RDS-PP TO OPTIMIZE O&M FOR WIND

Brendan Kelly

MD EMEA
NRX AssetHub provides maintenance, reliability, and operations professionals at asset-intensive businesses with world-class software solutions and services for visualizing, building, editing, organizing, governing, reporting and sustaining high quality Asset and Maintenance Master Data for their Enterprise Asset Management (EAM) systems.

NRX AssetHub helps our customers become top performers in their industries through achieving excellence in operations and maintenance.

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- Accenture
- SAP
- IBM
- Larsen & Toubro
- Wipro
- Tata Consultancy Services
- EEEGR

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- EDP
- Chevron
- Siemens Gamesa
- Orsted
- MAERSK
- ConocoPhillips
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- AEP
- ExxonMobil
- Calgon Carbon
- Res
- Consol Energy
- Statoil
- REC
- Total

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- Proserv
- WorleyParsons
- James Fisher and Sons plc
- ae
- Buy Logic
- 3sun
- Ramboll

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- BNSF
- Georgia-Pacific
- Lorillard Tobacco Company
- Mars Incorporated
- BHP Billiton
CUSTOMER AND PROJECT EXPERIENCE

➢ **SGRE**
  ➢ Multiple projects, building turbine platforms with RDS-PP, related to spares, maintenance, handover and reliability

➢ **RES**
  ➢ Developing their asset data strategy for all renewables using RDS-PP

➢ **EDPR / ENGIE / LEM**
  ➢ Developing RDS-PP Standards and Data Handover Strategies for O&M

➢ **Manufacturers, OO’s and Services Partners**
  ➢ Developing WTG and BOP O&M standards using RDS-PP
WHAT IS THE CUSTOMERS CHALLENGE?

➢ Very poor quality asset data is handed over to the Operator during project delivery and often this is not utilized correctly.

➢ Data comes in many different formats and types and does not normally fit into any O&M systems.

➢ The cost of rebuilding this data is very high during Operations and rarely gets the funding or attention needed.

➢ The result is poorly organized asset and maintenance strategies, little coordination with others involved in O&M, little concept of spare parts strategy and a lack of important information available when critical issues happen.
WHAT IS ONE OF THE SOLUTIONS?

➢ Adopt a data standard that will be used by all participants in the Wind Industry and make sure it is fit for purpose

➢ Ensure that data produced in any project phase is carefully managed so its value can be realized in Operations

➢ Use the same “language” internally so everybody in your company understands what is being discussed

➢ So why does this not already happen???

➢ It is too complicated, nobody understands what is needed, it does not fit our organization, it is only for engineers, etc, etc
GENERAL PRINCIPLES FOR USING RDS-PP

➢ A set of tools used to create contexts and relationships of all kinds of technical installations and equipment’s.

➢ Used to create reference designations for
  ➢ Systems and subsystems
  ➢ Objects and components in different technical structures

➢ Purpose is to structure the assets for a computer-based maintenance system. All the information needed for your maintenance strategy can be found in one place.

➢ Goal is to show a historical record and to improve reporting functionality of technical and financial data. Focused on operating assets for future use.
BACKGROUND TO RDS-PP & STANDARDS

➢ KKS
➢ Identification System for Power Plants

➢ RDS-PP
➢ Reference Designation System for Power Plants

➢ RDS-PP Nordic
➢ Origin for Wind

➢ RDS-PP T32
➢ Official designation

RDS-PP is a common standard for operators and manufacturers of power plants. The world-wide acceptance opens further potentials for long-term cost reductions on planning, construction and operations of power plants (VGB).
### Industrial systems, installations, equipment and industrial products
**Structuring principles and reference designations**

<table>
<thead>
<tr>
<th>Basic Standards [RDS]</th>
<th>IEC 81346-1</th>
<th>Structuring principles and reference designation basic rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 81346-2</td>
<td>Classification of objects and codes for classes</td>
<td></td>
</tr>
<tr>
<td>ISO 81346-3</td>
<td>Application rules for a reference designation system</td>
<td></td>
</tr>
</tbody>
</table>

