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mySAP PLM

PLM300 : Business Processes in Plant Maintenance

SAP PLM : ALM - Plant Maintenance Certification

PLM300: Business Processes in Plant Maintenance

Part I of I

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THE BEST-RUN BUSINESSES RUN SAP

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**SAP PLM: ALM Plant
Maintenance
Certification Curriculum**

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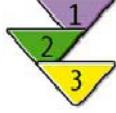
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Icon	Meaning
	For more information, tips, or background
	Note or further explanation of previous point
	Exception or caution
	Procedures
	Indicates that the item is displayed in the instructor's presentation.

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Course Overview

This course gives an overview of Plant Maintenance with SAP and shows all the most important business processes that can be mapped with SAP solutions.

One of the most important aims of this course is for participants to gain an understanding of how Plant Maintenance integrates with other SAP applications, and how it fits into the range of SAP solutions. Plant Maintenance should not be examined in its narrowest sense here, but should also be presented within the overall context of a comprehensive Enterprise Asset Management.

Target Audience

This course is intended for the following audiences:

- Project leader
- Project team member
- Decision maker

Course Prerequisites

Required Knowledge

- Basic knowledge of Plant Maintenance business processes

Recommended Knowledge

- SAP01 – Overview of the SAP Solution Portfolio
- SAPPLM – Overview of the *mySAP Product Lifecycle Management* solution



Course Goals

This course will prepare you to:

- Gain an overview of Plant Maintenance with SAP
- Understand how Plant Maintenance fits in with the solutions provided by SAP



Course Objectives

After completing this course, you will be able to:

- Name the most important business processes in Plant Maintenance and how they are mapped with SAP
- Describe some of the most important ways that Plant Maintenance is integrated with other SAP applications

SAP Software Component Information

The information in this course pertains to the following SAP Software Components and releases:

Unit 1

Navigation

Unit Overview

In this lesson you learn how to use the *SAP GUI* to navigate in SAP systems. You also learn something about the personalization options and the different forms of help available for working with SAP systems.



Unit Objectives

After completing this unit, you will be able to:

- sich erfolgreich am System anmelden
- die Elemente eines *SAP-GUI*-Bildschirms benennen und nutzen
- Funktionen des SAP-Systems auf verschiedenen Wegen aufrufen
- die Standardmenüs **System** und **Hilfe** beschreiben
- die Grundfunktionen der F1–Hilfe nutzen
- die F4–Hilfe verwenden
- die Informationen der Online-Dokumentation abrufen
- verschiedene Personalisierungsmöglichkeiten des SAP-Systems nutzen

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Lesson: Anmeldung und Bildschirmdesign

Lesson Overview

In dieser Lektion lernen Sie neben dem Anmelden am System auch die Bedeutung der verschiedenen Bildschirmelemente des *SAP GUI* kennen.



Lesson Objectives

After completing this lesson, you will be able to:

- sich erfolgreich am System anmelden
- die Elemente eines *SAP-GUI*-Bildschirms benennen und nutzen

Business Example

Wie kann man sich an SAP-Systemen anmelden und welche Bedeutung haben die verschiedenen Bildschirmelemente des *SAP GUI*?

Die Anmeldung am System

Auf SAP-Systeme kann über unterschiedlich gestaltete Frontend-Programme zugegriffen werden, so hat z. B. das SAP Business Information Warehouse (SAP BW) den sogenannten Business Explorer (BEx) als Frontend. Jedoch sind alle von SAP ausgelieferten Lösungen immer auch über ein allgemeines Frontend-Programm zugreifbar, dem so genannten *SAP Graphical User Interface (SAP GUI)*. Für fast alle SAP-Lösungen stellt das *SAP GUI* den Standardzugang dar. Das *SAP GUI* existiert in verschiedenen Varianten, alle sind grafisch äquivalent, aber in unterschiedlicher Weise umgesetzt. Für die weitere Beschreibung wird die Verwendung des *SAP GUI* für die Windows-Umgebung angenommen.

Das Programm *SAP GUI* verbindet den Frontend-Rechner mit einem bestimmten SAP-System. Theoretisch ist es möglich, die Wahl des jeweiligen SAP-Systems dem Aufruf des *SAP GUI* auf Kommandozeilenebene mitzugeben; dies ist für die alltägliche Arbeit jedoch nicht praktikabel. Daher stellt SAP ein weiteres Programm für das Frontend zur Verfügung: *SAP Logon*. *SAP Logon* bietet nach seinem Aufruf eine Liste mit SAP-Systemen an, für die der Anmeldeprozess gestartet werden kann. Diese Liste stammt aus einer Datei auf dem Frontend: `saplogon.ini`. Diese Datei wird typischerweise von zentraler Stelle vorkonfiguriert und für Endanwender zur Verfügung gestellt. Das Programm SAP Logon ermöglicht zudem bei der Anmeldung an ein System eine so genannte "Logon-Lastverteilung" über die vom gewählten System zur Verfügung gestellten Ressourcen.

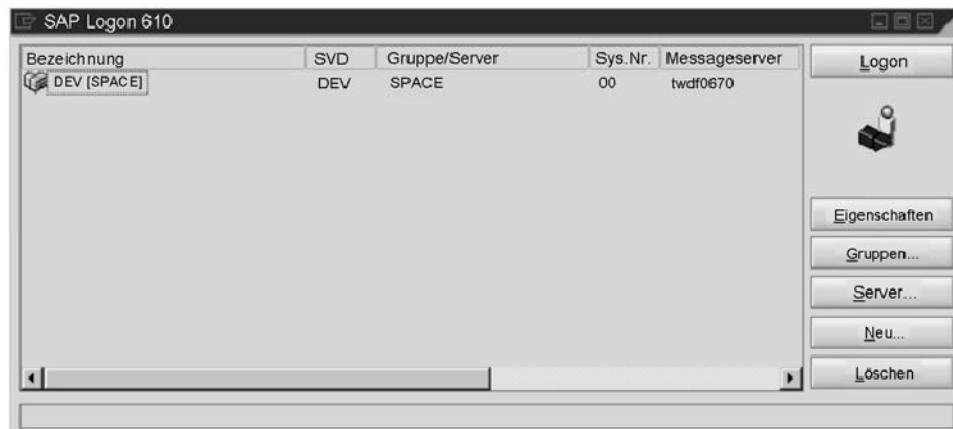


Figure 1: Das Programm SAP Logon

Bei der Anmeldung an ein SAP-System werden Sie nach folgenden Eingaben gefragt: Benutzer und Kennwort. Beim Einsatz einer SingleSignOn (SSO)-Lösung können diese Eingaben entfallen. Des Weiteren haben Sie bei der Anmeldung die Möglichkeit, einen bestimmten Mandanten anzugeben; dieses Feld ist zumeist schon passend vorbelegt.



Hint: Ein Mandant entspricht in der Regel der Abbildung eines Unternehmens in einem SAP-System. Das heißt in einem SAP-System mit mehreren Mandanten können mehrere Unternehmen abgebildet und parallel tätig sein. Der Mandant hat eine Entsprechung als Schlüsselfeld in den Tabellen der vom SAP-System verwendeten Datenbank. Von einem Mandanten aus können nur Daten genau dieses Mandanten zugegriffen werden. Somit entsprechen Mandanten betriebswirtschaftlich eigenständigen Entitäten.

Sie können bei der Anmeldung eine der von Ihrem System unterstützten Anmeldesprachen auswählen. Installierte SAP-Systeme können eine große Zahl von Sprachen unterstützen, und zwar immer mindestens Englisch und eine gewählte weitere Sprache. Welche Sprachen Ihr System unterstützt, hängt von der Anzahl der installierten Sprachen ab. Auf dem Anmeldebild haben Sie außerdem die Möglichkeit,

maximal einmal täglich Ihr Kennwort über die Drucktaste *Neues Kennwort* zu ändern. Das Anmeldebild kann von Ihrer Systemadministration mit einem zusätzlichen Text versehen werden. Folgen Sie hierfür dem SAP Hinweis 205487.



Note: SAP-Hinweise sind weiterführende Informationen zu bestimmten Funktionen oder auch Korrekturen zu bekannten Fehlern in SAP-Produkten. Auf *SAP-Hinweis* können Sie z. B. über den SAP Service Marketplace unter Angabe eines gültigen Benutzers mit Kennwort im Internet zureisen: <http://service.sap.com/notes>



Hint: Im Rahmen einer Anmeldung an einem System können Sie parallel in mehreren Modi (Bearbeitungsfenster des SAP-Systems) arbeiten. Über einen Systemparameter kann Ihre Systemadministration vorgeben, wie viele Modi pro Anmeldung am SAP-System möglich sind. Dieser Parameter (*rdisp/max_alt_modes*) gilt für alle Benutzer eines Systems und kann auf Werte zwischen 2 und 6 eingestellt werden.

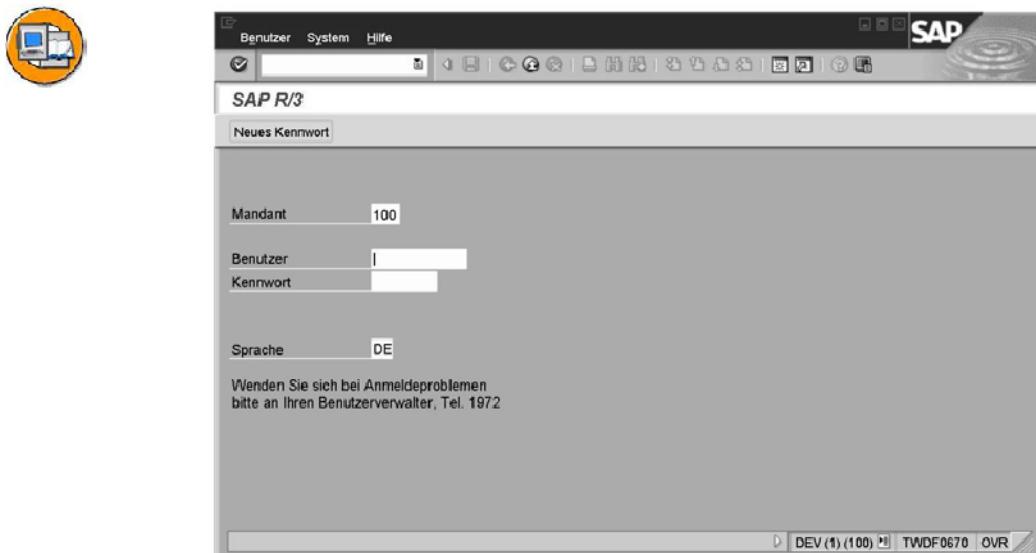


Figure 2: Das Anmeldebild eines SAP-Systems

Benutzerdaten sind im System mandantenabhängig abgelegt, d. h. Sie können sich z. B. am Mandanten 100 Ihres Systems anmelden, aber für den eventuell vorhandenen Mandanten 200 keinen Benutzer haben. Die Daten zu einem Benutzer innerhalb eines Mandanten werden auch "Benutzerstammsatz" genannt.

Mehrfachanmeldungen werden ab SAP R/3 Release 4.6 protokolliert. Dies hat sowohl sicherheitsbedingte als auch lizenzerrechtliche Gründe. Bei einer zweiten und jeder weiteren Anmeldung des gleichen Benutzers erscheint eine Hinweismeldung, die dem Benutzer drei Möglichkeiten bietet:

- Beenden der bestehenden Sitzung(en) und Neu anmeldung
- Vorhandene Sitzung(en) bestehen lassen, zusätzlich neu anmelden (wird protokolliert)
- Neu anmeldung abbrechen

Nach erfolgreicher Anmeldung gelangen Sie auf das Einstiegsbild des SAP-Systems, das auch *SAP Easy Access* genannt wird.

Der Bilddaufbau

Das Bild SAP Easy Access ist das Standardeinstiegsbild in SAP-Systeme. Im linken Bildbereich erhalten Sie eine Baumdarstellung der Ihnen zur Verfügung stehenden Menüs des SAP-Systems, im rechten Bildbereich können Sie sich ein Logo anzeigen lassen. Dieses Logo wird von Ihrer Systemverwaltung zentral zur Verfügung gestellt und ist nicht benutzerindividuell einstellbar.

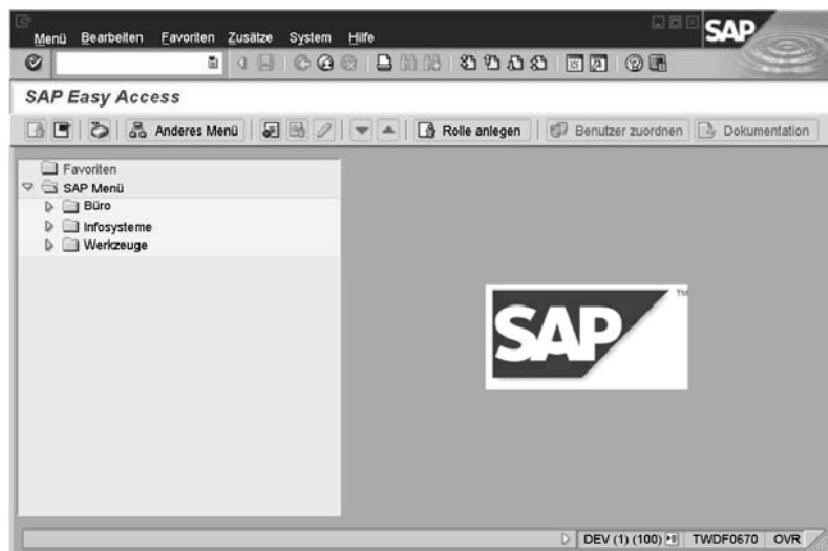


Figure 3: SAP Easy Access

Die Konfiguration des Logos im *SAP Easy Access* finden Sie (falls Sie die entsprechende Berechtigung haben) unter *Zusätze → Information zur Administration* detailliert beschrieben. Beachten Sie, dass das Bild im System hinterlegt wird und bei jeder Anmeldung auf das Frontend transportiert wird. Diese Übertragung findet zwar komprimiert statt, jedoch sollte das Einstiegslogo nicht größer als etwa 20 kB sein. Sie

können den Aufruf dieses Bildes auch unterbinden, indem Sie entweder im Programm *SAP Logon* die Einstellung *Low Speed Connection* wählen (siehe SAP-Hinweis 161053) oder unter *Zusätze → Einstellungen* den Aufruf des Bildes ausschalten.

Ein typisches Bildschirmbild (mit verschiedenen Elementen) erhalten Sie, wenn Sie z. B. *System → Benutzervorgaben → Eigene Daten → Festwerte* wählen. Dann erhalten Sie dieses Ihrem Benutzer entsprechende Bild:

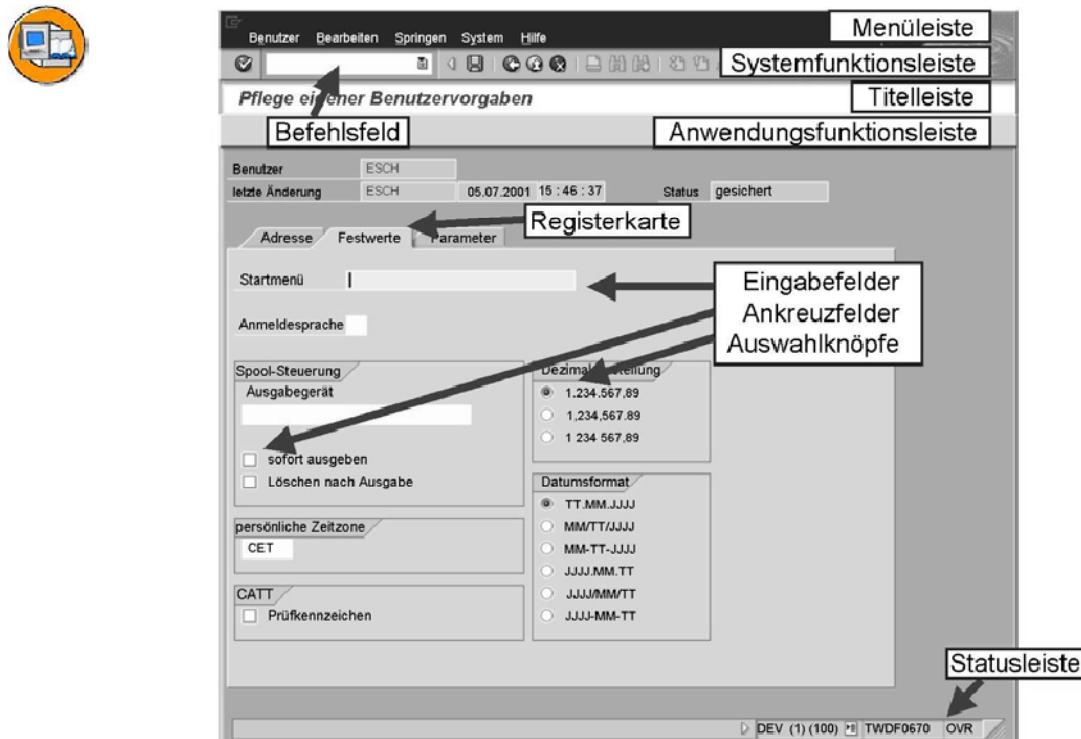


Figure 4: Pflege eigener Benutzervorgaben

Ein SAP-Bildschirmbild kann z. B. folgende einfache Bildelemente beinhalten:

- **Kommandofeld (Befehlsfeld)** : Im Kommandofeld (Befehlsfeld), das normalerweise ausgeblendet ist, können Sie Anwendungen direkt über die Eingabe des Transaktionscodes anwählen. Den Transaktionscode einer Anwendung finden Sie entweder im Übersichtsbaum des Bildes SAP Easy Access, in der Statusleiste (siehe unten) oder in der jeweiligen Anwendung unter *System → Status*.
- **Menüleiste** : Die Menüleiste ist die oberste Zeile jedes Dialogfensters im SAP-System. Die hier angezeigten Menüs sind von der jeweiligen Anwendung abhängig, in der Sie gerade arbeiten. In diesen Menüs werden Ihnen unter Umständen Untermenüpunkte angeboten.
- **Systemfunktionsleiste** : Die Drucktasten in der Systemfunktionsleiste sind auf jedem SAP-Bildschirmbild vorhanden. Die nicht nutzbaren Drucktasten sind je nach Anwendung ausgegraut. Wenn Sie den Cursor einen Moment auf einer Drucktaste stehen lassen, erscheint ein kleines Fähnchen mit dem Namen bzw. der Bedeutung der jeweiligen Drucktaste. Hier sehen Sie gegebenenfalls auch die entsprechende Funktionstastenbelegung.
- **Titelleiste** : Die Titelleiste benennt die Funktion, die Ihnen gerade angezeigt wird.
- **Anwendungsfunktionsleiste** : Hier sind Drucktasten sichtbar, die in Ihrer momentanen Anwendung genutzt werden können.
- **Ankreuzfelder** (check boxes): Innerhalb einer Feldgruppe können Sie bei Ankreuzfeldern mehrere Optionen gleichzeitig auswählen.
- **Auswahlknöpfe** (radio buttons): Sie können jeweils genau eine Option auswählen.
- **Register** : Hier werden mehrere Teil-Bildschirmbilder übersichtlich angeordnet.
- **Statusleiste** : Die Statusleiste zeigt Informationen zum momentanen Systemstatus, z. B. Warnungen und Fehler. Hier können Sie sich durch die entsprechende Anzeigeauswahl auch z. B. den Transaktionscode Ihrer gegenwärtigen Anwendung anzeigen lassen.

Weitere Elemente sind beispielsweise **Eingabefelder** und **Drucktasten**.

Exercise 1: Anmeldung und Bildschirmdesign

Exercise Objectives

After completing this exercise, you will be able to:

- sich am SAP-System anmelden

Business Example

Sie wollen am SAP-System arbeiten.

Task: Anmeldung am System und erste Schritte

Melden Sie sich am Schulungssystem an und führen Sie erste Schritte im System aus. Die Menüpfade beziehen sich auf das SAP-Standardmenü.

1. Starten Sie das Programm *SAP Logon* und wählen Sie den Eintrag des Ihnen vom Referenten benannten SAP-Systems aus. Wählen Sie *Logon*.
Benutzen Sie den Mandanten, den Benutzernamen, das Initialkennwort und die Anmeldesprache, die Ihnen der Referent vorgibt. Beim erstmaligen Anmelden erscheint ein Fenster, in das Sie ein selbst gewähltes, neues Kennwort doppelt eingeben müssen.
2. Wie viele Modi (Fenster des SAP-Systems) können Sie über *System → Erzeugen Modus* maximal parallel öffnen?
3. Wie heißt die über *Werkzeuge → Administration → Monitor → Systemüberwachung → Benutzerübersicht* im SAP-Standardmenü erreichte Funktion? Welcher Transaktionscode entspricht dem Aufruf über das Menü?

