PIDX SPRING CONFERENCE APRIL 2013
MATERIALS MANAGEMENT PROGRAMME
IN SHELL

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Group Materials Management lead
DEFINITIONS AND CAUTIONARY NOTE

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AGENDA

- About Shell
- Where were we 2 years ago?
- Materials Management Programme
- Where is our focus now
- Why is Data so important to us
ABOUT SHELL

- Active in more than 70 countries and territories
- Worldwide, more than 87,000 employees
- Produce around 3.3 million barrels of oil equivalent per day
- 44,000 Shell service stations worldwide
- Shell transports fuel to some 10 million customers a day

In 2012...
- We generated an income of $26.8 billion;
- Invested $29.8 billion in capital; and
- Spent over $1.3 billion on R&D.
C&P supports the entire Shell Group

- Approximately 2500 staff
- Managing some 30,000 Contracts
- 1 Million Purchase Orders
- 5 Million Invoices
- 120,000 Suppliers each year
- ~$65 billion in 3rd party annual spend

The C&P team is responsible for everything that Shell buys with the exception of hydrocarbons, but including the hydrocarbons for own use.
If value necessitates then workflow sends to Requisition Approver

- System automatically chooses ‘Stock’ or ‘Procure’ route
- ‘Stock’ materials are available for issue
- ‘Procure’ materials - system finds Outline Agreement and automatically creates PO without need for approvals

- Materials arrive at Work-site – fully Inspected and fit for purpose

- Downtime of facilities are minimized and production shut-ins are avoided

- Any used materials are returned through the appropriate investment recovery channels
2010 - THE IDEAL WORLD – MATERIALS ARE DELIVERED ON TIME

- Technician plans Work Order within realistic timing window
- Equipment has fully structured Bill of Materials attached with accurate overhaul quantities
- Technician selects spare parts from BoM
- Low value consumables are available as free issue or from vending machines and do not require planning
- Technician selects higher value consumables from Task List or …
- Technician selects higher value consumables from system catalogue - standardized easily understood material specs
RIGHT KIT, RIGHT PLACE, RIGHT TIME

- How much time do you lose locating the right materials?
- How often do you spend waiting for materials?
- How often do you pay extra for a rush order to meet ROS date?
- How confident are you that your materials are of the right quality?
- Has inadequate attention to stock preservation caused shortage of critical spares?
- How often do you have to deal with wrong materials, condition or inadequate documentation?
- How much more would you produce and/or save if you had the right kit in the right place at the right time?
SCOPE OF MATERIALS MANAGEMENT PROGRAMME

Materials Management involves delivering the right kit, at the right place, at the right time to improve site/asset uptime, optimise inventories, whilst supporting safe operations (Goal Zero).
Focused development of current assets to provide fit-for-purpose, easy to use systems which give users the confidence that the right kit will be delivered, at the right place and at the right time.

- Enforce quality on existing and new data
- Users can quickly find the required information whether in the office or in the field.
- End-to-End visibility of the material
MM VALUE LEVERS

When the business & CP are planning collaboratively together with clear data and specifications…

And we have the right materials in stock or timely and effective delivery from suppliers…

Then Business Benefits Result

Right Specifications & Data

Right Buying

Right Kit
Right Place
Right Time

+ +

Planning & Performance Mgmt

Right Inventory
### HOW WILL WE GET THERE?

#### Right Specifications & Data
- Standardisation/Variety Control
  - Increased Standardisation
- Material Catalogues
  - Zero Generics, QA/QC flagged
- Critical Spares
  - Tagged, preserved, protected
- Bill of Materials (BoMs)
  - Improved BoM quality and coverage
- Lead Times
  - Accurate, available lead times

#### Right Buying
- Sourcing Strategy
  - Greater use of Enterprise Framework Agreements (EFAs)
- Manage Supplier Delivery
  - New expediting strategies
- Supplier Managed Inventory
  - Leveraging Suppliers to hold and manage physical stocks, delivering just in time
- Stocking vs Vendor Managed Inventory
  - Supplier performance measures, adequate controls

