PM Bills of Material

Maintenance bills of material (BOMs) are used to describe the way in which a piece of equipment or functional location is structured and to allocate the spares to a piece of equipment or assembly for maintenance purposes. Bills of material can either be created individually for each piece of equipment/ functional location, or they can be valid for an entire group of technical objects. A bill of material can be allocated to a technical object in one of the two following ways:

Direct Allocation

One or more pieces of equipment/functional locations refer to a bill of material. If all the pieces of equipment are identical in terms of their construction, the bills of material items are valid for all the pieces of equipment allocated. If different materials or assemblies are valid for individual pieces of equipment, the common bills of material can still be used. In this case the equipment-specific differences are documented by means of variant items.

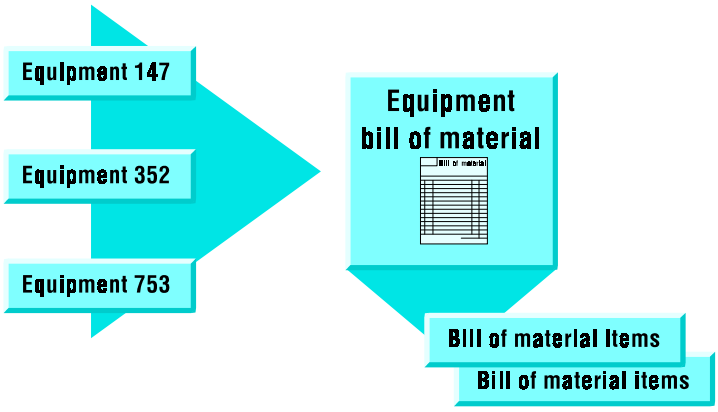

Figure 3-17: Direct Allocation of Bills of Material

Indirect Allocation by Material Category

If a company has several identical pieces of equipment, grouped under a material number which defines that particular category, then this "category bill of material" is automatically valid for all these pieces of equipment.

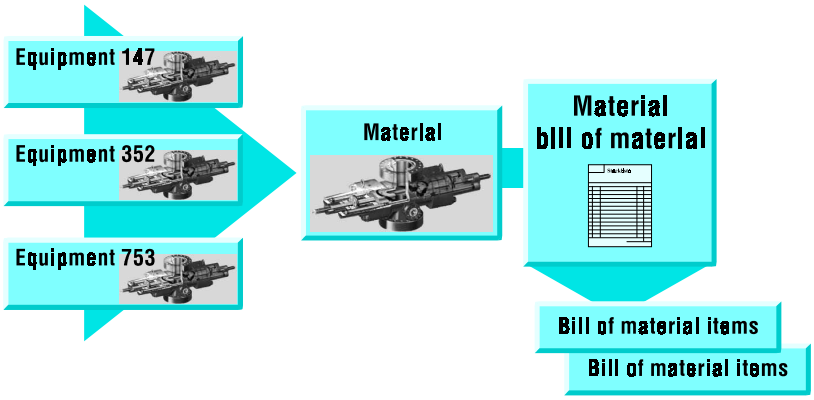

Figure 3-18: Indirect Allocation of Bills of Material

Including Bills of Material

The bill of material structures are included in system structuring in the overall structuring of individual operational systems, for example functional locations or pieces of equipment, enabling a unified and consistent structuring method. In addition to this "top-down" approach, **where-used lists** enable you to keep track of the usage of materials and assemblies at higher structural levels.

Temporal Period of Validity

Bills of material are valid from an organizational view for a particular planning plant, but also from a temporal aspect for a certain period in time. When changing items, for example when replacing a material with another material from a specific point in time, the relevant entries can be made by entering a validity date, from which the change is effective.

Bill of Material Header

In the bill of material header, the planner assigns the bill of material to one or more plants, defines the period of validity and defines whether the BOM is released for maintenance in its current form (status management).

Item Sub-item

The object parts are described in the items. They can be divided from an engineering perspective (assemblies) or they can be spares or, in the case of documents and drawings, they can also be text items. Items are differentiated by item category. Sub-items are used to specify the place of installation.

Item Categories

Within a bill of material the items are differentiated by item category. The item categories relevant for maintenance are:

- **Stock items**

  These parts are automatically reserved when used in the PM order.

- **Non-stock items**

  A purchase requisition is automatically created for these materials when they are used for maintenance purposes, which then leads via Purchasing to an order-specific material procurement. Non-stock items can be created with or without a material master record.

