Wireless development in digital control systems for valves and actuators

Shelley Pike

rotork®

Biography

Shelley Pike

- Joined Rotork as an engineering apprentice in 1988
- Has a degree in electronic engineering
- Joined Rotork's quality department before moving to the electronics design department, where she eventually became a Senior Electronic Engineer
- Attained a Chartered Engineer accreditation
- Shelley helped design and develop a number of network related products, including the Pakscan master station
- Currently Systems Sales Manager for Rotork Controls

Agenda

- How we got to wireless
- Smart actuators and the data they provide
- What can we use this data for?
- Wireless case study
- Questions

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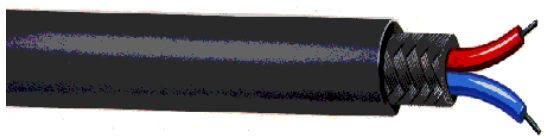
Why do people use networks?

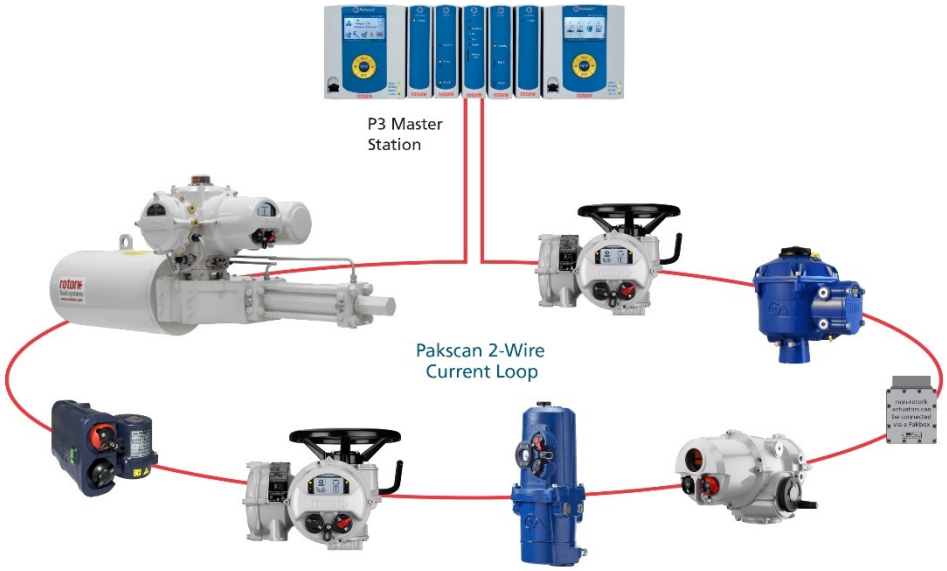
Signal	Conductors
End Position Indication	3
Open Close Stop or proportional control	4
Emergency shut-down	2
Continuous valve position	2
Available for control	1
Local / Remote switch position	1
Stop button pressed	1
Motor running	1
Torque switch tripped	1
Torque throughout stroke	2
Total conductors	**18**

- More data = more wires
- More wires = more potential failure points
- More wires = more cost for installation and infrastructure
- More wires = more complexity in engineering

Why do people use networks?

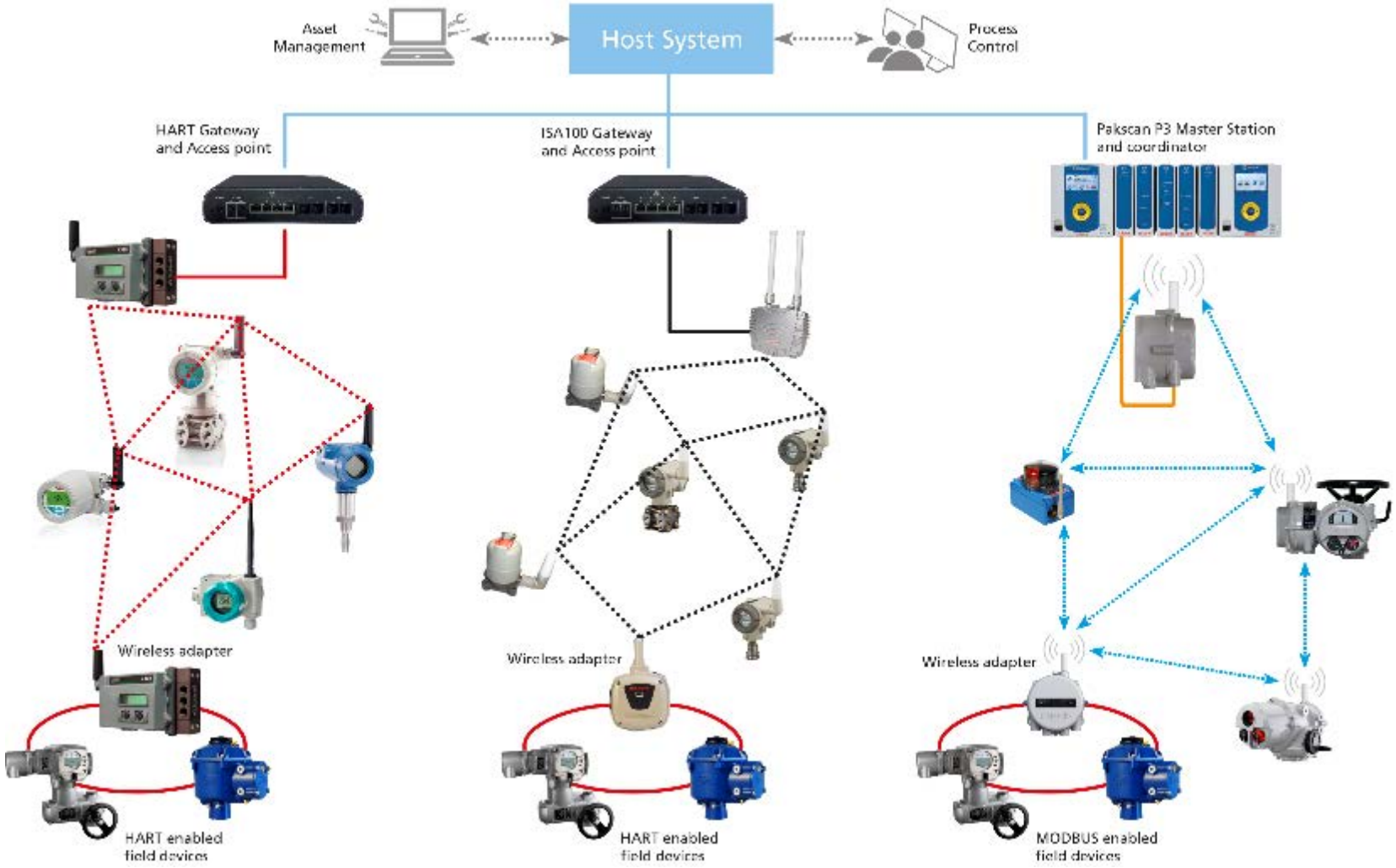
Signal	Conductors
End Position Indication	-
Open Close Stop or proportional control	-
Emergency shut-down	-
Continuous valve position	-
Available for control	-
Local / Remote switch position	-
Stop button pressed	-
Motor running	-
Torque switch tripped	-
Torque throughout stroke	-
Total conductors	**2**



