Product Data Management and Parts Classification Systems

Why You Need Both

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Engineers need information support early in the development cycle, but have even less success in gathering it.

Early Design Support….

- Do I have a part for re-use?
- What parts will help me meet my target cost?
- How reliable is this supplier?
- Which one do I buy the most of?
- Which supplier is closest to the manufacturing plant?
- What should I expect the cost and investment to be for this part?
Concurrently, professionals in other functional organizations are asking related questions to protect and improve bottom line performance.

<table>
<thead>
<tr>
<th>Engineering</th>
<th>Sourcing</th>
<th>Quality/Compliance</th>
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<tbody>
<tr>
<td>• Do I have a part I can re-use?</td>
<td>• Do I have alternative suppliers for this part?</td>
<td>• Do we have any risk of counterfeits?</td>
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<tr>
<td>• Are all the parts / suppliers approved?</td>
<td>• Are there any lower cost alternatives?</td>
<td>• Are any parts or suppliers consistently poor performers?</td>
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<td>• Am I below my cost target?</td>
<td>• Do I have all the correct facts for this negotiation?</td>
<td>• Have manufacturing processes changed significantly</td>
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<tr>
<td>• Are there any End of Life issues with any of the components I am specifying?</td>
<td>• Has technology used all the best parts &amp; suppliers?</td>
<td>• Are all of our test plans on track?</td>
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<td>• Are we keeping in compliance with the latest environmental reg’s, e.g. Design for Environment (DfE)?</td>
<td>• Are our suppliers prices in line with what others are paying?</td>
<td>• Do we have any RoHS / REACH exposures?</td>
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The Data Required to Drive Effective Decision Making exists both Inside & Outside of the Company
Not effectively answering these questions can result in suboptimal performance at many points in the product lifecycle.
PDM/PLM Systems excel at managing *Product-related* development processes and associated data...to a major extent.

- New product development….clean sheet of paper….designing the new or doing a “make from”

- **Product** Lifecycle Management
  - Creating a product structure (EBOM)
  - Release and change management of parts, assemblies and products (ECN/ECO)
  - Managing effectivity of changes over time (Configuration Management)…. 

- Document revision / version management

- Primary Relationship management
  - Document versions / revisions to part revisions / versions
  - Hierarchical….part to sub-assembly, assembly to product…. 
Typically, existing parts are found in PDM / PLM via the part number and perhaps some small number of part describing attributes.

- Requires the design engineer to have some prior knowledge of the specific part he is looking for before going to get it….
  - This is not a good scenario for finding parts across organizational and geographic boundaries…
  - Because of this, Procurement is not fully able to leverage Volume purchasing across businesses

- Historical part classification evidence shows that typically 20 – 30 distinct attributes are required to fully describe an individual part.
  - PLM data models typically don’t provide for this high a number of distinct attributes

- PLM data models are typically static and difficult to change over time
Therefore, PDM/PLM Systems aren’t as good at maximizing the re-use of existing enterprise part assets.

- Parts / assemblies that have already been designed, qualified, sourced and inventoried for use in other enterprise products that meet the requirements for a new design
  - Cross organizational boundaries….e.g. valves designed for washing machines might be applied to dishwashers
  - Cross geographic boundaries….e.g. from other global design centers

- PDM / PLM systems therefore don’t completely fulfill the promise of “right part at the right time in the right place”
A Parts Classification solution, like Design for Retrieval (DFR) is optimized for enabling the re-use of enterprise part assets.

- DFR provides a logical, Hierarchical Taxonomy of objects from broad similarity of characteristics down to narrower criteria
  - Part Categories consist of Grouping parts in families and subfamilies according to their similarities and independent of their usage in products or other structures
  - Each category has its own unique set of Attributes which in turn may be searched against

- Many more attributes and specific attribute values are provided thus enabling the ability to differentiate and/or compare objects
  - Physical Attributes…length, width, weight, etc.
  - Commercial attributes…price, volume, supplier
  - Dynamic Data on Material Compliance (REACH, RoHS), Obsolescence (YTEOL)

- DFR utilizes a dynamic data model which allows for the classification structure to easily change with changes to the business, e.g. acquisitions / divestitures.
Re-use and parts standardization has impact all along the value stream…

- The objective is to reduce cost and risk by standardizing designs.
- The Industry average cost for introducing a new part into inventory is $9400:
  - Ref-Coopers & Lybrand – 1991 dollars
  - In 2008 the Defense Logistics Agency estimated the cost at >$27K for government programs
  - Saving a few cents/dollars on a part can be expensive if it introduces a new part or supplier into the system.
- Standardization reduces the overhead required to:
  - Select and review new parts and suppliers
  - Certify and track new parts and suppliers
  - Create design libraries (schematic symbol and footprints)
  - Procure, kit, store and manage parts
  - Resolve part/supplier issues
  - Program manufacturing machines
  - Develop manufacturing processes
PDM/PLM and Parts Classification Systems complement one another.

- What PDM/PLM is best at…
  - Managing hierarchical BOM structures, over time, with effectivity of changes as well as the associated change processes
  - Coordinating the processes of document lifecycle management, virtual product development / prototyping, engineering change / effectivity management, collaborative design

- What a Classification System is best at…
  - Grouping parts in families and subfamilies according to their innate similarities, i.e. independent of their usage in products or other structures
  - Providing a logical, hierarchical taxonomy of objects from broad similarity of characteristics down to narrower and narrower criteria

- A relatively small number of critical item attributes are managed in PLM/PDM
  - Part numbers and part description
  - Documents with versions / revisions and Dates
  - Responsible parties

- Many more attributes and specific attribute values are required to provide the ability to differentiate and/or compare objects in this type of schema
  - Physical / Functional Attributes…length, width, weight, material spec., flow rates, max voltage, etc. etc. etc.
  - Commercial attributes…price, volume, supplier
  - Dynamic Data on Material Compliance (REACH, RoHS), Obsolescence (YTEOL)
For optimum parts re-use, Classification and PDM systems need to be effectively integrated to allow the relative strengths of each.

- Data needs to be integrated with / governed by a controlled New Part Request workflow process such that potential new parts can be REJECTED if an Equivalent already exists
  - Let the dedicated classification tool be the taxonomy master
  - View the detailed meta-data in the PDM tool, but don’t make taxonomy changes there
  - Integrate the classification tool web client to the PDM tool to facilitate on the spot data editing within the PDM user interface
    - Avoid data synchronization issues
Why use both PDM/PLM and Parts Classification Solutions together?

Re-use

- Address Parts Proliferation
- Promote Standard Parts and Preferred Suppliers
- Reuse existing intellectual capital and allow scarce engineering resources to focus on real innovation
Supplemental Slides

- Case Study example of PLM / Classification Integration
Classification & PDM Integration Example: DFR attributes are exposed through a Windchill PartsLink user interface...

If you click on the DFR icon, allows users to update data via web-DFR if its not released

DFR manages master taxonomy – view-only in PartsLink – mitigates change management issues – no synchronization is required
...and WebDFR supports data editing

**Example: Illustrative New Part Introduction Governance using WebDFR**

Creating and classifying New Parts
Managing a Parts List

Classify parts, enter and validate attribute data

Auto-generate part numbers for new parts including cloning existing parts

Identify errors prior to saving, provides EVV support including request for new EVV’s workflow

Enables partners, suppliers to maintain their own data versus using spreadsheets

Allows users to edit and create relationships…can insure each part has at least 1 MFG part

Mouse-overs expose detailed category and attribute definitions to aid in data entry