



SAP-CENTRIC EAM 2006

Driving Value from SAP-Centric EAM

Use SAP PM to Capture Quality Equipment Reliability Data

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Agenda and ISO References

- Presentation
 - Technical concepts – Tony
 - Process changes and SAP configuration - Dan
- Key learning topics/take-aways
 - Fundamentals of ISO 14224
 - How to capture ISO 14224 with SAP PM
 - BP for SAP PM technical objects and technical object structures
- ISO standards referenced
 - ISO 14224, *Petroleum and natural gas industries — Collection and exchange of reliability and maintenance data for equipment*
 - ISO 15926, *Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities.*

Nexen and SAP

- Nexen, Inc
 - Global oil and gas company with 3000+ employees and annual revenues of US\$2.9 billion
- SAP
 - First go-live in January 2002 (version 4.6C)
 - Global implementation with shared system configuration and design
 - PM system has
 - Common order and notification types
 - Unique technical object structures and classifications

Changes at Nexen

- Reasons for change
 - Incomplete and disparate equipment characteristic, reliability, and cost data
 - Data mining required for maintenance analyses
- Key changes
 - 1. Standardize technical object structures
 - 2. Capture detailed equipment characteristic and reliability data with taxonomy
 - 3. Modify work processes to facilitate complete, efficient, and accurate data capture

Change 1: Standardize Technical Object Structures

- Define rules for technical object configuration and classification.
 - Functional area location (FAL) versus functional equipment location (FEL)
 - Functional physical object vs. materialized physical object
 - FEL vs. primary equipment vs. sub-equipment
- Explicitly define ISO 14224 equipment unit boundaries with technical objects

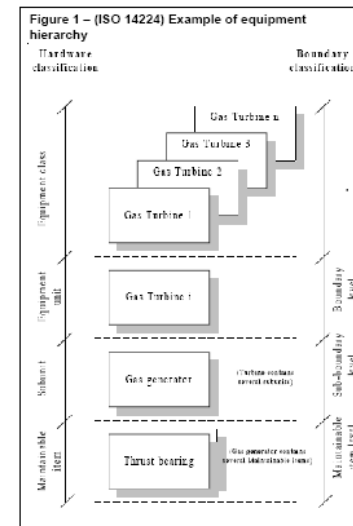
Best Practice for SAP Technical Object Structures
V. Anthony Ciliberti, P.E.

Objectives

Establish a hierarchical framework for capturing quality equipment reliability data that can be applied consistently for all facility types in the oil and gas industries and supports the data requirements of ISO 14224, Petroleum and natural gas industries – Collection and exchange of reliability and maintenance data for equipment. The framework should be a logically-organized structure that captures equipment specific engineering specifications and characteristic data in a model that supports data flow from engineering design to procurement, installation, operation, and maintenance. This model should conform to industry standard ISO 15298, Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities. The framework should also differentiate between functional requirements of equipment versus equipment capabilities in a manner that allows automated confirmation that installed equipment items are correct for their applications.

Functional Locations and Equipment

The SAP functional location structure is a hierarchical structure for identifying process functions as technical objects and cataloguing them in a logical manner. Top-level functional locations identify facility areas that can be referred to as functional area locations (FALs). Bottom-level functional locations



(structure endpoints) identify individual equipment functions that can be referred to as functional equipment locations (FELs). FELs are equivalent to functional physical objects as defined by ISO 15926 (Figure E.9). Materialized physical objects defined by ISO 15926 are equivalent to both ISO 14224 Equipment Units (Figure 1) and SAP equipment technical objects, have actual physical entities, are installed in FELs, and execute the respective process requirements as defined by those FELs (Figure E.9). SAP sub-equipment objects are differentiated from equipment objects in this context and are discussed below.

Both FELs and equipment are classified using the ISO 14224 taxonomy. Each taxonomy ID has a given set of characteristics associated with it that are specific to the FEL or equipment item it represents. SAP allows the use of the same taxonomy ID for FEL and equipment technical objects, which means that different sets of characteristics can be applied to a one taxonomy ID for FEL versus equipment objects.

Each FEL is analogous to a tag number on a process and instrument diagram (P&ID) and is assigned applicable characteristics data fields based on its taxonomy ID that specify its process requirements and conditions. Each equipment item is assigned applicable

SAP Functional Location Hierarchy

Purpose/Objectives

- Represent an enterprise's locations and functions completely, logically, and consistently
- Catalog technical objects
- Flexible structure to accommodate both simple and complex facilities
- Facilitate data capture per ISO 14224 and data exchange per ISO 15926



SAP Functional Location Structure: Hierarchical Asset Catalog

Functional Location Template (XXX-XXX-XXX-XXX-XXX-XXX-XXX-XXX-XXX)					
M/O ¹	Class ²	Node	Example ³	Node Type	
M	BU	Business Unit Entity	YEM	Business and process area	FAL
M	FC	Facility	CPF		
O	P1	Plant Level 1	CPP		
O	P2	Plant Level 2	CP1		
O	P3	Plant Level 3	YPG		
O	P4	Plant Level 4	DG1		
O	EC	Equipment Class	PMP	ISO 14224	
O	ET	Equipment Type		Equipment characteristic	
O	EA	Equipment Application		Process characteristic	
M	EU	Equipment Unit	001	ISO 14224	FEL

1.M/O – Mandatory/Optional for equipment installation (nine levels maximum)
 2.Additional plant levels are permissible
 3.Abbreviations should be standardized

Functional versus Materialized Object

ISO 15926-2:2003(E)

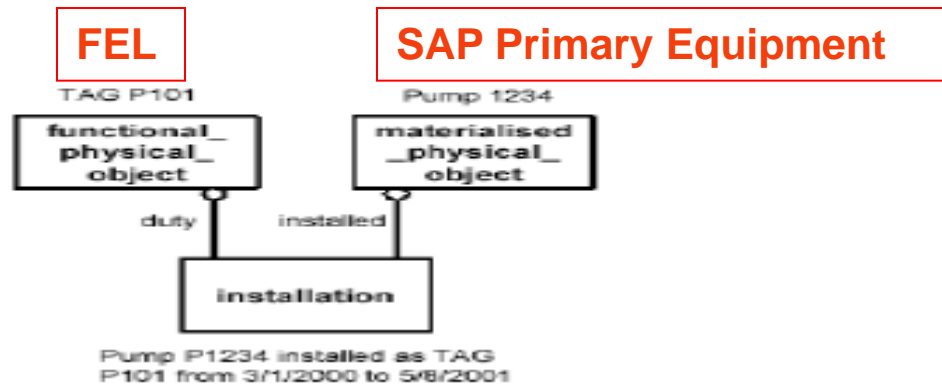


Figure E.9 — Coincident individuals

Figure E.10 shows this example using a space-time map. Here it is possible to see that the duty represented by TAG P101, and Pump 1234 are coincident for the period of the installation, i.e. the state S1 of Pump 1234 that is installed as TAG P101 is in fact also a state of TAG P101. Indeed, the TAG P101 consists of those states of the pumps that are installed in this place.

