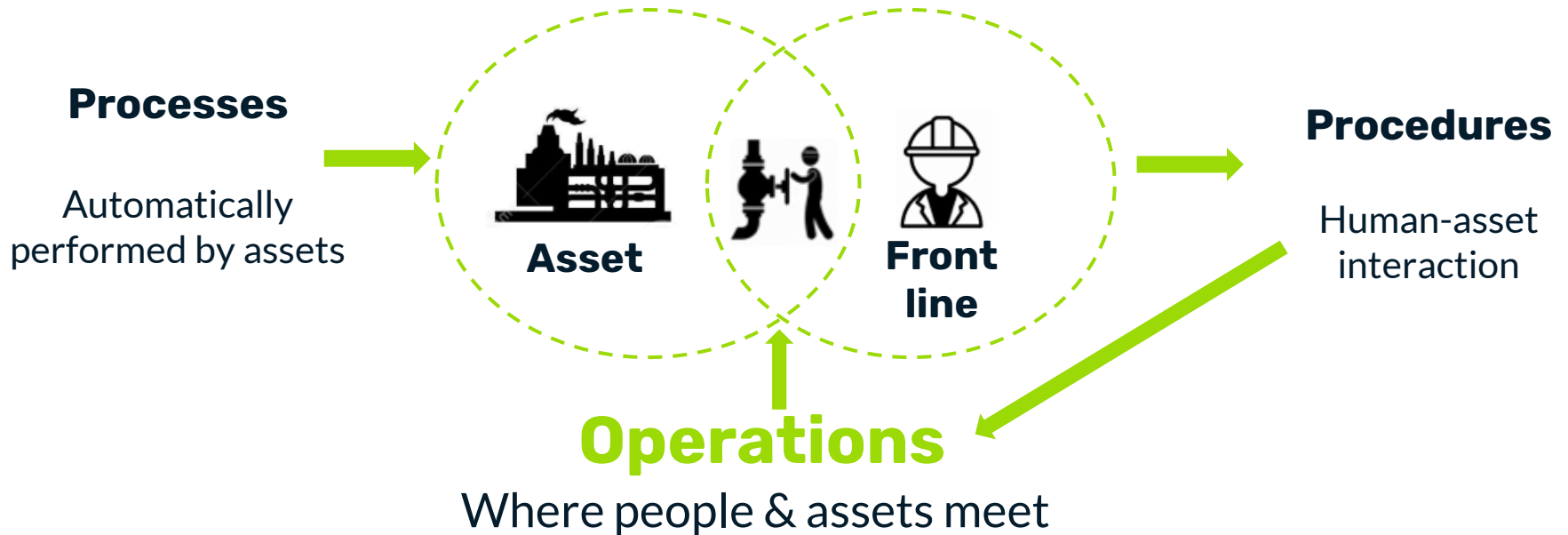


How Enhanced Reality technology reduces human errors.

Jaime Aguilera
September 2022

Operations: a challenge for asset intensive industries

OWE: Workforce Availability, Reliability, Productivity





'Failure to follow procedure' is often cited as
root cause in incident investigations

Voovio data shows **'Procedure Clarity'** is a
major source of error overlooked in the
process industry



What is Procedure Clarity for an Operator?

1. Clear and concise actions
2. Ability to visualize procedure steps in the field
3. Ability to practice standardized execution (*learn by doing*)

Procedure Analysis.

We randomly sampled and analysed ~300 customer procedures:

S/U and S/D incl Equipment Swaps	83%
Normal	8%
Emergency/Abnormal	7%
Maintenance Overhaul	1%
Temporary	1%

90%
Of SOPs
analyzed
contained
ambiguities

Three reasons for suboptimal procedure clarity.

- 1. Procedure does not reflect operator practice**
Written procedures vary from the unit's established practice with some practices varying from shift to shift either due to training inconsistencies or a lack of standardized execution.
- 2. Ambiguities and generalizations**
Procedures are written with a lot of technical content, generalizations and ambiguities that assume clear understanding by the operator.
- 3. Inexperience; Lack of practice**
Operators only experience or practice ~40% of the procedures they qualify on for any given job.

Ambiguity - Customer example.

1 step

2.3 *Open the non-instrumented fuel gas cock valves and air dampers.*



10 actions

- Interacting with 5 air dampers
- Actuating 5 fuel gas valves



Ambiguity - Customer example.

1 step

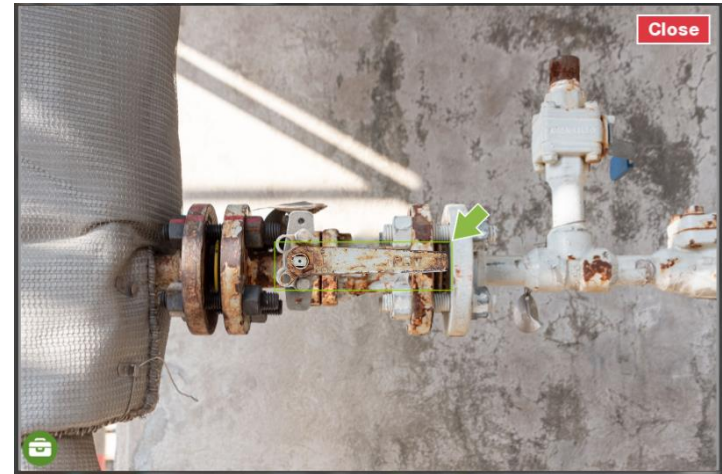
MANUALLY FLUSH all CTO's, top/bottom flushes, bypasses around flush flow meters, and any other isolation flush valves