#### Planning & Performance Management
- Joined-up Planning
  - Integration of Technical, CP, Logistics planning
- Integrated Scheduling
  - Materials available before work order released
- MM Big Rules
  - Common rules to drive performance
- KPIs
  - Use of common KPIs and targets

#### Right Inventory
- Inventory Management (min/max)
  - Stock linked to contracts / Right levels of inventory
- Stock Replenishment
  - Move to automation/replenishment planning
- Preservation & Certificates
  - Common policies followed
- Surplus Disposition
  - Implement reuse, scrapping, selling
- Warehouse Operations
  - Improved storage and handling; stock checking and accuracy; receiving, transfers, and returns
OVERVIEW OF CURRENT MATERIAL MASTER DATA
OPPORTUNITIES

Master Data Focus Areas

- BoM coverage to support maintenance
- Creation and handover of BoMs into Operations
- Multiple and complex templates used to request Material master data
- Material Master data roles and ownership
- Duplicate Material master records
- Effective search capabilities to locate Materials
CRITICAL SUCCESS FACTORS

- Data definition, data value owners and accountability for data integrity clearly defined
- Effective change management of new processes and proactive early end user feedback incorporated into final communications
- Prioritisation and implementation of business aligned master data cleansing initiatives
- Updated governance model which redefines master data management processes and policies
- Leverage existing and newly cleansed and codified Master data back into ERPs
- Selection of new technology solution for master data management
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AGENDA

- Material Master Management
- Need for Open Content
- Classification & Attribute Management
- Cleanse Material Master
- Catalogue Search
### MATERIAL MASTER MANAGEMENT:
#### SHELL CATALOGUE MILESTONES

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914</td>
<td>1) Initiative was taken by some material experts to set up the BPM (Bataafsche Petroleum Maatschappij) Materials Catalogue, in order to provide guidance for all staff anywhere in the world involved in the procurement and management of materials.</td>
</tr>
<tr>
<td>1932</td>
<td>1) Material and Equipment Standards and Code - MESC coding with unique 7-digit number made possible to communicate more efficiently with telex from overseas operations with the head-office.</td>
</tr>
<tr>
<td>1946</td>
<td>1) MESC number extended to 10-digit number to support the increase of Catalogue items.</td>
</tr>
<tr>
<td>1985</td>
<td>1) MESC on Compact Disk implemented, which simplified distribution. Gradual decrease in central coding and increase in local coding.</td>
</tr>
<tr>
<td>1995 - todate</td>
<td>Converted Legacy ERP’s to Global ERP’s. Conversions do not include complete cleanse.</td>
</tr>
<tr>
<td>2005</td>
<td>Start transition program to hand-over Master Data Management to Shell Business Service Centre’s. Implementation Data Quality Standards. Implemented KPI’s for process and Data Quality.</td>
</tr>
<tr>
<td>2011</td>
<td>Group Data Quality Standards implemented. LAKE &amp; RIVER check implementation per ERP started.</td>
</tr>
<tr>
<td>2012</td>
<td>Plan launched for new system Landscape that enables central Material Master Management.</td>
</tr>
</tbody>
</table>

1) Source: Koninklijke Olie 1890 – 1990
MATERIAL MASTER MANAGEMENT: MISSION & VISION

Mission

- Fit for purpose, readily available set of Master data in line with Laws & Regulations, Technical Integrity, HSSE, Standardisation & Variety Control and Group Data Quality Standards to support the Businesses/Functions and to enable Contracting & Procurement to achieve Top Quartzile.

Vision

- Fit for Purpose Material Masters and Bills of Materials are readily available and easily identifiable for the Business User.
- Material specifications in accordance to latest Industrial standards.
- Material specifications maintained by Shell are managed/coordinated centrally in one MASTER system. One Standard suite of tools allows to handle requests, cleansing and Material Masters centrally.
- Bills of Materials are maintained during the life cycle of an equipment.
- Material specifications permit flawless execution of RtP process.
In 1914 1) with the issue of the first B.P.M. Catalogue aiming at following three goals:

1. To bring uniformity amongst the materials used in the different operations.

2. To make a connection between those staff who use the materials, and those who purchase materials.

3. To bring under attention of all parties concerned, in a concise way the materials used in the B.P.M., enabling independency from Supplier Catalogue’s for the majority of the materials in the Catalogue.

