Best practices for asset data management: ISO 5500X in practice

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Session II – 12.10.2015
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The assignment

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The organizational structures

PART 2 : Asset Datagovernance

A common datamodel

PART 3 : Asset life cycle
Part 1 – ISO 5500X

• ISO 55001 The Norm
  • 7.5 information requirements

• ISO 55002 The Guideline
  • 7.5.1. about the method
  • 7.5.2. about the scope
  • 7.5.3. and some subjects to be considered

“Data! Data! Data! I can’t make bricks without clay!”
– Sherlock Holmes –
ISO 55001 : 7.5 Information requirements

The organization shall determine its information requirements to support its assets, asset management, asset management system and the achievement of its organizational objectives.

In doing this:

a) the organization shall include consideration of
   - the significance of the identified risks
   - the roles and responsibilities for asset management
   - the asset management processes, procedures and activities
   - the exchange of information with its stakeholders, including service providers
   - the impact of quality & availability & management of information on organizational decision making

b) the organization shall determine
   - the attribute requirements of identified information
   - the quality requirements of identified information
   - the requirements... how and when information is to be collected, analysed and evaluated

c) the organization shall specify, implement and maintain processes for managing its information

d) the organization shall determine the requirements for alignment of financial and nonfinancial terminology relevant to asset management throughout the organization

e) the organization shall ensure that there is consistency and traceability between the financial and technical data (and other relevant non financial data) to the extent required to meet its legal and regulatory requirements while considering its stakeholders requirements and organizational objectives

all you need is a detailed set of information specifications based upon a)
ISO 55002 Guidelines 7.5.1 about the method

The organization should determine the information needs related to its assets, asset management and its asset management system.

• The organization should use a systematic approach to identify the necessary asset information and establish the appropriate information repositories.

• For example, the organization should undertake
  – a needs analysis
  – establish priorities
  – review
    • system development options
    • data collection strategies
  – plan the creation of information repositories and data collection
  – then implement as appropriate.
ISO 55002 Guidelines 7.5.2 about the scope
In general the organization should consider its asset information requirements related to the following areas

<table>
<thead>
<tr>
<th>Areas</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) strategy and planning</td>
<td>corporate service levels and objectives, asset strategy(ies), demand mgt</td>
</tr>
<tr>
<td>b) process</td>
<td>process performance objectives and indicators, asset related processes and procedures</td>
</tr>
<tr>
<td>c) technical and physical properties</td>
<td>ownership, design parameters, vendor, location, condition, in service dates</td>
</tr>
<tr>
<td>d) service delivery and operations</td>
<td>service levels, performance objectives, asset performance characteristics</td>
</tr>
<tr>
<td>e) maintenance management</td>
<td>historical asset failures, betterment or replacement date, future maintenance req.</td>
</tr>
<tr>
<td>f) performance management and reporting</td>
<td>asset performance, continuous improvement objectives, regulatory</td>
</tr>
<tr>
<td>g) financial and resource management</td>
<td>historical cost, depreciation, asset replacement value, date of acquisition, materiality, capitalization rules, asset classification hierarchies, life cycle costing analysis, useful lives of assets, residual value and any residual liabilities</td>
</tr>
<tr>
<td>h) risk management</td>
<td></td>
</tr>
<tr>
<td>i) contingency and continuity planning</td>
<td>stock</td>
</tr>
<tr>
<td>j) contract management</td>
<td>asset related contractual information, vendor, service objectives, third party agreements</td>
</tr>
</tbody>
</table>
Data definitions are essential, organization wide.