#### ISO/TS 16952-10 being transferred to ISO/TS 81346-10
Reference designation system - Part 10: Power plants

#### VGB B101
RDS-PP Letter Codes for Power Plant Systems

#### VGB B102
RDS-PP Letter Codes for Basic Functions and Product Classes

**VGB-S-823-01 Power Plants General**
- Mechanical
- Civil
- Electrical and I&C
- Process control

**VGB-S-823**
- 31 Hydro Power Plants
- 32 Wind Power Plants
# OVERVIEW OF THE MAIN WIND POWER PLANT SYSTEMS IN RDS-PP®

## Denomination

<table>
<thead>
<tr>
<th>LC</th>
<th>Denomination</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Energy Conversion</td>
<td>Wind Turbine Generator System (WTG)</td>
</tr>
<tr>
<td>K</td>
<td>Common Communication</td>
<td>Wind power plant management common communication network</td>
</tr>
<tr>
<td>W</td>
<td>Transmission of Energy or Resource</td>
<td>HV-, MV-, LV-Cable systems access ways, transport system</td>
</tr>
<tr>
<td>T</td>
<td>Transformation of Energy</td>
<td>Substation</td>
</tr>
<tr>
<td>C</td>
<td>Storage of Energy or Material</td>
<td>Stores, central energy stores</td>
</tr>
<tr>
<td>B</td>
<td>Common Measurement Systems</td>
<td>Met mast</td>
</tr>
<tr>
<td>U</td>
<td>Common Enclosure or Support</td>
<td>Structures, (compensation-)areas, harbour</td>
</tr>
</tbody>
</table>
Conjoint designation for Wind Power Plant: #5154N00883E.DE_NW.ELI_1WN

Main system designation e.g. for Wind Turbine Generator: =G001

System designation e.g. for Yaw System: =G001 MDL

Subsystem designation e.g. for Yaw Drive System: =G001 MDL10

Basic Function designation e.g. for Yaw Drive 1: =G001 MDL10 MZ010

Product designation e.g. for Yaw Motor 1: =G001 MDL10 MZ010-MA001

Product designation e.g. for Yaw Gear 1: =G001 MDL10 MZ010-TL001
# Conjoint Designation

<table>
<thead>
<tr>
<th>#5154N00883E.DE_NW.ELI_1WN</th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Main System</strong></td>
<td><strong>System</strong></td>
<td><strong>Subsystem</strong></td>
<td><strong>Basic Function</strong></td>
<td><strong>Product Class</strong></td>
<td></td>
</tr>
<tr>
<td>Wind Turbine 1 =G001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind Turbine 1 =G001</td>
<td>Yaw System MDL</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Wind Turbine 1 =G001</td>
<td>Yaw System MDL</td>
<td>Drive Subsystem 10</td>
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<tr>
<td>Wind Turbine 1 =G001</td>
<td>Yaw System MDL</td>
<td>Drive Subsystem 10</td>
<td>Drive 1 MZ010</td>
<td></td>
<td></td>
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<tr>
<td>Wind Turbine 1 =G001</td>
<td>Yaw System MDL</td>
<td>Drive Subsystem 10</td>
<td>Drive 1 MZ010</td>
<td>Motor 1 -MA001</td>
<td></td>
</tr>
</tbody>
</table>
## RDS-PP Aspects, What, Where, How?

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Designation task/aspect</th>
<th>Application</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Function Designation</td>
<td>Main Systems, Systems, Subsystems, Basic Functions</td>
<td>=G001 MDA30 GP001, WTG 1, Tip Hydraulic Oil Pump Brake System Rotor</td>
</tr>
<tr>
<td>-</td>
<td>Product Designation</td>
<td>Product classes</td>
<td>–MA001 Electric Motor 1</td>
</tr>
<tr>
<td>+</td>
<td>Point of Installation</td>
<td>Cabinets, vessels</td>
<td>+G001 MDA30 GP001.MA001, WTG 1, Tip Hydraulic Oil Pump Brake System Rotor, Motor Side</td>
</tr>
<tr>
<td>++</td>
<td>Site of Installation</td>
<td>Building, areas</td>
<td>++G001 MUD10, WTG 1, Nacelle</td>
</tr>
</tbody>
</table>

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**What does this object do?**
It operates/switches electrical energy.

