SAP PM Overview

SAP PM Team

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Agenda

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- SAP Overview
- SAP PM Overview
- SAP PM Master Data
- SAP PM-MM/FI Integration
- Work Order Management
- Preventive Maintenance Process

SAP Overview

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- Industry best practices for business processes
- Seamless Integration of business processes
- One system for all functions
- Improvement in quality of information
- Online data entry & Data transparency
- Authorization matrix
- Reduction in document flow across various departments
- Online Reporting for decision making & activity monitoring

Various Data Types in SAP

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- Customization Data / Key Data Structure (KDS)

  - It represents data which is customized according to the needs of the organization. Defined only by the implementation team members (Consultants / Core Team Members) as an one-time activity.

- Master Data

  - This data explains the characteristics and attributes. It is defined by Core Team Members (CTM) and updated as and when required

- Transactional Data

  - It records the execution of business processes in the form of transactions. This data is recorded in the system by end users as a routine activity

SAP Plant Maintenance (PM) Overview

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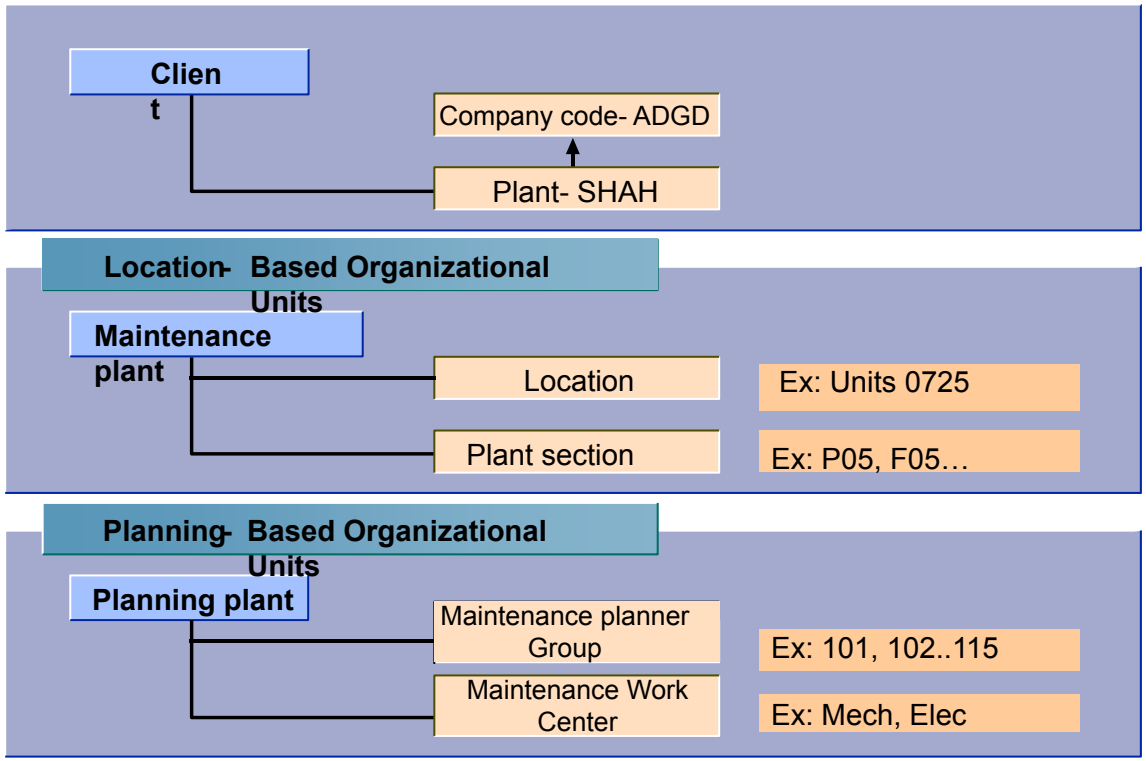
SAP Plant Maintenance is a core SAP ERP module, integrated into the logistics chain of the R/3 System, that helps management in performance of maintenance tasks, including:

- Representing *organizational structures* within maintenance
- Representing and managing *maintenance objects* in detail
- Planning and processing *maintenance tasks* in detail:
  - *Inspection* ; Determining the actual condition of a technical system
  - *Preventive maintenance* ; Maintaining the ideal condition of a technical system
  - *Repair* ; Restoring the ideal condition of a technical system
  - Constructing and modifying *technical systems*
- Processing *external services*.
- Performing *cost planning* and *cost determination*
- Recording important data and enabling a *maintenance information system(mis)*

Organizational Structure-Plant Maintenance



What are the Benefits of SAP PM?

- SAP PM can consolidate all inspections, supplemental work, and corrective work into one common, standardized corporate-wide maintenance management system.
  - Improved visibility enables drive towards planned and preventive maintenance.
- Integration with MM, FI/CO and HR/CATS captures cost information directly to the Work Order without rekeying, interfaces or validation errors.
- Integrated processes automate reserving inventory and purchasing goods or services.
  - Increase procurement process efficiency, more control of availability of materials and purchased services.
- Equipment information can be standardized so that consistent data is being collected and maintained.

What are the Benefits of SAP PM?

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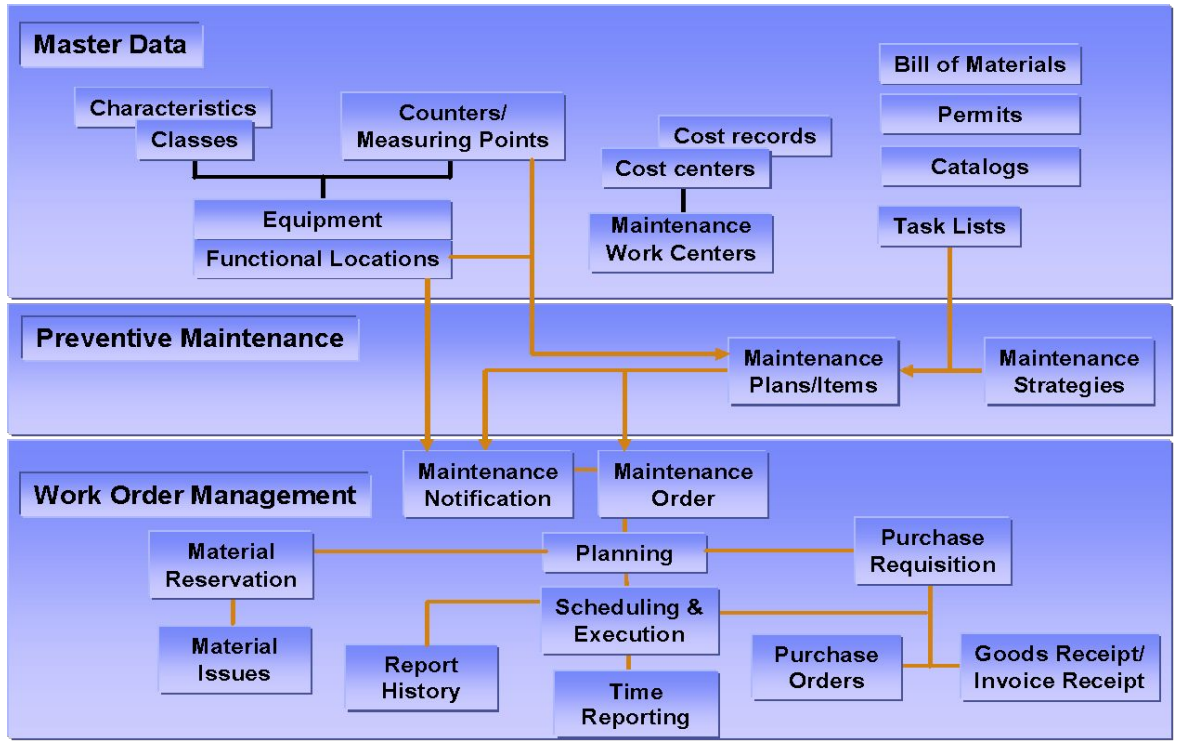
- Complete picture of costs and failures associated with an Asset.
  - Full cost visibility, powerful tool for decision whether to maintain or replace.
- Planning of the work order will support improved utilization of both internal and external resources.