<table>
<thead>
<tr>
<th>Information requirements area</th>
<th>Asset life cycle</th>
<th>Asset Performance</th>
<th>Function</th>
<th>Equipment</th>
<th>Versioning (function)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) strategy and planning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>b) process</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>c) technical and physical properties</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>ETCS</td>
<td>CBM</td>
<td>X</td>
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<tr>
<td>d) service delivery and operations</td>
<td>X</td>
<td>X</td>
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<td>Asset Acc</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>j) contract management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
ISO 55002 Guidelines 7.5.3
Subjects to be considered

- Data priorities (*added value, additional cost, risk*)
- **Data definitions** (technical & financial) linked to a *common reference datamodel*
- Data process mgt (*asset life cycle, continuous improvement*)
- (Shared) **auditable** repositories (for reference data)
- **Data quality** (*completeness, accuracy and integrity*)
- **Project mgt** (stakeholders, change mgt,...)
- **Data security & archiving**

Of course, all these subjects must be managed in a coherent & structured way.
Part 2 - Datagovernance

• The challenge
• Why ?
• A working framework
  • Datagovernance
  • Adapted to your needs
• Lessons learned

“Success consists of going from failure to failure without loss of enthusiasm.”
– Winston Churchill –
The challenge

my data
my processes

shared data-use
optimized processes

Well, technically Anarchy is a form of governance...

www.ComicStripGenerator.com
Why data governance?

- The organization gets so large that traditional management isn’t able to address data-related cross-functional activities.
- The organization’s data systems get so complicated that traditional management isn’t able to address data-related cross-functional activities.
- The IT department needs the support of a cross-functional program that takes an enterprise (rather than siloed) view of data concerns and choices.
- Regulation, compliance, or contractual requirements call for formal Data Governance.
A working framework

What is DG
A way/organisation
• to make/collect/align rules,
• to resolve issues, and
• to monitor/enforce compliance while providing support

http://www.datagovernance.com
<table>
<thead>
<tr>
<th>N°</th>
<th>Building Block</th>
<th>Examples of activities</th>
<th>Lessons learned</th>
</tr>
</thead>
</table>
| 1  | Mission & Vision of Datagovernance | • Proactively define/align.  
• Provide ongoing, boundary-spanning protection and services to data stakeholders.  
• React to and resolve issues arising from non-compliance with rules | • Define the “official” governance board based upon the experiences & deliveries of realized data programs. Integrate successful initiatives.  
• Governance <> Operational data management |
| 2  | Goals | • Define an approach to couple data to a common reference data-repository.  
  • Common process vision  
  • Common datamodel vision  
• Assure operational added value as success factor. | • Keep focus with SMART objectives.  
• Start with reference data-system (track-topology)  
• Don’t mix data cleansing with normal recurrent data management activities |
| 3  | Data rules & definitions | Assure data quality with data definitions, data rules and processes (timing). | • Keep definitions adequate & usable |
| 4 - 5 | Decision rights & accountability | Implication of all levels & all stakeholders to decide & implement rules | • Choice of president & members of the DG board  
• Support of top management. |
| 6  | Controls | • Define asset data KPI’s like you do for other core activities  
• Install audits and reviews.  
• Use “built-in” data & process-control functions | More control & integration means more complex systems that need more specialized competences. |
| 7  | Stakeholders | Implicate hierarchy of users, creators and rule managers | • Communication & buy in  
• If needed multi company (eg engineering) |
| 8  | Data Gov. Office | Set up of an support office | Independence from operational services |
| 9  | Data stewards | Support data stewards with a council. | Managed roles & competences. |
| 10 | Data processes | 1. Visualize data processes  
2. Integrate data processes in overall processes | • The right person at the right place  
• Not too early, not too late |
Adapted to your needs

Governance models
• Top-down ⇔ Bottom-up ⇔ ....

Focus areas
• Management alignment
• Privacy / Compliance / Security
• Policy, standards & Strategy
• Data Warehouses & Business Intelligence

SUCCES is ESSENTIAL (keep focus)
• Build upon existing needs & initiatives
• Manage your data-processes as a part of your core processes

http://www.datagovernance.com
Part 3 - Asset data modelling

• 3 Basic dimensions
• 1 integrated model
• Process-driven statuses
• Asset life cycle
• Systems & processes
• Lessons learned

“Design is not just what it looks like and feels like. Design is how it works.”
– Steve Jobs –
3 Basic dimensions

Location
- XYZ
- Linear

Function
- Exploitation
- Configuration
- Possessions
- ...