- **Variable-sized items**

  These items are distinguished by the fact that format entries, for example length and width, are taken and converted into the quantity required on a stockable quantity basis. In this way variable data, such as the size of a steel sheet required to repair some planking can be entered directly during order processing, without having to keep creating new material master records with fixed dimensions.

- **Document items**

  Using document items, documents such as drawings or safety regulations can be integrated in the bill of material.

- **Text items**

  These are used for adding texts as required.

Bill of Material Maintenance

Bills of material in the PM System are created and changed on a single-level basis. Most of the maintenance takes place on a single overview screen. If, for example, additional information is required for a piece of equipment, the system automatically takes the user to the appropriate detail screen.

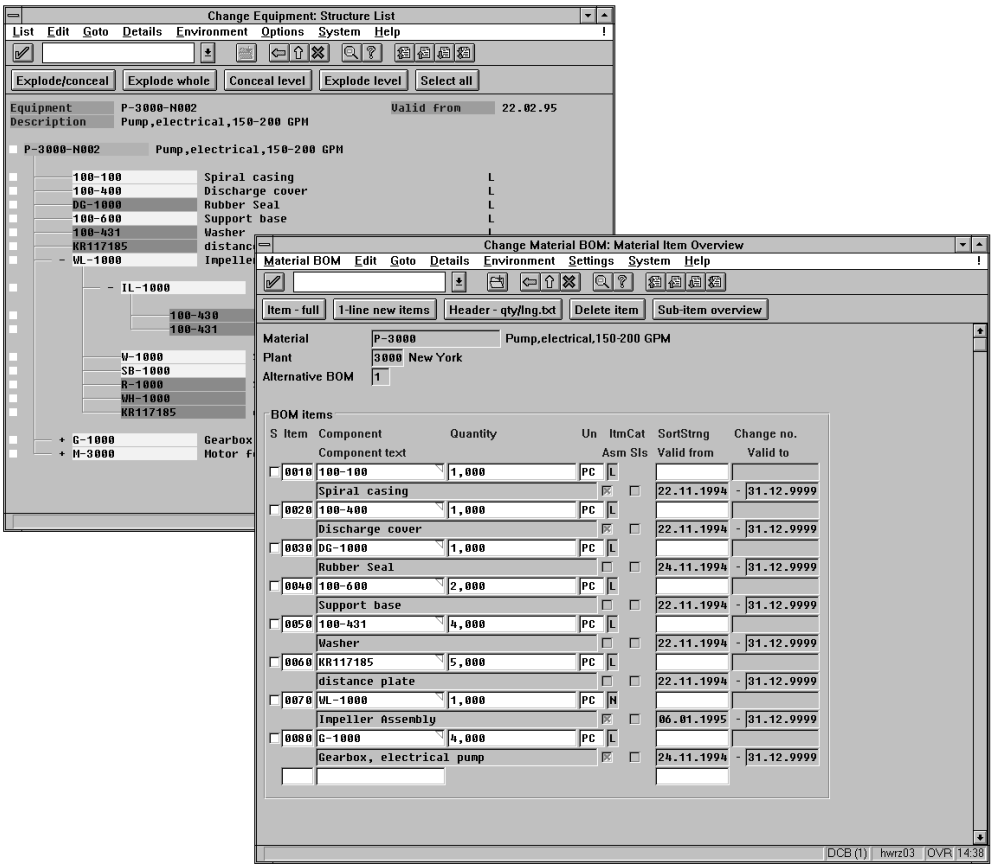

Figure 3-19: Structure List and Item Overview of Single-Level Bill of Material

Engineering Change Management

Change History

Engineering change management controls and documents connected changes to basic data. Basic data changes can be documented using this functionality in a comprehensive change history. Furthermore, engineering change management ensures that changes are automatically taken into account with the operative functions in maintenance planning.

Engineering change management is a central basic data function, which can be used for the following objects:

- material
- document
- bill of material
- task list

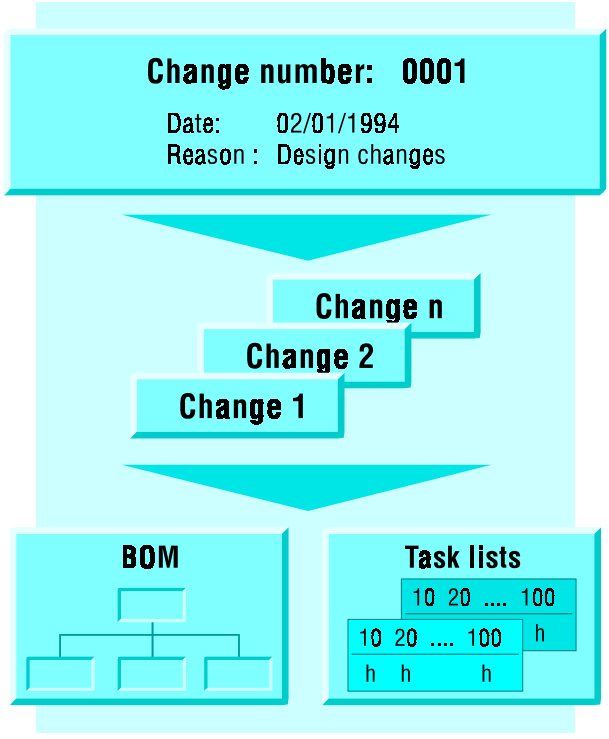

Figure 3-20: Engineering Change Management

Change Number

Changes are sorted by date and reason for change using a freely definable change number. Since changes are often carried out for several basic data objects at the same time, any number of basic data objects can be changed using one change number.

Networking Operational Systems

Production Systems

The elements of an operational system are not only related to one another, they are usually also related to elements from other operational systems. From a production point of view, a production system, such as a paper manufacturing system, consists of a large number of functional locations, which are linked in terms of their processing.

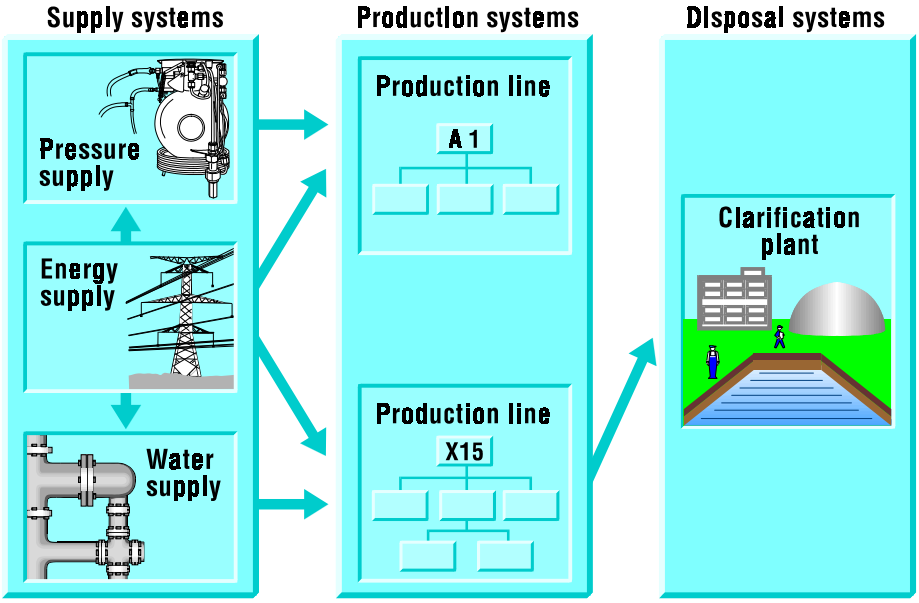

Figure 3-21: Networking Operational Systems

Supply and Disposal Systems

However, at the same time there are links to other operational systems, such as for example supply and disposal plants or energy supply systems.

Object networks built up between either functional locations or pieces of equipment can be represented between elements of different systems.

An object link contains descriptive information on the type of link, the direction of the link (directional / non-directional links) and the technical objects involved. In addition, technical links can be classified and evaluated according to specific criteria using the classification system.

The object links serve not only to document technical installations, but are also actively included in PM processing.