After almost 100 years Shell is following the same strategy. The only difference is that more and smart use of Vendor managed data is aimed for.
NEED FOR OPEN CONTENT

Shell uses data across a wide variance of commodities:

- Data supporting different processes with own formats and requirements
- Source data in different formats/standards
- Interfaced systems use different formats/standards
- Cannot ignore end-user needs
  - (US Customary Units/Metric/imperial, Native Languages, etc)
- Improvement effectiveness & reliability catalogue search
- Limited resources in budget and staff
- Short implementation time
- Ongoing changes in formats/standards

Therefore it is important that key content is open and easily can be mapped despite the format!
CLASSIFICATION & ATTRIBUTE MANAGEMENT:
KEY CLASSIFICATIONS IN USE

- Supporting Material Specification:
  - Shell MESC (Material and Equipment Standards and Code) (more than 80 years in use!),
  - Shell Schema (CMT= Catalogue Management Tool),
  - TradeRanger TROCS (TradeRanger Open Content Standard) (phased out),
  - External; e.g. PIDX, eCLASS (in 2013 investigation for smart use of Vendor managed data!).

- Supporting Spend reporting & Category Management:
  - Shell Product & Service Group Codes (PSGC),
  - Shell Business Workstreams.

- Supporting Financial Accounting & TAX Reporting:
  - Shell General ledger via Shell Valuation Class and Shell PSGC,
  - Capital Projects (NORSOK),
  - UNSPSC.
BACKGROUND ON CATALOGUE VERSIONING

VERSIONING TRIGGERS

- Alignment to International Industry Standards
- Shell Technical Standards (DEP) Updates
- Minimized additional company requirements
- Standardisation Efforts
- Reassessment of Variations
- Attributes needed in Engineering tools (3D-modeling)
- Continuous Improvement

DELIVERIES

Shell Internal Schema
Also called ‘Classifications’ or ‘Schema Templates’
Provides a structure format for the specifications

MESC Specifications
Contains approx 140K formatted Piping Class ¹ related material specifications
Supplemented by buying descriptions and other reference documents

¹ Piping class is a collection of most compatible components considering dimensional and material properties for the intended service over a range on pressure and temperature specified.
CLASSIFICATION & ATTRIBUTE MANAGEMENT: PAIN POINTS

- CMT new releases uploaded annually, but separately for each ERP system.
- Functionality to synchronize Classification/Characteristics from the CMT MASTER system with tables and Material Masters linked in SLAVE ERP systems;
  - only feasible for the creation/introduction of new attributes,
  - no multiple classifications (versions and or external) next to each other integral connected,
  - labor intensive and delay.
- Overlap of identical material crosses many categories in major ERP systems.
- Because of the different landscapes, the Classification/Attribute Management Process is not standard across each ERP system. Therefore there are differences in functionality and set-up of Material Masters, which causes differences in way MM’s are maintained, searched, how we measure the data quality > resulting in separate Operating Procedures, separate Reports, separate Training for staff and less flexibility to work cross border.
- Global specification usage also becomes less viable when upload is delayed or partial.
CLASSIFICATION & ATTRIBUTE MANAGEMENT: NEW CONCEPT

- Classifications will be centrally maintained on the One Master System.
- Schema/Attribute mapping will enable the system to recognize identical items.
- Catalog format changes can be easily reviewed by the end-users.
- Attribute data belonging to a different Attribute Code but similar content will be recognized.
- Possibility to accept supplier provided content based on other classification standard.
- Dynamic search functionality empowers indexed search for flat text content descriptions on ERP.
- Further integration to other Enterprise Tools for Detailed Engineering and Spares –handling becomes viable.
Catalogue update triggers effect the following changes on the attribute level:
(1) Lack of control on identifying similar attributes
(2) Rationalization of attributes
(3) Removal of attributes supporting negligible design specs
(4) Removal of specifications not supporting purchasing but should be indicated
MULTIPLE CATALOGUE VERSION CAPABILITY

