Strategies for supplier collaboration in complex projects

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Nils-Olof Persson & Sune Horkeby
Strategies for supplier collaboration

Content

- Siemens Finspång – Background and Products
- Project Rya – Short presentation
- PLM Application IT Target architecture
- The complexity – Information Volume
- Process Harmonization
- Information Models
- PLM Maturity Stages
- Business needs and Project Portfolio Management
- Lesson learn and Summary
Finspång - Long Industrial Innovation History

1496-1540 Iron mill in Finspång; Royal mill 1560
1620 Manufacture of cannons started
1641 Louis de Geer I bought the mill & property
1668-1685 Louis de Geer II built Finspång House

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Rya - Completed plant vision

View of the completed plant
The Project definition

- Combined cycle cogeneration, power generation: 260 MW, Heat generation: 290 MW
- Fuel: Natural gas, fuel consumption 300 million Nm3/year
- Operation time: 7-8 months/year
- Total efficiency 92.5% at 100% GT load and 100% Supplementary firing
- Power generation 1 250 GWh/year and District Heat generation 1 450 GWh/year corresponding to 30% of the electrical demands and 25% of the heat demand in Gothenburg.
- Site situated in the oil harbour at Rya wood on Hisingen in Gothenburg.
- ALSTOM Power Sweden AB, later SIT AB, was selected turn-key supplier of the new CHP plant.
- Consortium with NCC Sweden that was responsible for civil and buildings.
Project scope

Scope of delivery
SCC-800 3x1DH Turn-key.

- 3xSGT800 from I4 in Finspong
- 3xHRSG from ALSTOM Power, Czech Republic
- 1xSST900 from I2 in Finspong, Sweden
- Condensers from Sahala Works Oy, Finland
- Pipe installation from YIT, Finland
- Electrical installation from Emil Lundgren, Sweden
- Buildings from NCC Sweden
- All installation, erection and commissioning, including completion and performance tests.
Key figures for the Rya Project

- Total order sum: 1670 milj SEK
- Number of major components: 20,000
- Number of purchase contracts:
  - Minor contracts: 500
- Final documentation: 1200 binders
Project Coordination – Main Applications

Sales & Planning
- ProCon
- MS-Project and Primavera

Financial and Purchase
- SAP/R3

Engineering and Design
- 3D - Layout; PDMS
- 2D - Electrical; El-Master
- 2D - Process; ProCAD

Collaboration – Customer & Suppliers
- PIRS on Lotus notes (mail, letters, contracts etc.)
- TCC on www (drawings, specifications)
- Lastbryggan on Lotus Notes (Load Carrier for supplier collaboration)
Oil&Gas Division will consolidate the current IT landscape to common CAD/PDM/ERP systems harmonized with Energy

SIT AB - IT application migration plan:

<table>
<thead>
<tr>
<th>Process/Area</th>
<th>System Out</th>
<th>System In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Configuration</td>
<td>ProCon</td>
<td>Tacton</td>
</tr>
<tr>
<td>Design Mechanical</td>
<td>Ideas, CaddS5</td>
<td>UGS/NX *)</td>
</tr>
<tr>
<td>Process&amp;Electrical</td>
<td>ProCAD, ElMaster</td>
<td>Comos</td>
</tr>
<tr>
<td>CAM</td>
<td>EdgeCAM</td>
<td>UGS/NX-CAM *)</td>
</tr>
<tr>
<td>PDM</td>
<td>TC (Pulse)</td>
<td>UGS/Teamcenter *)</td>
</tr>
<tr>
<td>ERP</td>
<td>SAP R/3 (PRD)</td>
<td>SAP (Atlas)</td>
</tr>
</tbody>
</table>

**PLM As-Is Architecture (Industrial)**

**PLM Target Architecture (Industrial)**

Oil&Gas PLM/ERP journey for the next forthcoming 5 years.