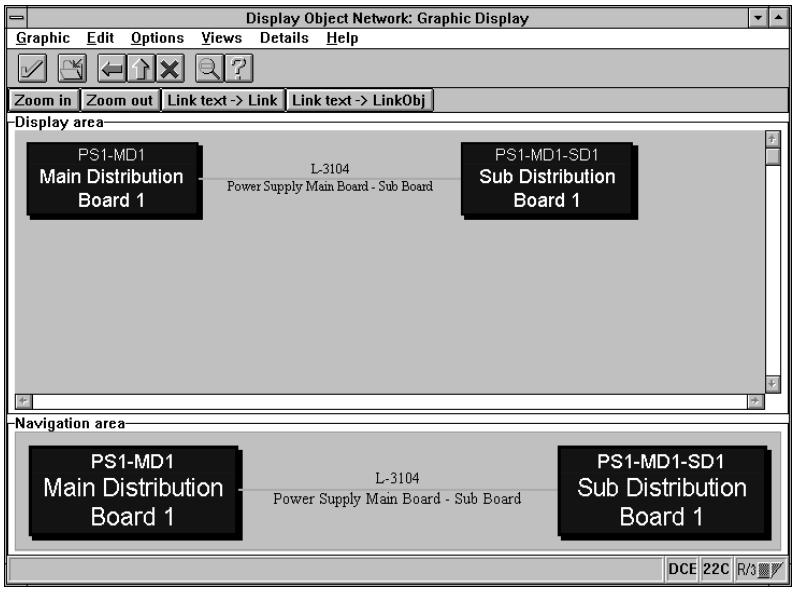

Figure 3-22: Clarification Plant - Network Representation

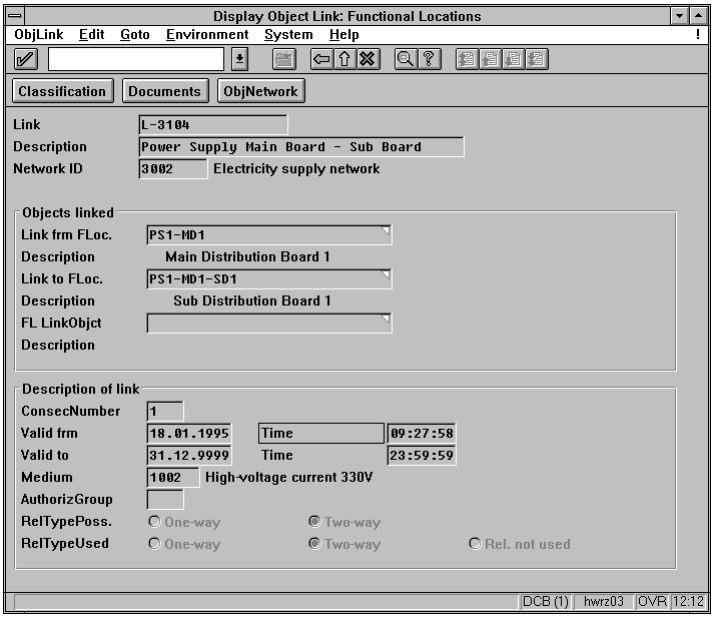

Figure 3-23: Object Link Master Data

Planning PM Notifications

When planning tasks that necessitate switching off an element within an operational system, the elements in other systems that are more or less closely affected can be identified and the corresponding plans can be determined for all the business areas involved.

Malfunction Analysis

It is similarly important in the case of the malfunction analysis to know the connections between different operational systems, in order to be able to limit the possible causes for the malfunction at a functional location or in a piece of equipment in this way.

Classification

We need to be able to group similar objects in classes wherever we work in maintenance with large numbers of objects, such as

- pieces of equipment
- functional locations
- assemblies
- spares

We also need to be able to create class-specific data for the objects (such as dimensions, power, and so on). It is important to be able to search for similar objects using the classification system.

The classification system is a cross-application basic data function which allows you to classify any number of data objects within the R/3 System. You can classify materials, task lists, documents, but also customers and vendors, or inspection characteristics.

Material

Within the PM System application area, the classification system can help employees in maintenance to find similar parts, reducing the number of different parts and avoiding data redundancy. Material classification is therefore an aid in reducing both stock levels and the time required for stock-keeping.

Task List

You can use the classification system to search for similar task lists in work scheduling.

Classes and Characteristics

Classes

Classes can be structured either on a single level or in multi-level class hierarchies. Catchwords, which are assigned to every class, can be used to help search for the appropriate class.

Characteristics

Characteristics describe the properties of classifyable objects. The user can define characteristics freely and assign any number of them to the classes. The characteristics and their values can be inherited over several class levels in the case of hierarchically structured classes. Freely-definable formats and value ranges, which are assigned to the characteristics, simplify classification.