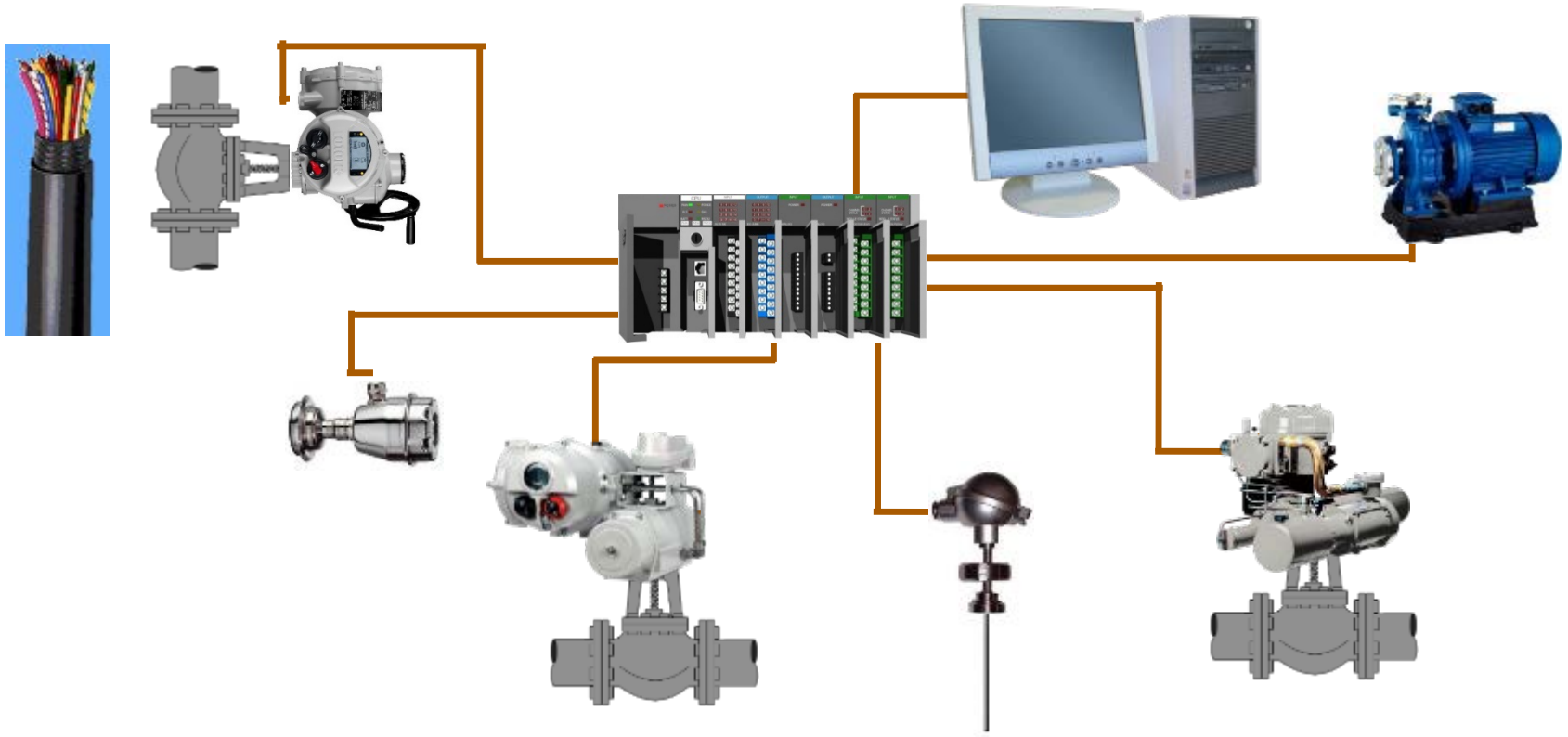


Wired networks

Wireless networks

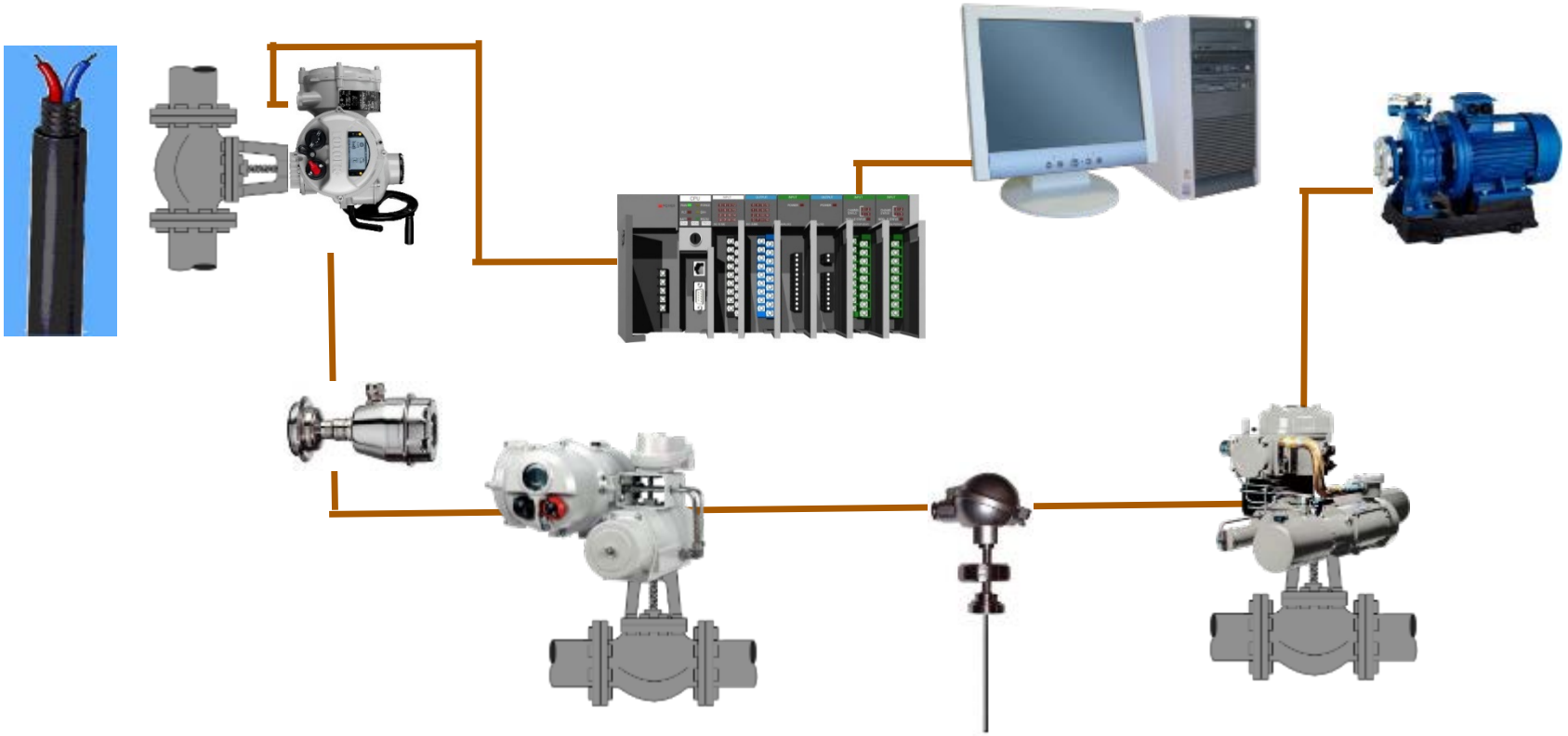


Field device connection progression – Parallel Wiring



From this…

Field device connection progression – Serial Network Wiring



