

IGPH INDUSTRIAL GAS PROJECTS HOUSE

Optimised Cylinder Filling



Agenda

1. Overview of the IGPH Group

2. Optimising Cylinder Filling;

1. Review current technologies
2. Automation

3. Benefits

1. Productivity & efficiency
2. Quality & Repeatability
3. Safety



Current techniques

Manual Filling / technology

- Heavily reliant on operator presence within fill area;
 - Managing the fill
 - Filling
 - Handling (FLT)
- Reliant on operator diligence for quality & repeatability
- Labour (man hours) intensive
- Safety??
- Lower CAPEX (historically)
- Higher OPEX

Automation

- Significantly reduced reliance on operators
 - Fill managed by the integrated control system
 - Use of AGV (Automatic Guided Vehicle) reduces fill area personnel
- Integrated control system manages quality and repeatability
- Significant reduction in man hours;
 - Increased productivity
 - Increased safety
- Reduced OPEX
- Significantly improved **INFORMATION** and statistics

Optimisation = Automation

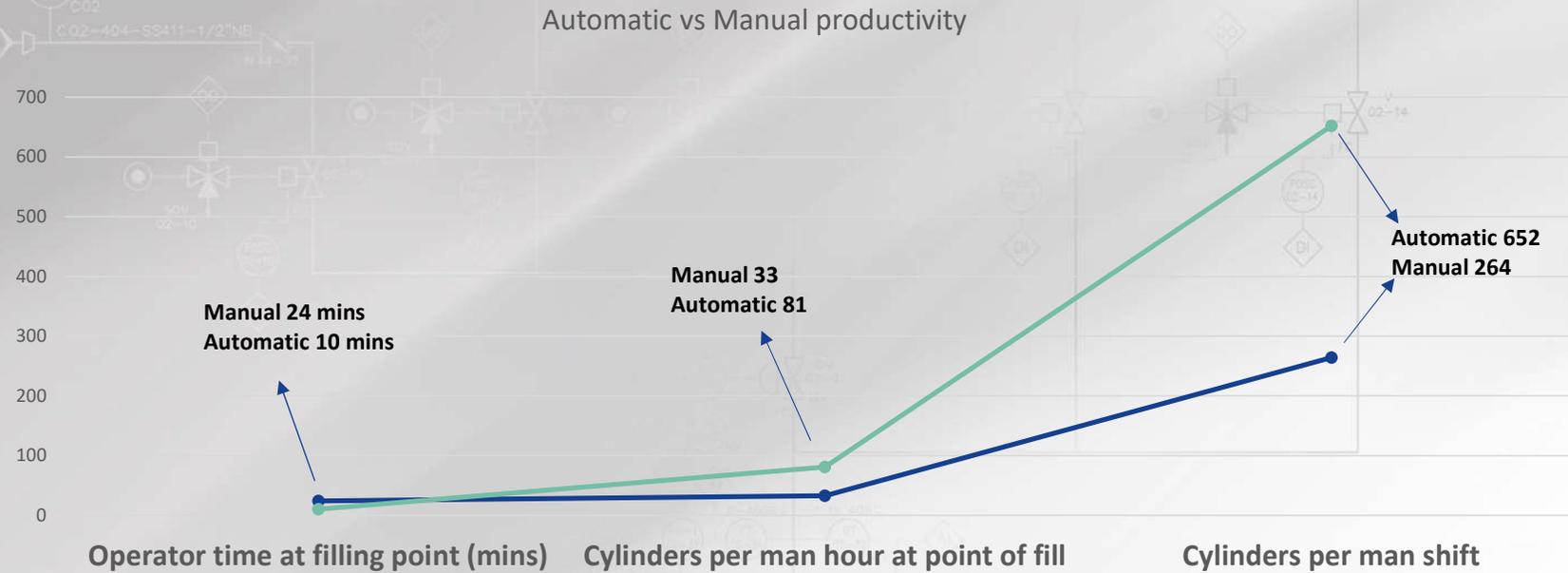
- Higher productivity = reduced costs
- Higher, repeatable quality = reduced “out of tolerance fill failures” = increased efficiency
- Reduced waste;
 - Unattended pumps build tank pressure leading to gas venting
 - Manual purging often uses more gas than necessary
 - Correct results, first time, every time
- Increased service intervals of pumps by enforcing automated sequences
- Less equipment required – smaller footprint
- Core pre engineered packaged solutions - closes CAPEX gap
- Increased safety for all stakeholders

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Productivity - Example



	Manual	Automatic
Mixture Filling		3 component
Cylinder size (Ltr Water capacity)		50
Settled Pressure (bar)		200
Cylinder batch size		15

Cylinders filled per day with less labour & less equipment

Techniques & features

Fine Fill Proportional Control

- Control system “controls” repeatable quality
- High accuracy
- Limits heat of compression



