Ageing of Industrial Control Systems (ICS)

Challenges with ageing of industrial information and control systems – compatibility/obsolescence
Agenda - Ageing of Industrial Control Systems (ICS)

• What do we mean with ICS?
• Setting the scene – main concerns
• Different types of ageing
• Physical ageing within ICS? Future threat?
• What separates the different levels regarding ageing, where is ageing most critical?
• Procurement challenges
• Conclusions
Industrial Control Systems (ICS)

- ICS are IT-based systems that are used to control and monitor physical processes and systems in real time.
  - Ranging from field equipment/instrumentation such as sensors etc via Programmable Logic Controllers (PLC) and Distributed Control Systems (DCS) to information management and monitoring systems such as SCADA etc.
- PLC:s – modular devices with inputs and outputs (I/O).
- SCADA systems – Supervisory Control And Data Acquisition.
Simplified model describing ICS

1 Information level

2 Automation level

3 Field level

Central storage and analysis

Setting the scene

• “The further from Microsoft you can get, the longer the stuff can stay.”

• “You have to ask how many can give support? Maybe only 4 or 5 retirees. Is that support? One has to get to the bottom of what we mean by support quality.”

• Main concerns
Different types of ageing

- **Relatively aging – technological aging**
  - Claim Context – i.e. inadequate properties relatively new requirements.
  - Support Context – i.e. the properties change because the support context changes.
  - Entity relatively – i.e. less good properties than (often a newer) comparison object.

- **Absolute aging**
  - Time
  - Property – physical or functional ageing.
Physical aging within ICS? Future threat?

- Physical degeneration: mechanical wear, fatigue, corrosion.
- Not a major problem.
- Lifetime of physical objects, generally considered to be long:
  - PLC – designed for 30-40 year service life
  - I/O card 20 years
- Importance of spare part availability.
- In the future physical ageing could be a threat.
  - Technical upgrades place very high demands on the organisation.
What separates the different levels regarding aging? Where is aging most critical?

- On the level of information, adaptation to the new requirements occurs quickly and moderately unhindered.
- On the level of automation, though, it seems that the demands for change are countered by the demand for stability, which creates complexity.

Procurement challenges

- Functionality vs Price
- “Soft” parameters
  - Support quality
  - Support access
  - System compatibility
- Price
- Major risk – One is stuck with a patchwork of parts that have varying degrees of compatibility.
Conclusions

• The main challenge is ageing in relation to contextual demands, primarily imposed by the rapidly evolving area of information, supervision and data acquisition.
  • New automation equipment is very soon considered obsolete.
  • The boundaries are set by the ever-shorter support horizons of suppliers.

• Major challenge with recruiting engineers.
Conclusions, continued

• ICS is approaching IT.
  • Opportunities and challenges:
    • Online and cheap, but with increased exposure to the Internet.
  • Trend towards off-the-shelf instead of customer solutions:
    • Less knowledge about how systems actually work.
• Procurement issues.
• Vulnerabilities in form of “black boxes” and “patchworks” of solutions.