To this…

Field device connection progression – Wireless

From this…

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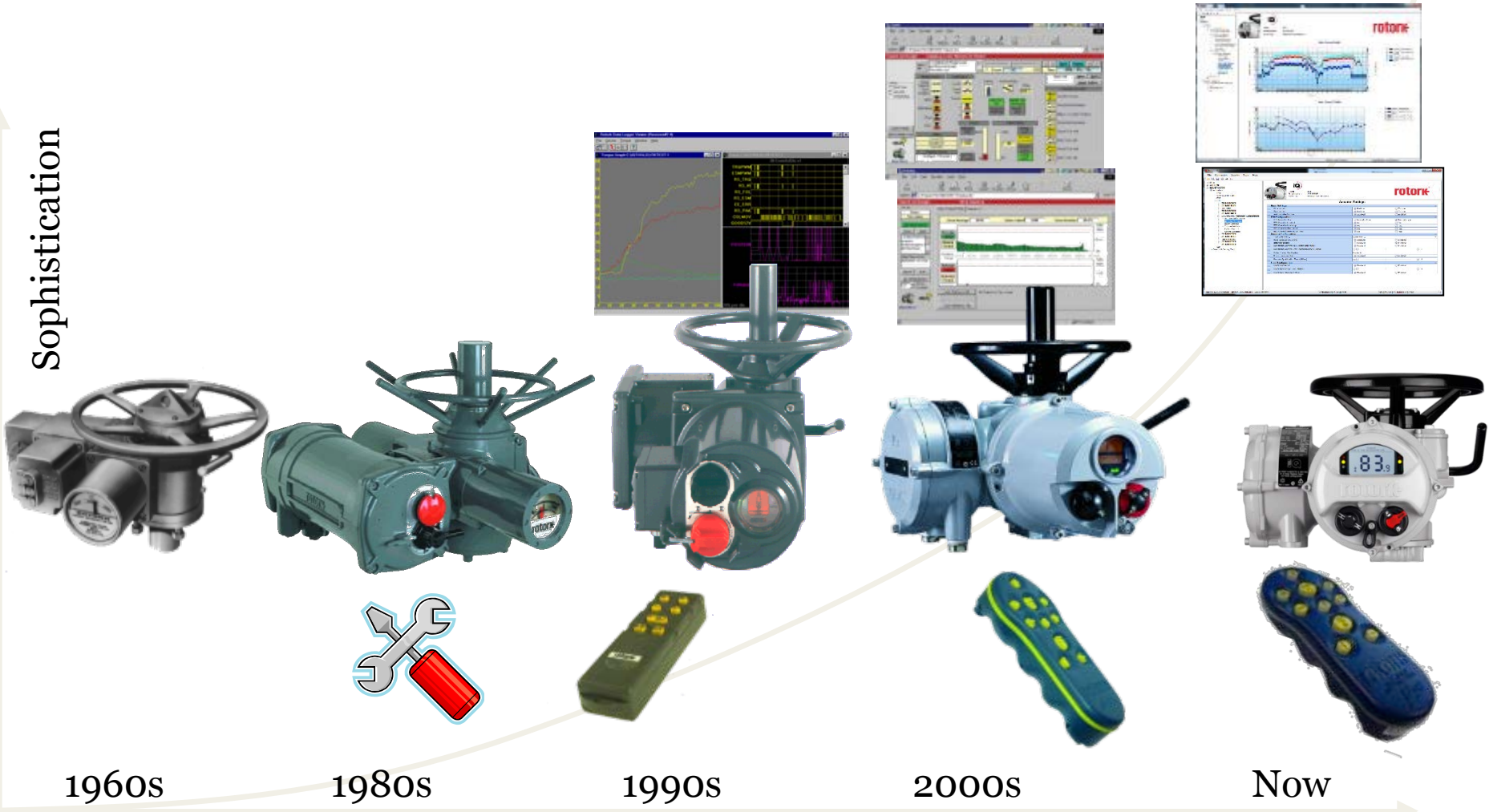
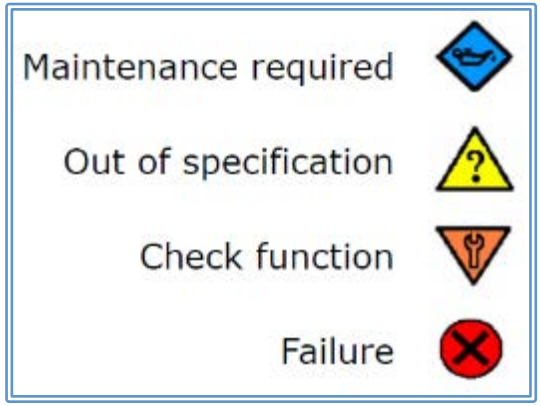
Evolution of actuation technology