- No need to go through the labour intensive process of upgrading the different ERP systems
- Seamless execution of the latest catalog versions
- Empowered usage of the globally identified specifications
- Efficient Master Data Management enabled through supplier catalog integration (via PIDX, eClass)
- More feasible integration between internal and critical applications

Specifications in Flat Text. Replication of Schema will no longer happen on SAP systems.
CLEANSE MATERIAL MASTERS: CATALOGUES ACROSS ALL ERP’S

Legacy ERP Systems

MM today

Cleanse d MM

Global ERP-1

MM today

Cleanse d MM

Global ERP-1

MM today

Cleanse d MM

Global ERP-1

MM today

Cleanse d MM

Global ERP-1

MM today

Cleanse d MM

Legacy ERP Systems

MM today

MM to be cleansed

Global ERP-1

MM today

MM to be cleansed

Global ERP-1

MM today

MM to be cleansed

Global ERP-1

MM today

MM to be cleansed

Smart Cleanse Tool

Uncleansed

Work packages per class

Uncleansed

Work packages per class

Uncleansed
CLEANSE DELIVERABLES: CONTENT & ENABLERS

- Quality Material Masters that meet the Shell Group Data Quality Standards, Group Big Rules and support Detailed Engineering, Maintenance, Logistics, Contracting & Procurement and Finance processes and help the Business to achieve Top Quartile.

- Structured clean and unique short-descriptions for logic sorting in search result lists.

- Reviewed Classification/Characteristics supporting searching, detailed engineering and procurement.

- Standardized Characteristic Value’s for reliable search and feeding engineering systems.

- Dictionaries with synonyms support ongoing cleanse, searching and “GATE KEEPING” when new items are created.

- Identification of duplicate Material Masters within the same ERP as well identical Materials across ERPs.

- “One time” opportunity to review PSGC assignment for similar materials across ERPs.
CATALOGUE SEARCH: PAIN POINTS

- Multiple solutions across Shell
  - training,
  - differences in search functions, some ERP advanced, others very basic,
  - differences in search results.
- ERP systems with only standard SAP search functionality may limit results for end users.
- No integral solution whereby end-users can access direct Third-Party Catalogues.
- New requests are raised for MM’s for items that already are coded in one or more of the ERP-systems, but could not be found by the (end) user, because of missing integration and/or limited access.
- Impossible to further narrow search result.
**CATALOGUE SEARCH:**
**EXAMPLE ACTIVE GUIDANCE DURING SEARCH**

### Piping Class

- **GLOBAL**
  - DEP 31.38.01.12
    - Class Selection
      - Class 11000
      - Class 11001
      - Class 11003
      - Class 11005
      - Class 11007
      - Class 11009
      - (Show more results)
  - DEP 31.38.01.15
  - DEP 31.38.01.84

- **LOCAL**

### Class / Classification

- FITTINGS AND FLANGES

---

### Attributes

**Step 1:**
Search criteria inserted

**Step 2:**
For Piping Class related materials as first option; Piping Class Standards are offered for further search guidance

**Step 3:**
Select item in Piping Class Matrix. Specification will be presented.

---

### DEP 31.38.01.12-Gen Class 11009

**Nominal pipe size:**

<table>
<thead>
<tr>
<th>Size</th>
<th>15</th>
<th>28</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MESC</td>
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<td></td>
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<tr>
<td>743093</td>
<td>0</td>
<td>201</td>
<td>301</td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>743093</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>743093</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>743093</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>743093</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Welding neck flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>766278</td>
</tr>
</tbody>
</table>

- **Step 2:**
  - for Piping Class related materials as first option
  - Piping Class Standards are offered for further search guidance

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### PO Text

- **Elbow, Pipe, Butt-weld**
  - Design spec: ASME B16.9
  - Dimensional spec: ASME B36.10M
  - Material: CARBON STEEL
  - Mat spec, fitting: ASTM A234 WPB
  - Manufacturing process: SEAMLESS
  - Service(s): SOUR
  - Angle: 45 deg
  - Type: LONG RADIUS
  - Mandatory requirements: MESC SPE 76/200 2012
  - Inspection, certif: ISO 10474 -3.1B
  - Caps code: E46B CS11
  - Schedule number: 80
  - Size: DN 50

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