CAUTION

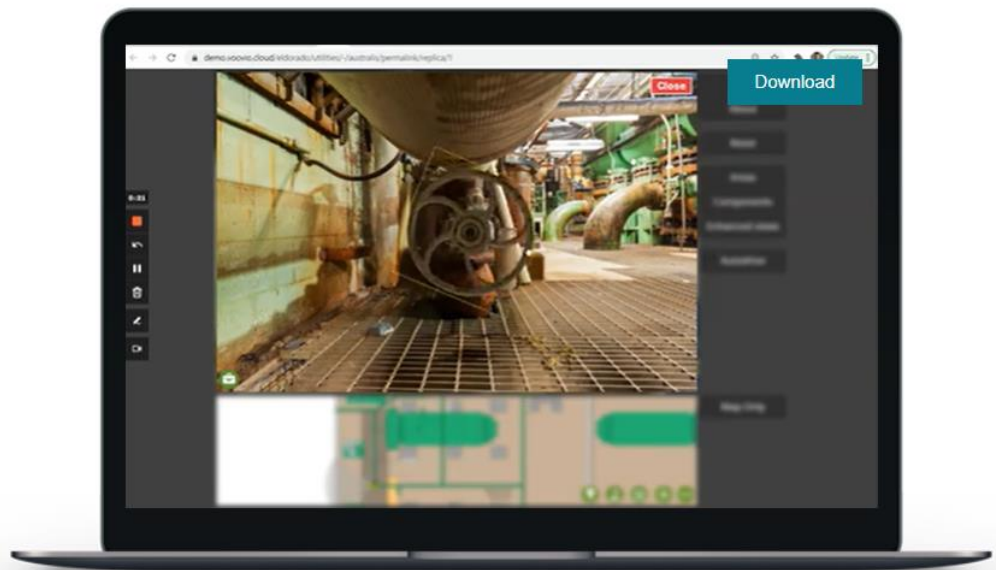
Failure to properly flush all CTOs may result in a reactor poisoning event

53 actions

Actuating 15 different valves



Demo.



Success Cases - ROI.

Case Study - Refinery.

Site:

- Refinery

Challenge:

- Eliminate loss of containment of process materials resulting in reportable incidents and regulatory fines
- Procedure generalizations
- Lack of exposure to entire startup procedure and lack of competency

Use of Voovio:

- Line Walk process to create action checklist clearly defining all release sources
- Practice procedure simulators prior to procedure execution
- Field execution tool

Main ROI contributor:

- Elimination of environmental releases



Case Study - Technical Gases.

Site:

- Plant / Support process for refinery

Challenge:

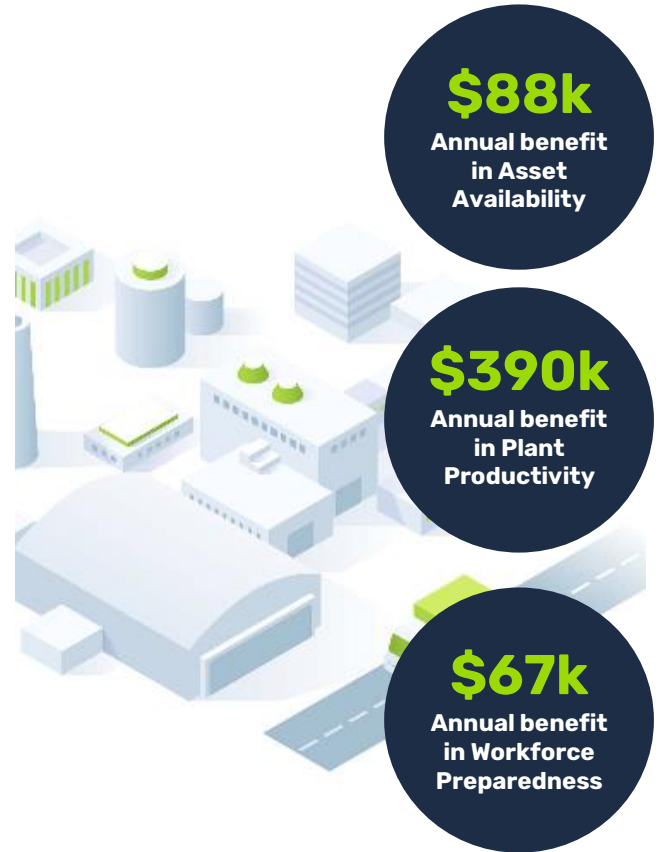
- High attrition: Improve operator onboarding efficiency and reduce costs. Impossible to expose operators to all SOPs.
- Unplanned downtime related to boiler feedwater (BFW) pump failures related to mis-operation

Use of Voovio:

- BFW training/refresher prior to execution
- Visual, action checklist provides clarity for inexperienced operators
- Onboarding curriculum for new operators

Main ROI contributor:

- Increased organizational productivity and reduction of unplanned failures



Fewer incidents and more efficient loading operations.

- Time savings for operators: 75-80%
- Structured training and consistency between operators
- Drivers know what to expect and better prepared
- Drivers are more familiar with equipment/site and recognize issues early
- Drivers give us better feedback on issues
- New confidence in drivers
- Automated, documented truck driver test results
- ... Now an area we worry less about. Life is a little easier



Proven solution, visit us at Booth 14





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