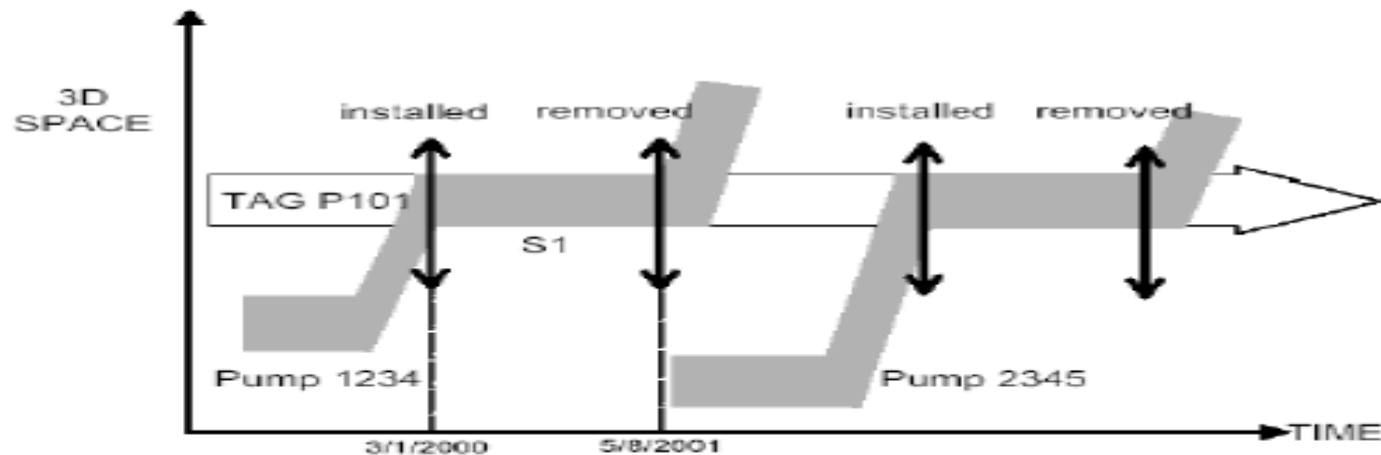
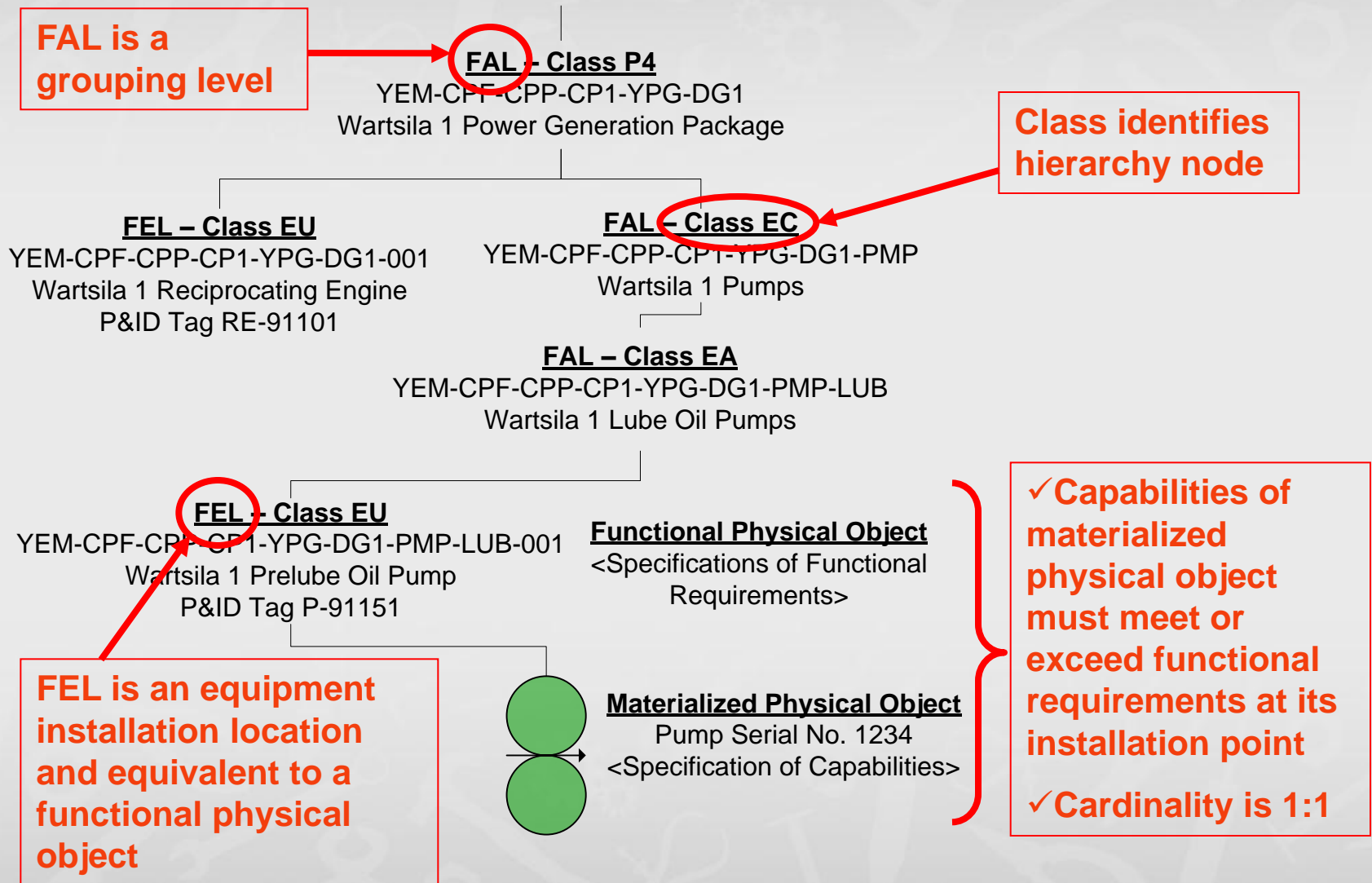


Figure E.10 — Space-time map for coincident individuals.