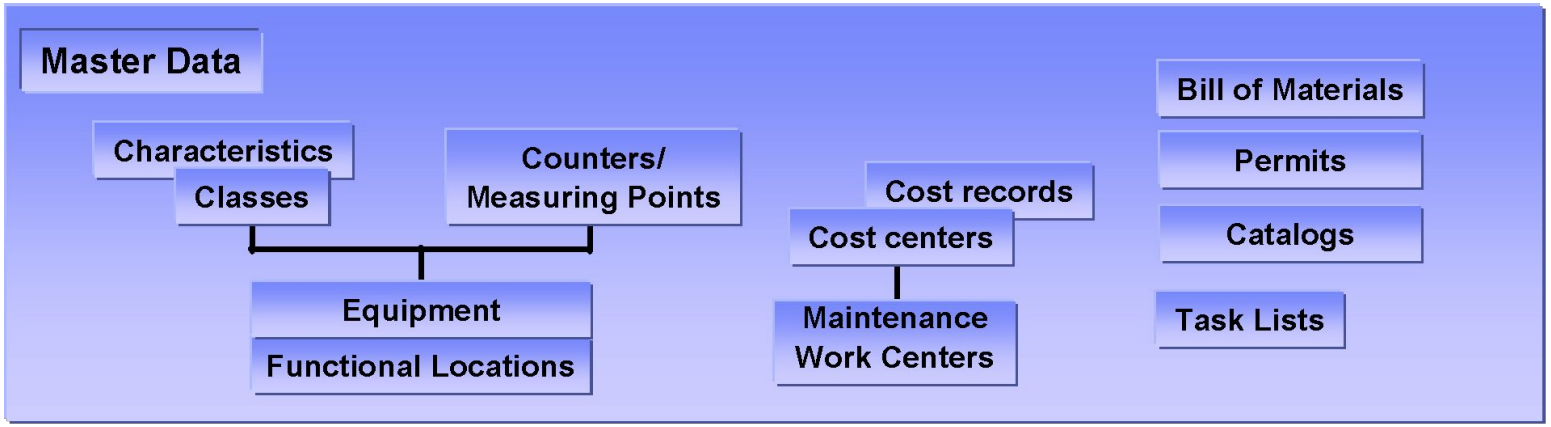
SAP PM Structure Overview

SAP PM can be thought of as having three major sub-modules or processes.

1. Master Data
2. Preventive Maintenance
3. Work Order Management



SAP PM Master Data

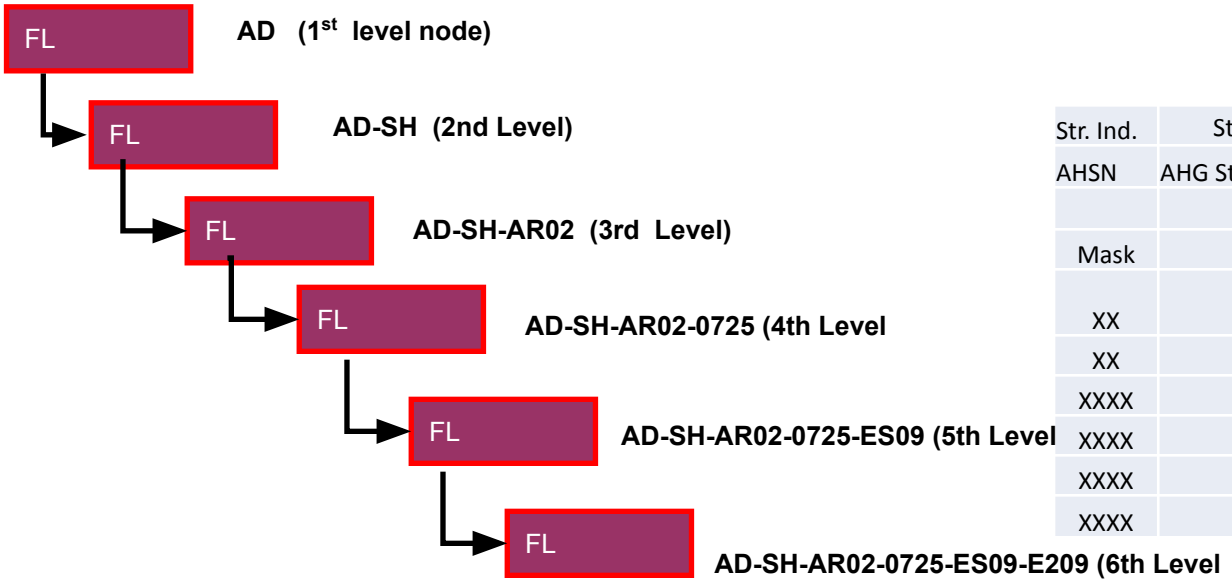


- SAP PM Master Data is information which tends to remain static over time.
- Master Data defines the objects which we are interested in (FLOC, EQ) and the attributes of those objects that are used for search, classification, reporting.
- Attribute examples could include manufacturer, model, serial number, design specifications, size, weight, spare parts, location specific data, etc.
- Master Data helps to represent the physical structure of your systems in SAP based on the Maintenance requirements.

Functional Location

Functional Location (FLOC) is an SAP concept that describes where an equipment is located logically.

- Functional locations are built in a hierarchy so that a user can start at a general location and drill down to a specific location.
- Functional Locations are a basis for organizing Assets logically, facilitating search for Assets and as a roll-up mechanism for reporting.
- The design of Functional Location for an organization must consider all the potential uses.

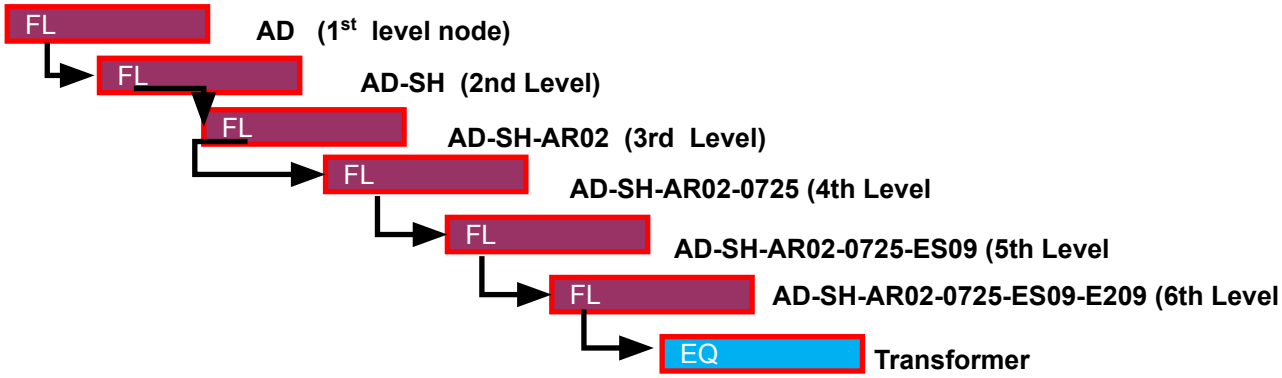


Str. Ind.	Structure Ind. Text	Edit Mask
AHSN	AHG Structure Indicator	XX-XX-XXXX-XXXX-XXXX-XXXX
Mask	Level	Remarks
XX	1	Abu Dhabi Gas Development Company Ltd
XX	2	Shah Gas Project
XXXX	3	Plant Area
XXXX	4	Unit
XXXX	5	Processing Unit
XXXX	6	System Unit