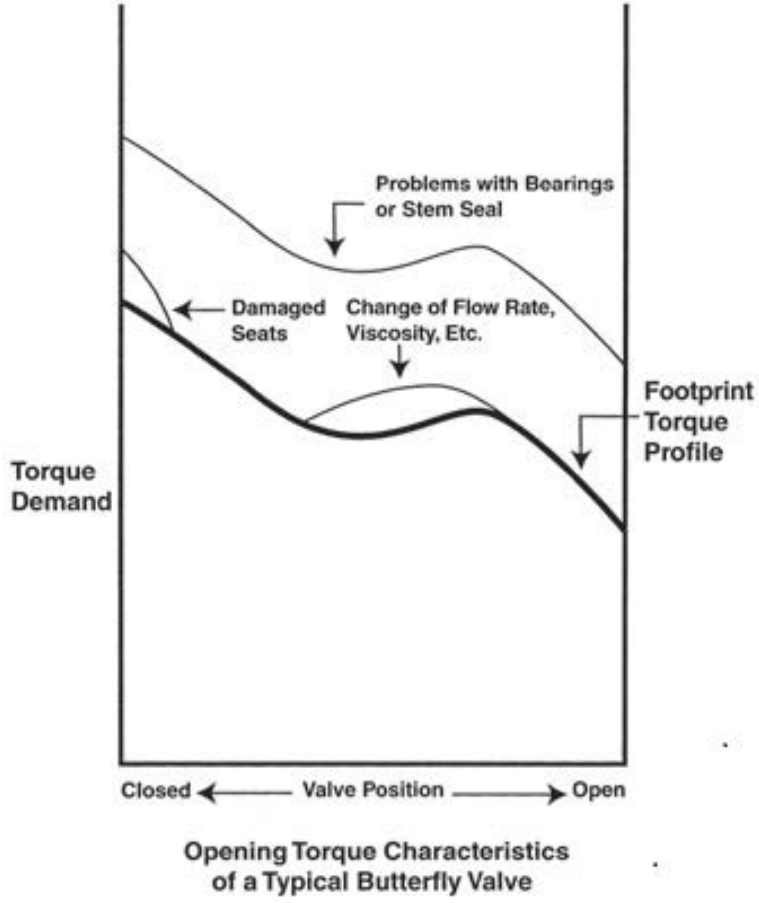


Smart actuators – data they provide

- Torque measurement
- Vibration and Internal Temperature sensors
- Position measurement
- Graphical display
- Configuration and Diagnostic menus
- Time stamped and Service and maintenance Alarms
- NE107 indication
- Error logs
- Power monitoring
- Event data and Motor starts logging
- Torque profiles
- Trend logs
- Asset data – build information
- Service history and notes
- Non-intrusive setting
- Easy incorporation of network cards for remote operation
- Operation statistics, total turns, total motor run time
- Firmware update facilities
- Various features to improve security, inhibit facilities
- Multi-language support
- Positional accuracy