**Product aspect**
(Design and configuration)

**Location aspect**
Is there any space for another object left?

**How is this object constructed?**
A metal frame containing electrical components.

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**Functional aspect**
(Function or task)
CODING STRUCTURES ALREADY IN PLACE

IEC 81346-2 Table 3

<table>
<thead>
<tr>
<th>Letter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Systems for common tasks</td>
</tr>
<tr>
<td>B</td>
<td>Systems of the main process (power plants)</td>
</tr>
<tr>
<td>C</td>
<td>Control and management systems</td>
</tr>
<tr>
<td>D</td>
<td>Functional allocation</td>
</tr>
<tr>
<td>E</td>
<td>Fuel treatment and supply of fossil and renewable energy sources inclusive residue disposal</td>
</tr>
<tr>
<td>F</td>
<td>Handling of nuclear equipment</td>
</tr>
<tr>
<td>G</td>
<td>Water supply, disposal and treatment</td>
</tr>
<tr>
<td>H</td>
<td>Heat generation by combustion of fossil renewable energy sources and heat generation from natural sources</td>
</tr>
<tr>
<td>I</td>
<td>Nuclear heat generation</td>
</tr>
<tr>
<td>J</td>
<td>Nuclear auxiliary systems</td>
</tr>
<tr>
<td>K</td>
<td>Systems for generation to and transmission of electrical energy (power plants)</td>
</tr>
<tr>
<td>L</td>
<td>Medium supply system, energy</td>
</tr>
<tr>
<td>M</td>
<td>Structural and area systems for systems outside of the power plant process</td>
</tr>
</tbody>
</table>

ISO/TS 16952-10 and VGB-B 101

<table>
<thead>
<tr>
<th>Letter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Denomination</td>
</tr>
<tr>
<td></td>
<td>Rotor System</td>
</tr>
<tr>
<td></td>
<td>Drive Train System</td>
</tr>
<tr>
<td></td>
<td>Yaw System</td>
</tr>
<tr>
<td></td>
<td>Central Lubrication System</td>
</tr>
<tr>
<td></td>
<td>Central Hydraulic System</td>
</tr>
<tr>
<td></td>
<td>Control System</td>
</tr>
</tbody>
</table>

Basic function

Specific

Letter code for objects

Letter code for sub-classes

RDS

Illustration

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NRX AssetHub.
LOWEST MAINTAINABLE LEVEL (LML)

➢ Develop asset structures only at the maintainable level for simplicity

➢ Incorporate spare part catalogs that are relevant to the LML and connect these intelligently

➢ Use / build work instructions for all PM’s, Correctives and Statutory work needed for your assets

➢ Connect service manuals, data sheets from manufacturers, drawings and any relevant information intelligently

➢ When your CMMS is in place transfer all data / documents / links preserving their intelligence
Lowest replaceable level:
- The level that you decide to replace parts at according to your maintenance strategy

Hydraulic Cylinder Example:
- Internal parts are not replaced as there is a bigger risk to contaminate the hydraulic system.
- Instead replace the whole cylinder with bearings, fittings and hoses available as spares
WHO USES THIS INFORMATION?

Wind Power Plant:
Enterprise view (controlling, finance, project development, board, ...)

WTG:
Procurement, project- and asset management, ...

System, Function, Component:
O&M, procurement, ...

Signals:
IT [SCADA], asset management, ...

Step 1: Maintenance demand
Step 2: Work order (WO) initiation
Step 3: WO planning & scheduling
Step 4: Work execution
Step 5: Completion & closing
Full asset life-cycle allows you to manage your equipment through every phase of use:

Enabling full traceability of all assets
THE BENEFITS OF RDS-PP T32

➢ Easy and manageable way to organize all data, documents and information pertinent to all teams in Project and Operations.

➢ Data visualization available to the entire organization. Allows for simple discussions where everyone is on the same page.

➢ Multiple business systems and processes access the same data. All are connect through context.

➢ Your final O&M strategy will require all the Wind Farm functions to merge and be managed as one in the CMMS. RDS-PP makes this possible.
Thank you for attending

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