Solution 1: Anmeldung und Bildschirmsign

Task: Anmeldung am System und erste Schritte

Melden Sie sich am Schulungssystem an und führen Sie erste Schritte im System aus. Die Menüpfade beziehen sich auf das SAP-Standardmenü.

1. Starten Sie das Programm *SAP Logon* und wählen Sie den Eintrag des Ihnen vom Referenten benannten SAP-Systems aus. Wählen Sie *Logon*.
Benutzen Sie den Mandanten, den Benutzernamen, das Initialkennwort und die Anmeldesprache, die Ihnen der Referent vorgibt. Beim erstmaligen Anmelden erscheint ein Fenster, in das Sie ein selbst gewähltes, neues Kennwort doppelt eingeben müssen.
 - a) Folgen Sie den Anweisungen der Übungsbeschreibung.
2. Wie viele Modi (Fenster des SAP-Systems) können Sie über *System → Erzeugen Modus* maximal parallel öffnen?
 - a) Je nach Einstellung des entsprechenden Systemparameters können Sie zwischen 2 und 6 Modi öffnen. In diesem Schulungssystem sollte das Öffnen von 6 Modi möglich sein.
3. Wie heißt die über *Werkzeuge → Administration → Monitor → Systemüberwachung → Benutzerübersicht* im SAP-Standardmenü erreichte Funktion? Welcher Transaktionscode entspricht dem Aufruf über das Menü?
 - a) Die Funktion heißt *Benutzerliste*, siehe Eintrag in der Titelleiste. Sie können den passenden Transaktionscode (hier SM04) auch herausfinden, indem Sie z. B. *System → Status* wählen. Den Transaktionscode der momentan aktiven Transaktion können Sie sich auch in der Statusleiste anzeigen lassen.



Lesson Summary

You should now be able to:

- sich erfolgreich am System anmelden
- die Elemente eines *SAP-GUI*-Bildschirms benennen und nutzen

Related Information

- Weitere Informationen finden Sie in der Online-Dokumentation unter *Hilfe* → *SAP-Bibliothek* → *Einführung in das SAP-System*.

Lesson: Anwahl von Funktionen

Lesson Overview

In dieser Lektion lernen Sie verschiedene Möglichkeiten zur Anwahl von Funktionen in SAP-Systemen kennen.



Lesson Objectives

After completing this lesson, you will be able to:

- Funktionen des SAP-Systems auf verschiedenen Wegen aufrufen
- die Standardmenüs **System** und **Hilfe** beschreiben

Business Example

keines

Favoritenliste und Benutzermenü

Nach erfolgreicher Anmeldung stehen dem Benutzer im linken Bildbereich zwei untereinander angeordnete Übersichtsbäume zur Funktionsanwahl zur Verfügung:

- die benutzerdefinierten Favoritenliste
- das rollenbasierte Benutzermenü oder das SAP-Menü

Die Favoritenliste beinhaltet Funktionen des SAP-Systems oder auch Links zu Internet-Inhalten oder auf Dateien des Frontend-Rechners des Endanwenders. Die anfangs leere Favoritenliste ist von jedem Endanwender individuell editierbar und nur für diesen sichtbar. Da die Daten zu den Favoriten innerhalb des SAP-Systems abgelegt werden, steht jedem Benutzer in verschiedenen Systemen möglicherweise eine andere Sammlung von Favoriten zur Verfügung. Favoriten können in Ordnern sortiert werden. Favoriten können Sie im Bild *SAP Easy Access* über das Menü *Favoriten* bearbeiten.

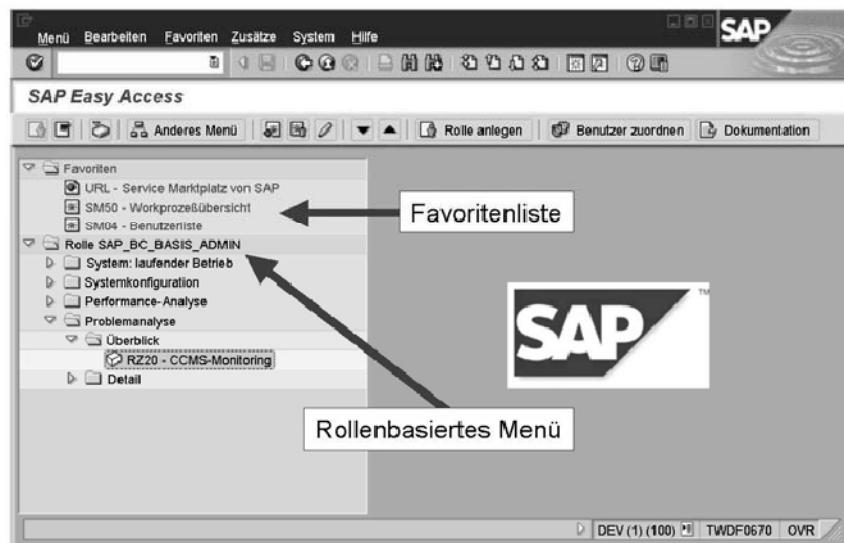


Figure 5: Favoritenliste und rollenbasiertes Benutzermenü

Im Menü *Favoriten* haben Sie die Möglichkeit, eine Funktion, die im Benutzer- (oder SAP-) Menü gerade durch den Mauszeiger hervorgehoben ist, über *Favoriten → Hinzufügen* der persönlichen Favoritenliste hinzuzufügen. Alternativ kann auch *Drag & Drop* mit Hilfe der Maus verwendet werden. Über *Favoriten → Sonstige Objekte einfügen* können Sie auch URLs oder Dateiverweise in die Favoritenliste aufnehmen. Die Favoritenliste kann über die Anwahl des Dreieck-Symbols vor dem Ordner-Symbol wahlweise komprimiert oder expandiert werden.

Das rollenbasierte Benutzermenü kann (je nach Systemeinstellung) vom Endanwender auch in das SAP-Standardmenü umgeschaltet werden.



Hint: In der Tabelle USERS_SSM kann die Systemadministration einstellen, ob ein Benutzer zwischen dem SAP-Menü oder dem Benutzermenü umschalten darf. Falls beides verboten sein sollte, wird das jeweilige Benutzermenü angezeigt. Die **Verfügbarkeit** des Benutzer- oder SAP-Menüs beeinflusst nicht die Berechtigungen eines Benutzers. Das heißt ein Benutzer kann immer die ihm erlaubten Funktionen über Transaktionscode aufrufen (siehe unten).

Das rollenbasierte Benutzermenü wird auf Grund der dem Benutzer zugeordneten Rolle(n) erstellt und auf das Frontend übertragen. Daher empfiehlt es sich, möglichst kleine Rollen zu erstellen, da große Rollen unter Umständen eine erhöhte Übertragungszeit auf das Frontend bedeuten. Falls ein Benutzer mehrere zugeordnete Rollen hat, kann es vorkommen, dass in seinem rollenbasierten Benutzermenü Funktionen an unterschiedlichen Stellen wiederholt aufgeführt sind. Falls dies

nicht erwünscht ist, finden Sie im SAP-Hinweis 357693 (und den dort erwähnten Hinweisen) Informationen zum Auffinden und Entfernen von Duplikaten sowie zu weiteren hiermit verbundenen Fragen.



Hint: Mit passenden Berechtigungen ist es Benutzern im SAP-System möglich, sich ein anderes als das im Benutzerstammsatz zugeordnete Benutzermenü anzeigen zu lassen. Dies erreicht man über die Drucktaste *Anderes Menü*. Über *Rolle anlegen* kommt man in die Funktion zur Rollenpflege, Transaktion PFCG.

Funktionen anwählen

In SAP-Systemen können Sie auf vielfältige Weise navigieren:

- über die Eingabe von Transaktionscodes im Kommandofeld
- über die Einträge der Menüs in der Menüleiste
- über Einträge der Favoriten oder des Benutzer- oder SAP-Menüs

Über die Tastatur kann man sowohl das *SAP-Easy-Access*-Bild als auch das Kommandofeld erreichen und von dort Funktionen des Systems aufrufen.



Hint: Um über die Tastatur im System zu navigieren, verwenden Sie folgende Tasten:

- **TAB**: springt innerhalb einer Feldgruppe von einem Feldelement zum nächsten
- **Strg + TAB**: springt von einer Feldgruppe zum ersten Element der jeweils nächsten Feldgruppe
- **Strg + /**: springt direkt ins Kommandofeld

Weitere Shortcuts finden Sie, indem Sie *Anpassung des lokalen Layouts* (*Alt+F12*) → *Hilfe zur SAP GUI* wählen.

Wenn das Kommandofeld (Befehlsfeld) eingabebereit ist, können Sie sich mit der F1-Taste über die Feldhilfe Eingabemöglichkeiten zu diesem wichtigen Feld anzeigen lassen. Folgende Eingaben sind möglich:

- **/n** zum Abbrechen der gegenwärtigen Transaktion
- **/nXXXX** zum Aufrufen der Transaktion XXXX aus einer anderen Transaktion heraus. Ohne den Präfix funktioniert der Aufruf von XXXX nur aus dem *SAP Easy Access*.
- **/o** zum Anzeigen der eigenen Modi
- **/oXXXX** zum Aufrufen der Transaktion XXXX in einem neuen Modus aus einer anderen Transaktion heraus.
- **/nend** zum Beenden der Anmeldesitzung mit Rückfrage.
- **/nex** zum Beenden der Anmeldesitzung ohne Rückfrage.
- **/i** zum Löschen des aktuell aktiven Modus.



Note: Ausnahmsweise nimmt man für das Kommandofeld (Befehlsfeld) nicht die F4-Hilfe, um die Eingabehilfe zu erhalten. Die F4-Hilfe des Kommandofeldes listet nur die letzten 15 unterschiedlichen Eingaben im Kommandofeld auf. Diese Liste liegt in der Registry auf dem Frontend und ist für alle Modi eines Frontends (unabhängig vom genutzten System) gültig.



Figure 6: Verschiedene Navigationsmöglichkeiten



Hint: Indem Sie `search_sap_menu` bzw. `search_user_menu` im Kommandofeld eingeben, können Sie wahlweise das SAP-Standardmenü oder Ihr Benutzermenü nach einem beliebigen String oder auch Transaktionscode durchsuchen. Als Ergebnis erhalten Sie eine Liste aller Treffer, die Ihnen zeigt, wie Sie die gefundenen Funktionen per Menü oder Transaktionscode erreichen können.

Die Menüs in der Menüleiste erreichen Sie einfach über die Tastenkombination **Alt + <unterstrichener Buchstabe des gewählten Menüpunktes>**.

Die Menüs “System” und “Hilfe”

Die beiden Menüs *System* und *Hilfe* stehen Ihnen auf jedem Bildschirmbild in einem SAP-System stets in gleicher Form zur Verfügung.

Im Menü *System* sind Zugriffe auf verschiedenste Systemfunktionen hinterlegt. Ebenso beinhaltet dieses Menü auch Funktionen, die nur über dieses Menü (und auf keinem anderen Weg) erreichbar sind. Über den Pfad *System* → *Abmelden* können Sie Ihre Sitzung beenden und über *System* → *Status* wertvolle Informationen über Ihr System und die gerade in Ausführung befindliche Funktion erhalten, wie z. B. den zugehörigen Transaktionscode.

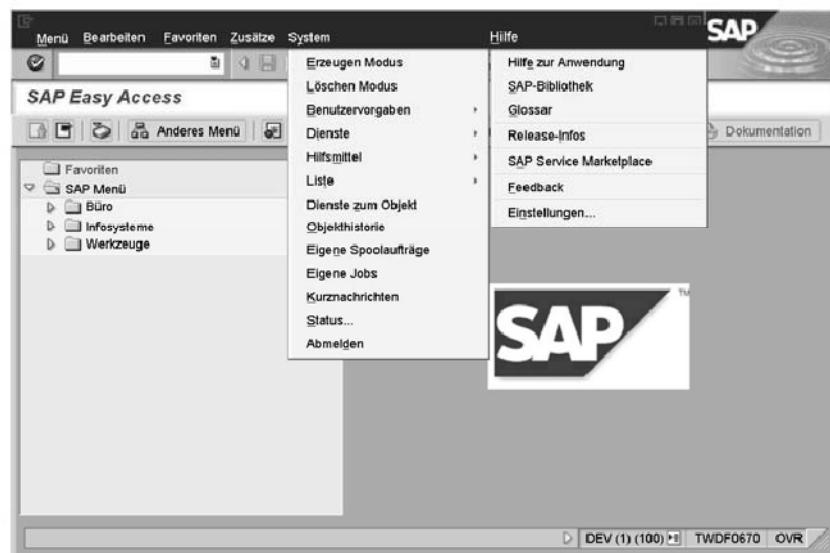


Figure 7: Die beiden Menüs System und Hilfe

Über das Menü *Hilfe* haben Sie Zugriff auf die Online-Dokumentation. Außerdem können Sie sich die sogenannten “Release-Infos” anzeigen lassen oder auch die Standardeinstellungen Ihrer F4-Hilfe konfigurieren. Zumeist werden Sie jedoch an dieser Stelle den kontextsensitiven Sprung in den für Ihre momentane Arbeit relevanten Teil der Online-Dokumentation nutzen. Die kontextsensitive Hilfe wird auch “Hilfe zur Anwendung” genannt. Das Werkzeug für den Zugriff auf die Online-Dokumentation ist die so genannte “SAP-Bibliothek”.

Exercise 2: Anwahl von Funktionen

Exercise Objectives

After completing this exercise, you will be able to:

- Sie lernen verschiedene Arten des Funktionsaufrufs kennen und somit im System zu navigieren

Business Example

keines

Task 1: Verschiedene Wege zur Benutzerübersicht

Wer ist gerade am Schulungssystem angemeldet?

1. Rufen Sie die Transaktion zur Anzeige der angemeldeten Benutzer auf. Folgen Sie hierzu dem Pfad (bezogen auf das SAP-Standardmenü)
Wählen Sie *Werkzeuge* → *Administration* → *Monitor* → *Systemüberwachung* → *Benutzerübersicht*.
2. Verlassen Sie die Benutzerübersicht, indem Sie entweder die F3-Taste drücken oder *Zurück* in der Systemfunktionsleiste wählen. Nun tragen Sie im Bild *SAP Easy Access* im Kommandofeld **sm04** ein. Sie erreichen direkt die Benutzerübersicht.

Task 2: Einige Eingaben im Kommandofeld (Befehlsfeld)

Welche Eingaben sind im Kommandofeld möglich?

1. Beginnen Sie diese Übung im Bild *SAP Easy Access*. Tragen Sie nacheinander folgende Eingaben im Kommandofeld ein, ohne auf das *SAP Easy Access* zurückzukehren. Notieren Sie sich Ihre Beobachtungen. (Das jeweilige Ergebnisbild brauchen Sie nicht näher zu betrachten, außer nach Eingabe von **/nend**: Wählen Sie hier *Nein*):

Eingabe	Resultat
SU3	
SM04	

Continued on next page

/nsm04	
/nend	
/nex	

Solution 2: Anwahl von Funktionen

Task 1: Verschiedene Wege zur Benutzerübersicht

Wer ist gerade am Schulungssystem angemeldet?

1. Rufen Sie die Transaktion zur Anzeige der angemeldeten Benutzer auf. Folgen Sie hierzu dem Pfad (bezogen auf das SAP-Standardmenü)
Wählen Sie *Werkzeuge* → *Administration* → *Monitor* → *Systemüberwachung* → *Benutzerübersicht*.
a) Lösung siehe Aufgabenstellung
2. Verlassen Sie die Benutzerübersicht, indem Sie entweder die F3-Taste drücken oder *Zurück* in der Systemfunktionsleiste wählen. Nun tragen Sie im Bild *SAP Easy Access* im Kommandofeld **sm04** ein. Sie erreichen direkt die Benutzerübersicht.
a) Lösung siehe Aufgabenstellung

Task 2: Einige Eingaben im Kommandofeld (Befehlsfeld)

Welche Eingaben sind im Kommandofeld möglich?

1. Beginnen Sie diese Übung im Bild *SAP Easy Access*. Tragen Sie nacheinander folgende Eingaben im Kommandofeld ein, ohne auf das *SAP Easy Access* zurückzukehren. Notieren Sie sich Ihre Beobachtungen. (Das jeweilige Ergebnisbild brauchen Sie nicht näher zu betrachten, außer nach Eingabe von **/nend**: Wählen Sie hier *Nein*):

Eingabe	Resultat
SU3	
SM04	

Continued on next page

/nsm04	
/nend	
/nex	

a)

Eingabe	Resultat
SU3	Aufruf der Verwaltung der eigenen Benutzereinstellungen
SM04	Erfolgloser Aufruf der Benutzerübersicht. Eine Transaktion kann nur vom Bild <i>SAP Easy Access</i> aus direkt (d. h. ohne Präfix) aufgerufen werden.
/nsm04	Erfolgreicher Aufruf der Benutzerübersicht. /n beendet zuerst die bestehende Transaktion und ruft dann die angegebene Transaktion auf.
/nend	Eine Abmeldungsabfrage erscheint. Sie könnten das System nun verlassen.
/nex	Es erscheint keine Abmeldungsabfrage und Ihre Sitzung wird ohne Rückfrage beendet.



Lesson Summary

You should now be able to:

- Funktionen des SAP-Systems auf verschiedenen Wegen aufrufen
- die Standardmenüs **System** und **Hilfe** beschreiben

Related Information

- Online-Dokumentation: Erweiterte Hilfe zum *SAP Easy Access*. Hierfür wählen Sie im *SAP Easy Access Hilfe* → *Hilfe zur Anwendung*.

Lesson: Möglichkeiten zur Hilfe

Lesson Overview

Diese Lektion macht Sie mit den Hilfemöglichkeiten vertraut, die Ihnen über die F1- und die F4-Taste angeboten werden.



Lesson Objectives

After completing this lesson, you will be able to:

- die Grundfunktionen der F1–Hilfe nutzen
- die F4–Hilfe verwenden
- die Informationen der Online-Dokumentation abrufen

Business Example

Sie möchten weitere Informationen über eingabebereite Felder sammeln, wie z. B. die Bedeutung des Feldes oder welche Werte Sie dort eingegeben können.

Feldhilfe (F1–Hilfe)

Mit der F1-Taste erhalten Sie Erläuterungen zu Feldern, Menüs, Funktionen und Meldungen. Über die Feldhilfe gelangen Sie auch zu technischen Informationen zum jeweiligen Feld. Dort finden Sie beispielsweise auch die Parameter-ID, die Sie für Ihren Benutzer zur wertmäßigen Vorbelegung von Eingabefeldern nutzen können, die ebenfalls auf diese Parameter-ID verweisen. Weitere interessante Informationen erhalten Sie auch, wenn Sie die Feldhilfe für das Kommandofeld aufrufen.