Dual Fill/Vent/Vac



- Full “preparation” = increased productivity
- Multi tasking operator = reduced overhead
- Flexibility

“Winter” Fill

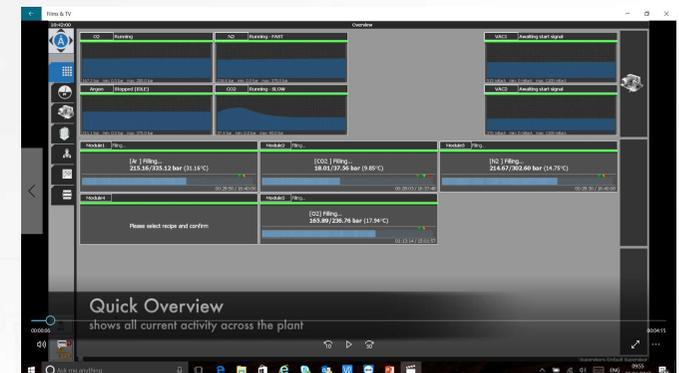
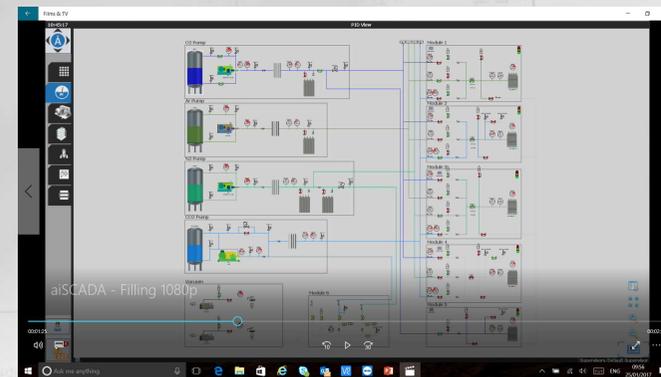
- Delivers cooler gas to filling module = continuous filling
- Increased equipment life & no pauses in filling



Quality & Repeatability

Integrated Automatic Control delivers;

- High accuracy – irrespective of ambient conditions
- Repeatability and consistency
- Total plant visibility – dual / multi language
- Easy to amend and implement new recipes & sequences
- Predictive & planned maintenance regimes
- Reduced reliance on operators – de-skilled process
- Access controlled authority levels
- Interface with factory system – analysis, warehouse, ERP, test shop etc
- INFORMATION – SMART Factory 4.0

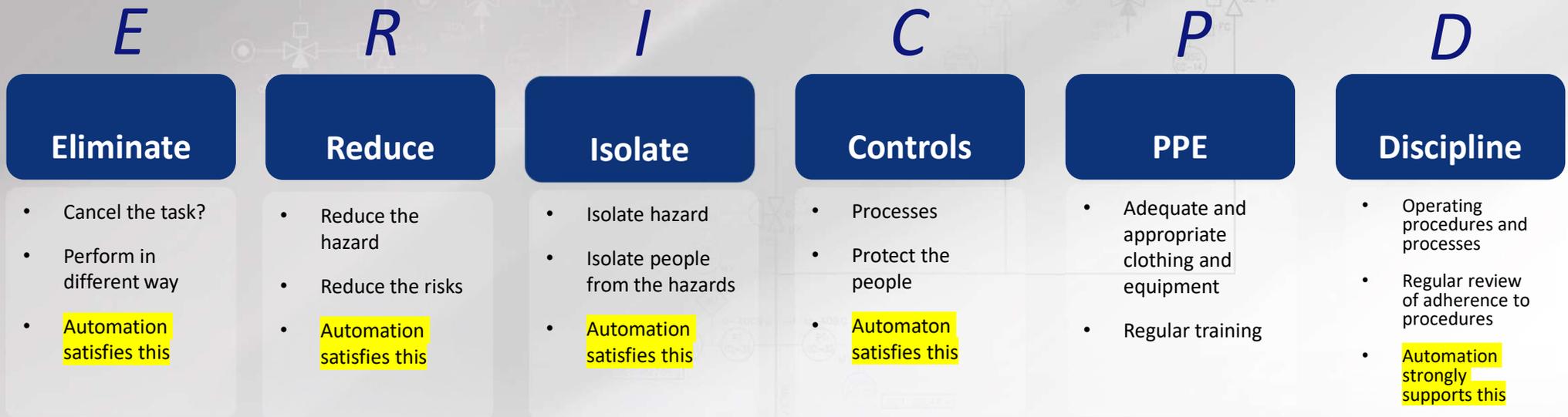


Safety - Paramount for all

- Owners
- Operators and Staff
- Health & Safety Authority
- Local Authority
- Environment Agency
- Customers
- Suppliers
- Contractors
- Society