FAL vs. FEL vs. Primary Equipment



ISO 14224 Equipment Hierarchy

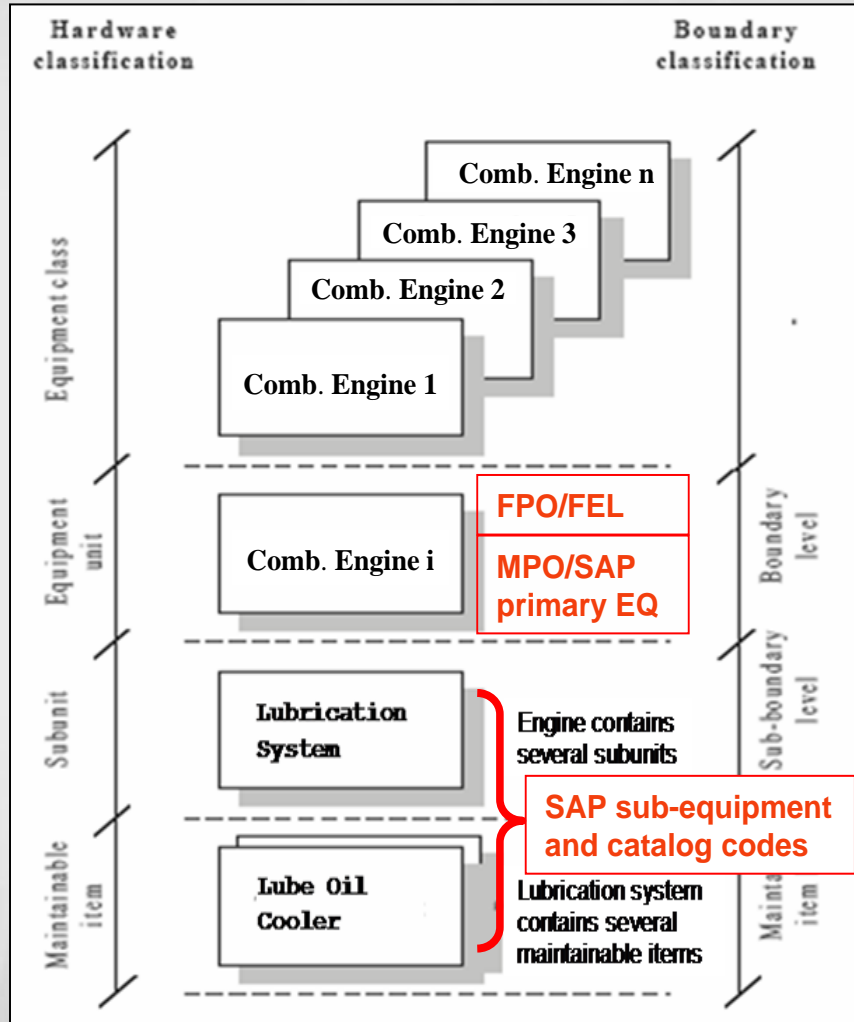


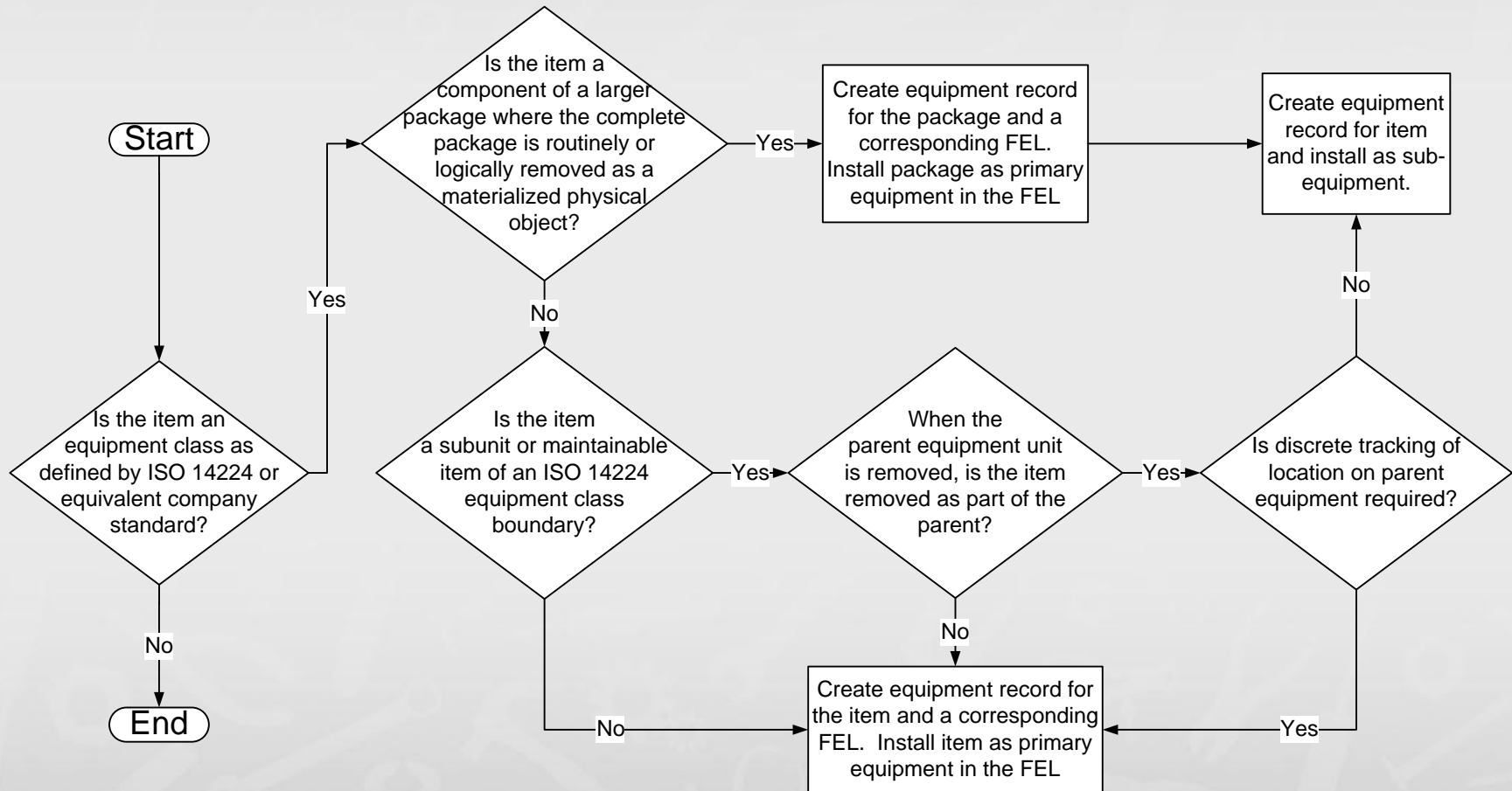
Table A.2 — Equipment unit subdivision — Combustion engines

Equipment unit	Combustion engines					
Subunit	Start system	Combustion engine unit	Control and monitoring	Lubrication system	Cooling system	Miscellaneous
Maintainable items	Start energy (battery, air)	Air inlet	Control	Reservoir	Heat exchanger	Hood
	Starting unit	Turbocharger	Actuating device	Pump w/motor	Fan and motor	Others
	Start control	Fuel pumps	Monitoring	Filter	Filter	Flange joints
		Injectors	Valves	Cooler	Valves	
		Fuel filters	Internal power supply	Valves	Piping	
		Exhaust		Piping	Pump	
		Cylinders		Oil	Temperature control	
		Pistons		Temperature control		
		Shaft				
		Thrust bearing				
		Radial bearing				
		Seals				
		Piping				
		Valves				

Annotations:

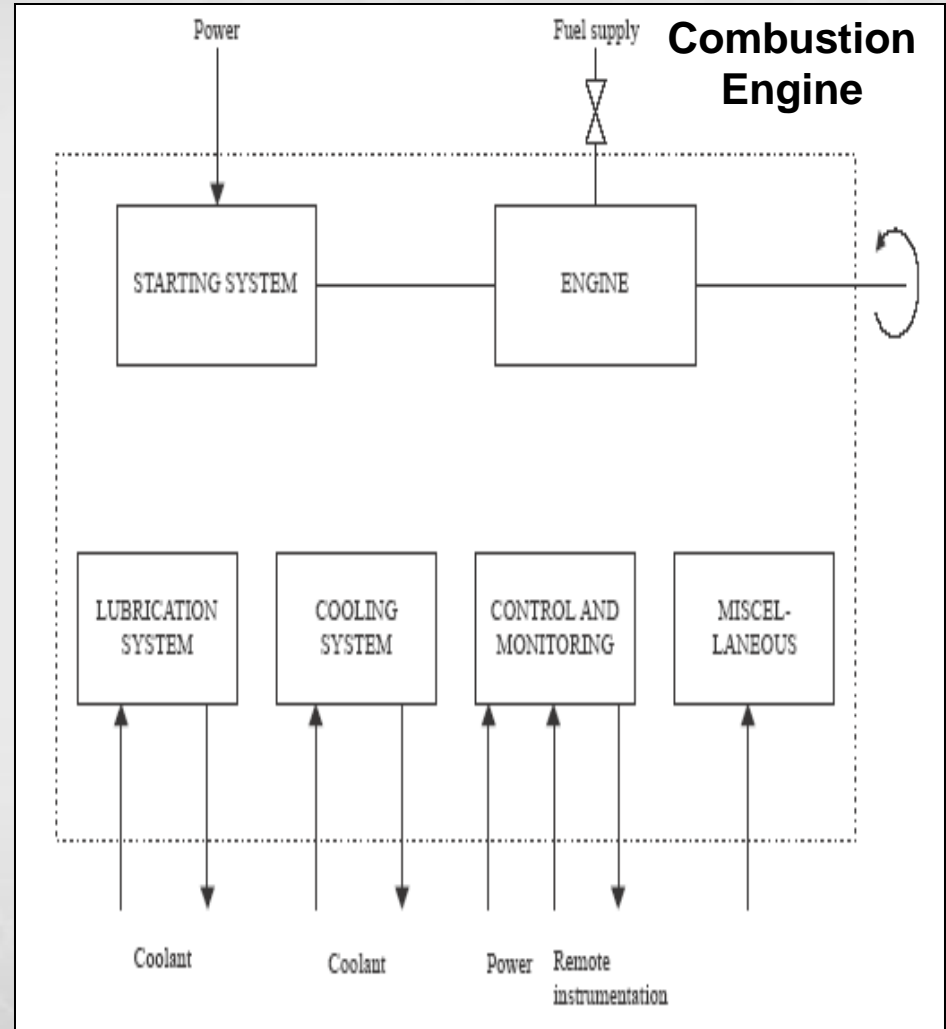
- Red circles highlight "Pump w/motor" and "Cooler" in the Lubrication system column.
- A red box highlights "Some maintainable items are ISO equipment class" pointing to the Pump w/motor and Cooler items.

Decision Logic for FEL, Primary Equipment, and Sub-equipment Objects



ISO 14224 Equipment Class Boundary Definition

- Boundary used for data analysis
- Establishes consistency in definition of equipment units
 - Shows what is “inside the box.”
 - Includes subunits and maintainable items
- SAP technical objects within the boundary need to be identified
 - Use Installed Base



SAP Installed Base: Equipment Unit Boundary Definitions

Installed base Edit Goto Environment System Help

Display Installed Base: Detail Screen

Component detail

Time : 2006/01/24 15:25:49

UNIT_RECIPROCATING_ENGINE_RE-S

- SUBUNIT_START_SYSTEM
- SUBUNIT_COMBUST_ENGINE
- SUBUNIT_CONTROL & MONITORIN
- SUBUNIT_LUBRICATION_SYSTEM
- SUBUNIT_COOLING_SYSTEM
- SUBUNIT_MISCELLANEOUS
- RECIPROCATING ENGINE #6 FOR C

Installed base 17395 ISO_14224 UNIT_RECIPROCATING_ENG...