*) UGS NX/Teamcenter acquisition of Siemens A&D (Siemens PLM Software)
Plant design 2D/3D – Today systems

Mechanical / Process
- Setting list
- Heat tracing list
- Delivery limits
- Instrument list
- Pipe list
- Base position list
- Aggregate list
- Equipment list

Installation
- Isometric
- Isometric
- Lay-out
- PDMS
- Hook-up
- Data sheet

Instrument
- Bently
- Listappl

Control System
- PC
- Simatic
- DB

Electrical
- Layout
- Circuit diagram
- Apparatus list
- Electrical load list
- I/O-list
- Wire table
- Cable list
- Connect

Suppliers

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Oil & Gas Division
Nils-Olof Persson & Sune Horkeby
Today's strengths in Finspång (NX/Teamcenter)

**NX**
- Parametric Authoring of CAD data
- Drafting
- Model Metadata Management
- Simple Rendering
- Knowledge Fusion

**Engineering**
- Manage of CAD data
- Fill out attributes
- Release of data
- Create of neutral files (JT IGES)
- Export and import of CAD data
- Share information (Multisite)

**Enterprise**
- Drawings
- SAP material
- Change Management
- Document Management
- Web interface
- Complete Engineering BOM
- Interfaces to different CAD systems
- Digital signatures on PDF

**Community**
- Internet Platform to integrate
  - Supplier
  - Service Providers
  - Other Partners
- Built-in viewer
- Based on Microsoft SharePoint Server

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**Tomorrow’s strengths in Oil & Gas**

### NX
- Parametric Authoring of CAD data
- Drafting
- Model Metadata Management
- Simple Rendering
- Knowledge Fusion
- Manage of CAD data
- Fill out attributes
- Release of data
- Create of neutral files (JT IGES)
- Export and import of CAD data
- Share information (Multisite)
- Harmonized Release

### TeamCenter
- Drawings
  - SAP material
  - Option & Variants
  - Change Management
  - Document Management
  - Web interface
  - Complete Engineering BOM
  - Interfaces to different CAD systems
  - Digital signatures on PDF
  - BOM creation support
  - Harmonized workflows
- Internet Platform to integrate
  - Supplier
  - Service Providers
  - Other Partners
- Built-in viewer
- Based on Microsoft SharePoint Server
- Integrated with the rest of TeamCenter better supplier integration (JT)

### NX/CAD vs Teamcenter/PDM/Complete E-BOM

<table>
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<tr>
<th>NX/CAD</th>
<th>Teamcenter/PDM/Complete E-BOM</th>
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<td>- Manage of CAD data</td>
<td>- Drawings</td>
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<td></td>
<td>- Harmonized workflows</td>
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### SAP/ERP/Complete M-BOM

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## Project planning

### Project conditions

- **Contract signed**: 2003-10-20
- **Site establishment**: 2004-06
- **EXW 3xHRSG**: 2005-05
- **EXW SST900**: 2005-07, 2005-09/10
- **EXW 3xSGT800**: 2005-09/10
- **Start stationary commissioning**: 2005-12
- **Start rotating commissioning**: 2006-04
- **Hand over to customer**: 2006-12-15
RyaKVV: Process

Multiple shafts for extended load range and part-load efficiency

Supplementary HRSG Firing (All HRSG)

DH-driven district cooling

Seawater-cooled DH auxiliary cooler allows independent power generation
Equipment layout

- Flue gas
- Natural gas
- Power
- District heating
- Heat condensers
- Gas turbine
- HRSG
- Steam turbine
Gas turbine SGT-800
RyaKVV: Heat Recovery Steam Generator

- Drum and evaporator
- Catalyst (SCR)
- Superheater
- Membrane walls
- Supplementary firing burners
- Distribution plate
- Economizer (DH-cooled economizer)

Flue gas to stack

Hot flue gas from GT

Catalyst (SCR)

Supplementary firing burners

Distribution plate

Economizer (DH-cooled economizer)

Superheated steam to steam turbine

Cold DH water

Hot DH Water

Condensate
Project execution story

Take over, December 2006
PLM – Product Lifecycle Management

PLM/PDM overall scope

<table>
<thead>
<tr>
<th>Product Mgt</th>
<th>Product Development</th>
<th>Product Order Mgt</th>
<th>Product Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept and Specification</td>
<td>Development and Design</td>
<td>Calculation and Design</td>
<td>Procurement and Manufacturing</td>
</tr>
</tbody>
</table>