Equipment Master

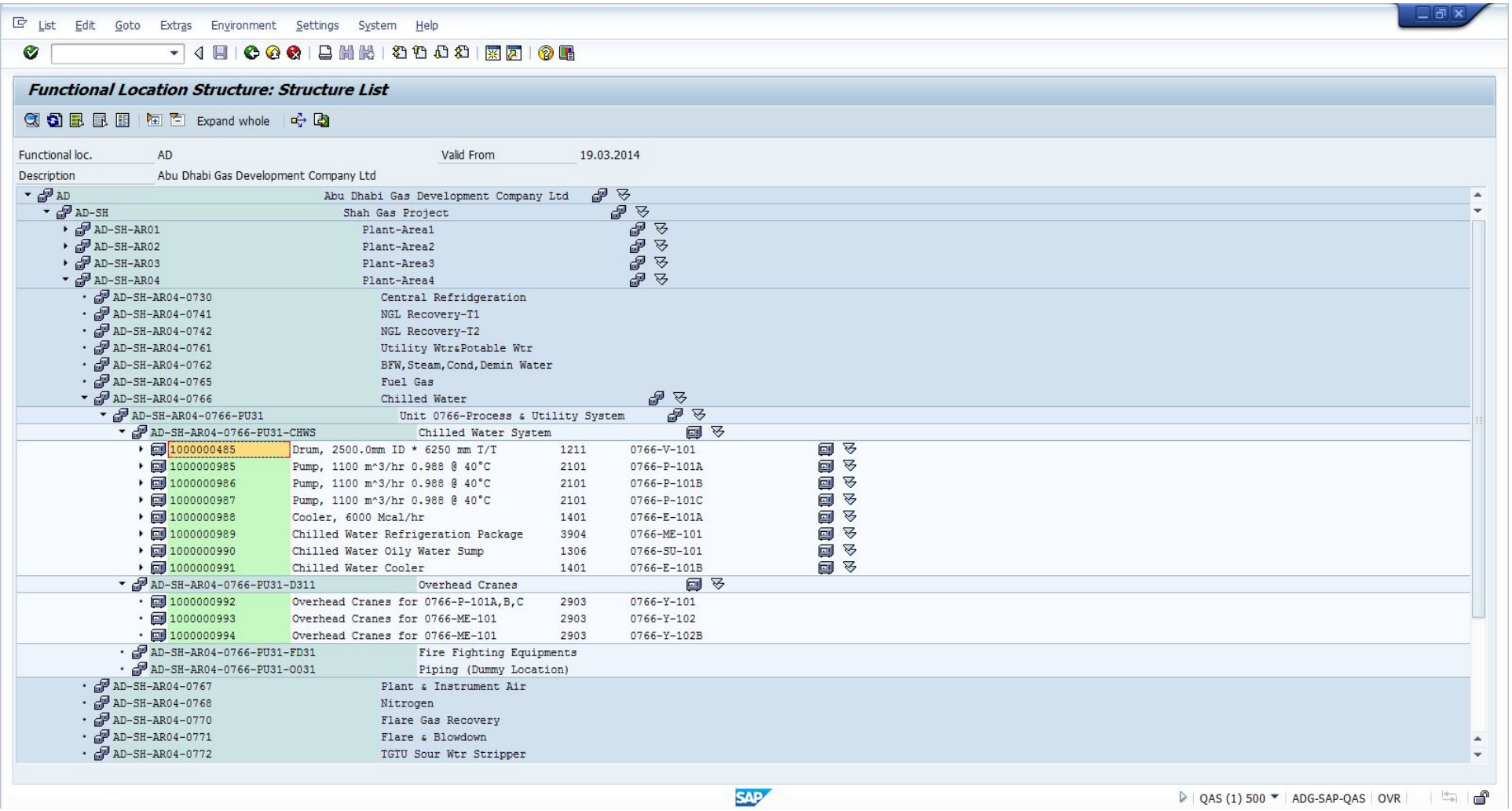
Equipment Master (EQ) describes a specific equipment and its attributes such as manufacturer, model, serial number, status, design specifications, size, weight, etc.

- Examples of equipments could be the machinery, production Equipments, etc.
- Equipment may have sub-equipment linked to them, which can be defined and maintained in their own right.



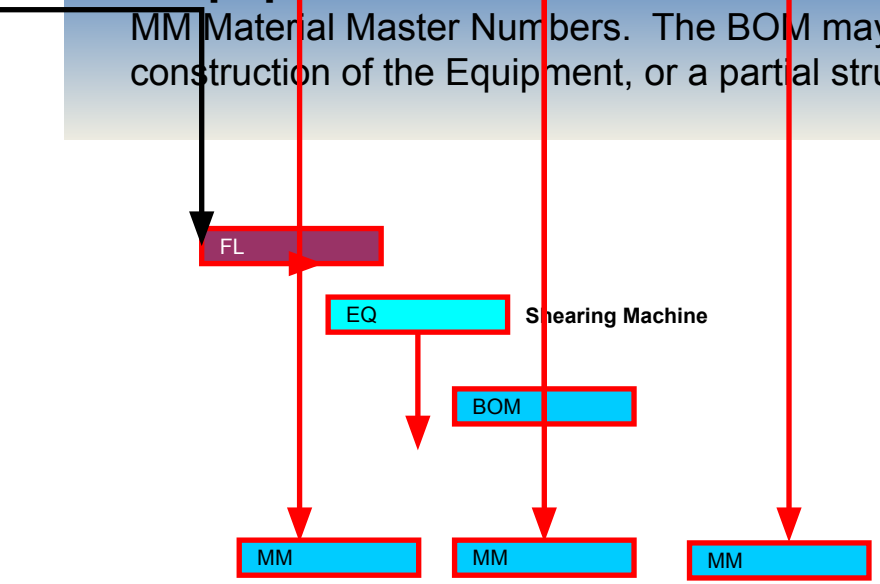
- Equipment's are “installed” into a Functional Location so that the relationship of equipment to F. location can be established and maintained.
- If the Equipment is removed, then it is “dismantled” from the specific location and its replacement equipment is “installed” into the Functional Location.

Over all Structure



Equipment Bill of Materials (BOM)

An Equipment BOM is a data structure that describes the structure of an equipment in terms of MM Material Master Numbers. The BOM may be a complete structure , intended to describe the construction of the Equipment, or a partial structure , for example to designate spares.