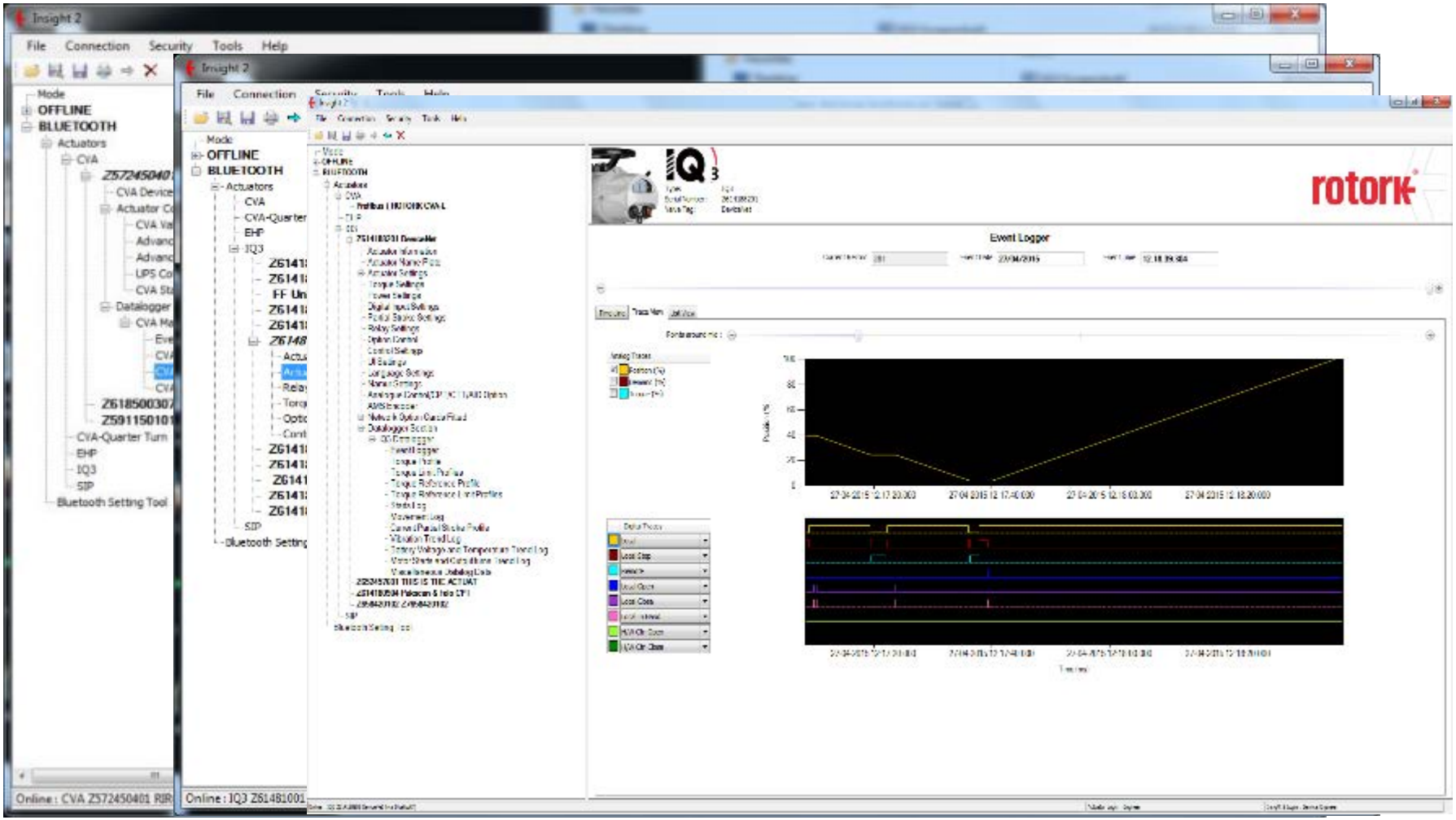


Smart actuators – torque data



Opening Torque Characteristics
of a Typical Butterfly Valve

Smart actuators – data viewing