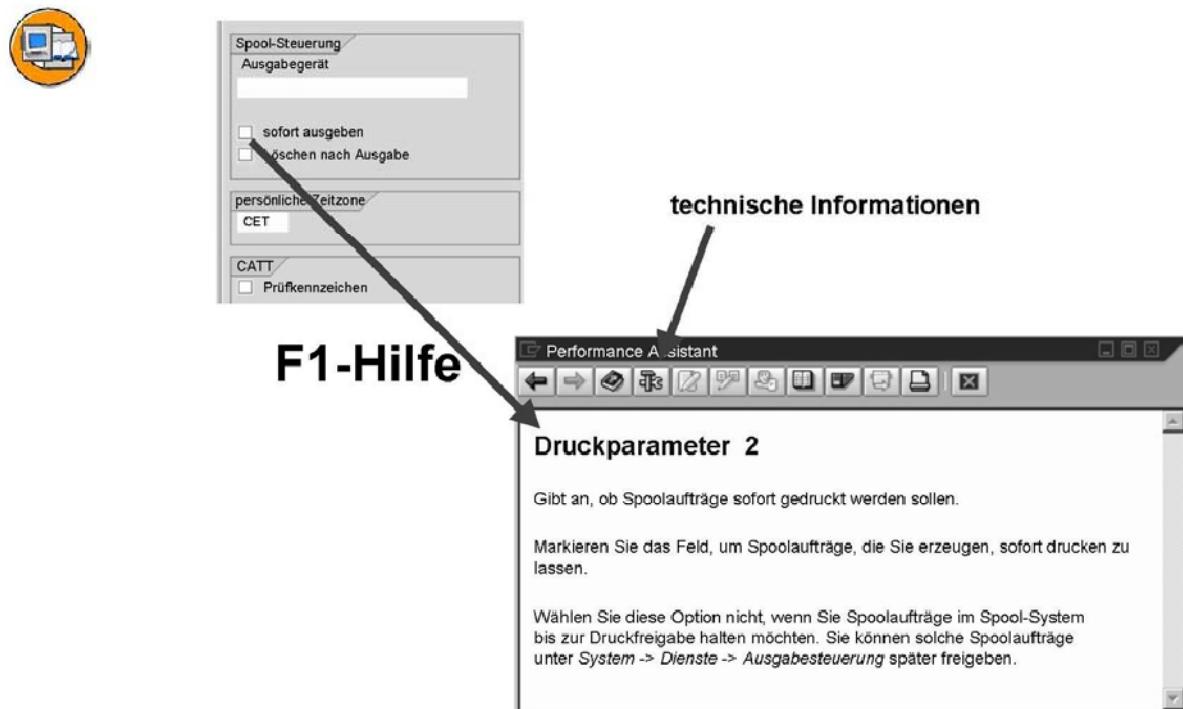


Figure 8: Feldhilfe (F1-Hilfe)

Auf dem Dialogfenster des so genannten *Performance Assistant* erhalten Sie weitere über Drucktasten erreichbare Angaben zum ausgewählten Feld. Eine der wichtigsten weiterführenden Informationen ist neben dem Link zur kontextsensitiven *Hilfe zur Anwendung* der Verweis auf die so genannte *Technische Information*. Hier erhalten Sie weitergehende Informationen, wie z. B. die dem Feld zugeordnete Parameter-ID. Auf die Verwendung von Parameter-IDs wird an dieser Stelle nicht eingegangen.

→ **Note:** Den *Performance-Assistant* müssen Sie unter Umständen erst aktivieren. Wählen Sie hierzu *Hilfe* → *Einstellungen* → *F1-Hilfe*.

Eingabehilfe (F4-Hilfe)

Mit der F4-Taste erhalten Sie Informationen zu möglichen Eingabewerten. Die Eingabehilfe für ein Feld können Sie alternativ über die Drucktaste direkt rechts neben einem gewählten Feld aufrufen. Wenn Felder mit einem ‘Haken’-Symbol belegt sind, können Sie in der jeweiligen Anwendung nur nach Eingabe eines zugelassenen Wertes fortfahren (Musseingabe). Viele Felder einer Anwendung können vom Benutzer über Transaktions- oder Bildvarianten sowie über Customizing als eingabepflichtig (Muss) oder optional (Kann) gekennzeichnet, ausgeblendet oder unsichtbar mit Vorgabewerten gefüllt werden.

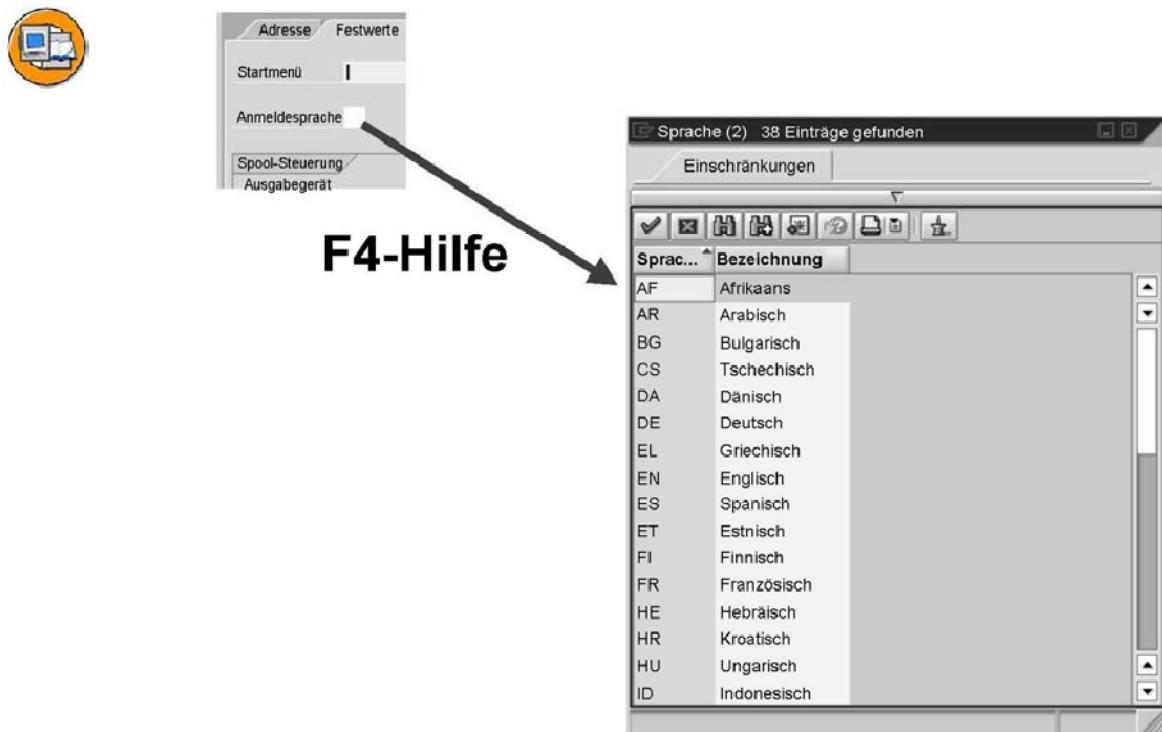


Figure 9: Eingabehilfe (F4-Hilfe)

Die Eingabehilfe bietet zu einem Feld eine Liste von Eingabemöglichkeiten an. Falls es sehr viele Eingabemöglichkeiten gibt, wird ein weiteres Selektionsbild „zwischengeschaltet“. Die Eingabehilfe zeigt bei einer großen Ergebnisliste nur so viele Einträge an, wie vom Endanwender unter *Hilfe → Einstellungen* auf der Registerkarte *F4-Hilfe* vorgegeben wurde. Der Default-Wert hierfür ist 500. Machen Sie sich auch mit den anderen dort zu findenden Einstellungen vertraut.

SAP-Bibliothek (Online-Dokumentation)

Die SAP-Bibliothek ist eine wertvolle Hilfe, um die Systemfunktionen kennen zu lernen. Sie bietet den Zugriff auf die so genannte Online-Dokumentation. Die dort abgelegten Informationen beschreiben nicht nur die Nutzung von Systemfunktionen, sondern erklären auch Konzepte der Systemarchitektur, geben Beispiele für mögliche sinnvolle Konfigurationen unterschiedlicher Prozesse und warnen vor möglichen Bedienungsfehlern und deren Folgen. Häufig finden sich in der Online-Dokumentation auch Tipps und Tricks, die die alltägliche Arbeit mit dem System erleichtern und beschleunigen.



Figure 10: Die SAP-Bibliothek



Hint: Auf die SAP-Bibliothek kann auch im Internet zugegriffen werden. Rufen Sie hierfür die Adresse <http://help.sap.com> auf oder schauen Sie unter <http://www.sap.com> → *Education* → *SAP Help Portal*. Dort ist der Zugriff auf die Dokumentation aller Produkte in verschiedenen Releases über eine komfortable Volltextsuche (pro Solution) möglich.

Exercise 3: Möglichkeiten zur Hilfe

Exercise Objectives

After completing this exercise, you will be able to:

- die F1- und die F4-Hilfe verwenden

Business Example

Sie möchten nähere Informationen zu einem Feld auf Ihrem Bildschirmbild.

Task: Nutzung der F1- und F4-Hilfe

Sie rufen innerhalb der Transaktion SU3 die F1- und die F4-Hilfe auf.

1. Rufen Sie entweder über das Systemmenü oder über den Transaktionscode SU3 die Pflege der eigenen Benutzerdaten auf. Rufen Sie dort für verschiedene Eingabefelder die F1-Hilfe auf. Finden Sie über *Technische Informationen* die Parameter-ID zum Feld *Anmeldesprache*. Verwenden Sie hierfür die Anzeige im *Performance Assistant*.
2. Rufen Sie die F4-Hilfe für das Feld *Anmeldesprache* auf. Welches Sprachkürzel steht für "Ukrainisch"?

Solution 3: Möglichkeiten zur Hilfe

Task: Nutzung der F1- und F4-Hilfe

Sie rufen innerhalb der Transaktion SU3 die F1- und die F4-Hilfe auf.

1. Rufen Sie entweder über das Systemmenü oder über den Transaktionscode SU3 die Pflege der eigenen Benutzerdaten auf. Rufen Sie dort für verschiedene Eingabefelder die F1-Hilfe auf. Finden Sie über *Technische Informationen* die Parameter-ID zum Feld *Anmeldesprache*. Verwenden Sie hierfür die Anzeige im *Performance Assistant*.
 - a) Das Feld “Anmeldesprache” befindet sich auf der Registerkarte *Festwerte*. Über *Technische Informationen* sehen Sie, dass die Parameter-ID für dieses Feld der String SPR ist.
2. Rufen Sie die F4-Hilfe für das Feld *Anmeldesprache* auf. Welches Sprachkürzel steht für “Ukrainisch”?
 - a) Gehen Sie nach der Aufgabenbeschreibung vor. Das Sprachkürzel für Ukrainisch lautet UK.



Lesson Summary

You should now be able to:

- die Grundfunktionen der F1–Hilfe nutzen
- die F4–Hilfe verwenden
- die Informationen der Online-Dokumentation abrufen

Related Information

- Weiterführende Informationen finden Sie unter <http://www.sap.com> → *Education* → *SAP Help Portal*.

Lesson: Möglichkeiten zur Personalisierung der Benutzeroberfläche

Lesson Overview

Sie lernen verschiedene Personalisierungsmöglichkeiten Ihres *SAP-GUI*-Erscheinungsbildes kennen.



Lesson Objectives

After completing this lesson, you will be able to:

- verschiedene Personalisierungsmöglichkeiten des SAP-Systems nutzen

Business Example

Der Endbenutzer möchte den Zugriff auf SAP-Systeme personalisieren.

Wege zur Personalisierung des SAP GUI

Im System stehen den Endbenutzern vielfältige Personalisierungsmöglichkeiten zur Verfügung. Einige sind hier beschrieben. Unter *Zusätze → Einstellungen* können Sie die Gestaltung Ihres Einstiegsbilds beeinflussen, z. B. über eine Ausschaltung des Bilds im rechten Teilbereich des Fensters oder über Zuschaltung der technischen Namen (Transaktionscodes) im Bild *SAP Easy Access*.

Die Möglichkeit zur *Anpassung des lokalen Layouts* finden Sie mit folgender

Drucktaste:

Über die Drucktaste *Anpassung des lokalen Layouts* finden Sie z. B. unter *Optionen... → Lokale Daten* die Möglichkeit, die Eingabehistorie zu verwalten. Die Eingabehistorie baut, wenn sie aktiviert ist, eine kleine Datenbank auf dem Frontend auf, die für Eingabefelder in Transaktionen die letzten x Eingaben beinhaltet. Den Wert für "x" können Sie selbst vorgeben. Diese Eingaben werden Ihnen als Eingabehilfe bei entsprechend deklarierten Feldern angeboten. Die Eingabehistorie arbeitet mit einer gewissen Verzögerung; diese Verzögerung können Sie bestimmen, indem Sie *Optionen... → Lokale Daten → Historie → Sofort* wählen.

Unter den *Optionen...* finden Sie auch die Möglichkeit, die Geschwindigkeit der Quick-Info einzustellen, oder Systemmeldungen als Dialogfenster anzeigen zu lassen (*Optionen... → Nachrichten*). Es gibt hier noch viele weitere kleine Hilfen und Einstellungsmöglichkeiten, wie z. B. die Wahl des Farbschemas Ihres GUI-Erscheinungsbildes.

→ **Note:** Unter *Anpassung des lokalen Layouts* finden Sie auch unter *Neues Design... → Allgemein* eine Möglichkeit zur **Anpassung der Schriftgröße** in Ihrem SAP GUI-Fenster. Allerdings müssen Sie, bevor diese Einstellung wirksam wird, das Programm *SAP Logon* beenden, erneut aufrufen und sich anschließend neu am System anmelden.

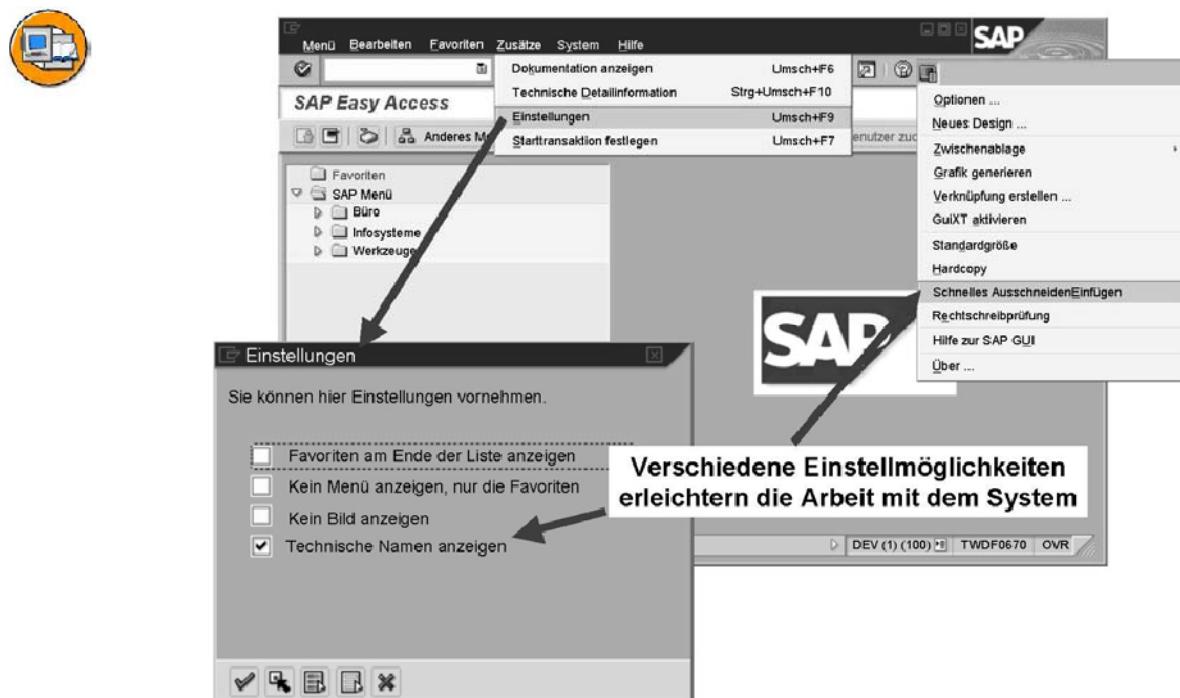


Figure 11: Zwei von vielen Personalisierungsmöglichkeiten

Unter *System → Benutzervorgaben → Eigene Daten* können Sie persönliche Vorgabewerte einstellen. Dazu können Sie die Registerkarten *Adresse*, *Festwerte* und *Parameter* wählen.



Hint: Mit Parametern können Sie häufig verwendete Eingabefelder mit Vorschlagswerten vorbelegen. Voraussetzung dafür ist allerdings, dass dem entsprechenden Eingabefeld eine so genannte Parameter-ID zugeordnet ist. Um eine Parameter-ID zu finden, gehen Sie auf das vorzubelegende Eingabefeld, wählen Sie die F1-Hilfe und anschließend *Technische Information*. Daraufhin wird ein Dialogfenster geöffnet, das unter dem Punkt *Feld-Daten* die entsprechende Parameter-ID anzeigt (sofern dem Feld eine Parameter-ID zugeordnet ist). Sie nehmen diese Parameter-ID, wie z. B. "XUS," und ordnen ihr in Ihren Benutzervorgaben unter der Registerkarte *Parameter* einen Wert zu, hier Ihren Benutzernamen. In der Folge werden alle Felder, deren Parameter-ID auf XUS weist, mit dem von Ihnen vorgegebenen Wert vorbelegt.

Eine weitere Personalisierungsmöglichkeit bieten die Favoriten im *SAP Easy Access* und die Anzeigevarianten der Statusleiste.



Hint: Machen Sie Gebrauch von den Informationen, die Sie aus der Statusleiste am rechten unteren Rand des GUI-Fensters erhalten. Sie können sich dort z. B. stets den Transaktionscode der aktuellen Systemfunktion anzeigen lassen.

Exercise 4: Möglichkeiten zur Personalisierung der Benutzeroberfläche

Exercise Objectives

After completing this exercise, you will be able to:

- Sie lernen einfache Personalisierungsmöglichkeiten kennen.

Business Example

Sie möchten Ihr Frontend personalisieren, d. h. auf Ihre Bedürfnisse anpassen.

Task: Einfache Personalisierungsmöglichkeiten

Sie nehmen einfache Anpassungen Ihres Frontends vor.

1. Wählen Sie *Anpassung des lokalen Layouts* → *Schnelles Ausschneiden/Einfügen*. Testen Sie anschließend die Verwendung dieser Funktion an einigen Felder Ihrer *Benutzervorgaben* (SU3). Abschließend können Sie diese Funktion auf gleichem Weg wieder deaktivieren.
2. Lassen Sie sich in der Statuszeile den Transaktionscode der momentanen Transaktion anzeigen.

Solution 4: Möglichkeiten zur Personalisierung der Benutzeroberfläche

Task: Einfache Personalisierungsmöglichkeiten

Sie nehmen einfache Anpassungen Ihres Frontends vor.

1. Wählen Sie *Anpassung des lokalen Layouts* → *Schnelles Ausschneiden/Einfügen*. Testen Sie anschließend die Verwendung dieser Funktion an einigen Felder Ihrer *Benutzervorgaben* (SU3). Abschließend können Sie diese Funktion auf gleichem Weg wieder deaktivieren.
 - a) Rufen Sie das Layout-Menü auf und wählen Sie *Schnelles Ausschneiden/Einfügen*. In der Statuszeile wird Ihnen die Verwendung dieser Funktion erklärt.
2. Lassen Sie sich in der Statuszeile den Transaktionscode der momentanen Transaktion anzeigen.
 - a) Verwenden Sie in der Statuszeile die Drucktaste zum Auswählen der Anzeigemöglichkeiten und wählen Sie *Transaktion*. Für jede von Ihnen ab jetzt aufgerufene Transaktion wird in der Statuszeile dieses Modus auch der zugehörige Transaktionscode angezeigt.



Lesson Summary

You should now be able to:

- verschiedene Personalisierungsmöglichkeiten des SAP-Systems nutzen

Related Information

- Weiterführende Informationen finden Sie in der Online-Dokumentation im Bereich "Einführung in das SAP-System."



Unit Summary

You should now be able to:

- sich erfolgreich am System anmelden
- die Elemente eines *SAP-GUI*-Bildschirms benennen und nutzen
- Funktionen des SAP-Systems auf verschiedenen Wegen aufrufen
- die Standardmenüs **System** und **Hilfe** beschreiben
- die Grundfunktionen der F1–Hilfe nutzen
- die F4–Hilfe verwenden
- die Informationen der Online-Dokumentation abrufen
- verschiedene Personalisierungsmöglichkeiten des SAP-Systems nutzen



Test Your Knowledge

1. Man kann in einem SAP-System immer nur in einem Fenster (Modus) arbeiten.
Determine whether this statement is true or false.
 - True
 - False

2. Welche Aussagen treffen auf einen Mandanten in einem SAP-System zu?
Choose the correct answer(s).
 - A Er bildet eine betriebswirtschaftlich vollkommen eigenständige Einheit.
 - B Er hat eine eigene Datenbank.
 - C Er entspricht einem Kunden.
 - D Ein Mandant kann die Abbildung eines kompletten Unternehmens sein.

3. Folgende Eingaben im Kommandofeld veranlassen das System zu einer sinnvollen Aktion:
Choose the correct answer(s).
 - A /nend
 - B /nex
 - C ?SM04
 - D /nsm04
 - E vom SAP Easy Access aus: SM04
 - F vom SAP Easy Access aus: search_sap_menu

4. Sie können die F1-Taste benutzen, um ...
Choose the correct answer(s).
 - A die Bedeutung eines Feldes erklärt zu bekommen
 - B eine Liste möglicher Eingabewerte zu erhalten
 - C Ihre Benutzerdaten (wie z. B. die Anmeldesprache) zu ändern
 - D den aktuellen Modus zu beenden
 - E technische Detailinformationen zu einem Feld zu erhalten

5. Sie verwenden die F4-Taste, um ...

Choose the correct answer(s).