General data

Status CRTE

IBase type 01 IBase

Validity type 2 Temporal validity

Authoriz. group

Comp.Store Config.store

Created by HENDERSG Created on 2005/10/01

Changed by CILIBERT Changed on 2005/11/16

Directly subordinate objects

Material Equipment Functional location Document Installed base

S..Item	Sort string	Installed base	Short text	Ext. name
<input type="checkbox"/>		17556	SUBUNIT_START_SYST...	ISO_14224
<input type="checkbox"/>		17708	SUBUNIT_COMBUST_E...	ISO_14224
<input type="checkbox"/>		17721	SUBUNIT_CONTROL & ...	ISO_14224
<input type="checkbox"/>		17762	SUBUNIT_LUBRICATIO ...	ISO_14224
<input type="checkbox"/>		17784	SUBUNIT_COOLING_S...	ISO_14224
<input type="checkbox"/>		17859	SUBUNIT_MISCELLANE...	ISO_14224
<input type="checkbox"/>		0		
<input type="checkbox"/>		0		
<input type="checkbox"/>		0		

SAP Installed Base: Equipment Subunit Boundary Definitions

Installed base Edit Goto Environment System Help

Display Installed Base: Detail Screen

Component detail

Time : 2006/01/24 15:09:51

SUBUNIT_START_SYSTEM

- STARTING AIR RECEIVER FOR RE-91106
- V-91106 AIR RECEIVER (PAL-91623B)
- V-91106 AIR RECEIVER (PI-91624)
- V-91106 AIR RECEIVER (PSL-91623)

Installed base: 17556 ISO_14224 SUBUNIT_START_SYSTEM

General data

Status: CRTE

IBase type: 01 IBase

Validity type: 2 Temporal validity

Authoriz. group:

Comp.Store Config.store

Created by: CILIBERT Created on: 2005/11/15

Changed by: CILIBERT Changed on: 2005/11/16

Directly subordinate objects

Material Equipment Functional location Document Installed base

S..Item	Sort string	FunctLocation	Description
		YEM - CPF - CPP - CP1 - STA - REC - 006	STARTING AIR RECEIVER F ...
		YEM - CPF - CPP - CP1 - STA - REC - INT - 007	V-91106 AIR RECEIVER (PA...
		YEM - CPF - CPP - CP1 - STA - REC - INT - 015	V-91106 AIR RECEIVER (PI...
		YEM - CPF - CPP - CP1 - STA - REC - INT - 023	V-91106 AIR RECEIVER (PS...

SAP Technical Object Record Boundary Display

The screenshot shows the SAP Technical Object Record (TOR) boundary display for a functional location. The window title is "Display Functional Location: Master data". The main data fields are:

FuncLocat	YEM-CPF-CPP-CP1-YPG-DG6-001	Cat.	N NEXEN SURFACE LO...
Description	RECIPROCATING ENGINE #6 FOR G-91106		
Status	CRTE		

Below the data fields are tabs for "General", "Location", "Organization", "Structure", "Class", and "Unit Boundary". The "Unit Boundary" tab is active, showing a tree view of the installed base. The installed base is identified as "UNIT_RECIPROCATING_ENGINE_RE-91106" with a quantity of 17395. The tree view shows the following structure:

- UNIT_RECIPROCATING_ENGINE_RE-91106
 - SUBUNIT_START_SYSTEM
 - SUBUNIT_COMBUST_ENGINE
 - SUBUNIT_CONTROL & MONITORING
 - SUBUNIT_LUBRICATION_SYSTEM
 - SUBUNIT_COOLING_SYSTEM
 - SUBUNIT_MISCELLANEOUS
 - RECIPROCATING ENGINE #6 FOR G-91106

Change 2: Capture Detailed Equipment and Reliability Data with Taxonomy

Purpose/Objectives

- Structure for capturing equipment data
 - Characteristic data
 - Support data flow from engineering and procurement to maintenance technical objects (ISO 15926)
 - Reliability data
- Classification of equipment for data analysis purposes
- Verification of equipment capabilities versus functional requirements

ISO 14224 Equipment Classification: Combustion Engines

A.2 Process equipment **PE**

Class: PE_CE_DE_MP

A.2.1 Combustion engines (piston)

Table A.1 — Taxonomy classification — Combustion engines

Equipment class		Type		Application	
Description	Code	Description	Code	Description	Code
Combustion engines - piston (diesel/gas engines)	CE	Diesel engine	DE	Main power	MP
		Gas engine	GE	Essential power	EP
				Emergency power	EM
				Water injection	WI
				Oil handling	OH
				Gas handling	GH
				Water fire-fighting	FF
				Material handling	MH

ISO 14224 Equipment Characteristics: Combustion Engine

Table 1 — Equipment data

Main categories	Subcategories	Data
Identification	Equipment location	Equipment tag number (*)
	Classification	Equipment unit class, e.g. compressor (see annex A) (*)
		Equipment type (see annex A) (*) Application (see annex A)(*)
	Installation data	Installation code or name (*)
Installation category, e.g. platform, subsea, refinery (*)		
Operation category, e.g. manned, remote controlled (*) Geographic area, e.g. Southern North Sea, Adriatic Sea, Gulf of Mexico, continental Europe, Middle East		
Equipment unit data	Equipment unit description (nomenclature)	
	Unique number, e.g. serial number	
	Subunit redundancy, e.g. number of redundant subunits	
Design	Manufacturer's data	Manufacturer's name (*)
		Manufacturer's model designation (*)
	Design characteristics	Relevant for each equipment class, e.g. capacity, power, speed, pressure, see annex A (*)
Application	Operation (normal use)	Equipment unit redundancy, e.g. 3 x 50 %
		Mode while in the operating state, e.g. continuous running, standby, normally closed/open, intermittent Date the equipment unit was installed or date of production start-up Surveillance period (calendar time)(*) The accumulated operating time during the surveillance period Number of demands during the surveillance period as applicable Operating parameters as relevant for each equipment class, e.g. operating power, operating speed, see annex A
	Environmental factors	Ambient conditions (severe, moderate, benign) ^a Interior environment (severe, moderate, benign) ^b
Remarks	Additional information	Additional information in free text as applicable
		Source of data, e.g. process and instrumentation diagram, data sheet, maintenance system

^a Features to be considered, e.g. degree of protective enclosure, vibration, salt spray or other corrosive external fluids, dust, heat, humidity.

^b Features to be considered, e.g. for compressor, benign (gas - clean and dry), moderate (some droplets corrosion), severe (sour gas, high CO₂, high particle content).

Table A.3 — Equipment unit specific data — Combustion engines

Name	Description	Unit or code list
Driver application (*)	Name of driven unit	Pump, generator, compressor
Corresponding driven unit	Specify identification number of driven unit	Numeric
Power- design (*)	Max. rated output (design)	kW
Power - operating (*)	Specify the approximate power at which the unit has been operated for most of surveillance time	kW
Speed (*)	Design speed	r/min
Number of cylinders	Specify number of cylinders	Integer
Cylinder configuration	Type	Inline, vee, flat
Starting system (*)	Type	Electric, hydraulic, pneumatic
Fuel	Type	Gas, light oil, medium oil, heavy oil, dual
Air inlet filtration type	Type	Free text
Engine aspiration type (*)	Type of engine aspiration	Turbo, natural

(*) Indicates high-priority information.

SAP Classes and Characteristics: Configuration of ISO 14224

- More specific characteristics appear first
- Green check marks identify inherited characteristics

The screenshot shows the SAP Class Configuration interface for ISO 14224. The main window displays a class hierarchy starting with 'PE' (PROCESS EQUIPMENT). Below it, several sub-classes are listed, including 'PE_CE' (COMBUSTION ENGINES), 'PE_CE_DE' (DIESEL ENGINE), and 'PE_CE_GE' (GAS ENGINE). Each class has a green checkmark in the 'Inherited' column, indicating that these characteristics are inherited from the parent class.