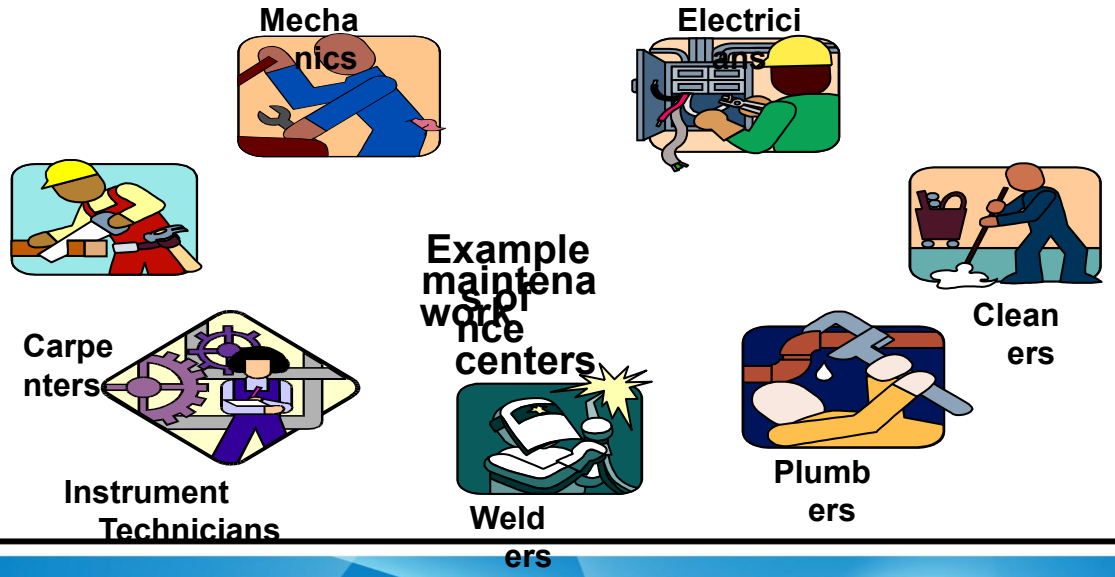
- SAP can track changes to the BOM over time.
- BOM can be unique to a specific equipment, or using the 'construction type' field one BOM can be assigned to multiple equipments of the same type.

Work center

The Work center usually represents one person or a department, responsible for ensuring that the maintenance work in an order is executed

Functions:

- Costing can be determined based on the standard values specified for the activity types
- Scheduling can be done for the operations



Classifications and Characteristics

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The SAP Classification system is a powerful feature that enables classification schemes to be set up for Functional Locations, Equipment .

Classification enables the definition of additional fields, together with business rules – i.e. mandatory / optional, validated against list of entries.

Classification entries can then be used to search for and to report on different objects.

- Classifications are used to group Functional Locations and Equipment Master records of the same type
- Characteristics are assigned to a Classification
- Individual Characteristic values are assigned at the unique Functional Location or Equipment Master record to identify specific attributes for that object.
- Characteristics can record many different types of attributes, such as what something is, different measurements and dimensions values, where it is and what is its status.

Measuring Points

A Measuring Point is a physical or logical point where measurement readings are taken.

- Measuring Points can be assigned to equipment or functional locations (each can have more than one measuring point)

- A Measuring Point is a physical or logical point where measurement readings are taken.
- Measuring Points are configurable for specific applications and can be used as counters. Examples:
  - Odometer readings
  - Run time in hours
  - Thickness readings for wear points
  - Temperature readings
  - Vibration analysis point
- Measuring Points can identify the automatic creation of a Preventive Maintenance Work Order when a reading is captured outside of the desired tolerance. E.g. change oil every 3000 miles

Task List

- Task list master data contains the information on activities to be performed for maintaining an equipment
- Task List master data contains :
  - Activity list – Operations to be performed
  - Activity duration –e.g. 4 hours
  - Work involved –
  - Maintenance packages – Tools etc.

- Task Lists are used
  - To create Operation lists in maintenance orders
  - To Schedule preventive maintenance orders

Plant Maintenance Integration

SAP Plant Maintenance (PM) is integrated with below mentioned SAP Modules. MM & FICO will be discussed in detail:

MM (Materials Management: Purchasing, Stores)
FI (Financial Accounting: Accounts Payable)
CO (Controlling: Costing, Financial Reports)
HR (Human Resources: CATS Time Entry)
PS (Project Systems: Capital Projects)
QM (Quality Management: Calibration)
PP (Production Planning: Capacity planning)
DMS (Document Management System)

Materials Management Integration

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- Material Requirements Planner (MRP) is integrated to SAP PM to order new stock taking into consideration future work order material demands
- Requisitions for non-stock materials can be created automatically from the SAP PM work order
- Requisitions for services can be created automatically from the SAP PM work order
- Purchasing is notified of the work order demand, procurement is commenced, goods and/or services are received and actual costs are captured in the original SAP PM work order for final settlement.