- A einen weiteren Modus zu öffnen
- B technische Detailinformationen zu einem Programm zu erhalten
- C die SAP-Bibliothek aufzurufen
- D mögliche Eingabewerte zu einem Eingabefeld genannt zu bekommen
- E einen Druckauftrag des gegenwärtigen Bildschirmbildes zu erzeugen

6. Die kontextsensitive SAP-Bibliothek steht Ihnen auch über die F1-Taste zur Verfügung.

Determine whether this statement is true or false.

- True
- False

7. Folgende Personalisierungsmöglichkeiten stehen Ihnen im *SAP GUI* zur Verfügung:

Choose the correct answer(s).

- A Sie können die Schriftgröße im *SAP GUI* in einem gewissen Rahmen ändern.
- B Sie können sich Systemmeldungen in einem Dialogfenster anzeigen lassen.
- C Sie können die Größe von Eingabefeldern variieren.
- D Sie können die Anzeige von Bildern im *SAP GUI* unterdrücken
- E Jeder Benutzer kann im *SAP Easy Access* ein eigenes Bild einbinden.
- F Sie können eine persönliche Eingabehistorie auf Ihrem Frontend nutzen.



Answers

1. Man kann in einem SAP-System immer nur in einem Fenster (Modus) arbeiten.

Answer: False

Für eine Anmeldung ist es möglich, parallel in bis zu 6 Fenstern (Modi) zu arbeiten.

2. Welche Aussagen treffen auf einen Mandanten in einem SAP-System zu?

Answer: A, D

Die Daten aller Mandanten eines SAP-Systems liegen innerhalb einer gemeinsamen Datenbank. Diese Daten sind dennoch stark voneinander getrennt, sodass in verschiedenen Mandanten auch verschiedene Unternehmen verwaltet und gesteuert werden können. Ein Mandant ist kein "Kunde" innerhalb eines SAP-Systems.

3. Folgende Eingaben im Kommandofeld veranlassen das System zu einer sinnvollen Aktion:

Answer: A, B, D, E, F

Vom *SAP EasyAccess* aus können sinnvolle Transaktionscodes direkt eingegeben werden. Von anderen Funktionen des Systems aus ist das Voranstellen von /n erforderlich. /nend und /nex sind unterschiedliche Abmeldemöglichkeiten. ?SM04 ist keine sinnvolle Eingabe. search_sap_menu ist eine zulässige Eingabe, sie erzeugt eine Suchmaske für Einträge im SAP-Menü.

4. Sie können die F1-Taste benutzen, um ...

Answer: A, E

Die F1-Hilfe bietet Ihnen Felddokumentation und Technische Informationen zu diesem Feld an.

5. Sie verwenden die F4-Taste, um ...

Answer: D

Die F4-Taste stellt eine Liste mit Eingabemöglichkeiten zu einem ausgewählten Feld zur Verfügung.

6. Die kontextsensitive SAP-Bibliothek steht Ihnen auch über die F1-Taste zur Verfügung.

Answer: True

Im Fenster der F1-Hilfe können Sie über die Drucktaste *Hilfe zur Anwendung* die kontextsensitive Hilfe aufrufen.

7. Folgende Personalisierungsmöglichkeiten stehen Ihnen im *SAP GUI* zur Verfügung:

Answer: A, B, D, F

Über den Menüpunkt *Zusätze* und die Drucktaste *Anpassung des lokalen Layouts* sowie über die Statuszeile und *Hilfe → Einstellungen...* haben Sie zahlreiche Personalisierungsmöglichkeiten. Sie können jedoch nicht die Eingabefeldgrößen beeinflussen. Ein eigenes Bild im *SAP Easy Access* ist ebenfalls nicht mit den Mitteln des *SAP GUI* erreichbar.

Unit 2

Plant Maintenance Organization

Unit Overview

This chapter shows the various types of plant maintenance and gives an overview of the processes that can be mapped. This chapter also shows the different SAP solution packages that include Plant Maintenance. The most important topics are the organizational levels in Plant Maintenance and how Plant Maintenance fits into the structure of the whole company.



Unit Objectives

After completing this unit, you will be able to:

- Describe the entire life cycle of a technical asset
- Describe the SAP software solutions in general and the solutions and functional areas for mapping plant maintenance in particular
- Identify the plant maintenance process with regard to implementing SAP
- Name the various methods of connecting to an SAP system
- List the organizational levels in Plant Maintenance
- Explain plant-based and plant-wide plant maintenance.
- Describe maintenance work centers and their function
- Describe the function of the implementation guide

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Lesson: Overview of Processes and Available Solutions

Lesson Overview

This lesson provides an overview of business processes and the solution portfolio from a Plant Maintenance viewpoint.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the entire life cycle of a technical asset
- Describe the SAP software solutions in general and the solutions and functional areas for mapping plant maintenance in particular
- Identify the plant maintenance process with regard to implementing SAP

Business Example

The Plant Maintenance processes, such as breakdown or preventive maintenance, should be implemented with the other enterprise areas in an integrated fashion.

Plant Maintenance for Technical Assets

The lifecycle of a technical asset can be divided into the following phases:

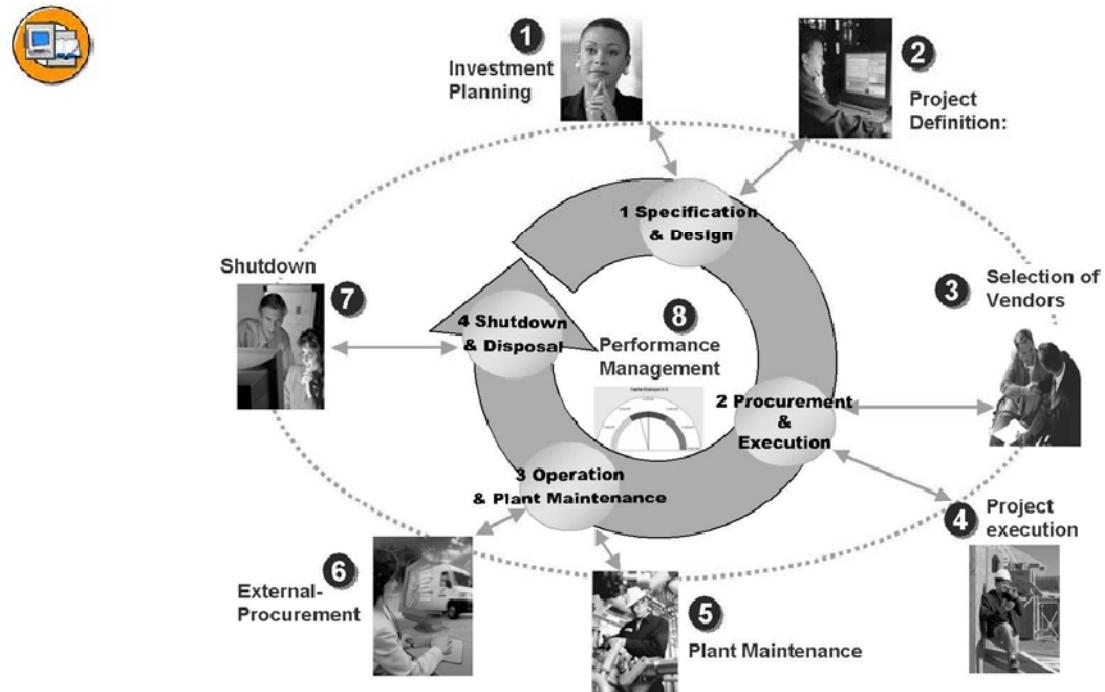


Figure 12: Lifecycle of a technical asset

1. Investment planning
 - Collection of details for planned investment projects (bottom-up planning)
 - Pre-analyses and risk valuation
 - Budget distribution
2. Project Definition
 - Define scope of project
 - Define project structure and time frames
3. Selection of vendors
 - Invite bids
 - Select vendors
 - Create purchase order or contract
4. Project execution
 - Planning, controlling and monitoring the individual phases of the project
 - Cross-department and cross-company exchange of documents during execution
5. Plant Maintenance
 - Structuring technical assets and making the required information available
 - Planning maintenance tasks and assigning resources
 - Recording tasks performed and costs incurred
 - Ensuring a secure work environment
6. External procurement
 - Procuring external services
 - Procuring external materials
 - Strategic management of vendor relationships
7. Shutdown
 - Define shutdown project
 - Ensure professional and licit disposal
 - Ensure security of employees
8. Performance Management
 - Monitor performance of asset from operational and financial perspective

This course is concerned in detail with the **Plant Maintenance** phase and the external procurement and Performance Management phases.

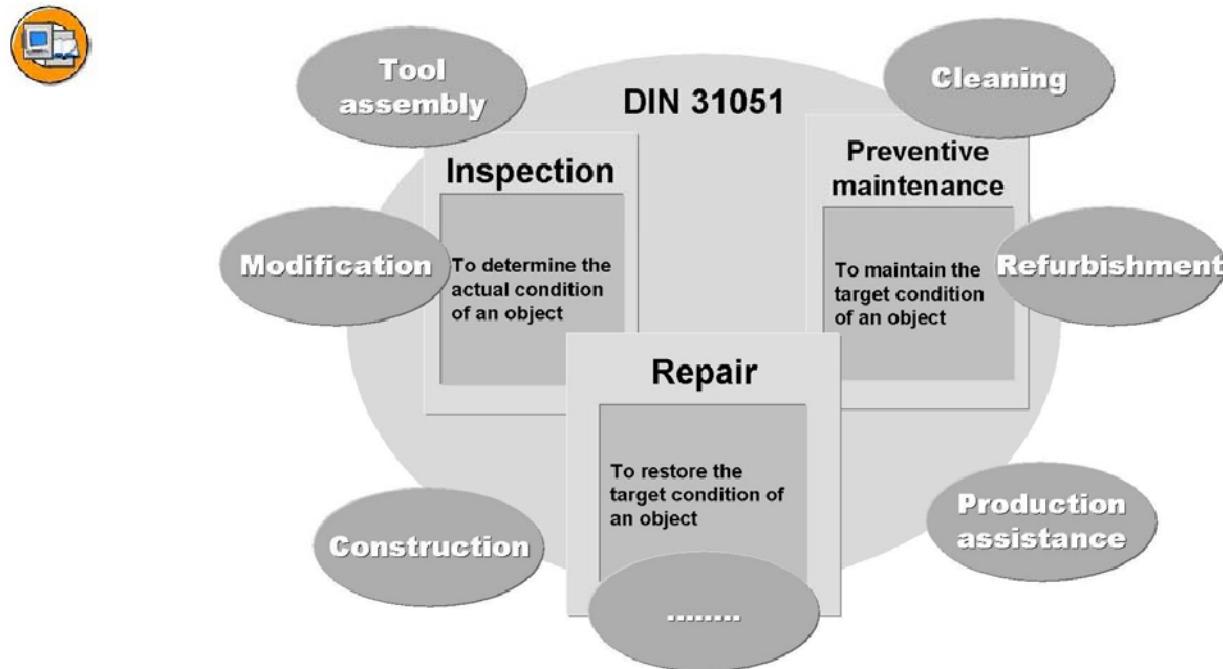


Figure 13: Types of Planned Maintenance

The maintenance of a technical system comprises the following tasks:

- **Inspection:** To determine the actual condition
- **Maintenance:** To maintain the target condition
- **Repair:** To restore the target condition

The maintenance organizations usually perform other technical activities, which do not belong to Plant Maintenance, but should be performed using the same tools of maintenance order planning and processing, for example:

- Modification or construction
- Cleaning
- Revisions
- Tool assembly and erection of fixtures
- Production assistance

When performing maintenance, you use various strategies aimed at optimizing the asset availability, thus minimizing the risk of outages and minimizing the maintenance costs.

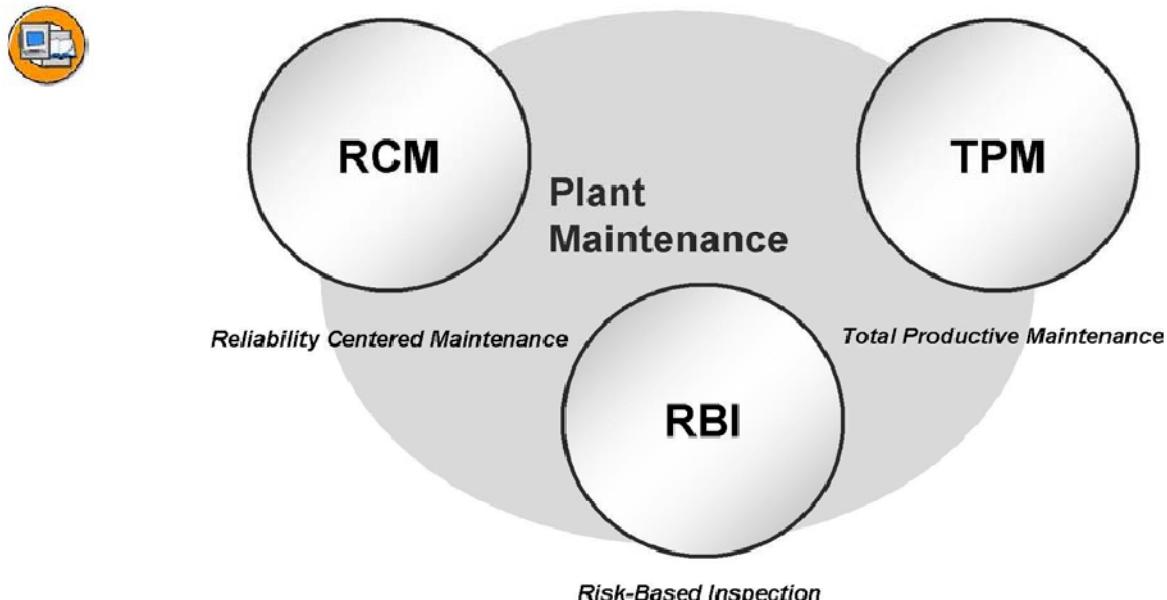


Figure 14: Maintenance strategies:

Reliability Centered Maintenance (RCM) RCM is an optimization method of maintenance strategies aimed at reducing maintenance costs and improving asset availability. Damage options, production losses, and asset costs are systematically evaluated. RCM can also be linked to a risk analysis and thus be used for security-critical and environmental-critical systems.

Risk-Based Inspection (RBI) is an optimization method that optimizes the maintenance effort on the basis of risk. This reduces not just the maintenance effort but also minimizes the risks associated with operating the asset (such as the risk of interrupting production). This helps to identify risk drivers, that is, components that significantly contribute to the overall risk. The RBI-method allows you to focus maintenance efforts on the risk-entailing parts of your assets and thus to optimize the assignment of resources with an ever-decreasing budget.

Total Productive Maintenance (TPM) is the concept by which maintenance tasks can be largely planned and performed by machine operators.

The **SAP portfolio solutions** support all the phases and strategies of Plant Maintenance.

SAP's Solution Portfolio

The SAP solution portfolio maps both the entire lifecycle of a technical asset and also the individual processes of Plant Maintenance as part of this lifecycle.

SAP provides cross-industry and industry-specific solutions for the process-oriented representation of business cases. A solution contains a combination of application- and technology components selected in line with a specific business aim.

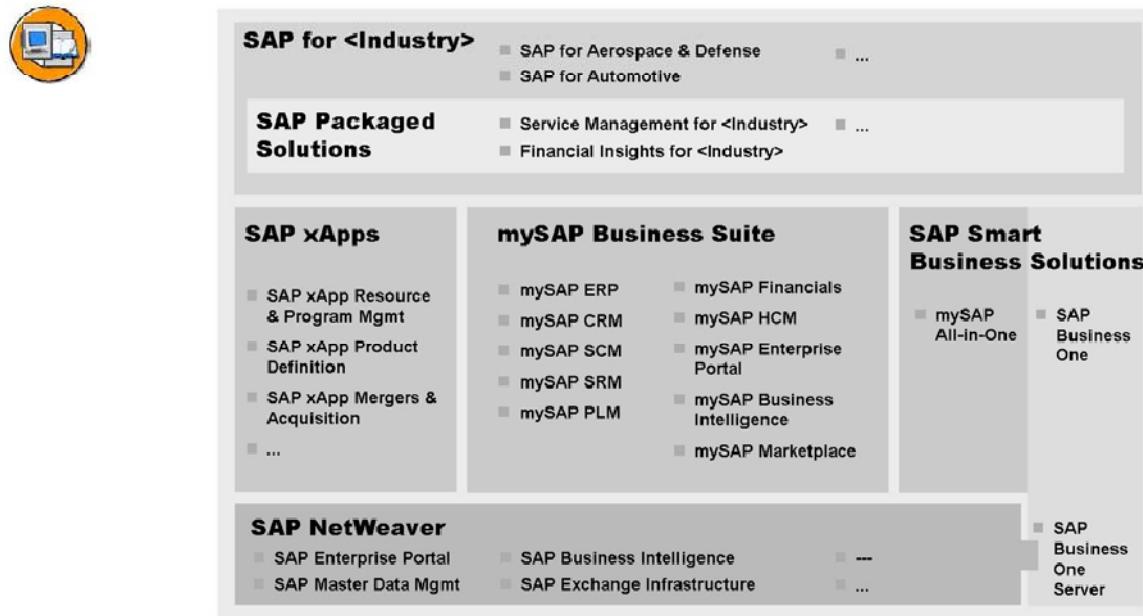


Figure 15: Overview of the Solution Portfolio

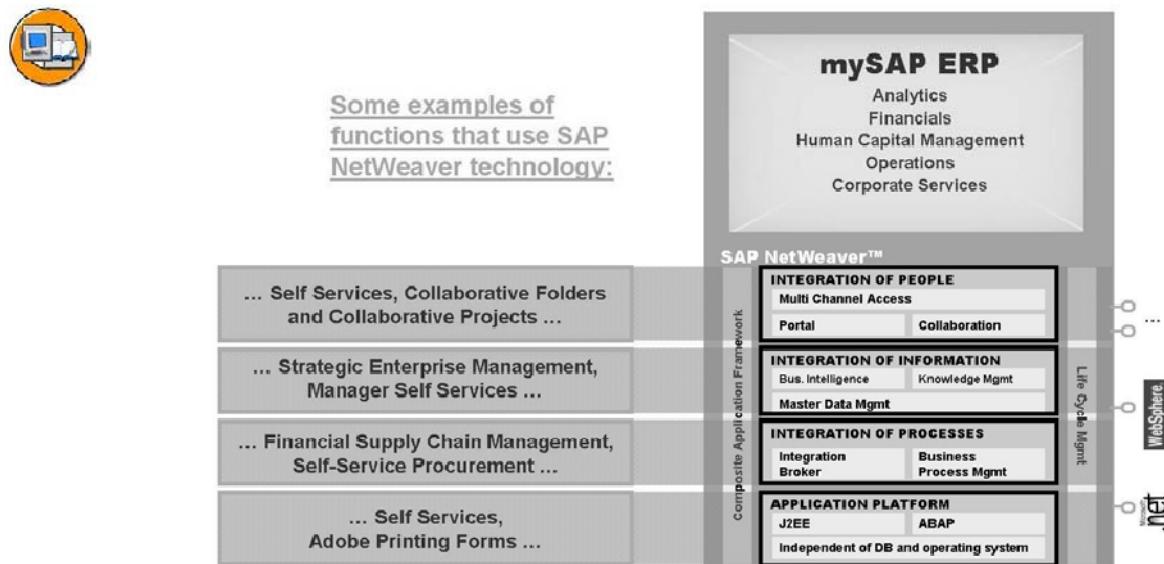


Figure 16: mySAP ERP and SAP Netweaver

mySAP Enterprise Resource Planning (ERP) is the successor to SAP R/3. From an application perspective, mySAP ERP maps all the areas of a company, such as accounting, human resources, logistics, corporate services, real estate, travel management, and strategic enterprise planning.

From a technological perspective, mySAP ERP, in contrast to R/3, focuses on **SAP Netweaver** and is thus embedded in an **Enterprise Services Architecture (ESA)**, which is open and flexible and can also link to other SAP and non-SAP applications via **Web Services**, thus protecting existing IT investments.

