Obsolescence Management for Industrial Assets

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Mr. Don A. Ogwude is president and CEO of Creative Systems International. He has over 30 years of experience in industrial process automation, safety systems implementation, and project management. His broad experience spans both upstream and downstream oil and gas production.

Don has facilitated several safety systems studies including Hazard Identification (HAZID), Hazards and Operability (HAZOPS), Failure Modes, Effects and Criticality Analysis (FMECA), Layer of Protection Analysis (LOPA), Safety Integrity Level (SIL), and API 14C analysis. He has also conducted quantitative and qualitative analysis for risk reduction and production availability scenarios. Don is currently focused on leading edge technologies for offshore and subsea oil and gas applications with extensive experience in subsea High Integrity Pressure Protection Systems (HIPPS).

Mr. Ogwude, a TUV certified Functional Safety Expert, has been active in the development of industry standards including ANSI/ISA-S84.01-1996-Application of Safety Instrumented Systems for the Process Industries and API 17O – Recommended Practice for Subsea High Integrity Pressure Protection Systems (HIPPS).
This presentation highlights key considerations to optimize asset productivity and increase safety by mitigating the impact of obsolescence during project development and asset utilization phases.
Obsolescence Management for Industrial Assets

What is Obsolescence?

• Obsolescence is the state of being which occurs when an object, service, or practice is no longer wanted even though it may still be in good working order.

• It is a measure of an asset’s loss in value resulting from a reduction in the performance of the asset relative to its current expectations.
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Current State

• Equipment obsolescence in industry is a silent threat to project success and asset life-cycle optimization.
• It is hardly a topic of discussion during project development and execution;
• During the asset utilization, it only gets attention at the time when the options to limit its impact have become severely limited.
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The Concern

Impact of equipment obsolescence on an industrial asset could result in potential safety concerns and loss of production due to:

- Increased equipment failure
- Operator error due to frustrations with software failures, network and communications issues
- Poor vendor relationships
- Lack of spare parts
- Deficient knowledge base, etc.
1. Large complex systems are increasingly becoming standard components of oil and gas production (e.g. PCS, SIS, Dynamic positioning systems, Remote pipe handling systems, etc.

2. These systems are subject to obsolescence and will need a methodology to effectively mitigate the associated risks.

3. Dealing with obsolescence involves a lot of trade offs, risk assessment and long term planning. This calls for structured engineering and management approach.
The Business Case for Obsolescence Management

4. The management approach must follow the asset life cycle – from project development through detailed engineering, operation and decommissioning – obsolescence management lifecycle.

5. Cost constraints requires that financial justification and obsolescence risks must be documented to support obsolescence management efforts.
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Types of obsolescence

- Technical Obsolescence
- Functional Obsolescence
- Unplanned Obsolescence
- Postponement Obsolescence
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Technical Obsolescence?

Technical obsolescence occurs when a product loses value in its current expected performance due to degraded functionality of its component(s).

Example:

Distributed Control System (DCS) running on outdated Intel 8086 16-bit processors on the input/output (I/O) board.
Functional Obsolescence?

Functional obsolescence occurs when a product loses value in its current expected performance due to degraded functionality of the product.

Example:

Website that has outgrown its access capacity and frequently crashes.
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Unplanned Obsolescence?

Unplanned obsolescence occurs when a product's loss of value in its current expected performance is caused by unexpected degradation or loss of vendor support.

Example:

Vendor suddenly goes out of business resulting in unavailability of critical replacement parts.
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Postponement Obsolescence?

Postponement obsolescence occurs when a product loss of value in its current expected performance is recognized but its replacement is delayed in order to obtain perceived future benefit.

Example:

Not implementing a software patch in anticipation of a new release with a desired feature.
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Obsolescence Management Life Cycle

Plan
- Feasibility/Concept Selection
- Identify Critical Equipment
- Identify Vendors
- Review Existing Inventory

Design
- Identify Critical Equipment Components
- Evaluate Vendors
- Product Roadmap
- Identify Alternate Sources of Supply
- Develop Obsolescence Strategy

Act
- Functional Obsolescence
- Technical Obsolescence
- Postponement Obsolescence
- Unplanned Obsolescence

Check
- Decommission
- Conduct Vendor Performance Assessment
- Update Inventory Database
- Installation/Operation
- Monitor Parts Inventory
- Monitor Vendor Support Strategy
- Conduct Obsolescence Analysis
- Upgrade or Replace Per Obsolescence Plan

Feed
- Detailed Design/Manufacture
- Develop Obsolescence Plan
- Initiate Product Qualification
- Review Existing Inventory

Don Ogwude, Creative Systems International
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Obsolescence Risk Assessment

Risk = Likelihood * Consequence
Likelihood – what is the likelihood for loss of value or change in demand in use of product

Consequence – what is the impact to the business due to loss of value or change in demand
Obsolescence Risk Assessment

Obsolescence Likelihood Factors:
• Product contains software modules
• Product comprises several components from multiple suppliers
• Product/components are subject to rapidly changing technologies
• Product is leading edge technology developed by a financially unstable company or with potential of going out of business or being bought out
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Obsolescence Risk Assessment

Consequence of obsolescence on business bottom line can result from inability to achieve business results due to **loss of value** from product due to:

1. Performance degradation (operator frustration/inefficiency with possible safety implications)
2. Exhaustion of built-in spare capacity
3. Reduced availability (frequent breakdowns)
4. Supportability – lack of spare parts or service with higher maintenance cost
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Obsolescence Risk Assessment

Consequence of obsolescence on business bottom line can also result from product’s inability to react to imposed **changing demands** such as:

1. Expanded functionality
2. Increased performance requirements
Obsolescence Risk Assessment

Products with high obsolescence risk must be identified, prioritized, and managed throughout the asset life-cycle.
# Obsolescence Management for Industrial Assets

## Obsolescence Risk Matrix

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<th>CONSEQUENCE</th>
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</table>

### Likelihoods
- Remote
- Highly Unlikely
- Unlikely
- Possible
- Quite Likely
- Likely

### Consequences
- A+ Catastrophic
- A Massive
- B Major
- C Moderate
- D Minor
- E Slight

### Risk Levels
- **SEVERE RISK**
  - Critical implementation of obsolescence strategy
- **HIGH RISK**
  - Urgent implementation of obsolescence strategy
- **MEDIUM RISK**
  - Monitor/Review obsolescence strategy
- **LOW RISK**
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Dealing with obsolescence

• Increase inventory of spares
• Engineered solution with validation*:
  ❖ Use compatible replacement parts from another vendor
  ❖ Identify alternate suppliers for critical components
  ❖ Re-allocate function to other products/systems
  ❖ Replace with functionally equivalent system
  ❖ Migrate to new system

* Must evaluate impact on other systems.
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Planning for Obsolescence

- Understand supplier product development cycle/plans.
- Evaluate vendors and engage those that are established and with a product line road map that extend to the target project life cycle
- Identify alternate suppliers for critical components
- Maintain database of relevant suppliers and conduct periodic obsolescence risk assessment.
- Design for reduction of future obsolescence
  - Use common/standards interfaces
  - Incorporate modular/open architectures
  - Use commercial off the shelf (COTS) components
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Optimum Time to Replace Obsolete Products

- Cost impact
  - Productivity/ Coping with inefficiencies
  - Production commitments
  - Cost constraints/justification
- Schedule implications/ Tolerability of down time
- Resource availability
- Spare parts availability
- Rapidly changing technologies
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THANK YOU!

Questions?