Finance Integration

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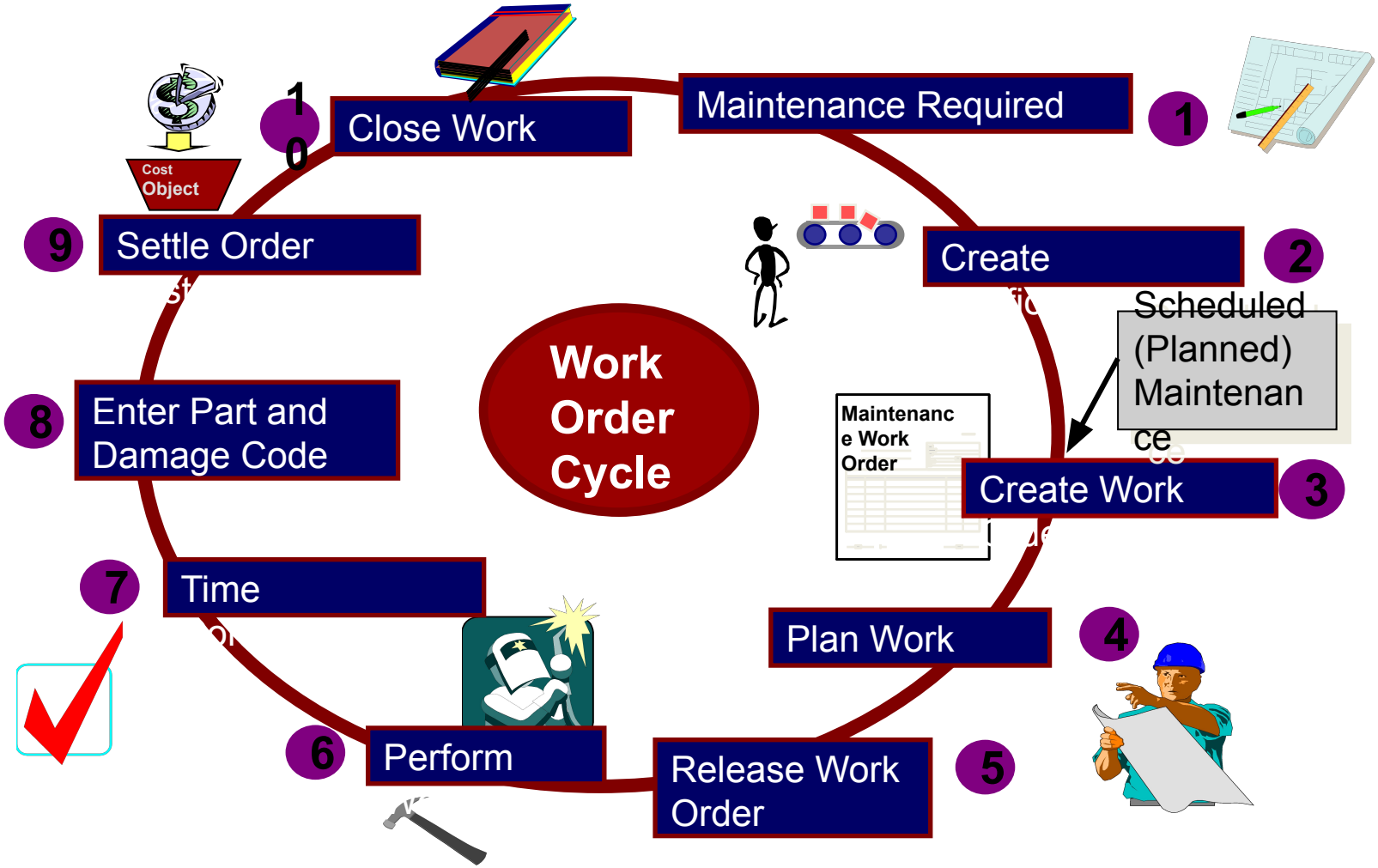
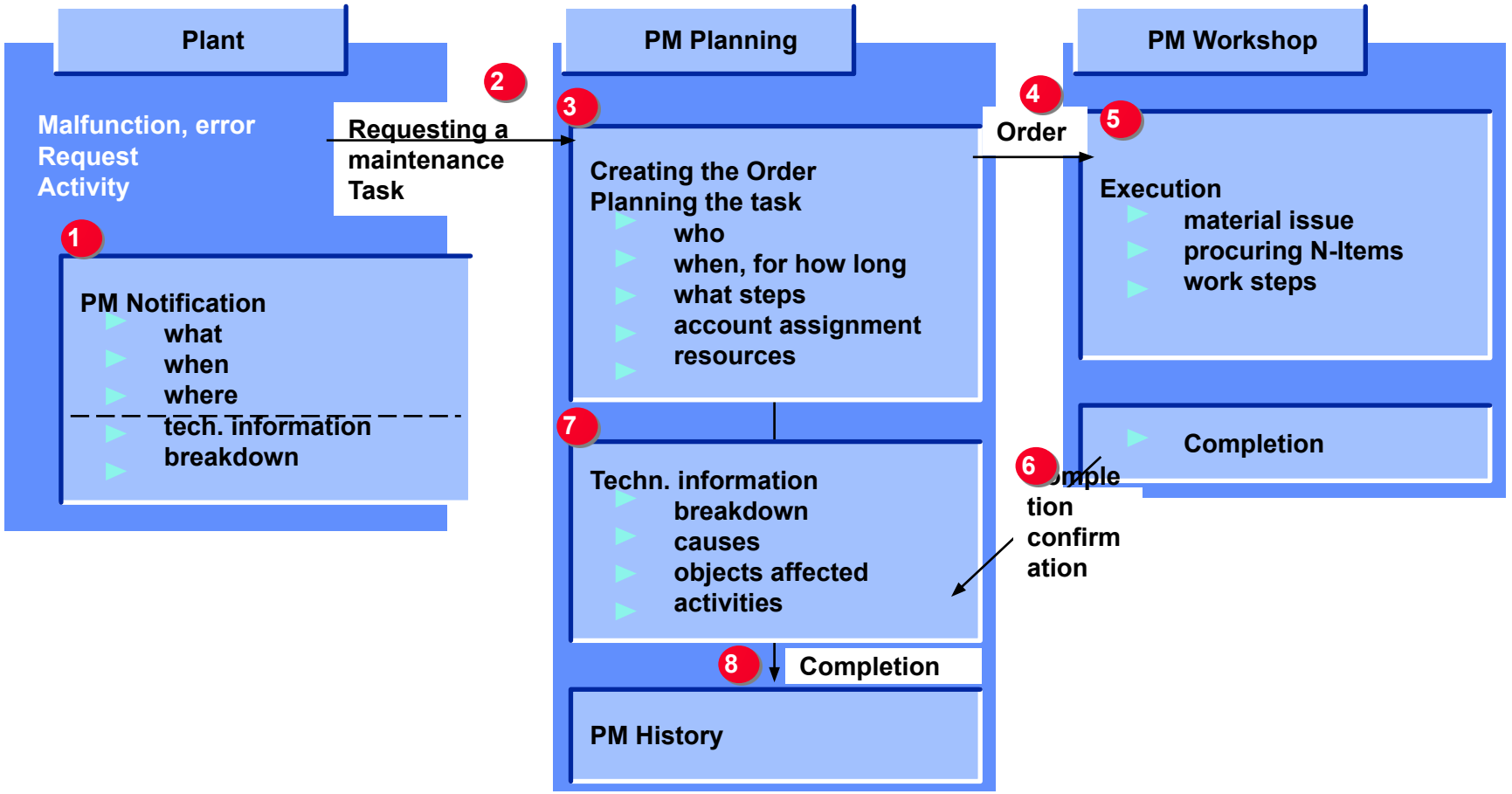
- Financial postings are validated and posted in real time within the SAP system
- Actual costs for materials, labor and services are captured in the SAP work order
- SAP PM Work Orders costs are settled directly to a SAP cost object (Cost Center, WBS Element, Internal Order) within the SAP system
- Comparison reports for Planned cost verses Actual costs are standard by work order, groups of work orders, equipment lists and functional location lists

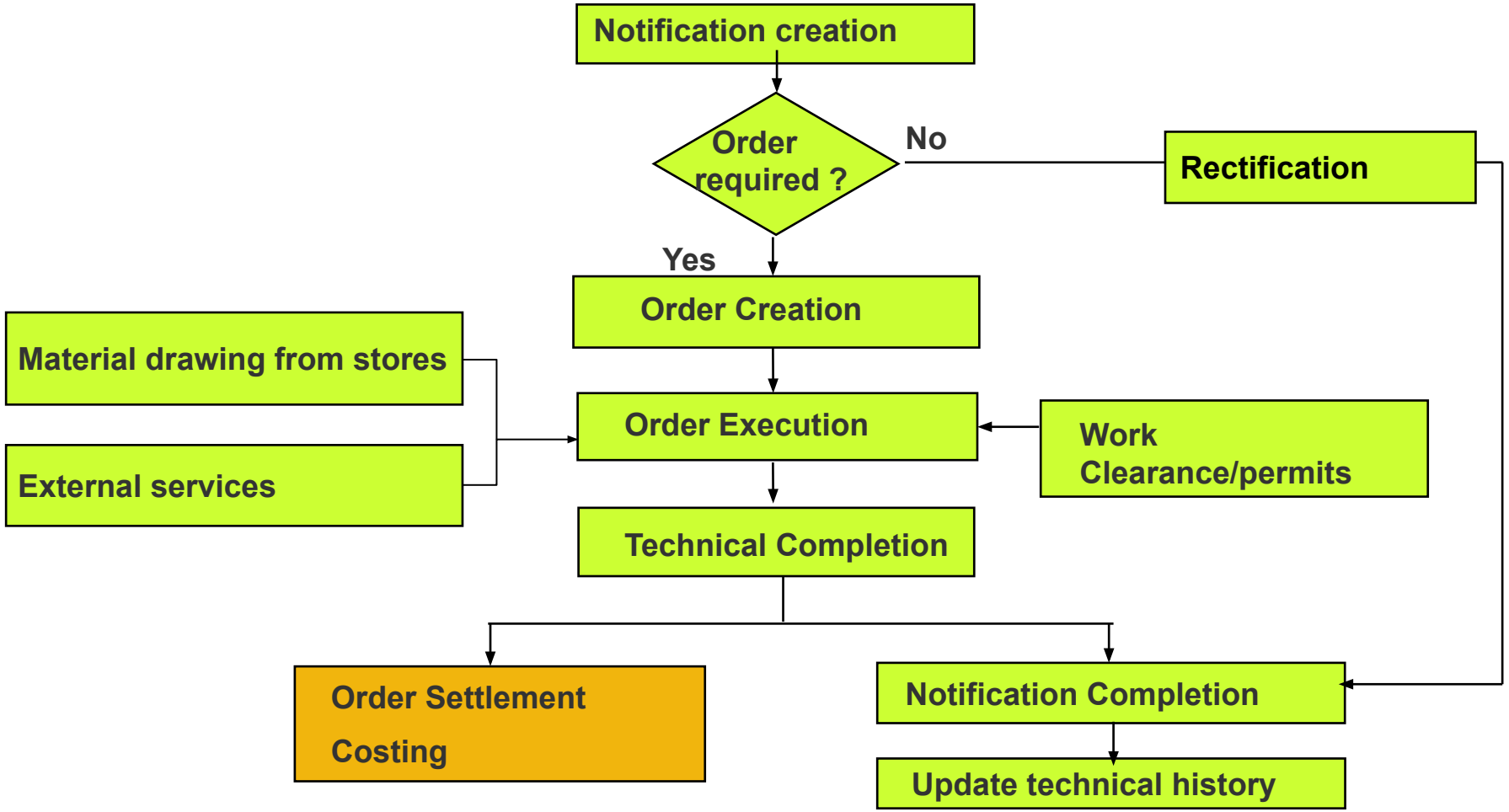
Work Order Management



Basic Steps in Maintenance Processing



Maintenance Processing



Notification

Notification is a “Request for Work”. This could be corrective, Breakdown, or preventive work. Notifications are only used to identify the work and as a historical document. Time and material cannot be charged to a Notification.