In addition to a portal infrastructure, SAP Netweaver also provides a mobile infrastructure for connecting mobile end devices, an exchange infrastructure for connecting to processes, plus a central master data management (MDM).

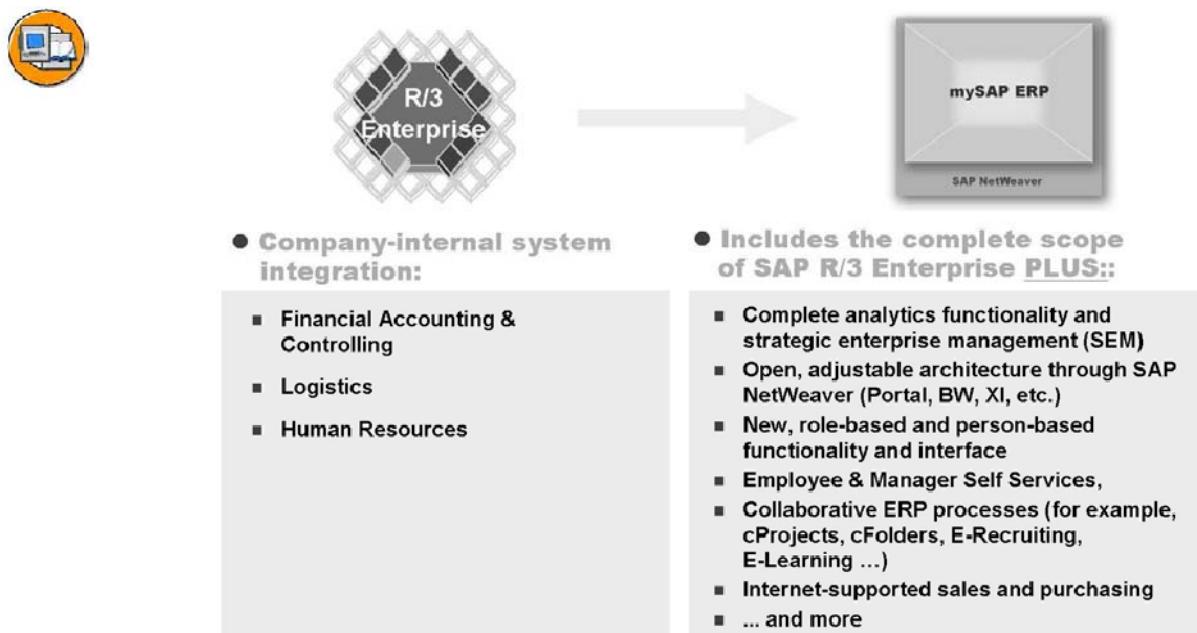


Figure 17: mySAP ERP and R/3 Enterprise

mySAP ERP includes the complete functionality of SAP R/3 - and more in many areas.

The solution map shows the function areas of the mySAP ERP solution. **Enterprise Asset Management (EAM)** is in the area of **Operations: Support**.

Enterprise Asset Management as a function area of mySAP ERP maps the maintenance of technical assets using the functionality of mySAP ERP and SAP Netweaver.

Enterprise Asset Management **in the wider sense** charts the totality of all the lifecycle phases of an asset (investment planning, project management, vendor selection, project execution, maintenance, external procurement, shutdown, performance management).



Self Services						
Analytics	Strategic Enterprise Management		Financial Analytics	Operations Analytics		Workforce Analytics
Financials	Financial Accounting		Management Accounting	Financial Supply Chain Management		Corporate Governance
Human Capital Management	Employee Lifecycle Management		Employee Transaction Management	HCM Service Delivery		Workforce Deployment
Operations: Value Generation	Procurement	Inventory & Warehouse Management	Manufacturing	Transportation	Sales Order Management	Customer Service
Operations: Support	Lifecycle Data Management		Program & Project Management	Quality Management		Enterprise Asset Management
Corporate Services	Travel Management		Environment, Health & Safety	Incentive & Commission Management		Real Estate Management
SAP NetWeaver™	People Integration		Information Integration	Process Integration		Application Platform

Figure 18: mySAP ERP (Enterprise Resource Planning)

There is a licensing perspective, in addition to the application and technological perspectives. Depending on the size and arrangement of the company, each customer can purchase different SAP solutions containing a different mix of applications and technology.

So, as well as mySAP ERP, the most comprehensive solution, there is also the **mySAP Product Lifecycle Management (PLM)** solution, which focuses on product development and on asset operation.

mySAP PLM also contains the function area of Enterprise Asset Management.



Lifecycle Data Management	Document Management	Product Structure Management	Recipe Management	Integration	Change and Configuration Management
Enterprise Asset Management	Technical Assets Management		Preventive and Predictive Maintenance	Maintenance Execution	Work Clearance Management
Program and Project Management	Project Planning		Project Execution	Interfaces	Program and Project Management
Lifecycle Collaboration and Analytics	Idea Management and Concept Development	Design Collaboration	Collaborative Project Management	Quality Collaboration	Analytics
Quality Management	Quality Engineering		Quality Assurance / Control		Quality Improvement
Environment, Health and Safety / Emissions Management	Basic Data and Tools	Product Safety	Hazardous Substance Management	Dangerous Goods Management	Waste Management
				Industrial Hygiene and Safety	Occupational Health
					Emissions Management

Figure 19: mySAP PLM (Product Lifecycle Management)

The following diagram shows the different phases in the lifecycle of a product from the perspective of the product manufacturer with a simultaneous look at the neighboring process chains of Supply Chain Management (SCM) and Customer Relationship Management (CRM).

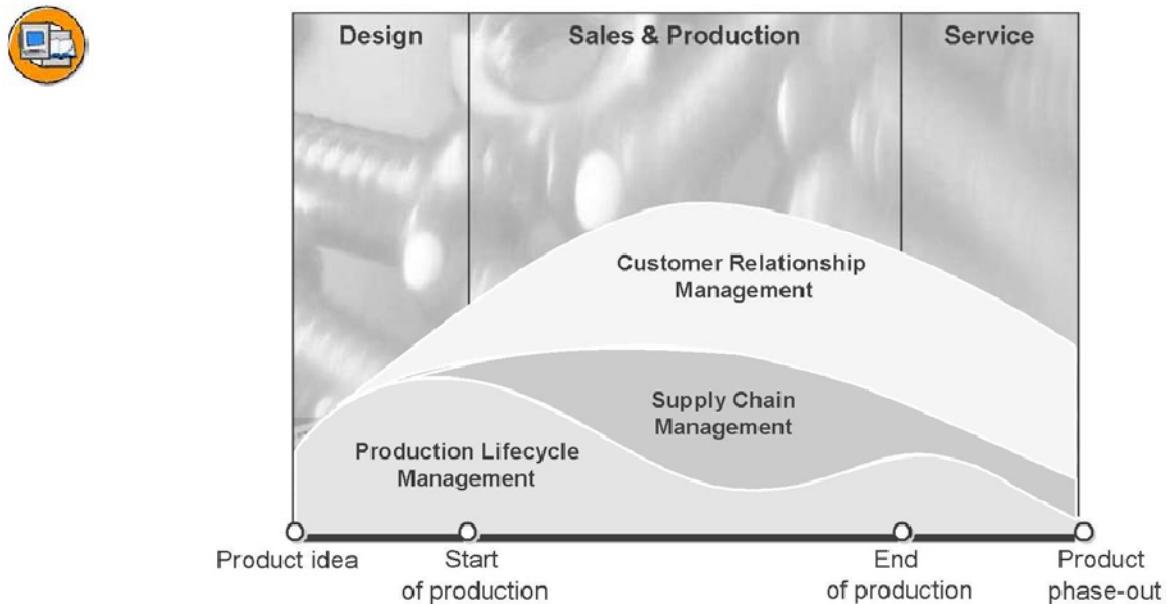


Figure 20: Product Lifecycle Management (PLM)

Plant maintenance and service represent the final phase of a product's lifespan.

The following looks at maintenance from a technical asset perspective only. It must be made clear here that Plant Maintenance in the SAP system has many integration aspects. Executing maintenance tasks is always embedded in the overall context of a company and must therefore consider accounting, production, materials management, and other areas.



Figure 21: Plant Maintenance Integration

The following courses provide information on integration:

- Materials Management
- Controlling
- Financial Accounting - in this course,
- Asset Accounting in the PLM305 course
- Production and Human Resource Management in the PLM315 course
- Investment and Project Management in the PLM316 course
- Real Estate Management in the AC290 course
- Funds Management in the IPS910 course
- Joint Venture is a part of an industry solution (IS-Oil) and must be installed separately. Integration with the standard system is planned. You can find information about these components in SAPNet.

The following processes within Plant Maintenance must be taken into account and can be mapped with Enterprise Asset Management.

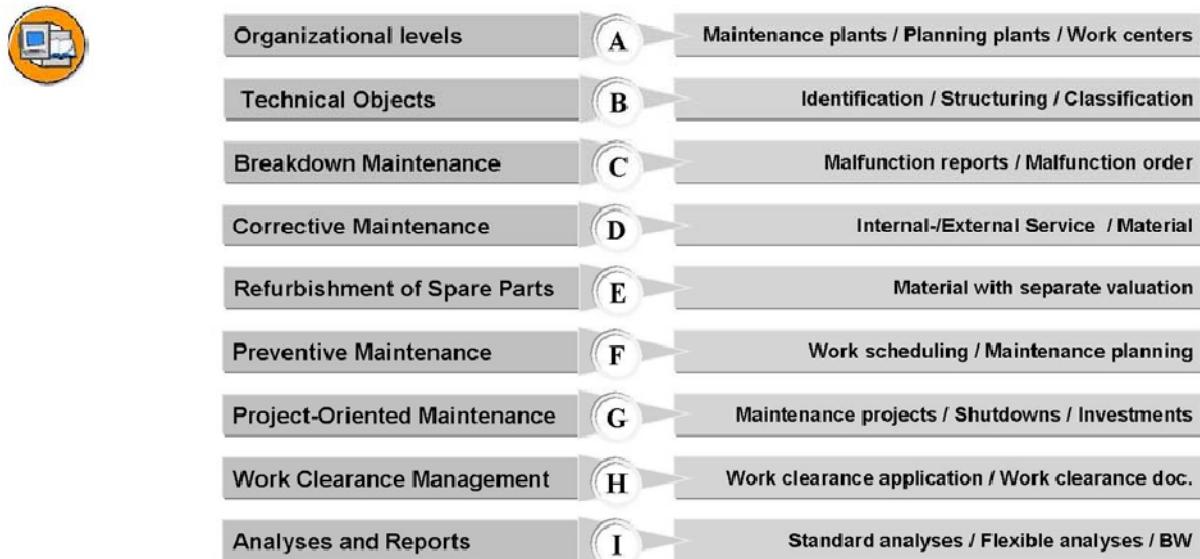


Figure 22: Plant Maintenance Process Overview

History and Terminology

The current situation in the area of managing technical assets is characterized by ever-increasing demands for performance, profitability, and availability. Various strategies and methods are used to optimize these factors.

The software that supports these processes plays an important role in this context. Optimizing the assets goes hand-in-hand with permanently optimizing the software. The software is subjected to ever-shorter innovation cycles. This often leads to frequently-changing terminology, which changes for various reasons, or is updated or even completely revised.

For this reason, there should follow a short account of the history of software development and the associated terminology for the area of Plant Maintenance. The following development stages can be traced:

1. *SAP R/3*

- *Plant Maintenance (PM)* module: Maintenance of internal assets
- *Customer Service (CS)* module: Maintenance of customers' assets

2. *mySAP Product Lifecycle Management (PLM)*

SAP solution that takes into account the lifecycle of a product with the accompanying data, and thus encompasses development, operational phase, together with shutdown and disposal.

3. *Asset Life-Cycle Management (ALM)*

Function area of *mySAP PLM*, encompassing Plant Maintenance and Customer Service. (Now obsolete and replaced by *Enterprise Asset Management*).

4. *mySAP Enterprise Resource Planning (ERP)*: SAP solution for controlling and planning the core areas of a company (accounting, human resources, logistics, corporate services such as real estate management, travel management, and strategic enterprise planning).

5. *Enterprise Asset Management*

Function area of *mySAP ERP*, for maintaining technical assets.

6. *Enterprise Asset Management* (in the wider sense)

Totality of all the lifecycle phases of an asset (investment planning, project management, vendor selection, project execution, maintenance, external procurement, shutdown, performance management).

Mapping the entire lifecycle of a technical asset can be achieved by combining the respective function areas of *mySAP ERP*.

This list evinces the development of area and module-oriented thinking up to the consideration of whole processes and complete and cross-system lifecycles.



Lesson Summary

You should now be able to:

- Describe the entire life cycle of a technical asset
- Describe the SAP software solutions in general and the solutions and functional areas for mapping plant maintenance in particular
- Identify the plant maintenance process with regard to implementing SAP

Lesson: User Interface

Lesson Overview

This lesson gives an overview of the methods for connecting to an SAP system.



Lesson Objectives

After completing this lesson, you will be able to:

- Name the various methods of connecting to an SAP system

Business Example

There are different user types in the company: Power-users work mainly with the *SAPGUI* (= SAP Graphical User Interface), supported by a role menu or the SAP standard menu.

Sporadic users tend to prefer the portal environment, which makes the required transactions available in the form of simplified screens.

User Interface of an SAP System

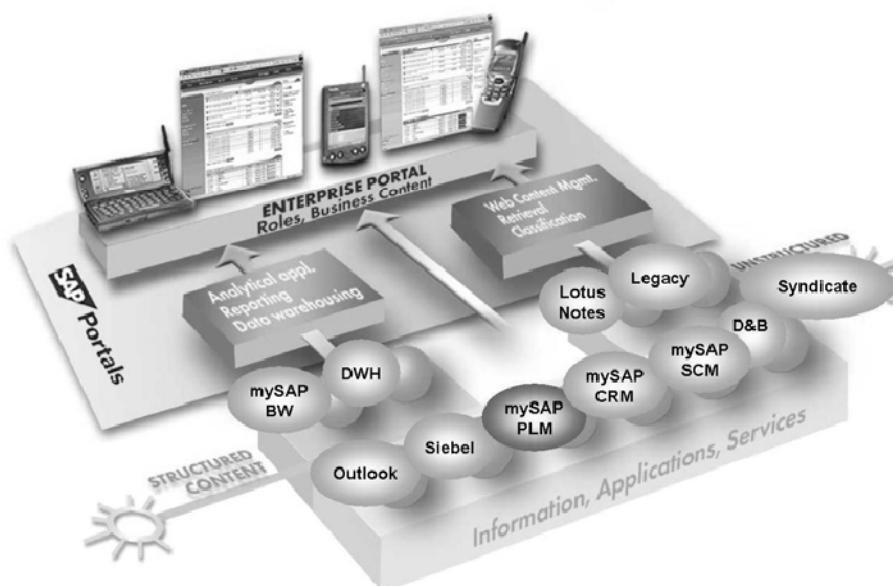


Figure 23: User Interface - SAP GUI or Portal?

SAPGUI shows the traditional methods of connecting to an SAP system. The GUI is usually installed on the local work center and forms the graphical interface composed of the SAP Easy Access, standard tool bar, and so on.

Another option for connecting to an SAP system would be to use a portal. Portals are HTML-based and allow access to almost any system (also non-SAP systems) through the intranet or internet.

However, the portals distinguish themselves as the SAP transactions of the backend system are not translated 1:1 into HTML, but particular functions (for example, displaying a technical object) are made available in a much more simplified form known as iViews (HTML screen areas, into which the data from particular SAP transactions are read) (See next page.)

This ensures that even occasional SAP users who do not have expert knowledge of the software can easily access certain functions.

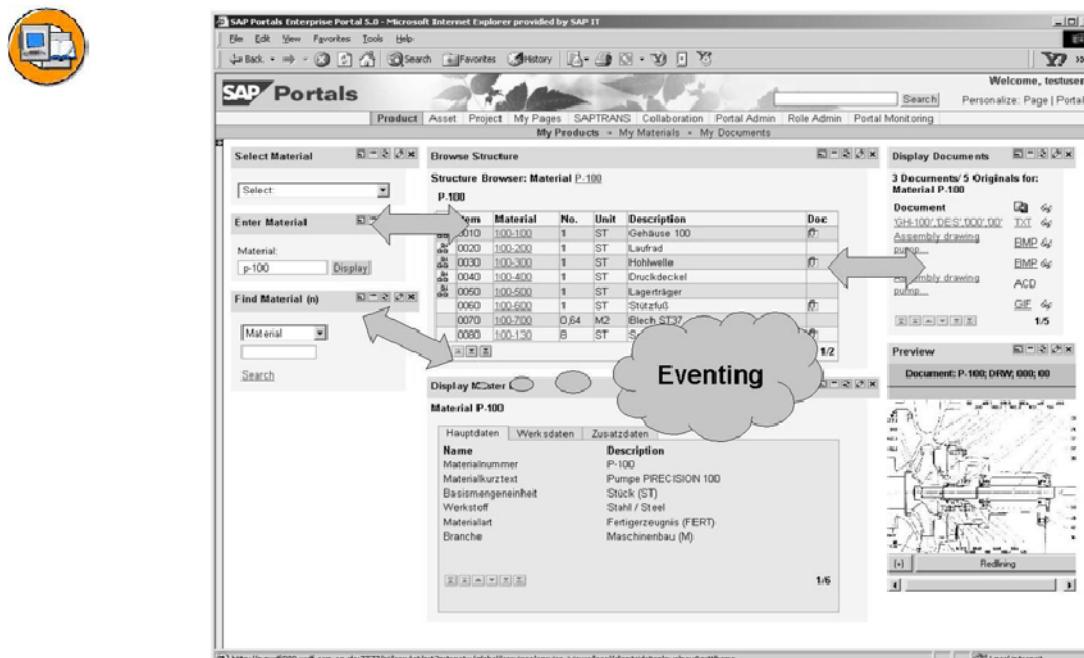


Figure 24: SAP Portals - An Example

The portals receive their content from the Business Packages (such as Business Package Assets – Technical Objects). These are composed of a sequence of iViews, which can be compiled flexibly for role-specific or function-specific screens (such as Portal for Maintenance Manager or Maintenance Technician).

The iViews are connected amongst themselves by the eventing mechanism, that is, if a particular object is selected, all the dependent iViews are automatically filled with the relevant data. This means that certain information can be displayed very easily without the user requiring extensive SAP know-how.



Lesson Summary

You should now be able to:

- Name the various methods of connecting to an SAP system

Lesson: Organizational Levels in Plant Maintenance

Lesson Overview

This lesson introduces the various organizational levels in Plant Maintenance. It also introduces the maintenance work center and its functions.

You then get a short overview of the functions of the implementation guide (IMG).



Lesson Objectives

After completing this lesson, you will be able to:

- List the organizational levels in Plant Maintenance
- Explain plant-based and plant-wide plant maintenance.
- Describe maintenance work centers and their function
- Describe the function of the implementation guide

Business Example

A company wants to implement Plant Maintenance with SAP. Depending on the company structure, maintenance planning is either plant-based (decentralized) or cross-plant (centralized).

The process is thus also oriented towards pre-defined organizational levels in the company.

When you have clarified the structure of your organization, you can make any additions necessary from a plant maintenance perspective in the implementation guide (IMG) of the SAP system.

Sequence for Defining the Organizational Levels

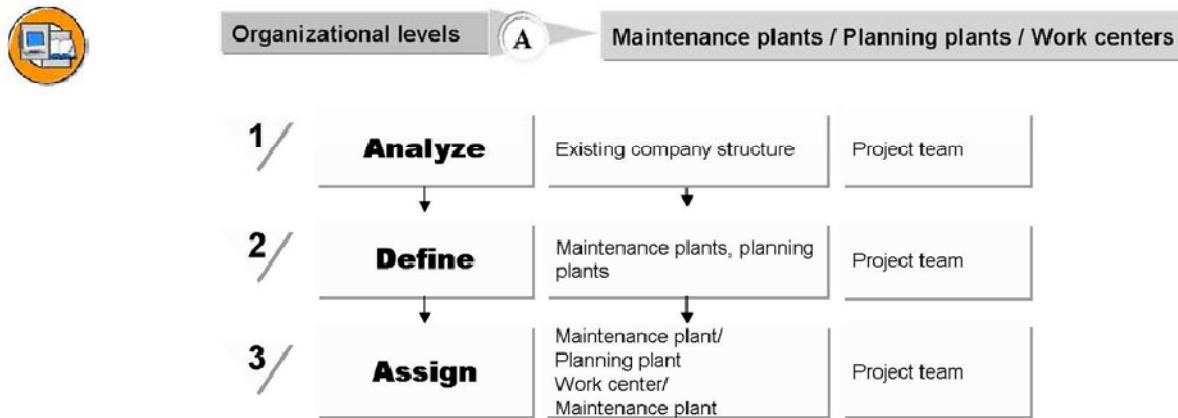


Figure 25: Organizational levels - Sequence

Step 1: Plant Maintenance is very often only implemented after other components, such as, Financial Accounting, Controlling, or Materials Management, have been implemented. This means that the company structure is for the most part pre-defined in the system. Now the existing structure must be analyzed from a plant maintenance perspective and extended to include the maintenance-specific parts.