Two windows are open showing the characteristics of the selected class 'PE':

Characteristics of class PE

Characteristic name	Char. description	Char...	Inh...
PID_TAG_NO	P&ID Tag Number		
DRAWINGS_TECHNICAL	Technical Drawings (Reference)		
INSTALLATION_CODE_OR_NAME	Operation entity ID		
INSTALLATION_CATEGORY	Type of installation		
OPERATION_CATEGORY	Operation category		
GEOGRAPHIC_AREA	Geographic area		
MANUFACTURERS_NAME	Manufacturer's name		
MANUFACTURER_MODEL_DESIGNATION	Manufacturer model designation		
OTHER_MANUFACTURER_DESIGNATION	Other manufacturer designation		
EQUIPMENT_UNIT_REDUNDANCY	Number of redundant eqpt units		
REDUNDANT_UNITS_IN_OPERATION	Redundant units in operation		
MODE_IN_OPERATING_STATE	Mode in operating state		
INSTALLATION_DATE	Installation date		
STARTUP_DATE	Startup date		

Characteristics of class PE_CE

Characteristic name	Char. description	Cha...	Inh...
DRIVER_APPLICATION	Type of driven unit		
CORRESPONDING_DRIVEN_UNIT	Tech ID number of driven unit		
SPEED	Design speed		
NUMBER_OF_CYLINDERS	Specify number of cylinders		
CYLINDER_CONFIGURATION	Type of cylinder configuration		
STARTING_SYSTEM	Type of starting system		
FUEL	Type of fuel		
AIR_INLET_FILTRATION_TYPE	Type of air inlet filtration		
ENGINE_ASPIRATION_TYPE	Type of engine aspiration		
POWER_DESIGN	Max. rated output -design (MW)		
POWER_OPERATING	Normal power output (MW)		
PID_TAG_NO	P&ID Tag Number	✓	PE
DRAWINGS_TECHNICAL	Technical Drawings (Reference)	✓	PE
INSTALLATION_CODE_OR_NAME	Operation entity ID	✓	PE
INSTALLATION_CATEGORY	Type of installation	✓	PE

SAP Classification Assignment to Technical Objects

Display Functional Location: Master data

Classification Measuring points/counters Data origin...

FuncLoc: YEM-CPF-CPP-CP1-YPG-DG6-001 Cat. N NEXEN SURFACE LO...

Description: RECIPROCATING ENGINE #6 FOR G-91106

Status: CRTE

General Location Organization Structure Class Unit Boundary

General data

Class: **PE_CE_DE_MP** DIESEL ENGINE - MAIN POWER

Object type: []

Weight: 0.000 Size/dimension: RE-91106

Start-up date: []

Reference data

AcquisValue: 0.00 Acquisition date: []

Manufacturer data

Manufacturer: [] ManufCountry: []

Model number: [] Constr.yr/mth: [] / []

ManufPartNo.: []

ManufSerialNo.: []

Display Functional Location: Master data

Classification Measuring points/counters Data origin...

FuncLoc: YEM-CPF-CPP-CP1-YPG-DG6-001 Cat. N NEXEN SURFACE LO...

Description: RECIPROCATING ENGINE #6 FOR G-91106

Status: CRTE

General Location Organization Structure Class Unit Boundary

Classification

Type of driven unit	GENERATOR
Tech ID number of driven unit	G-91106
Design speed	
Specify number of cylinders	16 Cyl
Type of cylinder configuration	VEE
Type of starting system	PNEUMATIC
Type of fuel	LIGHT OIL
Type of air inlet filtration	
Type of engine aspiration	TURBO
Max. rated output -design (MW)	5.0 MW
Normal power output (MW)	3.5 MW
P&ID Tag Number	RE-91106
Technical Drawings (Reference)	630-91-D-1206-01 95-67-89243234
Operation entity ID	CNPY
Type of installation	SURFACE OIL PRODUCT
Operation category	MANNED
Geographic area	MIDDLE EAST
Manufacturer's name	WARTSILA
Manufacturer model designation	18V32GD
Other manufacturer designation	
Number of redundant eqpt units	6 EA
Redundant units in operation	6 EA
Mode in operating state	CONTINUOUS RUNNING

Characteristics inherited from Class PE_CE. More specific characteristics appear first.

Characteristics inherited from Class PE. As PE is the top level class, all equipment will have these Characteristics

ISO 14224 Failure and Maintenance Notations

Catalog Codes

- Problem report
 - Failure modes
 - Method of detection
- Repair report
 - Failure descriptors
 - What failed
 - Subunit/maintainable item
 - assemblies/components
 - Failures causes
 - Maintenance activities to repair

SAP Notification – Problem Report

The screenshot displays the SAP PM Notification interface for an unplanned maintenance case. The main notification details include:

- Notification: 10171236
- Status: NOPR ORAS
- Order: 20206599
- Problem Report Details: DG 6 has high oil temp

Reference object information:

- FunctLocation: YEM-CPF-CPP-CP1-Y...
- Equipment: 3022115
- Assembly: RECIPROCATING ENGINE #6 FOR G-91106

Subject information:

- Failure Mode: ZFMCE (highlighted), OHE, Overheating
- Description: DG 6 has high oil temp
- Text: 2005/11/12 04:24:48 Tony Ciliberti (CILIBERT) The engine shut down.....

Start/End Dates:

- Req.start: 2005/11/13 14:18:24
- Required End: 2005/11/13 14:18:24

Responsibilities:

- Planner group: MAS / 4101
- Main WorkCtr: YENTRD / 4101
- Reported by: CILIBERT

Pop-up windows and callouts:

- Set User Status:** Shows status options: 00 PRODUCTION Interference (highlighted), 10 OTHER Other Observation Method.
- Catalog Display:** Shows a tree view of Failure Modes, with OHE Overheating (highlighted) selected under ZFMCE Combustion Engine Failure Modes.
- Methods of Detection:** A red callout box pointing to the PROD status in the Set User Status window.
- Failure Modes:** A red callout box pointing to the OHE Overheating entry in the Catalog Display window.

SAP Notification – Repair Report

What Failed and How

Change PM Notification: Unplanned Mtce

Notification: 10171236 N1 DG 6 has high oil temp
Status: NOPR ORAS PRD
Order: 20206599

Problem Report Details Groups Required Item, Failure and Cause Maintenance Activities Unit Affected

Maintainable Units Failure Causes

No.	Code gr...	Item	Item	Code gr...	Fai...	Failure	Text	It...	Assembly	AssemblyDescriptn	Defect class	Number of defects	DefectiveQty (extern...	DefectiveQty
1	CECS	CSHE	Heat exchanger	FDEXT	5.1	Blockage/plugged	heavily corroded		171911	Tube, bundle		1		

Assembly/MM Specification
✓ First –out, position, number of defects, etc.

Subunits/Maintainable Items

- Item
- Maintainable Items
- CECH Combustion Engine - Control and Monitor
- CECS Combustion Engine - Cooling System
 - CSFL Filter
 - CSFM Fan and motor
 - CSHP Heat exchanger**
 - CSPG Piping
 - CSPM Pump
 - CSTC Temperature control
 - CSVL Valves
- CEEU
- CELS
- CEMS
- CESS Combustion Engine - Start system

Failure Descriptions

- Failure
- Failure Descriptions
- FDEXT External Failure Descriptors
 - 5.1 Blockage/plugged**
 - 5.2 Contamination
 - 5.3 Miscellaneous external influences

SAP Notification – Repair Report Failure Cause for Maintainable Item

Change PM Notification: Unplanned Mtce

Notification: 10171236 N1 DG 6 has high oil temp
Status: NOPR ORAS PRD
Order: 20206599

Problem Report Details | Groups Required | Item, Failure and Cause | Maintenance Activities | Unit Affected

Maintainable Units | Failure Causes

For item 1

Item: CECS CSHE Heat exchanger
Failure: FDEXT 5.1 Blockage/plugged
Text: heavily corroded

No.	Code gr...	Ca...	Cause code text	Cause text	C...	Created by	Created on	Created at
1	FCOM	3.4	Expected wear and tear			CILIBERT	2005/11/12	04:39:25

Failure Causes

- Cause Failure Causes
- FCOM Failure Cause - Operations/Maintenance
 - 3.0 Failure related to operation/maintenance
 - 3.1 Off-design service
 - 3.2 Operating error
 - 3.3 Maintenance error
 - 3.4 Expected wear and tear

SAP Notification – Repair Report Maintenance Activities

Change PM Notification: Unplanned Mtce

Notification: 10171236 N1 DG 6 has high oil temp
Status: NOPR ORAS PRD
Order: 20206599

Problem Report Details | Groups Required | Item, Failure and Cause | Maintenance Activities | Unit Affected

No.	Code gr...	Acti...	Activity code text	Activity text	A...	Q...	Start date	Time	End date	Time	Created by	Created on	Cre...
1	MACM	REPD	Repair					00:0...		00:0...	MACPHERD	2005/11/14	21:55...