As work is identified, whether by maintenance, operations, or others (e.g. referrals), a SAP Notification is created.

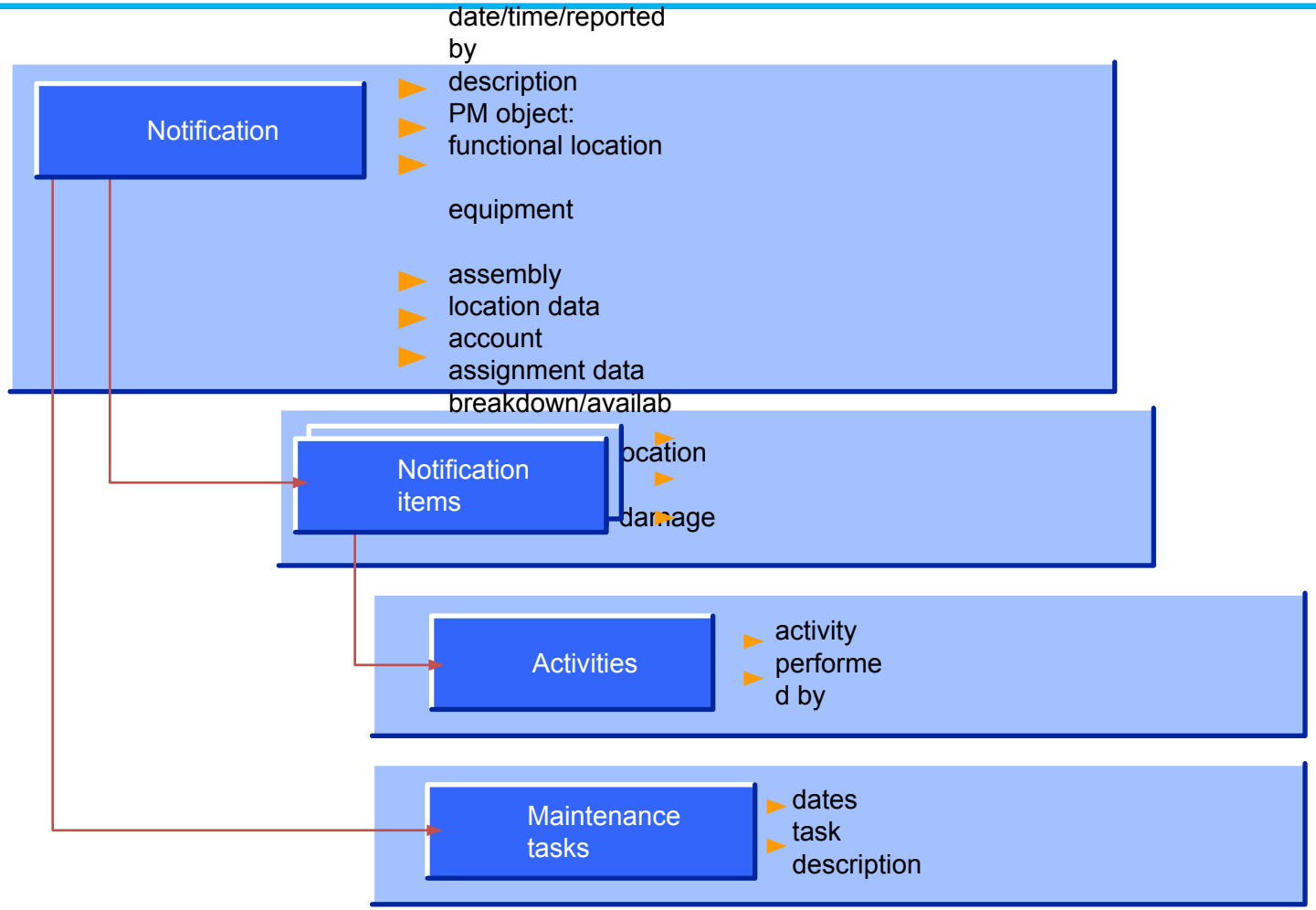
Notifications can be prioritized and statuses assigned for reporting and tracking purposes.

A Functional Location (Floc) and/or and Equipment Master (EQ) is assigned to a Notification. This provides the means now to identify all work for a specific piece of equipment, for all equipment in a specific area, or for all equipment in a general area.

Notifications are “routed” automatically to the Main Work Center and Planner Group which are identified on the FLoc or EQ.

Upon completion of the work, the notification also contains the failure code history of the part that was damaged, what damage occurred, what caused the damage, and the activity that was perform to correct the damage.

Structure of a Maintenance Notification



Work Order

A **Work Order** is used to plan, schedule, and execute the requested work (notification). Time, Material, and Services can be charged to the SAP Work Order.

Typically Notifications are reviewed and accepted and the planner or supervisor will create a Work Order from the Notification. Creation of a Work Order indicates the acceptance of the responsibility to perform the work.

Work Orders can be prioritized and statuses assigned for reporting and tracking purposes.

A Functional Location (Floc) and/or and Equipment Master (EQ) is assigned to a Work Order. This provides the means now to identify all work for a specific piece of equipment, for all equipment in a specific area, or for all equipment in a general area.

Work Orders are “routed” automatically to the Main Work Center and Planner Group which is identified on the Notification.