Step 2: After an in-depth analysis the organizational units relevant for Plant Maintenance are defined in the system: Maintenance plants (these usually already exist as logistical plants) and maintenance planning plants (planning plants for short) are defined in the company structure.

Step 3: This is where the maintenance planner groups are assigned to planning plants and maintenance work centers are assigned to maintenance plants.

Plants

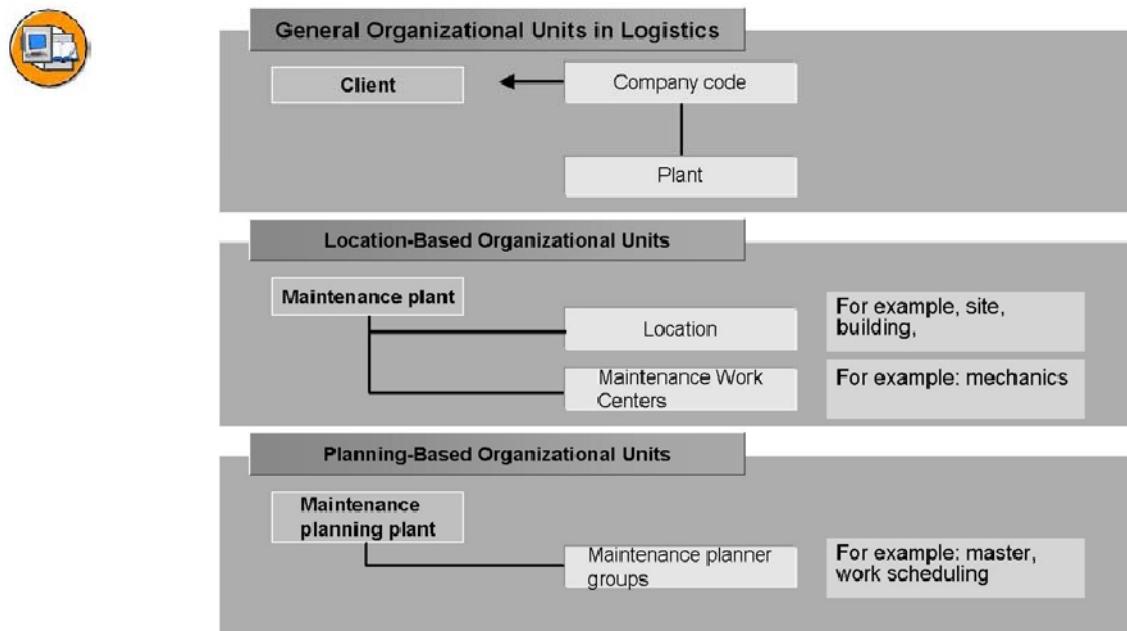


Figure 26: Plant structure

The organizational levels are structured as follows:

The client is the highest-level element of all the organizational units. It corresponds, for example, to a corporate group with several subsidiaries. Within a client, the system always accesses the same database. The subsidiaries with their own financial statements and balance sheets are defined as company codes. Within Logistics, the plant is one of the most important organizational units. It usually represents a production unit of a company.

The plant, at which the operational systems of a company are installed, is called the maintenance plant. If the maintenance work is planned at this plant, the maintenance plant is also the maintenance planning plant (planning plant for short). Locations subdivide a maintenance plant according to spatial criteria, for example, site, building, coordinates. A maintenance plant can also be subdivided into plant sections based on responsibility for production. The person responsible for the plant section is the contact person who coordinates production and maintenance (plant engineer).

The units of capacity in Plant Maintenance are managed as maintenance work centers. Maintenance work centers are assigned to the respective maintenance plant as workshops.

A maintenance planning plant is the organizational unit in which maintenance requirements are planned. These requirements can either come from your own plant or from another maintenance plant assigned to this maintenance planning plant. The planners within a maintenance planning plant are defined by maintenance planner groups.

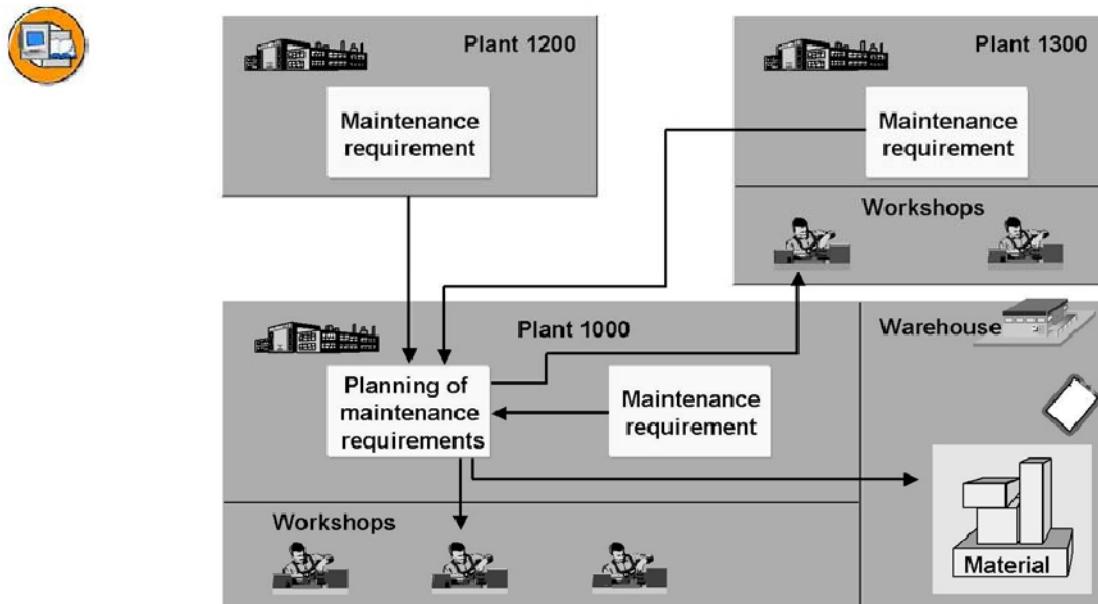


Figure 27: Cross-Plant Maintenance

Plant-specific planning: Maintenance plant = planning plant. In most organizational structures, the maintenance requirement is planned in the same plant where it occurs, the maintenance orders are executed by workshops from the same plant, and the spare parts are stored in the same plant (for example: plant 1000).

Cross-plant planning: Multiple maintenance plants are assigned to a planning plant. In one plant (for example, plant 1200) there is a need for maintenance, as a technical system there requires maintenance (= maintenance plant). All further functions (maintenance planning, order execution, spare parts storage) are, however, the responsibility of another plant.

Other constellations are also conceivable: The planning of a plant's requirements (for example, plant 1300) as well as the spare parts procurement take place in another plant (plant 1000). However, the tasks are performed by workshops available locally.

Work centers

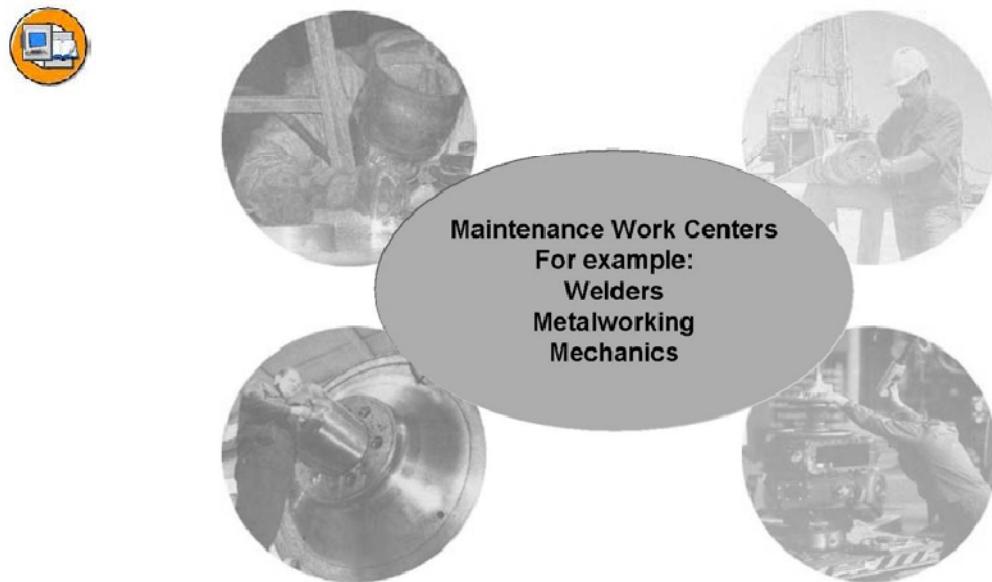


Figure 28: Maintenance Work Centers

A work center is an organizational unit where work can be carried out Examples for work centers:

- Machine
- Group of machines
- A person
- Group of people

In Plant Maintenance, work centers are used as

- responsible work center in the master record of the equipment and functional location
- responsible work center in a maintenance item
- responsible work center in the header of a task list
- executing work center in the operations of a task list
- Responsible employee in the order header
- executing work center in the operations of an order

Work centers belong to the master data and provide the capacity required to perform a task.

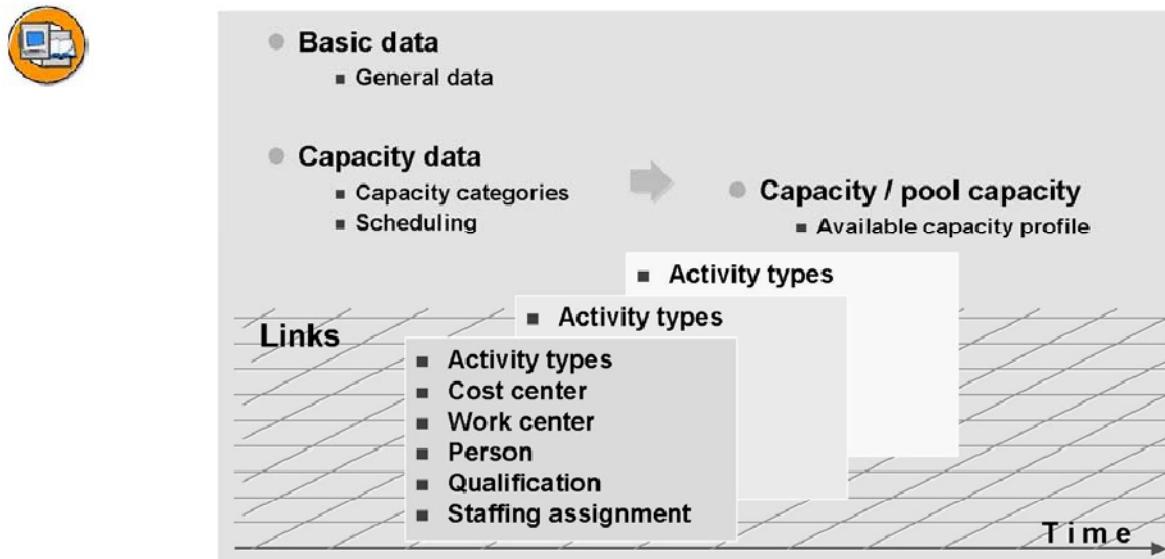


Figure 29: Work center - Content

The basic data contains general data such as work center category, description, responsibility, and usage.

Work center links provide the connection between work centers and other objects within the SAP System. You can link a work center to the following objects:

- With a cost center
- With qualifications
- With positions
- With people

The links are valid for certain periods of time.

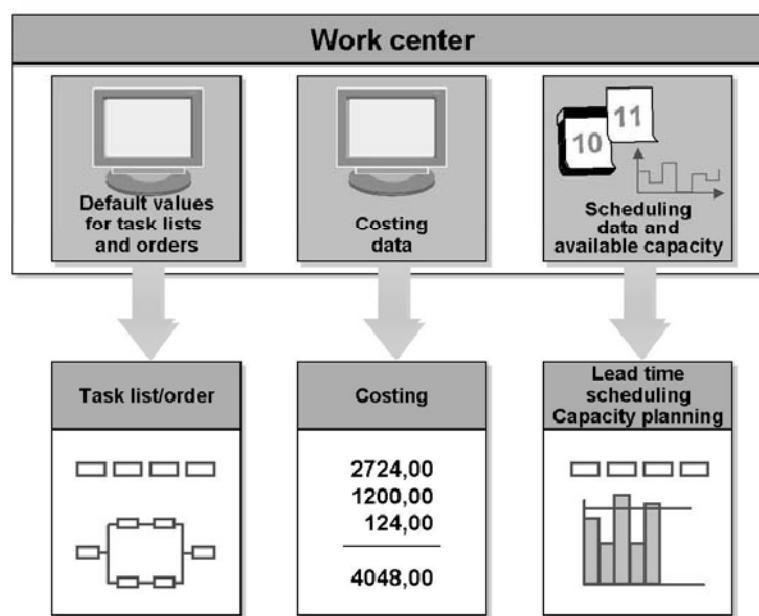


Figure 30: Work center - Functions

The work center has several functions:

Costing: You can use costing to determine the costs of an internal activity by a product unit. Its goal is to assign to the various cost objects the costs that were incurred by them. If the work center is used in an operation, the link to the cost center provides activity types for valuating the operation.

Scheduling: You can use scheduling to determine the dates when operations should be performed. For this, the time required for the operations must be calculated and compared with the time available in the work center. The standard values and quantities in the operations are used as the basis for this calculation. During scheduling, the start and end dates for the operations are calculated from this data using formulas, which have been entered for scheduling in the work centers.

Capacity planning: In capacity planning, the capacity requirements for the operations in the orders are determined and compared with the available capacity defined in the work center. During capacity planning, you can use work center hierarchies to aggregate (at higher-level work centers) the available capacity and capacity requirements of lower-level work centers.

Implementation Guide (IMG)

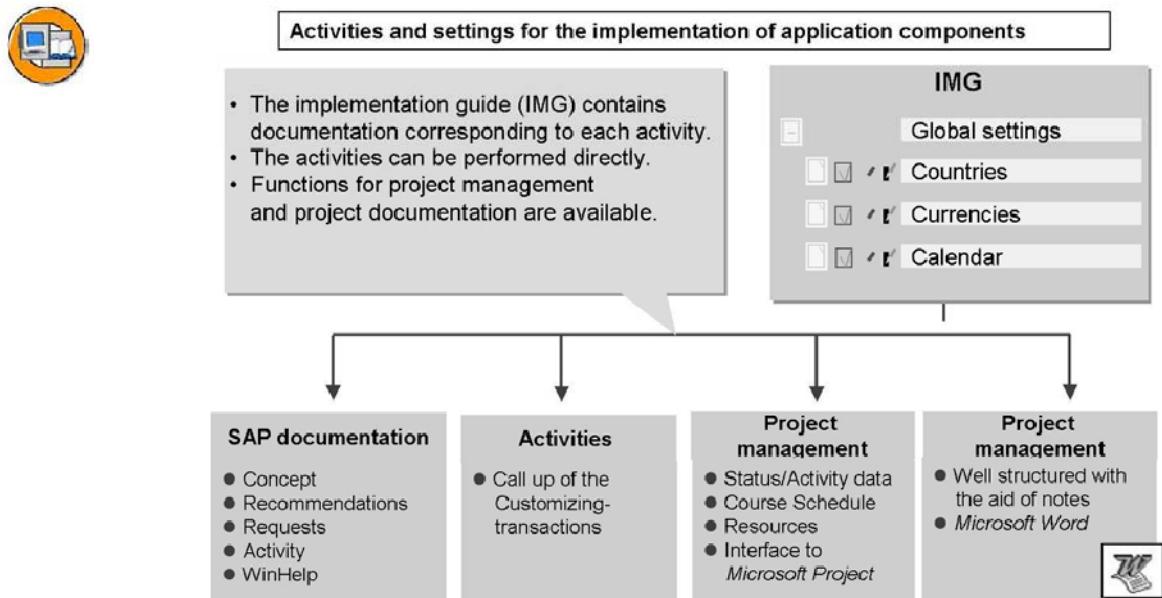


Figure 31: Implementation Guide (IMG)

The **Implementation Guide (IMG)** contains all the activities and settings (Customizing activities) that are required for the sequential and process-oriented implementation of application components.

You can create a separate IMG for each project.

On the basis of a project IMG, you can work on Customizing transactions, project documentation, cross-project documentation, and information on project management.

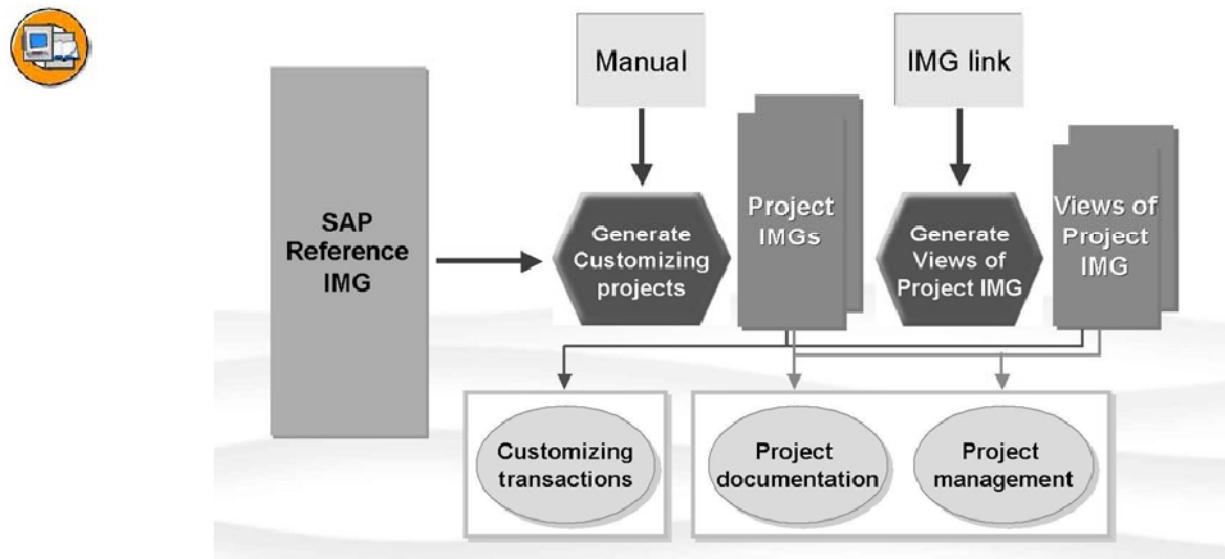


Figure 32: Customizing – Customer-Specific Settings

The IMG represents a checklist for the Customizing activities that a company should perform when implementing an SAP system. The IMG is structured hierarchically.

The IMG structure and the tools for IMG management (for example, resource management and the interface to *Microsoft Project*) help the project team to work through the Customizing activities in a systematic order.

For better structuring, you can create views for the project IMGs. The views allow you to process project documentation, project-wide documentation, and relevant information on project information similar to the Project IMG Customizing transactions.