Equipment
- Maintenance
- Purchasing
- Build
- ....

- Construction drawings (scale)
- GIS
- Functional drawings (schematic)
- SCADA
- Functional measurements
- Versioning (dataprep)
- Construction drawings, ...
- ERP: serial number, purchase article, BOM, checklists, finance
- Equipment measurements

+ TIME
1 Integrated datamodel

Each equipment has a function

Location | Function | Equipment

+ TIME

The network topology links location & function & equipment

“GIS” topology | Schematic topology

This model permits data coherence across all relevant systems & area’s.
## Process-driven life cycle statuses

<table>
<thead>
<tr>
<th>Location</th>
<th>Function</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Need defined)</td>
<td>(Need defined)</td>
<td>(Need defined)</td>
</tr>
<tr>
<td>(Approved)</td>
<td>Approved</td>
<td>Approved</td>
</tr>
<tr>
<td>Planned</td>
<td>Planned</td>
<td>Planned</td>
</tr>
<tr>
<td>Defined (in reserve)</td>
<td>-</td>
<td>Available (in reserve*)</td>
</tr>
<tr>
<td>Defined (future location)</td>
<td></td>
<td>Reserved / Ready for use</td>
</tr>
<tr>
<td>Defined</td>
<td>In service</td>
<td>In service</td>
</tr>
<tr>
<td>Defined</td>
<td>(Out of service)</td>
<td>In reparation</td>
</tr>
<tr>
<td>Defined</td>
<td>Out of service</td>
<td>Cannibalism</td>
</tr>
<tr>
<td>(Available)</td>
<td>Removed</td>
<td>Removed</td>
</tr>
</tbody>
</table>

*normal & strategic stock
Asset Life Cycle

- Planned
- Designed
- In repair
- Out of service
- End of useful life
- Cannibalism
- Removed (replaced)
- Reserved
- Purchasing flow (under construction)
- In service

Financial accounting of physical assets
Systems & Processes

- Asset Change Demand mgt
- Risk
- DESIGN Drawing GIS
- BUILD Drawing Material Mgt Project
- OPERATE Scada
- MAINTAIN Equipment
- FINANCE
- CAPEX / OPEX

Integrated ≠ All in one
Lessons learned

- Align
- Define (& simplify)
- Communicate

- Make it work
- Formalize (& improve)
- Communicate

- Extend
- Control
- Communicate

Take you time.
Business processes are the basis; IT will follow.
DISCUSSION
Infrabel – key figures

12,464 employees (2014)

€ 121,10 million EBITDA
€ -3,75 million EBT (31/12/2014)

Financing of investments: (€ million)
- 829.4 State Subsidy
- 105.2 RER/GEN-fund
- 105.9 Own funds
- 29.2 Europe
- 3.2 HST-input

Investments: (€ million)
- 157.4 ETCS & TBL1+
- 137.0 Capacity Extension (incl. HST)
- 130.4 RER/GEN
- 117.2 Concentration of signal boxes (incl. New Traffic Management)
- 37.8 Reception Infra
- 89.8 Production means
On the Belgian network (I)

800,000 passengers travel daily

1,100 trains pass through the Brussels Nord-Midi junction every weekday (31/12/2014)

1,818 level crossings are in use (31/12/2014)

In 2014 51.3 million tonnes of goods are transported by rail in Belgium
On the Belgian network (II)

- **10,932 signals** act as the interface between the signal box and the driver (31/12/2014)

- The Belgian railway infrastructure is made up of **11,637 civil engineering structures** (bridges, tunnels,…) (31/12/2014)

- **3.631 km of tracks** cover practically the entire country (31/12/2014)

- **4,400 trains (journeys)** on average are monitored every day

- **4.309 track mechanisms** (switches on main lines) are activated by the signal operators (31/12/2014)

- **1 Traffic Control Centre** and **152 signal boxes** manage rail traffic in real time (31/12/2014)