Catalog Selection

- Activity Maintenance Activity
 - MACM Corrective Maintenance Activities
 - ADJT Adjust to within tolerance
 - CHCK Check
 - MDFD Modify
 - OTHR Other - Please specify
 - OVHL Overhaul
 - REFT Refit
 - REPD Repair**
 - REPL Replace

Maintenance Activities to Repair

SAP Notification – Equipment Unit Affected and How

The screenshot shows the SAP Maintenance notification interface. The title bar reads "Change PM Notification: Unplanned Mtce". The notification details are as follows:

Notification	10171236	N1	DG 6 has high oil temp
Status	NOPR ORAS	PROD	
Order	20206599		

Navigation tabs include: Problem Report Details, Groups Required, Item, Failure and Cause, Maintenance Activities, and Unit Affected.

Effect on the system

Funct. loc. affected	YEM-CPF-CPP-CP1-YPG-D66-001	RECIPROCATING ENGINE #6 F...
Equipment affected	3022115	ENGINE RE-91106 WARTSILA DG # 6
Effect	3	Production breakdown

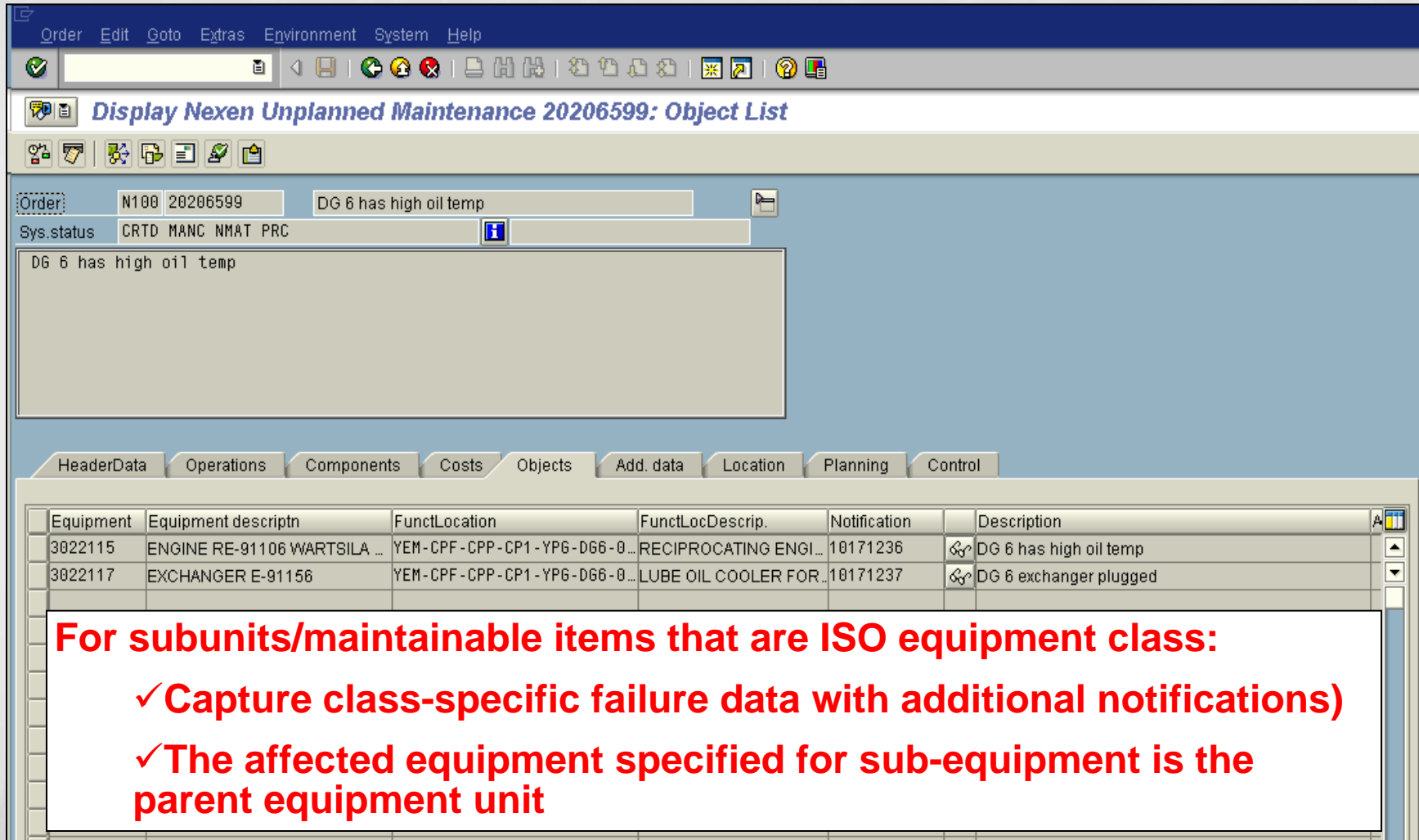
System availability

Avail.bef.malfunctn	100	Cond.bef.malfunctn	1	operational
Avail.aft.malfunctn		Cond.aft.malfunctn	3	out of order
Avail.after task	100	Cond.after task	1	operational

Annotations:

- ✓ System availability is used to classify failure severity
- ✓ System affected is the parent equipment unit

Capturing Multiple Equipment Class Data Within One Equipment Unit Failure



The screenshot displays the SAP-Centric EAM interface for displaying a maintenance object list. The title bar reads "Display Nexen Unplanned Maintenance 20206599: Object List". The main content area shows the object "DG 6 has high oil temp" with a status of "CRTD MANC NMAT PRC". Below this, a table lists the affected equipment and their descriptions.

Equipment	Equipment descriptn	FunctLocation	FunctLocDescrip.	Notification	Description
3022115	ENGINE RE-91106 WARTSILA ...	YEM - CPF - CPP - CP1 - YP6 - D66 - 0...	RECIPROCATING ENGI...	10171236	DG 6 has high oil temp
3022117	EXCHANGER E-91156	YEM - CPF - CPP - CP1 - YP6 - D66 - 0...	LUBE OIL COOLER FOR...	10171237	DG 6 exchanger plugged

For subunits/maintainable items that are ISO equipment class:

- ✓ Capture class-specific failure data with additional notifications)
- ✓ The affected equipment specified for sub-equipment is the parent equipment unit

ISO 14224 Equipment Class Interpretation

- Standard Interpretation of ISO 14224
 - Equipment to include/exclude
 - Clarifications of Class Boundary
 - Components to include/exclude
 - Repairs to include/exclude
 - KPI definitions

	Machinery Indicators	Key Performance Indicators	
	PUMPS	MP Section 2-2-1	Page 1 of 6
		JUNE, 1998	

1. PUMP KPI TAXONOMY

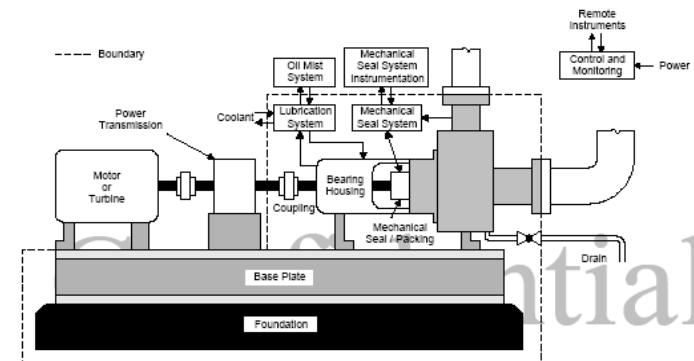


Figure 1 - Pump Equipment Class Boundary
See Section 3.3 for a list of components included or excluded from the pump equipment class boundary.