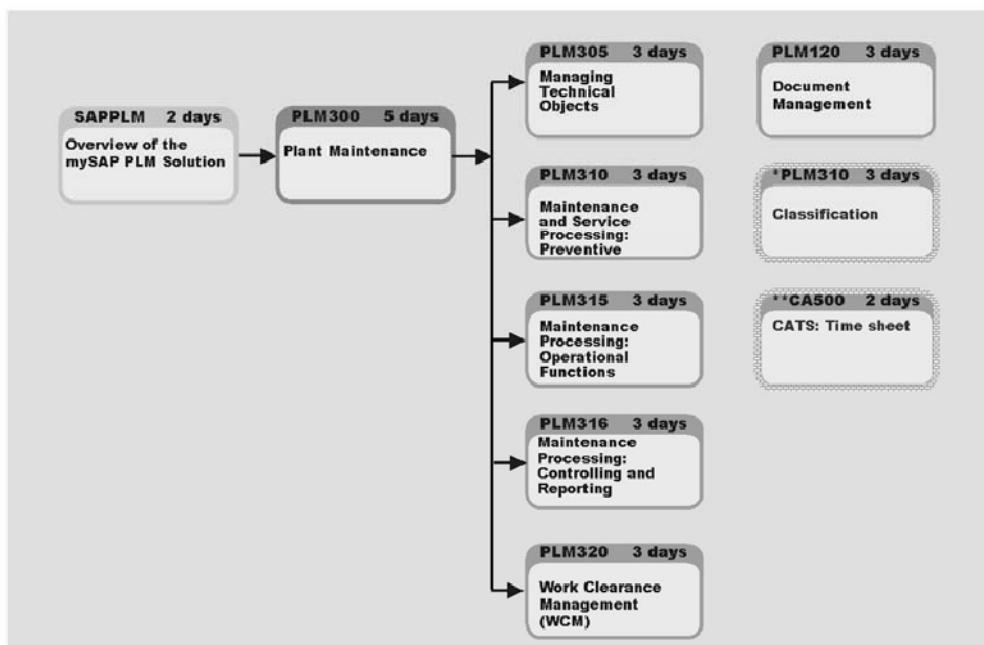


Figure 33: Education and training path for Plant Maintenance

Exercise 5: Organizational Levels in Plant Maintenance

Exercise Objectives

After completing this exercise, you will be able to:

- Describe the content of the work center master record
- List the organizational levels in Plant Maintenance

Business Example

When a company begins to implement Plant Maintenance with SAP, it must clarify which organizational structures in Plant Maintenance should be represented, and how they should be included in the existing structures for Logistics.

Task 1:

Display work center

1. Display the work center T-ME## in plant 1000. What menu path do you use?

Determine the following data:

Field name or data category	Values
Person responsible for work center	
Task list usage	
Task list types	
Operating time/capacity	
Cost center	
Activity type, internal processing	

Task 2:

Right or Wrong

1. A maintenance plant can also be a maintenance planning plant.
2. A location (for example, building F-141) can only exist once within the company.
3. A maintenance planner group is assigned to a maintenance planning plant.
4. A maintenance plant is assigned to a maintenance planning plant.

Solution 5: Organizational Levels in Plant Maintenance

Task 1:

Display work center

1. Display the work center T-ME## in plant 1000. What menu path do you use?

Determine the following data:

Field name or data category	Values
Person responsible for work center	
Task list usage	
Task list types	
Operating time/capacity	
Cost center	
Activity type, internal processing	

a)

*SAP Menu → Logistics → Plant Maintenance → Maintenance Processing
→ Environment → Work centers → Work center → Display*

Field name or data category	Values
Person responsible for work center	101
Task list usage	004
Task list types	Only Maintenance Task Lists
Operating time/capacity	7.20 h / 36.00 h
Cost center	4300
Activity type, internal processing	1410

Continued on next page

Task 2:

Right or Wrong

1. A maintenance plant can also be a maintenance planning plant.
a) **Right**
2. A location (for example, building F-141) can only exist once within the company.
a) **False (Locations are plant-dependent and can thus occur once per plant.)**
3. A maintenance planner group is assigned to a maintenance planning plant.
a) **Right**
4. A maintenance plant is assigned to a maintenance planning plant.
a) **Right**



Lesson Summary

You should now be able to:

- List the organizational levels in Plant Maintenance
- Explain plant-based and plant-wide plant maintenance.
- Describe maintenance work centers and their function
- Describe the function of the implementation guide



Unit Summary

You should now be able to:

- Describe the entire life cycle of a technical asset
- Describe the SAP software solutions in general and the solutions and functional areas for mapping plant maintenance in particular
- Identify the plant maintenance process with regard to implementing SAP
- Name the various methods of connecting to an SAP system
- List the organizational levels in Plant Maintenance
- Explain plant-based and plant-wide plant maintenance.
- Describe maintenance work centers and their function
- Describe the function of the implementation guide

Unit 3

Technical Objects

Unit Overview

This lesson describes how objects relevant for Plant Maintenance can be mapped using the SAP system. Emphasis is placed on the criteria used to make the selections. Following the identification of these objects, the structuring tools of functional locations, equipment, and bills of material and the concept behind each of them are explained and shown in the application.



Unit Objectives

After completing this unit, you will be able to:

- Describe the concept and criteria for functional locations
- Explain the basic idea behind the structure indicator
- Explain the concept of equipment
- Create and install a piece of equipment
- Explain the advantages of the usage list
- Explain the concept of maintenance bills of material

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Lesson: Functional Locations

Lesson Overview

This lesson provides an overview of the use of functional locations, taking into consideration the basic concept of a functional location.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the concept and criteria for functional locations
- Explain the basic idea behind the structure indicator

Business Example

In the company, you first need to decide which technical systems and buildings are relevant for maintenance and need mapping in the system.

Use functional locations to map more complex technical systems, equipment to map individual objects, and maintenance bills of material to map spare parts.

In the example, the maintenance engineer is responsible for the technical structures.

Functional Locations

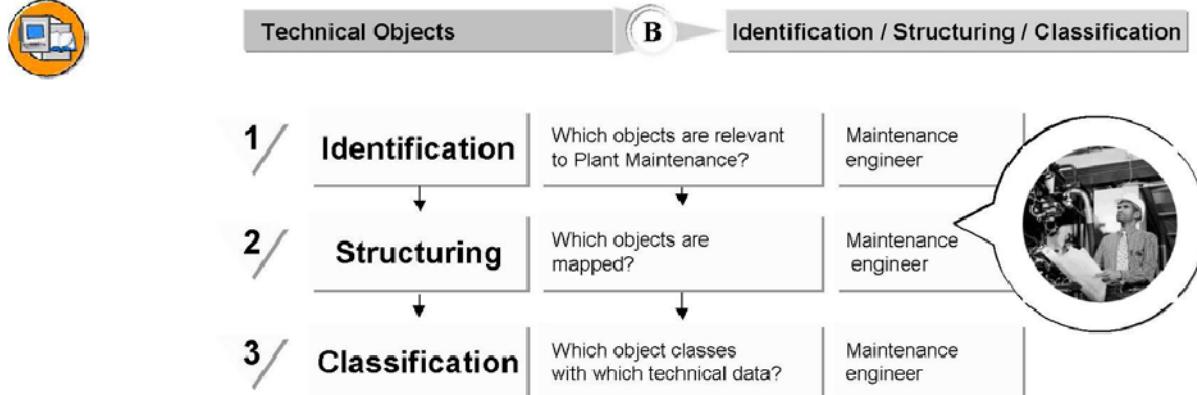


Figure 34: Technical Objects: Process

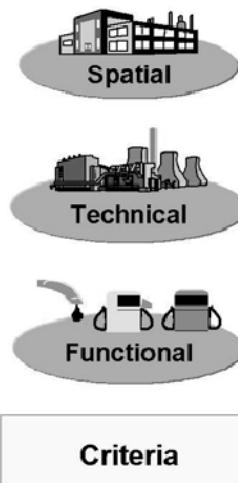
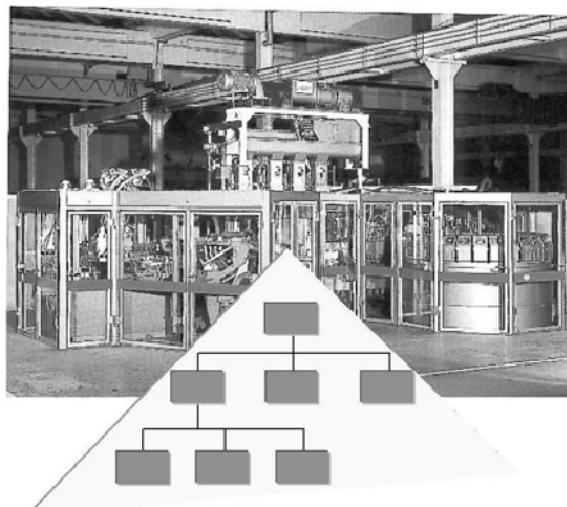
Step 1: When starting to map technical objects you need to decide which objects are relevant to Plant Maintenance - in other words, which objects require maintenance measures and for which objects evaluation is required.

Step 2: In the second step you choose the structuring instruments for each object (functional location, equipment, assembly, material), and create the structure.

Step 3: In the third step you create characteristics (technical characteristics, for example, electrical output) and classes (for example, pump classes). All technical characteristics become available for an object when a technical object (for example, equipment) is assigned to a class.



Functional location = multi-level, hierarchical structure, organized according to ...



Criteria

Figure 35: Functional location

Functional locations are hierarchically ordered structures that represent a technical system, building, or part thereof.

You can structure the functional location according to spatial (for example, building 1, building 2), technical (for example, press, press frame, press hydraulics), or functional, that is, process-oriented criteria (for example, polymerization, condensation).

The aim of creating a functional location is to structure a technical system or building into units that are relevant for Plant Maintenance.

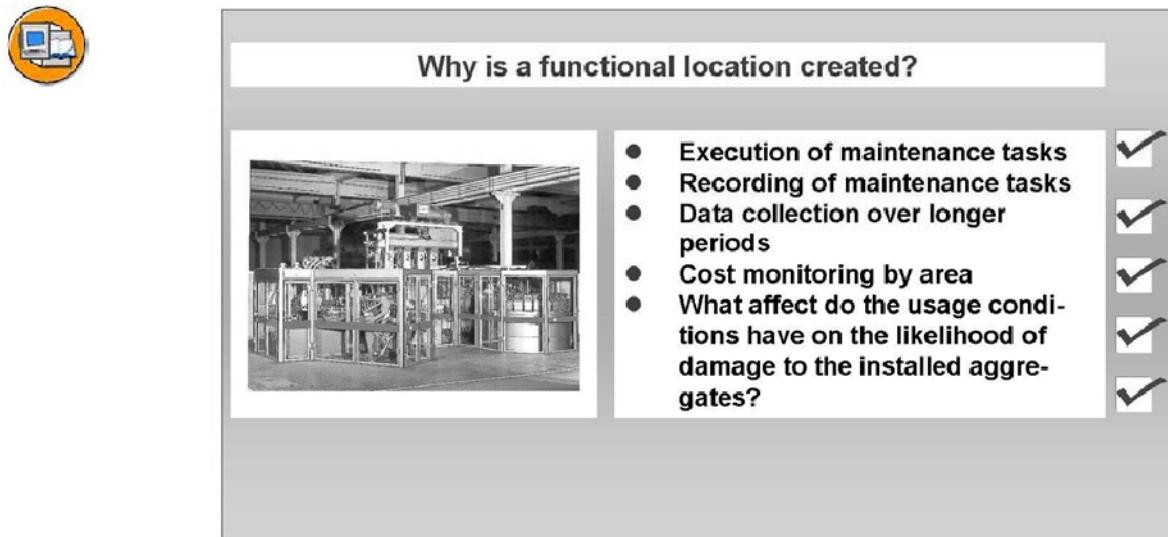


Figure 36: Criteria for Functional Locations

You should use functional locations to structure your systems if:

- You want to represent the structures of the technical systems in your company according to functional criteria
- Maintenance tasks have to be performed for certain parts of your technical system and this work must or should be recorded
- Technical data for certain parts of your technical system has to be stored and evaluated over a long period of time
- The costs of maintenance tasks have to be monitored for certain parts of your technical system
- You want to analyze what effects the usage conditions have on the likelihood of damage to the installed equipment

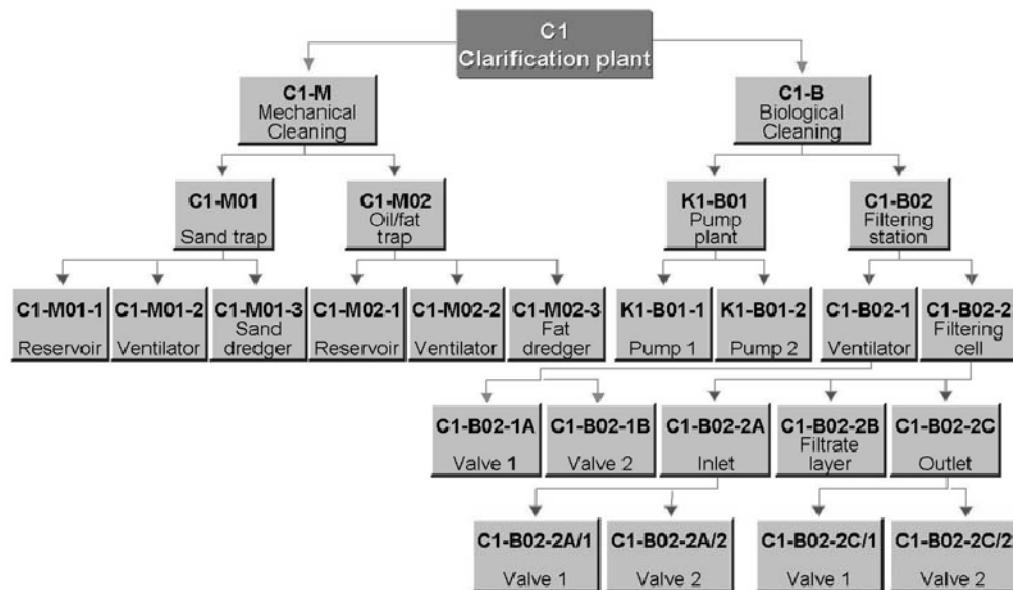


Figure 37: Example of Functional Location Structure

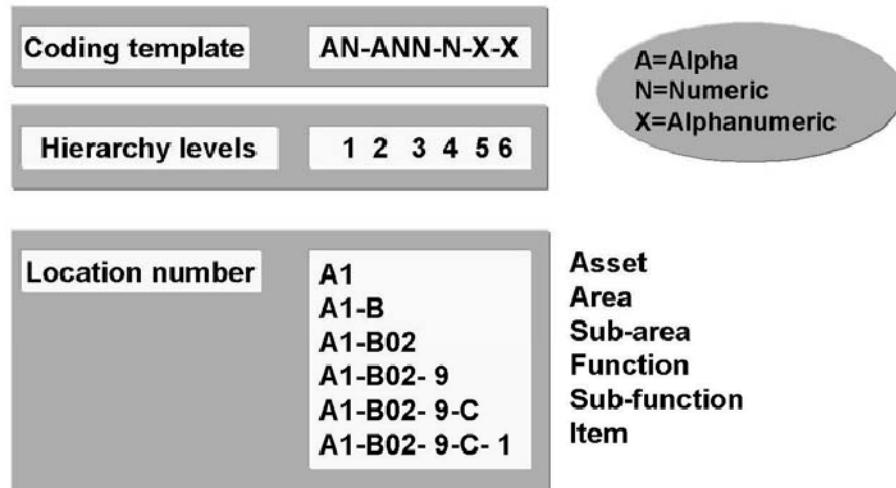


Figure 38: Structure Indicator

The identification for functional locations is created using the structure indicator. The structure indicator consists of two input fields:

Coding template

Hierarchy levels

The *coding template* is used to control which characters may be used for identification (letters, numbers, or both) and how these characters are grouped together or split. The *hierarchy levels* are used to define which level ends at which character and how many hierarchy levels the structure may contain.

A functional location can be identified using a maximum of 40 characters (=maximum length of the coding template).

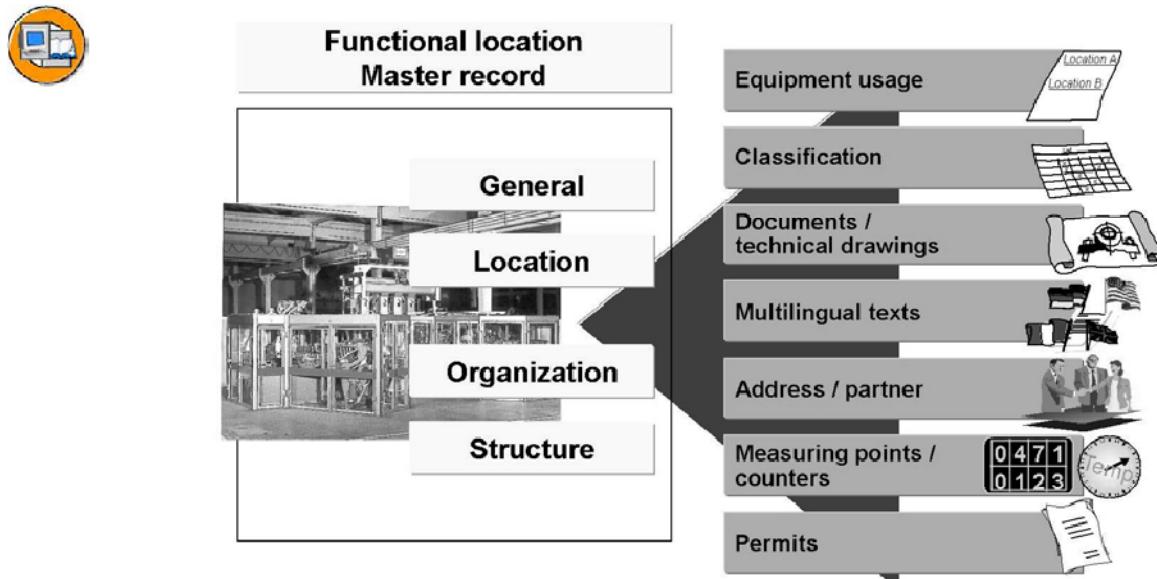


Figure 39: Master Record for Functional Location

The master record for the functional location uses the following views:

- General: Class, object type, reference data, manufacturer data and so on.
- Location: Location data, address
- organization: Account assignment (for example, company code, cost center), responsibilities (for example, maintenance planning plant)
- structure: for example, structure indicator, higher-level functional location, equipment

Additional data or links in the master record for the functional location can also be activated as tab pages or called up using pushbuttons (see graphic).

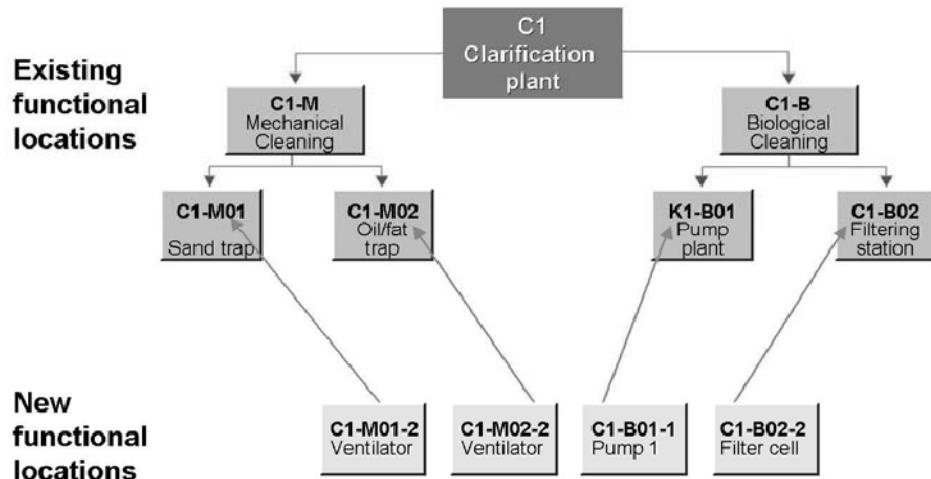


Figure 40: Automatic Assignment Upon Creation

The structure of the functional location is based on the structure indicator.

If you create a new functional location (for example, C1-M01-2), the system checks whether a hierarchy with this structure indicator already exists and whether the new identification is suitable for the existing hierarchy.

If this is the case, when the new functional location is created, it is included in the existing structure.

Exercise 6: Functional Locations

Exercise Objectives

After completing this exercise, you will be able to:

- Display the structure of functional locations
- Explain how a structure indicator is configured

Business Example

In order to represent the systems and buildings, you must first consider how to configure the structure and the degree of detail required. In a company, the workshops and technical systems should be represented using a hierarchy of functional locations, which is defined using a structure indicator.

Task 1:

Displaying the Structure of a Functional Location

1. Display the structure display of the clarification plant ## and determine the functional location labels of the valves in the pump station of the biological cleaning.

Task 2:

Display functional location

1. Display the functional location ##-B02 and determine the following data.

Maintenance plant	
Cost center	
Cost center manager	
Main work center	

Task 3:

Structure of a functional location (graphical)

1. Display the structure of functional location ##-B02 graphically. How do you proceed?

Continued on next page

Task 4:

Structure Indicator

1. Which structure indicator is used by clarification plant ##?
2. What are the effects of the structure indicator?
3. What is the edit screen and what does it mean?
4. What is the maximum number of levels that the hierarchy can have in this example?

