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Achieving Cost Reduction Targets Through MRO Data Cleansing

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The Data Challenge

As competition and technology continue to evolve in today's industrial and manufacturing industries, companies are faced with the ever-increasing challenge of reducing costs and improving efficiency, while minimizing equipment downtime. These manufacturing companies often have multiple sites spread across large geographic regions, each with thousands of MRO spare parts on hand to keep operations running. In such large organizations, several different employees enter items into various enterprise systems at each site, with little or no standard guidelines, and often in multiple languages. Over time, this lack of standardization causes materials data to become inconsistent and inaccurate, resulting in many negative effects that can be felt throughout all units of the business.

The most common effects caused by corrupt materials data include:

- Unidentifiable Items
- Excess Inventory
- Duplication
- False Stock-Outs
- Equipment Down-Time
- Inefficient Part Searches
- Increased Maverick Purchases (Direct Buys)
- Limited Benefits from ERP/EAM Systems

These inefficiencies can cost companies significant time and money, while preventing them from making critical business decisions.

The Data Cleansing Process

In order to transform corrupt legacy data into a high quality item master, a Data Cleansing process must be implemented to create one common corporate catalogue that can be maintained throughout the entire organization.

While the Data Cleansing process may appear very simple in nature, it requires a unique and specialized set of software, people, and procedures. Some Data Cleansing companies pride themselves on efficiency and speed through the use of automated software, but in reality, there is no software application that can accurately cleanse mass data files without human intervention. The Data Cleansing process is actually much more detailed, and for the most accurate results, requires the use of automated software applications combined with the expertise of cleansing specialists to ensure consistency, accuracy, and efficiency.

Step 1 – Establish Standard Operating Procedure

The first step in any data cleansing project is to establish a custom Standard Operating Procedure, which will address data format, naming convention, and abbreviation requirements. Each company and industry is different and it is critical that data be tailored to the specific enterprise system and business needs. Once the standard operating procedure has been approved, it will become the single source for structuring materials data moving forward.

Step 2 – Pre-Cleanse

Next, a pre-cleanse program will pass through raw client data in preparation for the standardization and enhancement process. Using automated software, the Manufacturer Name and Part Number are identified and segregated from the unstructured free text description. Once segregated, the Manufacturer Name and Part Number are corrected and standardized, ensuring each unique manufacturer name and part number maintains one consistent format throughout the entire database.

TB WOODS (Standardized)	THOMAS & BETTS
T B WOODS	T&B
T.B. WOODS	T & B
TB WOOD	TandB
TB WOOD'S	T-B
TBW	THOMAS & BETTER
WOODS	THOMAS-BETTS

Step 3 – Assign Noun-Modifier Pairing

Following the segregation and standardization of Manufacturer Names and Part Numbers, a standard part naming convention must be applied to each item. As illustrated in FIG. 1.0, a Standard Noun-Modifier Dictionary is used to assign each item with a Noun-Modifier pair, where the Noun is the primary identifier and the Modifier is the secondary identifier. Each Noun-Modifier pair also contains on average 5 to 7 associated attributes, which further describe the characteristics of that item.
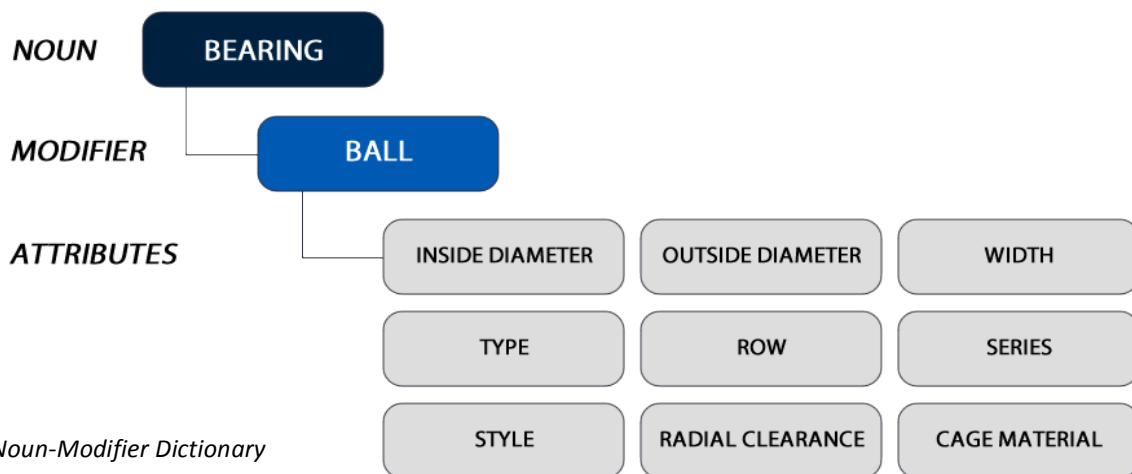
FIG. 1.0 – Noun-Modifier Dictionary