2. REFERENCES

3. DEFINITIONS TO BE APPLIED FOR DEVELOPING PUMP INDICATORS

3.1 Definition of a Pump

For the purposes of tracking performance indicators and costs, a pump is defined as a machine which increases the pressure of a liquid from the suction to discharge pressure and includes all necessary supporting systems such as lubrication systems and seal support systems as shown in Figure 1. The pump driver is excluded from the pump envelope. The coupling mounted on the pump is included in the envelope but all other power transmission devices on the pump set are excluded. In addition, the driver site rated power must be greater than 1 hp (in North America) or equal to or greater than 1 kW (outside North America). Table 1 below provides additional clarification on what pump types are to be included and excluded from the definition of a pump.

Table 1 - Types of Pumps Included/Excluded in the Pump Definition

Example from Meridium

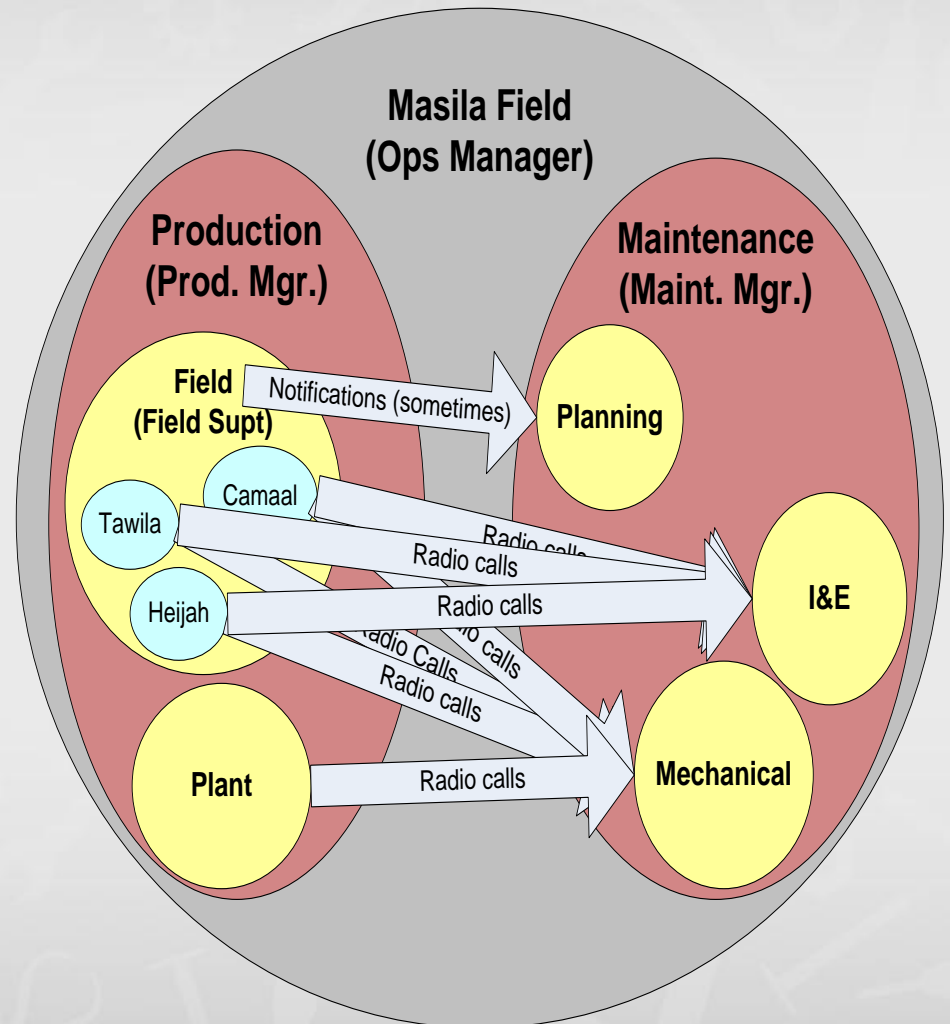
Change 3: Modify Work Processes for Complete and Accurate Data Capture

- Make SAP the single source of information
- Modify work notification process to ensure that all jobs are captured
- Customize SAP to support/enable new functionality

Work Notification Process Emergency Workflow – Existing

Current Issues

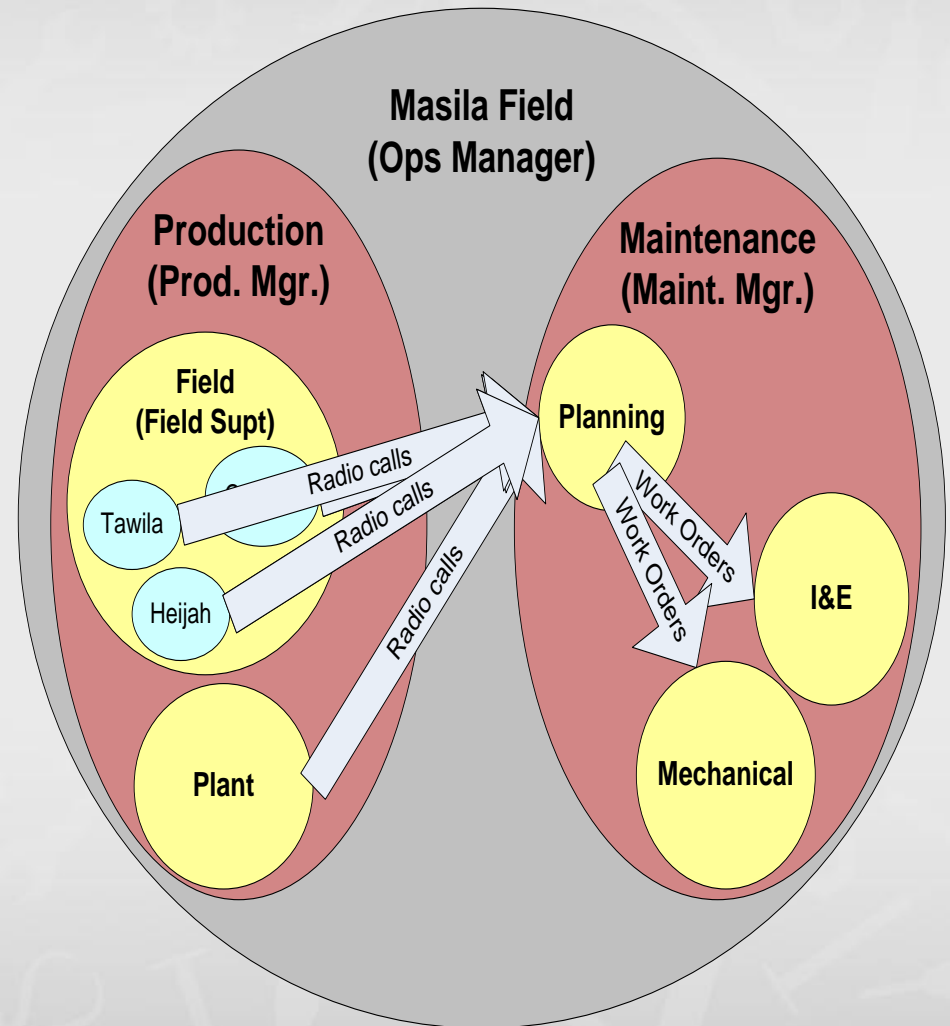
- Incomplete and improper allocation of costs and reliability data
 - N1 notifications not issued or issued after work completion
 - Improper notification sequence (N4 done before N1)



