Data as a Critical Asset for Integrity Management
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Growing global O&G demand
- NA Gas: Increased volumes: 1.5X by 2035, 2X BCF by 2050
- Slower construction growth
- Maintenance of existing assets and life extension is critical
- O&M optimization & data driven prioritization required
API TR 1178: guidelines to empower informed decisions

Goal: highest degree of data quality possible

- Efficient use of resources
- Easy access/security
- Communication across systems (enable analytics)

PHMSA: “The ability to integrate and analyze (...) data from many sources is essential for sustaining performance and a proactive IM program.”

Completes framework set by API RP’s 1160, 1163, 1173 and 1176

1160 – Managing System Integrity for Liquid Lines / 1163 – In-Line Inspection Systems Qualification / 1173 – Pipeline Safety Management Systems / 1176 – Recommended Practice for Assessment and Management of Cracking in Pipelines
Data Quality & Integrity: What is it?

- **Accuracy**: represents reality
- **Completeness**: all needed data is available
- **Consistency**: free of internal conflicts
- **Precision**: exact as needed
- **Granularity**: right level of detail
- **Timeliness**: current and retained until needed
- **Integrity**: structurally sound (topology)
  - Asset integrity: “is the ability to perform its required function effectively and efficiently over its entire life cycle”
✓ Currently, the 3 main systems operate as silos:
  • Work Management (Maximo)
  • GIS (Esri)

✓ Data Management (in-house, SCADA)

✓ Data grows significantly with more frequency and resolution... “big data” era

✓ Digital integration now more affordable

✓ Systems providers enable integration capabilities

✓ “One version of the truth” becomes a critical skill for any enterprise management system
The Triad of Systems

Best Case Today

- Governance and Procedures
- Integration Framework
- Application Integration / interoperability framework
- Application Modules
  - MDS:
    - Geo-Disruptive Centerline Records
    - Integrity
      - Asset Planning, Compliance
    - Work Mgmt.
      - Financial
  - 3rd Party
    - Contract, GIS
    - Risk Management
  - In-House
    - Engineering, Data, and Business

- Desktop, Mobility, Dashboards
- Customer Applications

Goal

- Decisions, KPIs
- Analytics, Applications

- Full Integration
- GIS
- WMS
- DMS

Outcomes

- Digital Twin (predictive, optimized)
- Enabled Analytics
- Situational Context
- Attribute Coincidence
- Data Alignment

Business Processes

Level of Maturity

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Managing Data as a Critical Asset

- Data Management needs to be a strategic decision (same as asset management)
- Prioritization of data efforts must be driven from “Use Cases” not “Data Sources”
- Data confidence must be a factor in decision-support outputs
- Governance & roles are critical to success
- Benefits of treating data as an asset:
  - Auditability / Traceability
  - Easier data corrections, less human error
  - Improved resource utilization
  - Security / Scalability
**Data Attributes**

**Context**
- Contextual data (Geo, operations, value chain)

**In-Service**
- Operational (ILI, field) TVC updates

**As-Built**
- Construction & manufacturing

**Data Governance**
(Owners, policies, systems, MOC)

**Process Validation**
- Process outcome
- TVC
- Centerline alignment
- Use-case based integration of systems
- Define business outcomes & goals

**Data Validation**
- Inputs, Stakeholders, data requirements, frequency
- Migration
- Integration of SME knowledge
- WMS + GIS
- Process optimization / automation
- Inputs, Stakeholders, data requirements, frequency
- Conditioning
- Confidence / quality
- Enhance data models
- Data analytics
- Machine learning

**Data Management & Integration**
- Policies and procedures
- Data models & standards (PODS, APDM, UPDM)

**Systems & Platforms Integration**
- Current state
- Gap assessment
- Goal setting

**Business Process Optimization**
- Operational (ILI, field) TVC updates
- Data analytics
- Machine learning
Use case example: Alaska Pipeline Operator, Compliance Management

- **Process & Data**
  - Manual process, ad hoc updates
  - Multi-tab XLS repository

- **Data Management & Integration**
  - From XLS to Maximo App

- **System Integration**
  - Field mobility app integrated to Maximo.
  - Esri Insights Dashboard and KPI's

- **Process Optimization**
  - Guaranteed, up-to-date, measurable compliance

- **Outcome**
  - Minimize non compliance segments
  - Optimize field / office work
  - Effective support for Reg audits

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Pipeline infrastructure demand growth continues

Safe asset lifecycle extension critical

Data needs to be treated as an asset: data integrity

Data & Business process integration supports safer and more efficient operations:
  • Airline industry shows incident reduction after data and proactive management efforts
  • Pipelines have increased technology and data volumes... safety records still not trending better

Data management is a journey, requires governance, roles, goals and continuous improvement mindset