Criteria for a safe plant



ERIC Prevents incidents & Increases Productivity

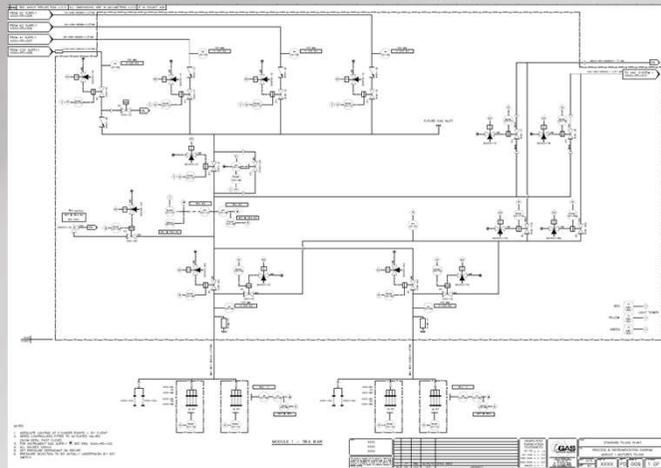
So, how does Automation improve safety?

- Removes / isolates the operators from the filling process / area and isolates them from the potential hazard
- Reduces the risk of operator error
- Monitors and actions key plant operating parameters – pressure, temperature
- Facilitates, safe, multi pressure filling – safety with productivity & commercial benefits
- Can be accessed globally for remote support and problem solving



How to limit initial CAPEX impact?

Pre – engineered & factory tested modular packages



Design & Engineering;

- Process, Mechanical and Electrical
- HAZOP, LOPA, SIL
- FAT & SAT documentation
- Operating instructions

Pump skids comprising;

- Automatic pump suction and return sets
- Cryogenic pump
- Pump control panel
- Line safety panel

4 Gas filling module;

- Mono or mixed gas filling
- Integrated control system
- Integrated vacuum system
- Integrated ramp valves

Conclusion

Automation delivers optimisation;

➤ **Increased productivity**

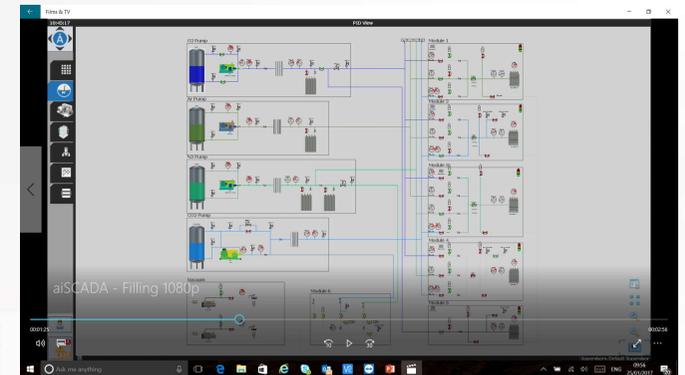
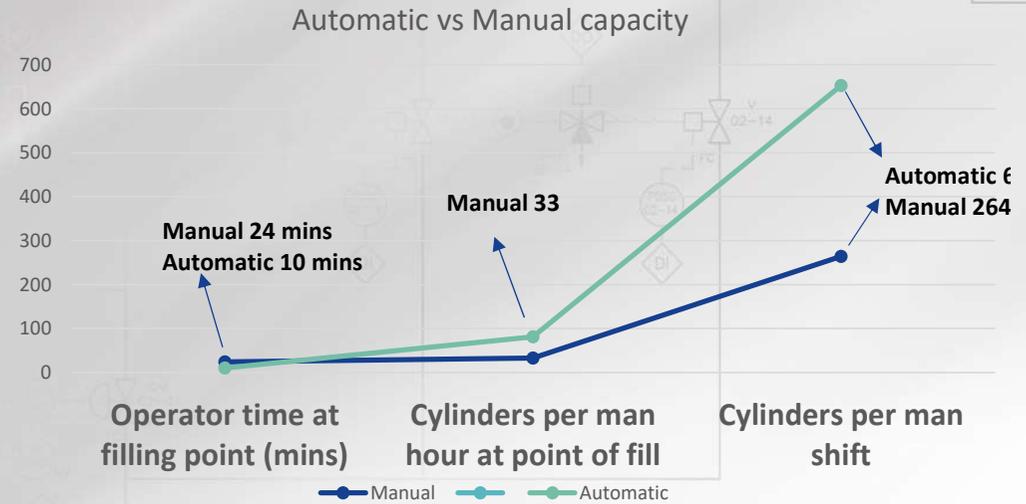
➤ **Increased safety**

➤ **Increased quality and repeatability**

➤ **INFORMATION & statistics**

➤ **Reduced OPEX**

➤ **Smart factory**



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Thank you