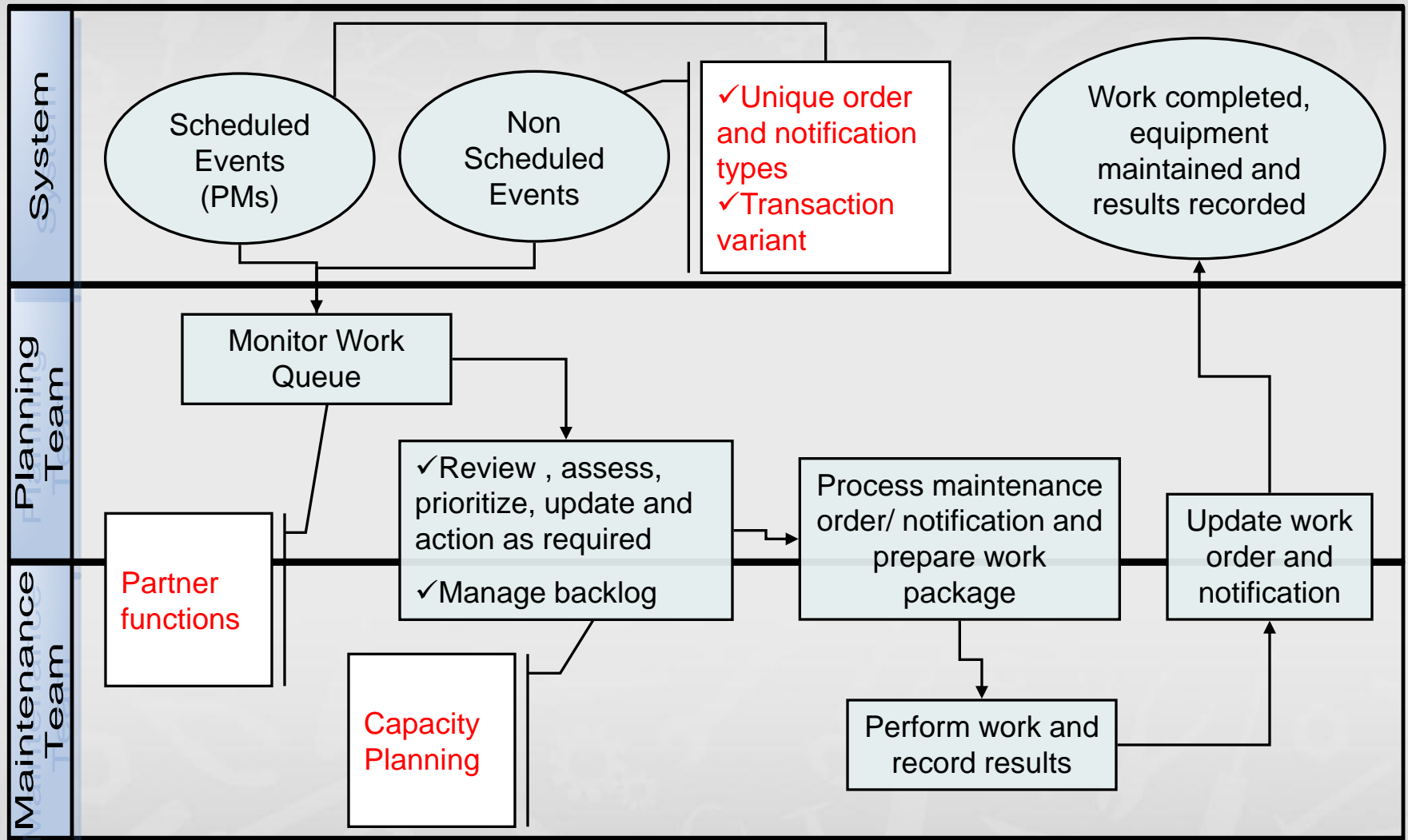
Work Notification Process Emergency Workflow – After Changes

Benefits Realization

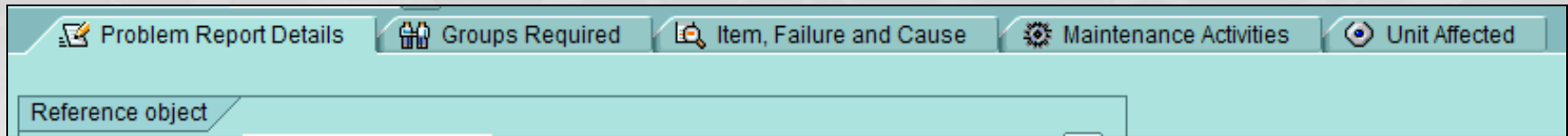
- Proper allocation of costs and reliability data to technical objects
 - All jobs captured with discrete and detailed work orders
 - Notification sequence done properly



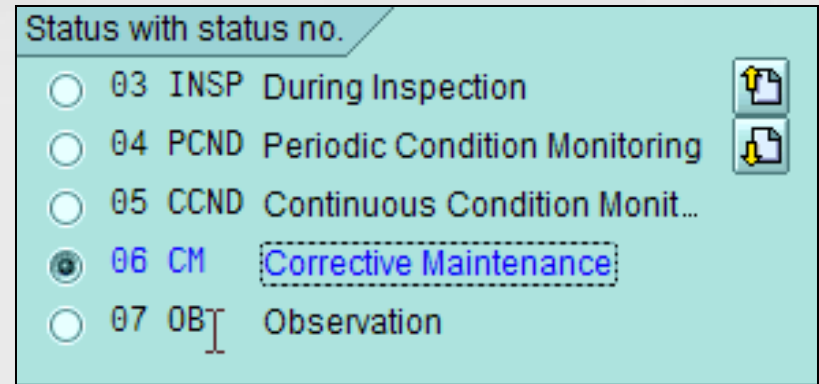
Order and Notification Processing



Notification Changes



- New Tabs in N1 type notification
 - Problem Report Details
 - Groups Required
 - Items, Failure and Causes
 - Maintenance Activities
 - System Affected
- New User Status Profile
 - To categorize how the problem was discovered



SAP Notification – Partner Functionality

Change PM Notification: Unplanned Mtce

Notification: 10171236 N1 DG 6 has high oil temp

Status: NOPR ORAS PRD

Order: 20206599

Problem Report Details | Groups Required | Item, Failure and Cause | Maintenance Activities | Unit Affected

Funct	Partner	Name	Address
	119998	Mechanical - CPP	
	119995	Maintenance Planning	

Info | PartnerAddress | PartnerAddress

✓ IDs of personnel groups that routinely use or maintain equipment default from technical objects.


✓ Additional groups can be added as applicable

Transaction Variants – Notification Create

Problem Report Details | Groups Required | Item, Failure and Cause | Maintenance Activities | Unit Affected

Reference object

Notification %00000000001 N1


CM 


Problem Report Details | Groups Required

FuncLocation

Equipment

Subject

Failure Mode 

Req.start 2005/11/15 11:08:44 Priority 

Required End 00:00:00 Breakdown

User responsibl

Reported by

Transaction Variants – “Queues” / List Edits

- Standard List Edits / Queues
- Standard variants per group (selection and display)

Notification status

Outstanding
 Postponed
 In process
 Completed
 Sel.profil

Notification selection

Notification to

Notification type to

Functional location to

Equipment to

Material to

Serial number to

Addit. device data to

Order to

Notification date to 9999/12/31

Partners YP Planning Group 119995

Req.start	Req. ti...	Notification	Description	Order	Description of functional location	Description of technical object	Equipment
2005/11/13	14:18:24	10171236	DG 6 has high oil temp	20206599	RECIPROCATING ENGINE #6 FOR G...	ENGINE RE-91106 WARTSILA DG # 6	3022115
2005/11/12	14:51:22	10171237	DG 6 exchanger plugged	20206599	LUBE OIL COOLER FOR RE-91106	EXCHANGER E-91156	3022117

Summary of SAP System Changes

- | | |
|---|--|
| <ul style="list-style-type: none">• Configuration changes<ul style="list-style-type: none">– Catalog profiles and content– Notification screen templates– Functional location structure indicator– User status profile• Classification<ul style="list-style-type: none">– Class hierarchy• Enhancements<ul style="list-style-type: none">– Notification content<ul style="list-style-type: none">• EXIT_SAPMIWO0_020– Equipment record content<ul style="list-style-type: none">• EXIT_SAPMIEQ0_001 | <ul style="list-style-type: none">• Transaction simplification<ul style="list-style-type: none">– Transaction variant– GUI xt– On-screen notification close-out process– Spares ordering• Queuing by discipline<ul style="list-style-type: none">– Partner functionality– Customized work lists based on partner ID• Reporting to support new functionality<ul style="list-style-type: none">– BIW web applications / queries– PM content to BW |
|---|--|

Data and Technical Administration

- Centralized data repository with common technical and costing design
 - Master data is the foundation of sound end to end business processes
- Centralized support for technical design
 - ISO 14224 interpretations and performance measures
 - Part of the change management and governance process
- Local business ownership of data and results



SAP-CENTRIC EAM 2006

Driving Value from SAP-Centric EAM

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