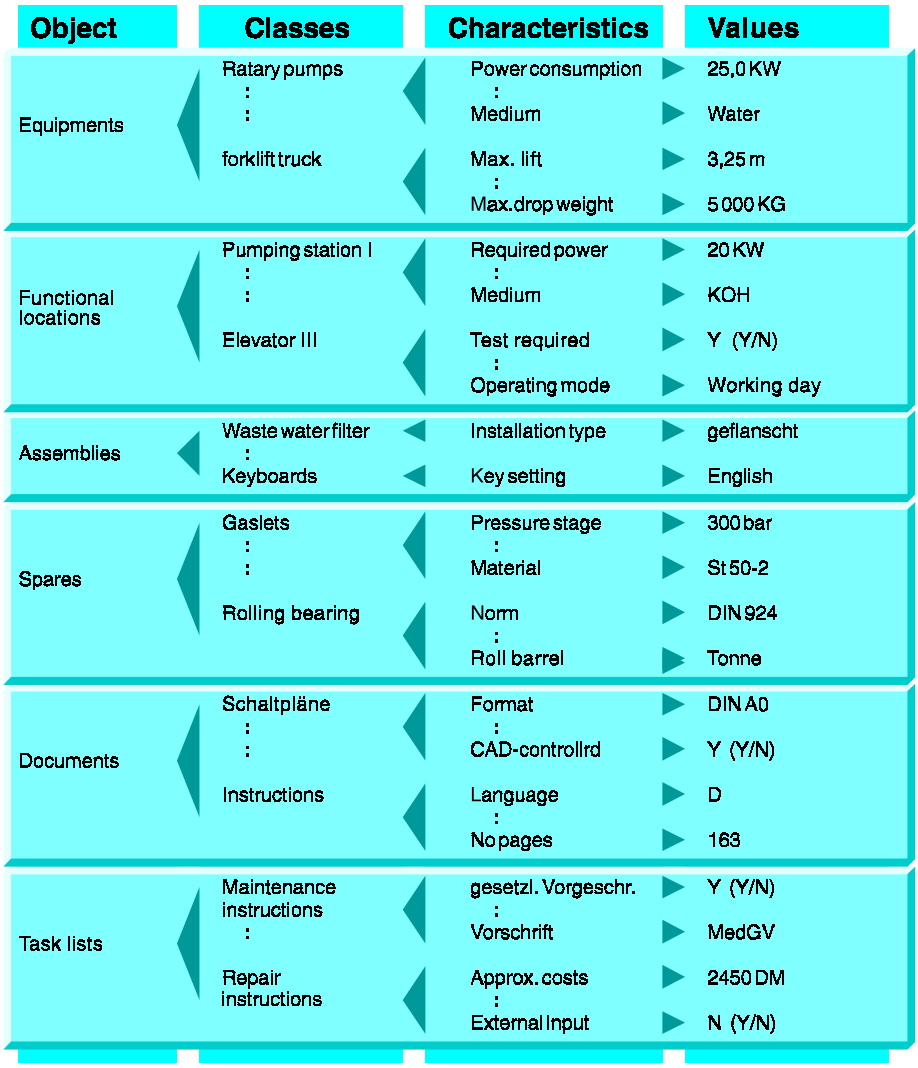

Figure 3-24: Example of Classification System Usage

Multi-lingual Functionality

Both the characteristic descriptions and their assigned values can be maintained in several languages. In this case you can search for objects in all the languages specified.

Master records often contain a large amount of descriptive information. These master data fields can be defined as a characteristic and be copied straight from the master record when you classify the object.

DIN-Data

The classification system supports the transfer of data in DIN 4001 format from external storage media. In this case the system automatically generates the classes and characteristics required.

Classification

You classify objects when maintaining basic data, or using the functions for mass classification. The system automatically sets up screens based on the characteristics, in which the characteristics can be evaluated.

Multiple Classification

An object can be assigned to one or more classes.

CAD Integration

You can classify a material directly from a CAD system, using the CAD function library. You can also search for materials from the CAD system.

Search in Classes

Class Search Function

The aim of classification is to find the objects you are looking for as quickly as possible. The search is divided into two steps. First, you must determine the object class. You can search using the class names, the catchwords, the graphical class hierarchy display or the matchcode function.

Characteristic Selection

Views

Within a class, the object is selected using the characteristics. You can use fixed values or value ranges for this purpose. The characteristics can be prepared on a department-specific basis, to maximize the efficiency of the search. This means that the user can only display and choose the characteristics that are relevant to that department.

Evaluations

Extensive evaluation functions are available, allowing you to carry out a systematic analysis of classified datasets.

Why is systems structuring necessary ?

- ❑ A well-structured operational system is the basic precondition for efficient planning, execution and analysis of maintenance work

What particularly characterizes the PM System in the area of systems structuring ?

- ❑ Variable systems structuring with an unlimited number of structural levels
- ❑ Function and object-related representation of operational systems
- ❑ Option to represent complex relations between production, supply and disposal systems
- ❑ Central maintenance functions using reference structures and multi-level data transfer within a hierarchy
- ❑ Integration of individual technical structures and general assembly structures