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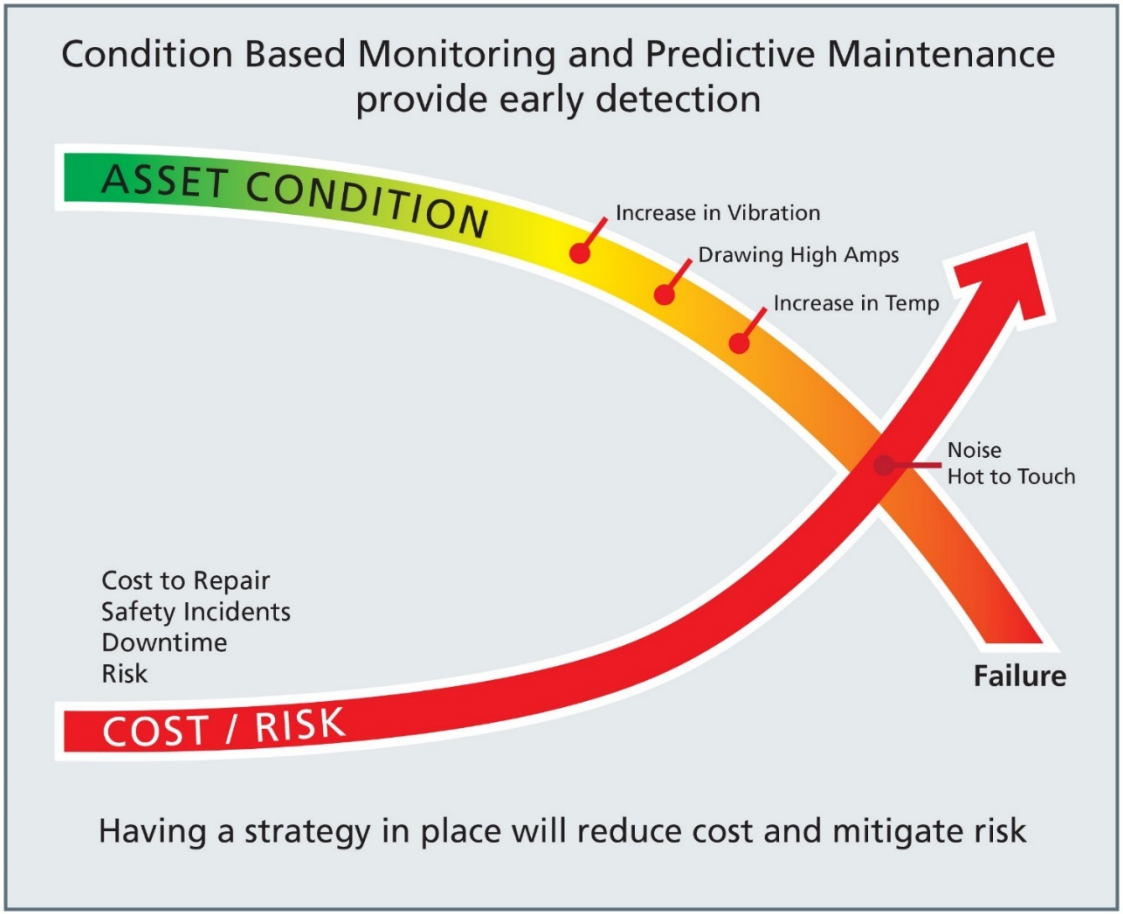
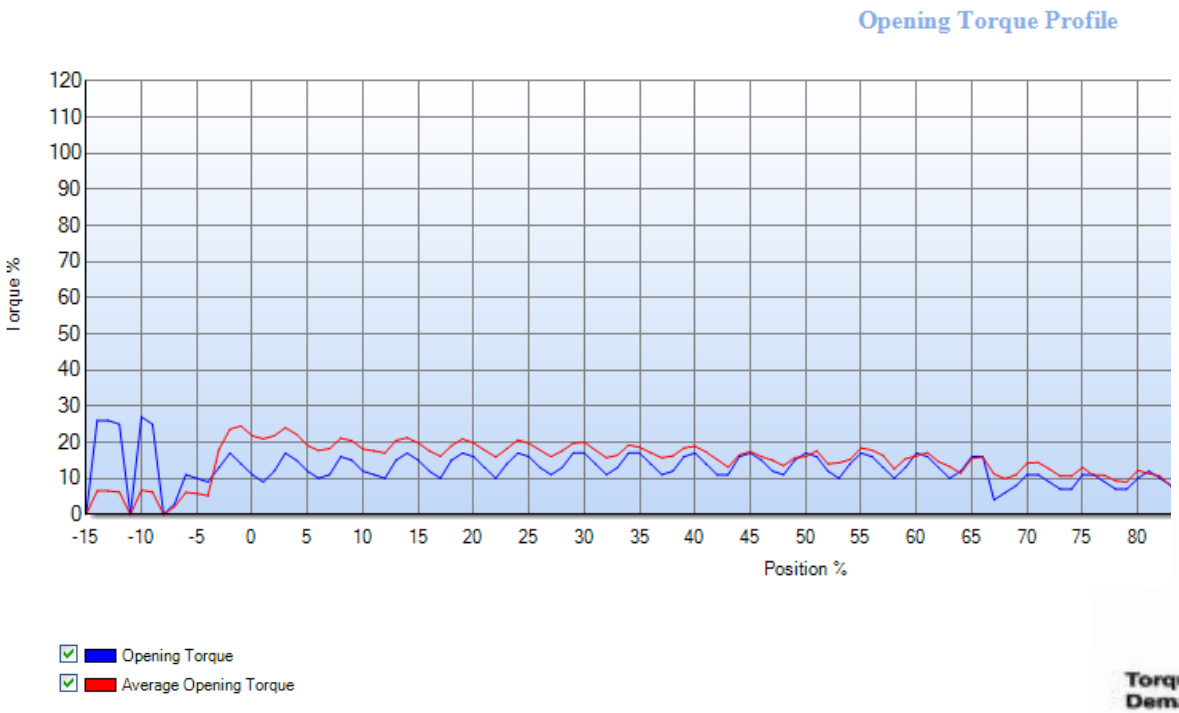
How do we use this information and intelligence?