**PLM Product Lifecycle Management**

**Product Portfolio Mgt**

- Concept and Specification
- Development and Design
- Launch
- Calculation and Design
- Procurement and Manufacturing
- Operation and Maintenance
- Dispose

**PDM focus**

GloBus/TC initiative

**ERP focus**

Atlas/SAP initiative

**In scope** are all tools for: PDM, CAD, CAM

**Out of scope is:**

- ERP (PLM), CAE

**Out of scope is:**

- financial data, administrative and logistic data

**In scope:**

- technical data

**In scope:**

- interfaces to ERP, CAE, others

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Common Information Model
(E.g. Dokument revision-Dokument master)

- Article_Individual_Structure_Relation_Document
- KKS_Structure_Relation_Document
- Document_Structure_Relation_Document_Master
- Document
- DocumentStructureRevision
- Document_Structure_Relation_Document_Revision
- DocumentRevision
- DocumentRevisionRepresentation
- DocumentRevision_Representation
- Language
- Digital_file
- Physical_file

- Document_Structure_Relation_Document_Master
- Article_Structure_Relation_Document_Master
- Article_Structure_Relation_Document_Revision
- Article_Structure_Relation_Document

K-2008-10
Uses Document Masters (uses)
- K-2008-43
  Has Revisions (has)
  - K-2008-43
    - K-2008-43
      - K-2008-43
        - K-2008-43
          - K-2008-43

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Common Data Model – What does this include?

The Common Data Model includes all business relevant data objects for the CPD Management layer (Teamcenter), all mandatory attributes and the mapping of those objects and attributes to the Atlas data model.

**Object class: “Part”**

**OC: “Classification”**

**OC: “Part Revision”**

**OC: “Dataset” for:**
- 3D Data model
- MS Office
- 2D Drawing (dxf, ..)
- Native formats (PDF, JT)

**OC: “Part Structure”**

<table>
<thead>
<tr>
<th>PG Mandatory</th>
<th>ATLAS</th>
<th>Team Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>Material Master</td>
<td>Item</td>
</tr>
<tr>
<td>Part Identifier</td>
<td>MM Identifier</td>
<td>Item Identifier</td>
</tr>
<tr>
<td>Part Type</td>
<td>MM Type</td>
<td>Material Type</td>
</tr>
<tr>
<td>Part Short Text</td>
<td>MM Name</td>
<td>Item Name</td>
</tr>
<tr>
<td>Part Status</td>
<td>MM Status</td>
<td>Item Status</td>
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</table>
In order to approach PLM in a structured way, different maturity stages should be understood and considered.

**PLM – Maturity Model**

- Increased degree of PLM maturity is reflected in two major dimensions:
  - Functional coverage
  - Integration

- To proceed to upper levels of maturity, the industry specific elements of the lower levels should be fulfilled.

Today status: Improving of basic PDM/PLM functionality needed.

PDM Basics

Integrated PDM

Collaborative PLM

Advanced PLM
PLM Needs & Solution Description
(Concept and Methodology)

Business Needs Description

Consolidated Work areas

Work area (scenario)

Work area (scenario)

Work area (scenario)

Solution Description

Engineering capabilities

Scenario

Scenario

Scenario

Solution components configuration

Global implementation parameters

Func / SOA

Business rules / security

Information model

Design & implementation

• PLM System configuration
• PLM System environment
• TC setup
• Customer configuration
The PLM Challenge

... executive level mindshare for PLM transformations
How to succeed with Supplier collaborations?

Lessons learn and some thoughts…

• Very good to have:
  • PLM Vision & Mission agreed with the Management (short & long term)
  • An agreed process framework (to some level)
  • Defined standard terminology and plant structures
  • IT Target architecture in placed including integration platform
  • Robust infrastructure needed

• The strategy for Supply chain Collaboration
  • Target application & integration - Define Capabilities and Basic principles as soon as possible
  • Actively defining common definitions of concepts and terms
  • Provide assistance for process improvements, knowledge management and business development by using an information model
  • Reducing cost for own tool development → Out-of-the-box strategy (e.g. Teamcenter/Briefcase and/or SAP/C-folders)
  • Be active to follow up projects and contribute with knowledge and experiences for the next one’s
Thank you for your attention!

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