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Maintenance Work Orders

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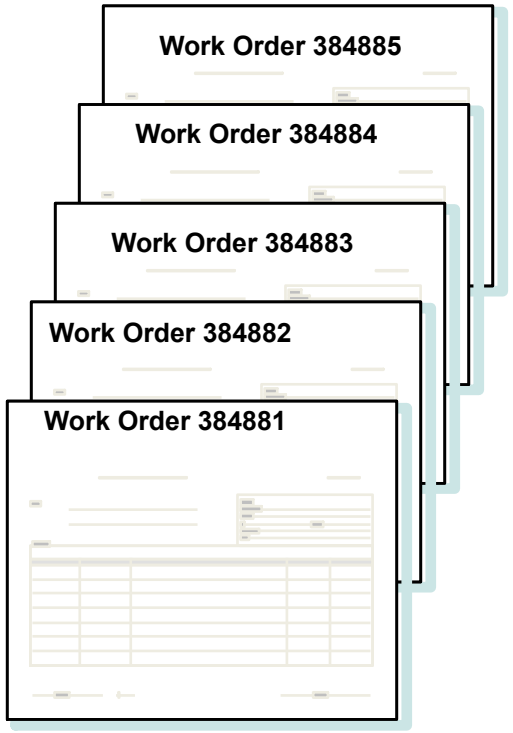
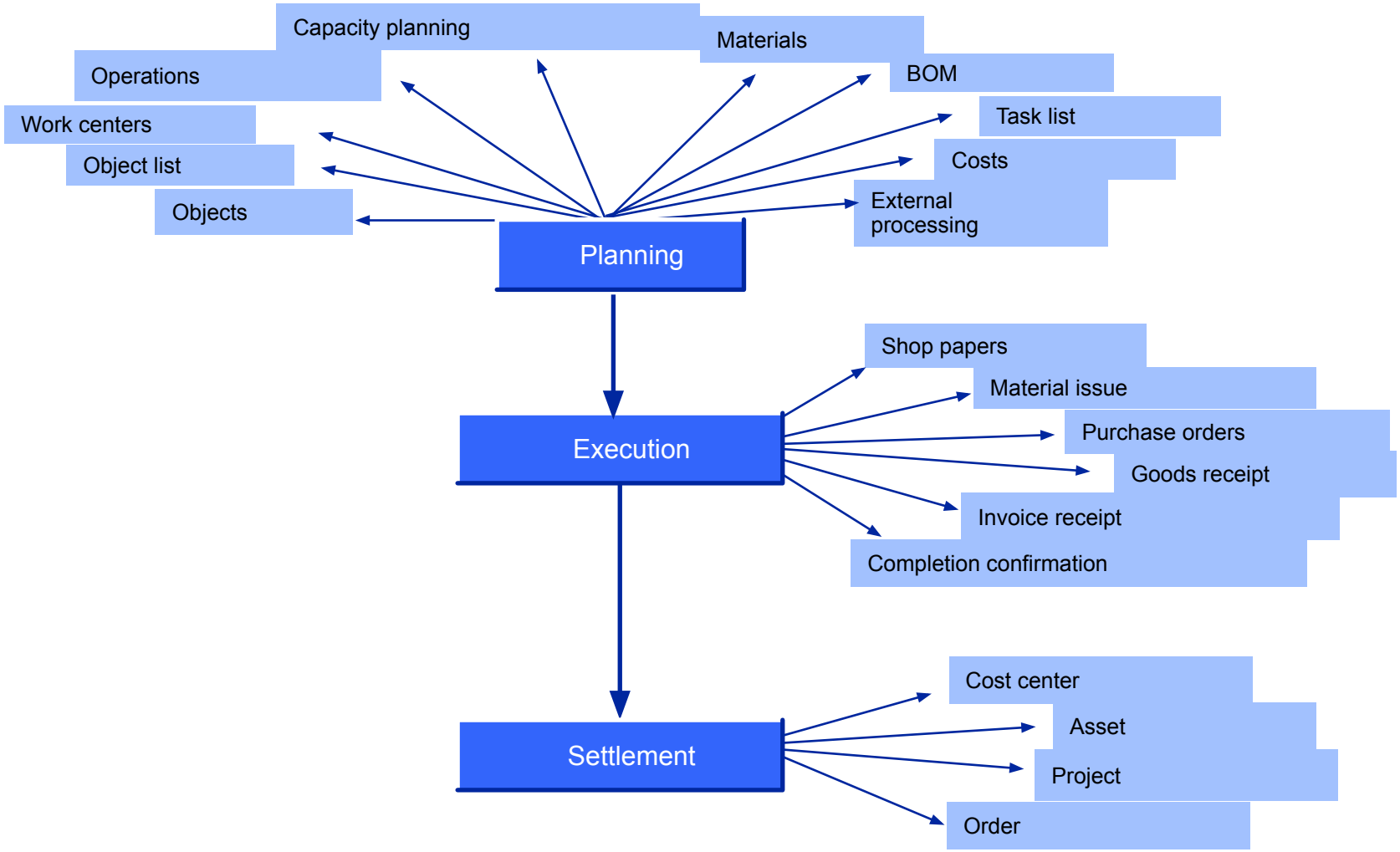
Work Order Types

- **Work Order Types** enable better reporting, planning and scheduling and maintenance management

- There can be many types of **Maintenance Orders:**
- **Examples:**
  - **Corrective order (PM01)**
  - **Preventive Order (PM02)**
  - **Breakdown order (PM03)**
  - **Refurbishment order (PM04)**
  - **Calibration order (PM05)**
  - **Shutdown order (PM06)**



Maintenance Order Functions



Work Order System Statuses

- Objects in SAP have a system status assigned to them as transactions are performed in the normal course of business.
  - For example, in PM functional locations and work orders have system statuses assigned that record their progress through the system.

- Over 300 system statuses exist in SAP for all the modules

- Within PM we are only concerned with a few that define significant events.

- They are useful when searching for work orders.

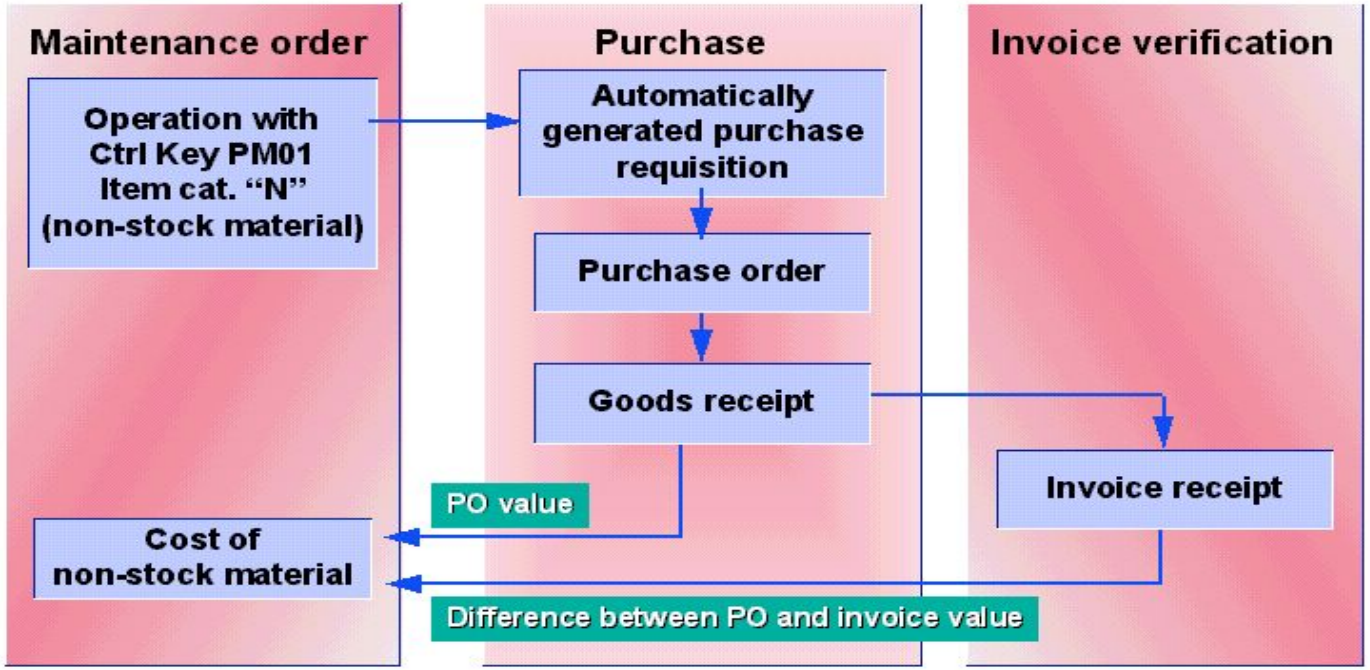
System statuses

System Status	Description	Purpose
CRTD	Created	Initial status of the work Order
REL	Released	Orders created in SAP with this status allow procurement and financial transactions to occur against the order
TECO	Technically complete	Work on the order is completed. Financial follow-on functions (for example, time entry and invoice payment) are allowed.
CLSD	Closed	Order is completed, both technically and financially. No transactions of any kind are allowed. All costs have been settled.
PCNF	Partially confirmed	Set during the first occurrence of time posted against a work order