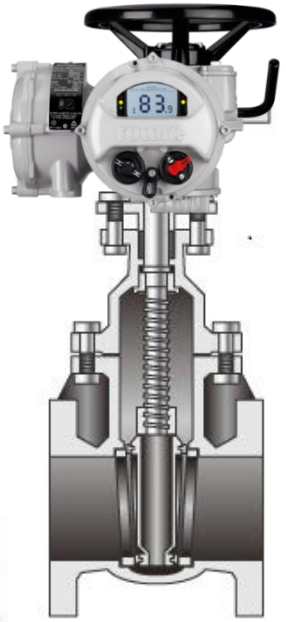
Maintenance regime	Notes
Corrective	Reactive - Run to fail
Preventative	Schedule driven - Calendar maintenance
Predictive	Reliability centred - Online diagnostics

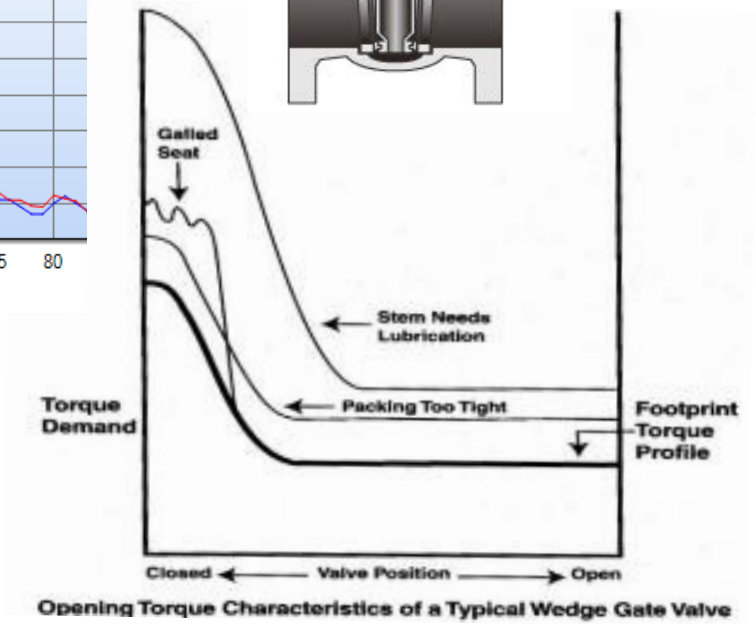
Data can help maintenance



How to use the data

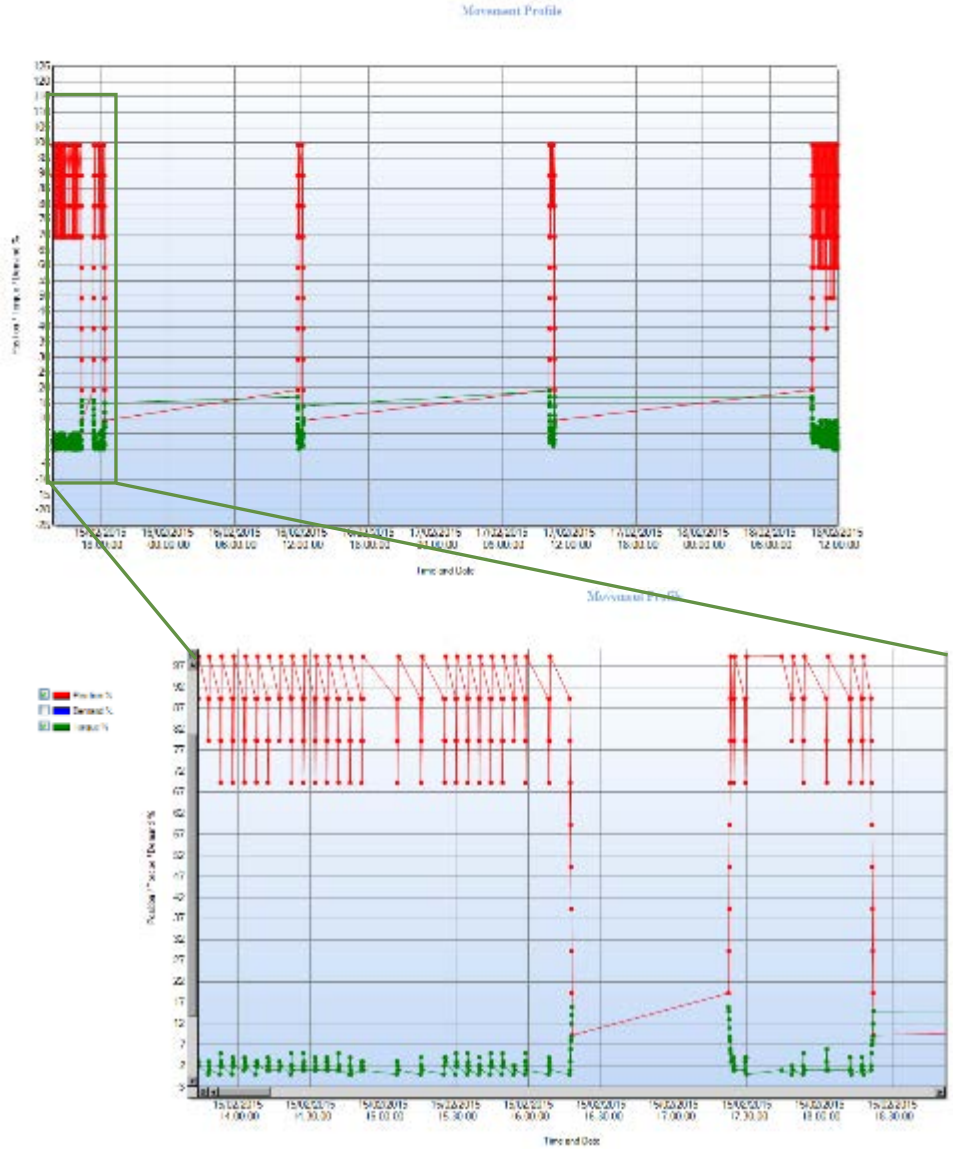