In an effort to satisfy business objectives, data requirements, and project budget, there are various levels of data cleansing available. Those levels include:

Level 1 - Cosmetic Cleanse: The Cosmetic Cleanse will identify and standardize Manufacturer Names and Part Numbers, while assigning accurate Noun-Modifier pairs for efficient identification. During the Cosmetic Cleanse, duplicate items are identified within individual sites and across the corporation, while items lacking critical information are flagged as "Review Items". The Cosmetic Cleanse is typically selected when data is being used specifically for procurement purposes, or when budgetary constraints are a critical factor. In this case, only pertinent part information is cleansed to enable accurate spend analysis, commodity segmentation, and part identification.

Level 2 - Standardization Cleanse: The Standardization Cleanse will identify and standardize Manufacturer Names and Part Numbers, assign accurate Noun-Modifier pairs, and standardize the client provided item description. During the Standardization Cleanse, duplicate items are identified within individual sites and across the corporation, while items lacking critical information are flagged as "Review Items". The Standardization Cleanse is typically selected when existing client data contains sufficient attribute information and enhancement is not required or desired. In this case, all existing information is cleansed according to pre-defined client standards, enabling improved part search ability, commodity segmentation, and spend analysis.

Level 3 - Full Enhancement Cleanse: The Full Enhancement Cleanse will identify and standardize Manufacturer Names and Part Numbers, assign accurate Noun-Modifier pairs, standardize the client provided item description, and provide attribute enhancements. During the Full Enhancement Cleanse, duplicate items are identified within individual sites and across the corporation, while items lacking critical information are flagged as "Review Items". The Full Enhancement Cleanse is typically selected when data is being used by maintenance and engineering, in which case comprehensive and complete item descriptions are required for efficient part search ability. The Full Enhancement Cleanse delivers data that is accurate, reliable, and readily available, ensuring rapid part location, minimal equipment downtime, and detailed management reporting.

Step 4 – Populate Attributes

After standardizing and populating information provided in the customer's raw description, the remaining attributes are populated using internal and external tools such as the Master Parts Library, which contains millions of pre-standardized items. An online research tool assists in the search and collection of additional part information. Using these powerful tools, item descriptions are accurately and efficiently enhanced with information retrieved directly from manufacturer and OEM catalogues.

Step 5 – Assign Classification Codes

Once all items have been correctly described by a Noun, Modifier and corresponding Attributes, they can now be assigned UNSPSC and/or customer-specified classification codes. The classification codes are typically used for commodity segmentation, spend analysis and other custom reports, enabling companies to leverage purchases and gain insight for improved procurement related efficiencies.

Step 6 – Identify Duplicate Items

After cleansing and classification is complete, duplicate items within the database are identified by direct duplicate (they have the same manufacturer name and part number) or by form-fit- function (they may have a different manufacturer name and part number but are identical according to type, size and material). Once duplicates have been identified, they are assigned one common corporate part number, descriptions are duplicated to appear identical throughout the database, and the items are flagged for customer review.

Step 7 – Quality Control Review

Due to the emphasis on quality and consistency, the next step involves a final human review of all items, typically conducted by an assigned project leader or dedicated quality control person. The quality control process ensures that every item follows proper format and nomenclature according to pre-defined customer standards, while verifying that enhanced descriptions are accurate and complete.

Step 8 – Send Review List to Customer

On average, 10% of the materials database is usually found to be review items, meaning items lacking critical information for accurate part identification such as Manufacturer Name or Part Number. During the Data Cleansing process these items are flagged and compiled into a customer review list. The review list is returned to the customer, who must then physically locate the item within the storeroom and record the necessary part information to be added into the Material Master.

Step 9 – Format Data to Customer ERP/EAM/CMMS

Once the missing information has been collected for all review items and the entire cleansed database has been approved by quality control, it is deemed complete and transferred to the IT department. At this stage, IT specialists format the data to the customer specified enterprise system and export it into a Return File. The formatting stage is critical to achieving the desired end result as every enterprise system has its own unique layout, headers, and character limitations. For instance, SAP has a 40-character limit on the short description, which presents a unique formatting challenge and requires a specific set of abbreviation standards during the cleansing process.

Step 10 – Return Cleansed File

Once the entire data file has been cleansed, standardized, enhanced, de-duplicated, reviewed, and formatted to the specified enterprise system, it is electronically delivered to the customer. At this time, the data can now be uploaded to the live enterprise system.

The Results

Esthetically, the results of Data Cleansing are obvious as the data now clearly maintains one consistent format and nomenclature throughout the entire organization, while containing enhanced information for improved part identification.