System statuses

System Status	Description	Purpose
CNF	Confirmed	Set when a flag is checked to indicate labor portion of the job is completed
PRC	Pre-costed	Set when the order is saved. Ignore it.
SETC	Settlement rule created	Set when an order has a settlement rule. All orders should be created with a default settlement rule.
GMPS	Goods movements posted	Set as soon as a goods movement occurs to issue or receive any materials in SAP against the work order
CSER	Error in cost calculation	Configuration or master data set-up problem

Processing External Procurement of Materials



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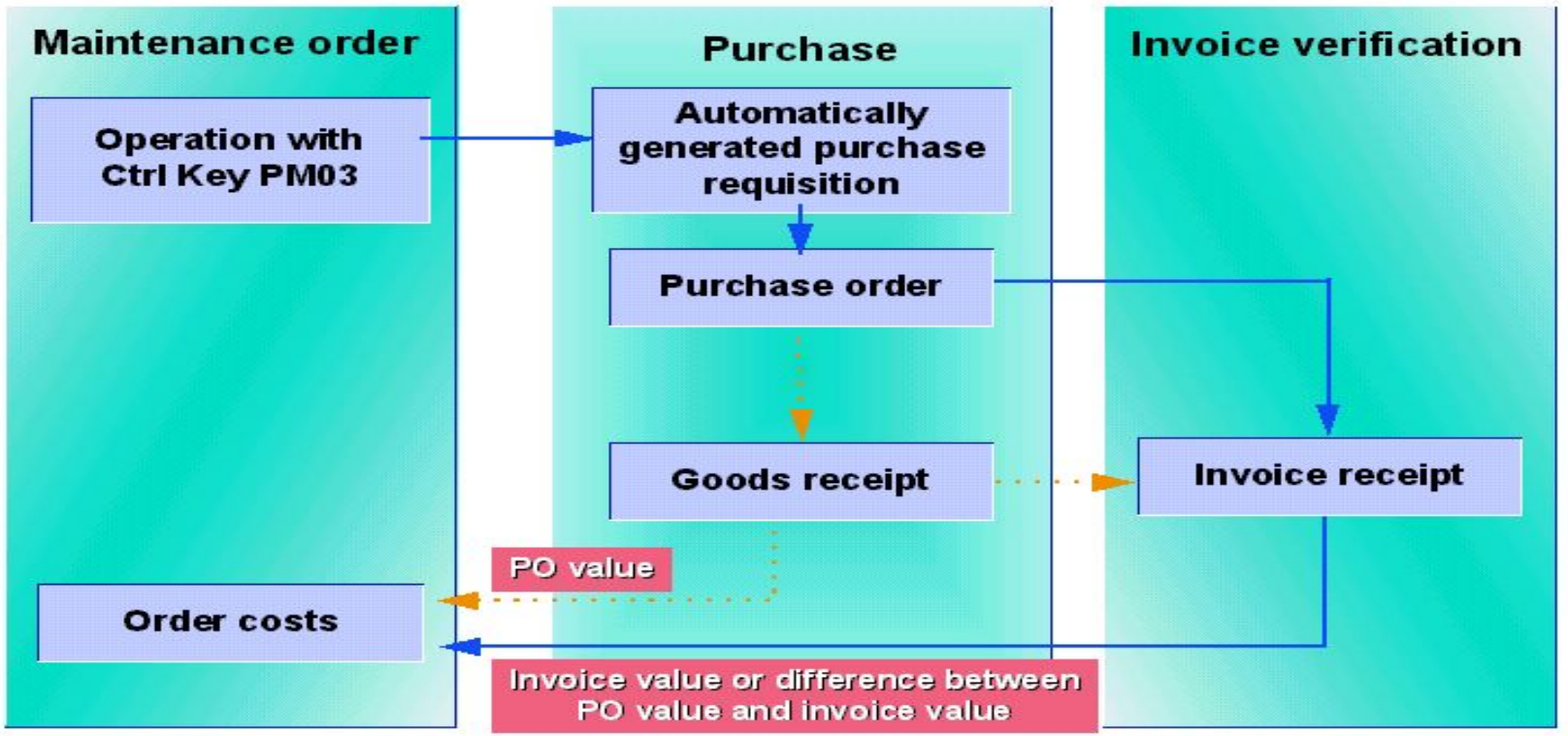
Procurement of External Services

Processing External Procurement of Services without External Services Management (MM-SRV)



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Job Completion - Time Confirmation

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Time Confirmations are entered once the maintenance technician has completed the work or the work shift has ended.

- Time Confirmations to a SAP PM work order are calculated by an individuals hourly rate or burdened rate

- Actual labor costs are posted in real time to the work order using the number of hours confirmed/worked multiplied by the individuals assigned hourly rate

Job Completion – History Reporting

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History Reporting is the process of documenting what occurred on the job, any measurement readings, what the failure codes were, and updating, as required, any information associated with the job plan or SAP PM Master Data

- Notifications capture the job history information
- Upon completion of work the Notification must be updated with the historical information about the maintenance repair
- Standard codes are used to enable consistent input and reporting
  - Object Part Codes – identifies the part that required maintenance
  - Damage Codes – identifies the damage that was found
  - Cause Code – identifies the potential cause of the damage
  - Activity Codes – identifies the activities required to make the repair

Job Completion – TECO and CLSD

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TECO (Technically Complete) is the process to indicate that all maintenance work has been completed for the specific SAP Work Order.

- Once the maintenance work is complete the work order status is changed to TECO. This indicates repairs are completed and no additional planned materials or time can be added to the work order.
- This status is be used for list reporting of completed work

CLSD (Closed) is the process to indicate that all charges have been received for the specific SAP Work Order

- Once all of the charges have been received against the work order, the work order status is changed to CLSD. No additional charges for materials, labor or services can be accepted. The work order is business complete.

Preventive Maintenance

Purpose

Preventive maintenance should maintain the high availability of technical systems, for example, production plants, in the long term.

- Legal requirements
- Customer requirements
- (for example, automobile industry)
- Reduction of system malfunctions
- Reduction of system restart costs
- Extension of system life
- Increased productivity
- Better capacity load control
- Reduction of repair costs

Preventive Maintenance Definitions

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SAP Preventive Maintenance terms

Strategy defines the scheduling rules for a Maintenance Plan. It defines items like the unit of time and packages (frequencies). e.g. Unit of Time = Months; Package = 12, 24, or 48

Maintenance Plan defines the schedule for a preventive maintenance activity or activities and groups similar Maintenance Items together so that similar preventive maintenance work can be performed in the same time frame.

Maintenance Item defines which Functional Location or Equipment Master the preventive maintenance activity is to be performed on. Maintenance Items are assigned to a Maintenance Plan.

Task List is the pre-defined procedure that documents the preventive maintenance activities are, who should perform the task, and what material are required. Task List is assigned to the Maintenance Item.

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Preventive Maintenance Process

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Preventive Maintenance — F — **Work scheduling / Maintenance planning**

1	**Task list**	Create task lists for different objects	Maintenance planner
2	**Maintenance plan**	Create maintenance plans	Maintenance planner
3	**Schedule**	Schedule Maintenance Plans	Maintenance planner
4	**Maintenance order**	Process maintenance orders	Maintenance technician
5	**Technical Completion**	Technically complete Complete maintenance orders	Maintenance supervisor

Information Systems

Purpose

The Plant Maintenance Information System can be used at a variety of levels in the decision-making process as an instrument for monitoring, controlling and planning your business operations.

The Plant Maintenance Information System allows you to evaluate breakdown behavior, or the maintenance tasks of a technical system or machine. It is also possible to analyze the costs incurred or the party responsible for the maintenance tasks and the exact activities that have been performed. It is used in:

- Reporting
  - Standard
  - Customized
  - Business Warehouse
- Early Warning System

Thank you