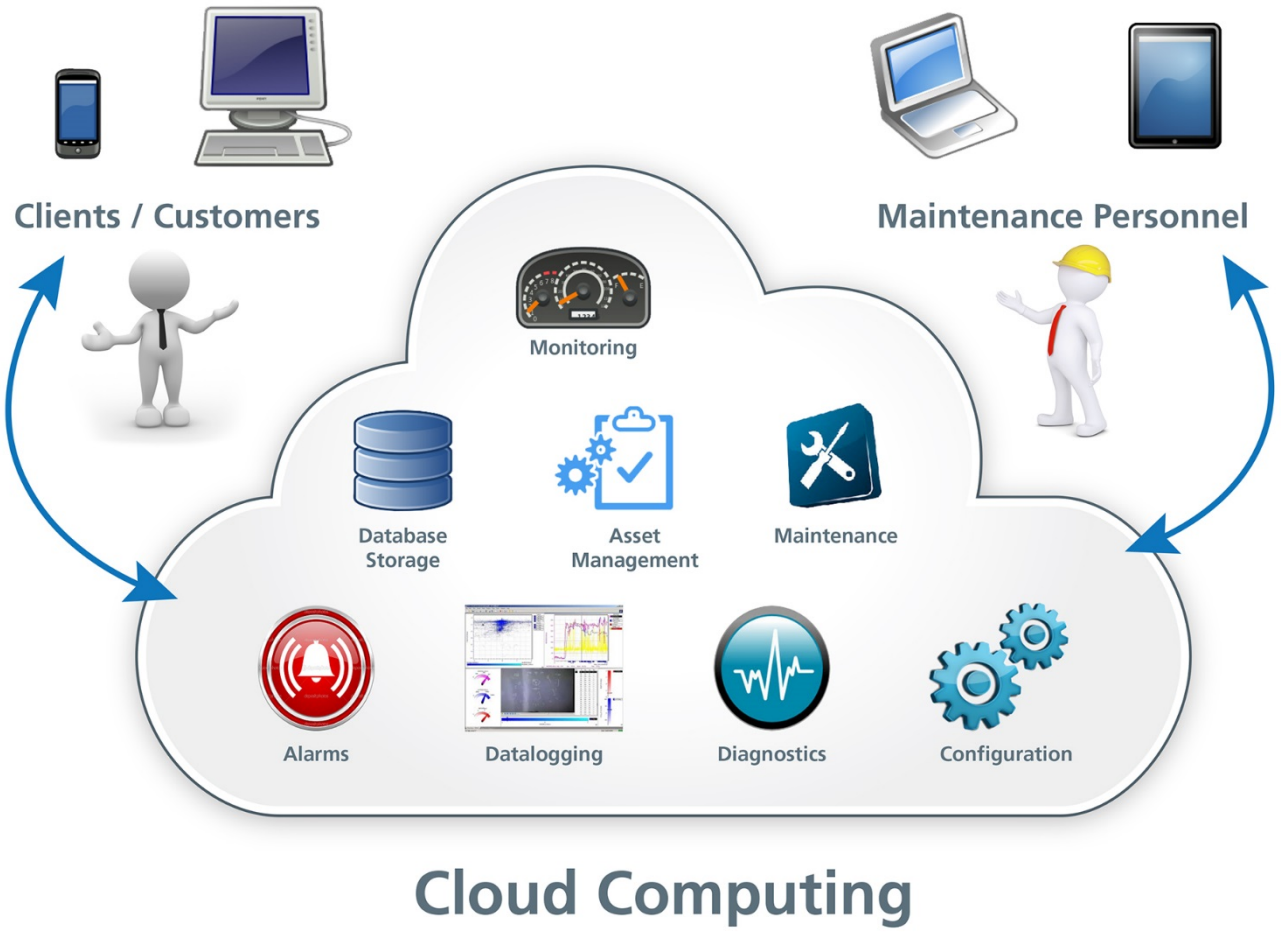
Opening Torque Characteristics of a Typical Wedge Gate Valve

How to use the data



What we are trying to avoid!!

How do we use this information and intelligence?



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Case study – Tank Farm, Port of Corpus Christi Texas

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Thank you