BEFORE

Plant	Plant 1
Stock Number	222-113-509
Manufacturer Name	SKF USA
Manufacturer Part Num	23022CCC3W33
Description	23022 CC/C3W33SKF Bearing, ABC Co.12345
Vendor Name	ABC Company
Vendor Part Number	12345

AFTER

Plant	Plant 1
Material Number	1000001
Manufacturer Name	SKF
Manufacturer Part Num	23022 CC/C3W33
Material Description	BEARING, ROLLER, 110MM ID, 170MM OD
PO Text	BEARING, ROLLER, 110MM ID, 170MM OD, 45MM WD, SPHERICAL, SELF-ALIGNING, C3 CLEARANCE, SKF, 23022 CC/C3W33
Vendor Name	ABC COMPANY
Vendor Part Number	12345
Old Item Number	222-113-509
Corp Num*	1000001

BEFORE

Plant	Plant 1	Plant 2
Stock Number	890723-01	880418-02
Manufacturer Name	SWAGELOK	Swaglock
Manufacturer Part Num	SS-810-C	SS810-C
Description	1/2" CAP PN:SS-810-C SWAGELOK	1/2" S.S. CAP, SS810-C
Vendor Name	XYZ COMPANY	ABC Company
Vendor Part Number	81235	64526

AFTER

Plant	Plant 1	Plant 2
Material Number	1000013	1000013
Manufacturer Name	SWAGELOK	SWAGELOK
Manufacturer Part Num	SS-810-C	SS-810-C
Material Description	CAP, TUBE, 1/2" TUBE OD, 316 SS	CAP, TUBE, 1/2" TUBE OD, 316 SS
PO Text	CAP, TUBE, 1/2" TUBE OD, 316 SS, SWAGELOK, SS-810-C	CAP, TUBE, 1/2" TUBE OD, 316 SS, SWAGELOK, SS-810-C
Vendor Name	XYZ COMPANY	ABC COMPANY
Vendor Part Number	81235	64526
Old Item Number	890723-01	880418-02
Corp Num*	1000013	1000013

BEFORE

BEARING, ROLLER, TAPERED, TIMKEN #39520
BEARING, CUP, TIMKEN #JLM710910
BEARING, ROLLER, TAPERED, #JM716610, CUP
BEARING CUP, 2 TAPER, TIMKIN #492A

AFTER

BEARING, CUP, TAPERED ROLLER, 4.4375" OD, 0.9375" WD, 0.1250" RAD, STRAIGHT OUTER, TIMKEN, 39520
BEARING, CUP, TAPERED ROLLER, 4.1339" OD, 0.7283" WD, 0.0400" RAD, STRAIGHT OUTER, TIMKEN, JLM710910
BEARING, CUP, TAPERED ROLLER, 5.1181" OD, 0.9449" WD, 0.1000" RAD, STRAIGHT OUTER, TIMKEN, JM716610
BEARING, CUP, TAPERED ROLLER, 5.2500" OD, 0.8750" WD, 0.1250" RAD, STRAIGHT OUTER, TIMKEN, 492A

The real benefits however, are those that may not be as visually obvious but present the greatest return on investment. The most valuable benefits are those that come from the ability to now identify and remove excess, obsolete and duplicate items, while improving search and reporting functionalities within the enterprise system.

Key Benefits of Data Cleansing include:

- Efficient Part Search Ability
- Maintenance Time Savings and Increased Productivity
- Accurate Reporting Capabilities
- Identification and Elimination of Duplicate Items
- Excess Inventory Reduction
- Equipment Down Time Reduction
- Elimination of Maverick Purchases
- OEM to MRO Conversion Opportunities
- Maximum ERP/EAM/CMMS Functionality

From a long-term perspective, quality materials data is the key to maintaining operation costs and efficiencies. This process does not end once the Data Cleansing project is complete though. Maintaining ongoing data quality requires a strict set of catalogue management procedures to ensure accuracy and consistency as new items are added and existing items are modified or suspended. Most Data Cleansing companies offer some type of Catalogue Management software or service for customers to maintain the quality of their cleansed catalogue; however, unless the customer is able to dedicate an internal resource to manage the catalogue, outsourcing this activity to the experts who originally cleansed the database will always deliver the best results.

No matter how expensive, functionality-rich, or industry recommended an enterprise system may be, the reality is that the software is only as good as the data flowing through it. While data cleansing may add cost to an already expensive software implementation, the savings and long-term benefits far exceed the upfront investment and the results truly speak for themselves.

About IMA Ltd.

Founded in 1989, IMA Ltd. provides world-class master data management, specializing in Data Cleansing, Governance, and Inventory Optimization solutions. Throughout twenty-five years of business, IMA has assisted manufacturing and asset-intensive organizations worldwide in their efforts to improve maintenance efficiency, reduce inventory costs, and optimize procurement performance.

For more information, please visit www.imaltd.com or contact info@imaltd.com.