Solution 6: Functional Locations

Task 1:

Displaying the Structure of a Functional Location

1. Display the structure display of the clarification plant ## and determine the functional location labels of the valves in the pump station of the biological cleaning.
 - a) SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Display

Field name or data type	Values
Functional location	##
Levels below	1
Location hierarchy	Activated (tick)

Explode pump station for biological cleaning step-by-step:

Field name or data type	Values
Valves	##-B01-1A ##-B01-1B ##-B01-2A ##-B01-2B

Task 2:

Display functional location

1. Display the functional location ##-B02 and determine the following data.

Continued on next page

Maintenance plant	
Cost center	
Cost center manager	
Main work center	

- a) Either double-click ##-B02 from the structural display, or choose:

SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Display

Field name or data type	Values
Maintenance plant	1000 (<i>Location tab page</i>)
Cost center	4110 (<i>Organization tab page</i>)
Cost center manager	Linden (double click <i>cost center</i>)
Main work center	MECHANIK (<i>Organization tab page</i>)

Task 3:

Structure of a functional location (graphical)

1. Display the structure of functional location ##-B02 graphically. How do you proceed?
 - a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Representation*
Set the *Graphic* indicator and confirm it.

Task 4:

Structure Indicator

1. Which structure indicator is used by clarification plant ##?
 - a) *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Display*
Structure tab page, StrIndicator field.

Continued on next page

2. What are the effects of the structure indicator?
 - a) The structure indicator sets the default structure and labeling options for a functional location. This enables you to draw conclusions about the position of the functional location in the hierarchy from its label. In the same way, newly-created functional locations are automatically arranged in the correct position in an existing hierarchy.

Continued on next page

3. What is the edit screen and what does it mean?

- a) Display the initial screen for *Functional Location*. To do this, choose the green arrow symbol (or the F3 function key) from the display mode. The *edit screen* appears, including the number of *hierarchy levels*:

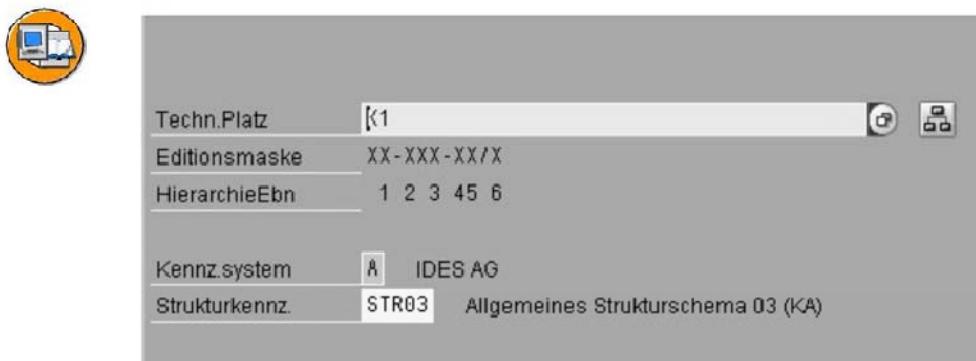


Figure 41: Structure Indicator

The *edit screen* (and therefore the structure) is subdivided into levels. Each level can have different numbers of characters. Levels can be adjoining or have separators between them.

If a character is represented by X, you can use either a numerical or an alphanumerical character. Other options for representing characters are A (alphanumerical) or N (numerical). The maximum number of characters available is 40. The *edit screen* also specifies which separators are allowed.

The number of each level is displayed in the line *Hierarchy Level*, always exactly below the last character of a level.

Level 1 XX

Level 2 X

Level 3 XX

Level 4 X

Level 5 X

Level 6 X

Levels 2 and 3, or 4 and 5 do not have separators between them.

Continued on next page

4. What is the maximum number of levels that the hierarchy can have in this example?
 - a) The maximum number of *hierarchy levels* in this example: 6. The *Hierarchy Level* part of the structure indicator *STR03* only allows 6 levels.

In general, there can be more structure indicators. You can redefine the number of levels for each structure indicator depending on the *edit screen*.



Lesson Summary

You should now be able to:

- Describe the concept and criteria for functional locations
- Explain the basic idea behind the structure indicator

Lesson: Equipment

Lesson Overview

This lesson introduces the concept of the equipment as well as criteria for creating equipment. It also shows the steps necessary for creating a new piece of equipment and installing it in a functional location, if necessary.



Lesson Objectives

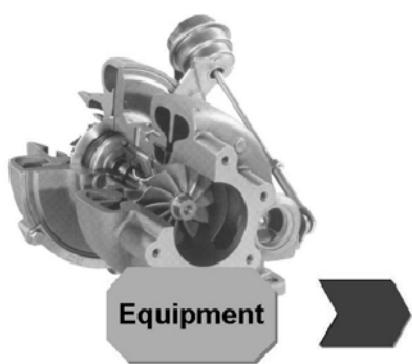
After completing this lesson, you will be able to:

- Explain the concept of equipment
- Create and install a piece of equipment
- Explain the advantages of the usage list

Business Example

Individual single objects that could be part of bigger technical structures or independent and for which a separate maintenance history should be constructed, are mapped using equipment.

Concept of Equipment



Individual physical object to be maintained as an autonomous unit

- Means of production
- Means of transport
- Test equipment
- Production resources/tools
- Customer devices
- Buildings, property
- Systems, system parts
- Vehicles

Figure 42: Equipment

A piece of equipment is an individual physical object that is to be maintained as an autonomous unit. Pieces of equipment usually represent single objects (for example, pumps, motors, vehicles), for which maintenance tasks should be performed and recorded.

Equipment can be installed at functional locations.

A piece of equipment can be linked with a material (if there is inventory management, in the sense of Materials Management, for the object).



For what purpose is a piece of equipment created?

	<ul style="list-style-type: none">● Management of individual data <input checked="" type="checkbox"/>● Recording of maintenance tasks <input checked="" type="checkbox"/>● Object-based recording of costs <input checked="" type="checkbox"/>● Evaluation of technical data <input checked="" type="checkbox"/>● Recording of usage times <input checked="" type="checkbox"/>
--	--

Figure 43: Criteria for Equipment Master Record

You should always create an equipment master record for a technical object if:

- You need to manage individual data for the object
- Breakdown, planned or preventive maintenance tasks are required for an object and need to be recorded
- Technical data for this object must be collected and evaluated over long periods of time
- The costs of maintenance tasks for this object are to be monitored
- You need to record the usage time of this object at functional locations

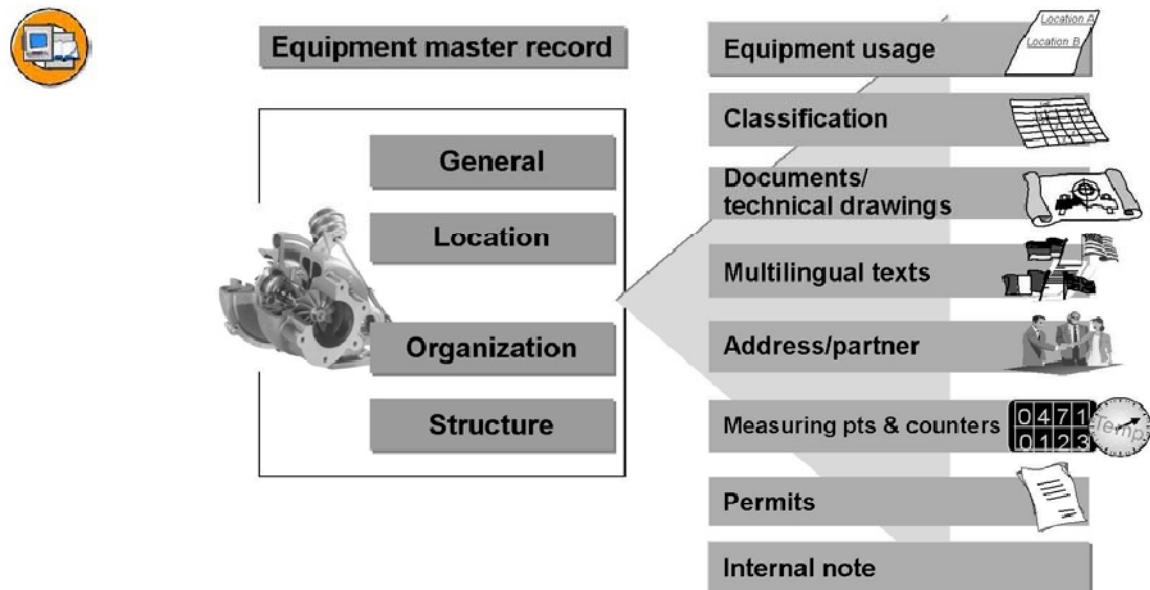


Figure 44: Equipment master record

The equipment master record uses the following views in the standard system:

- General: Class, object type, reference data, manufacturer data and so on.
- Location: Location data, address
- organization: Account assignment (for example, company code, cost center), responsibilities (for example, maintenance planning plant)
- structure: for example, structure indicator, higher-level functional location, equipment

Additional data or links in the master record for the equipment can also be activated as tab pages or called up using pushbuttons (see graphic).

You can use the time-based data to monitor a piece of equipment dynamically, that is, track changes to the equipment over a specific period of time. If your system is customized accordingly, it automatically creates a new time segment whenever certain changes are made in the master record. The time segment describes the equipment usage.

Install and Dismantle Equipment

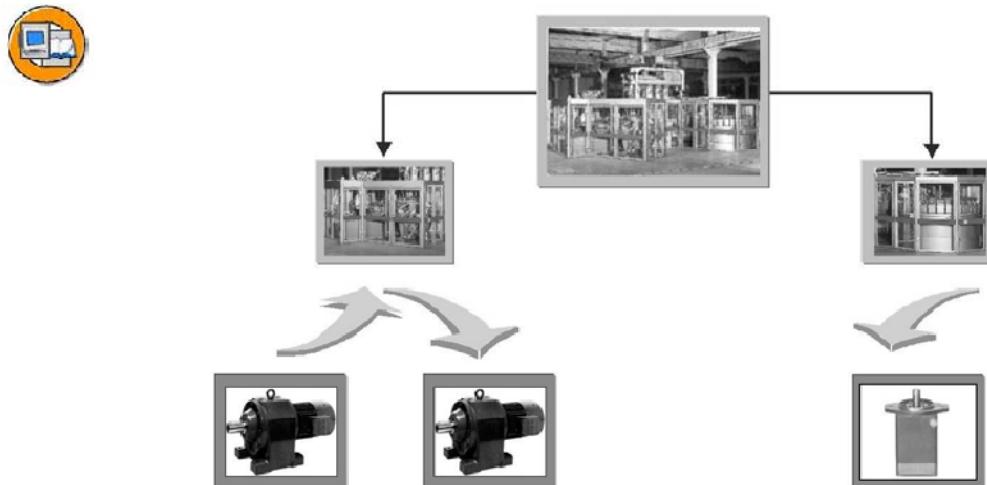


Figure 45: Installation/Dismantling of Equipment

Equipment can be installed and dismantled at functional locations. You can monitor the installation times for a piece of equipment from both the functional location view and the equipment view.

In the case of a piece of equipment that is linked with a material, then when the damaged piece of equipment is dismantled, it can automatically be placed in storage. Likewise, when the spare part is withdrawn from storage it can automatically be installed at the functional location.

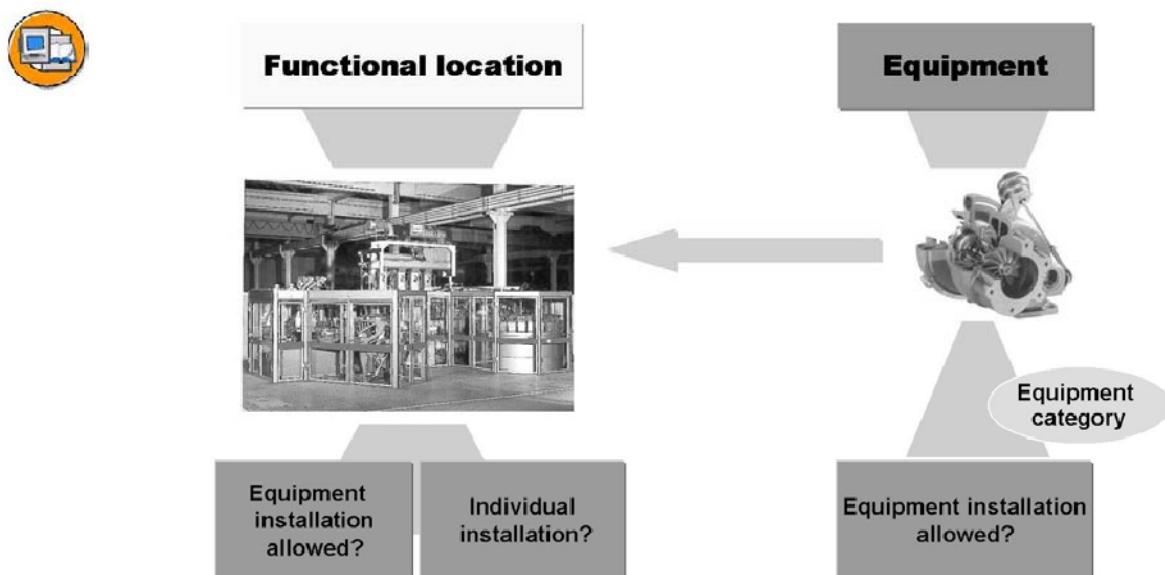


Figure 46: Prerequisites for Equipment Installation

Two prerequisites must be fulfilled for a piece of equipment to be installed at a functional location:

The equipment category must permit an installation (Customizing).

The option *Equipment Installation Allowed* must be activated in the master record for the functional location. You can restrict this option by using the *Individual Installation* option.

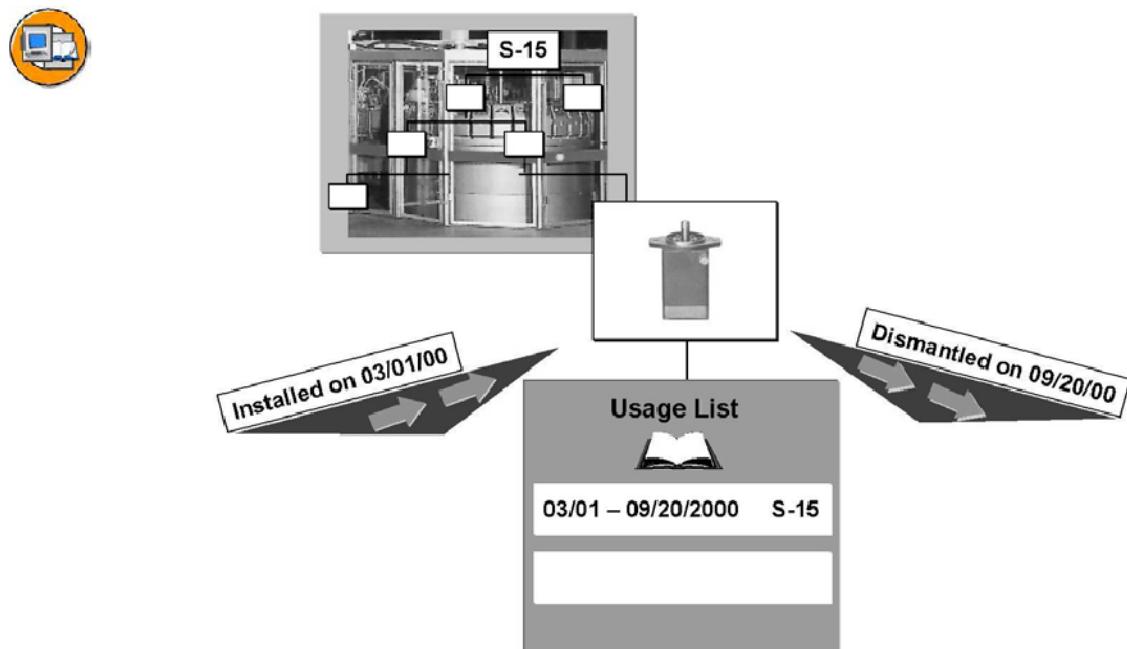


Figure 47: Equipment Usage List

The installation locations for equipment within a technical system are documented in the usage list. The usage list forms part of the equipment history.

Equipment usage periods can also be displayed from the functional location view.

As well as changes to the installation location, the usage list also documents changes to other fields of the master record (for example, cost center, asset, and so on). In the Customizing you can set which fields should be monitored in this way.

Exercise 7: Equipment

Exercise Objectives

After completing this exercise, you will be able to:

- Create an equipment master record
- Install a piece of equipment

Business Example

At IDES, individual physical aggregates, such as pumps and motors, which have to be exchanged frequently and whose lifecycle should be monitored exactly, are represented as pieces of equipment.

Task 1:

Display Equipment Master Record

1. Display the equipment with equipment number **TEQ-##** and determine the following data:

Description	
Maintenance plant	
Cost center	
Construction type	
Maintenance planning plant	
Main work center	

Task 2:

Create Equipment Master Record

1. Create a new piece of equipment **TEZ-##** (equipment category **M**). You can freely select the data in the area *General*. The maintenance plant is 1000, and the cost center is 4110. How do you proceed? What is the system status after you have created the piece of equipment?

Continued on next page

Task 3:

Install equipment

1. Install the new piece of equipment in the pump station for biological cleaning in your clarification plant ##. How do you proceed? Check the installation using the structural display for functional locations. How do you proceed?

Task 4:

Usage List

1. Display the pump *P-1000-N001*. When and at which functional location was the equipment installed for the first time?
2. Which pieces of equipment were installed in the filter station of the biological cleaning (clarification plant C1) in the time between 01/01/1998 and 01/01/1999?

Use the structural display of the functional location *K1* for this.

Solution 7: Equipment

Task 1:

Display Equipment Master Record

1. Display the equipment with equipment number TEQ-## and determine the following data:

Description	
Maintenance plant	
Cost center	
Construction type	
Maintenance planning plant	
Main work center	

- a) Choose SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Display.

Field name or data type	Values
Description	Electric pump 001
Maintenance plant	1000
Cost center	4110
Construction type	P-1000
Maintenance planning plant	1000
Main work center	T-ME##

Continued on next page

Task 2:

Create Equipment Master Record

1. Create a new piece of equipment TEZ-## (equipment category M). You can freely select the data in the area *General*. The maintenance plant is 1000, and the cost center is 4110. How do you proceed? What is the system status after you have created the piece of equipment?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Create (General)*.

Tab page *General*: Any data

Tab page *Location* enter maintenance plant 1000

Tab page *Organization*: cost center 4110

System status after the entry: *AVLB* (= Available)

Continued on next page

Task 3:

Install equipment

1. Install the new piece of equipment in the pump station for biological cleaning in your clarification plant ##. How do you proceed? Check the installation using the structural display for functional locations. How do you proceed?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Change.*

Choose *Structuring → Change Installation Location.*

Enter the label **##-B01** in the *Functional Location* field and confirm your entry.

or

Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Display.*

Enter the label **##** and confirm your entries. Open the structure of the biological cleaning and double-click on **##-B01**;

Functional Location → Display → Change;

Structure tab page;

In the equipment area, the symbol for subequipment;

Enter **TEZ-##** in the list and save. System status after the installation:
INST (=Installed)

Then choose:

SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Display

Enter the location **##-B01** and activate the *Installed Equipment* indicator.

Continued on next page

Task 4:

Usage List

1. Display the pump *P-1000-N001*. When and at which functional location was the equipment installed for the first time?

a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Display*

Choose *Extras → Usage List*

Field name or data type	Values
Installation date (Valid from column)	05.12.1994
Funct. Location	K1-B01-1

2. Which pieces of equipment were installed in the filter station of the biological cleaning (clarification plant C1) in the time between 01/01/1998 and 01/01/1999?

Use the structural display of the functional location *K1* for this.

a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Display*.

Change to the detailed view by double-clicking on K1-B02: then

Structuring → Equipment usage

Enter the period; installed equipment: P-1000-N001, M-1000-N051



Lesson Summary

You should now be able to:

- Explain the concept of equipment
- Create and install a piece of equipment
- Explain the advantages of the usage list

Lesson: Bills of Material

Lesson Overview

This lesson shows how bills of material are used in plant maintenance.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the concept of maintenance bills of material

Business Example

In the company, spare parts that are to be replaced and for which no history is to be created are to be represented in the form of maintenance bills of material.

Bills of material

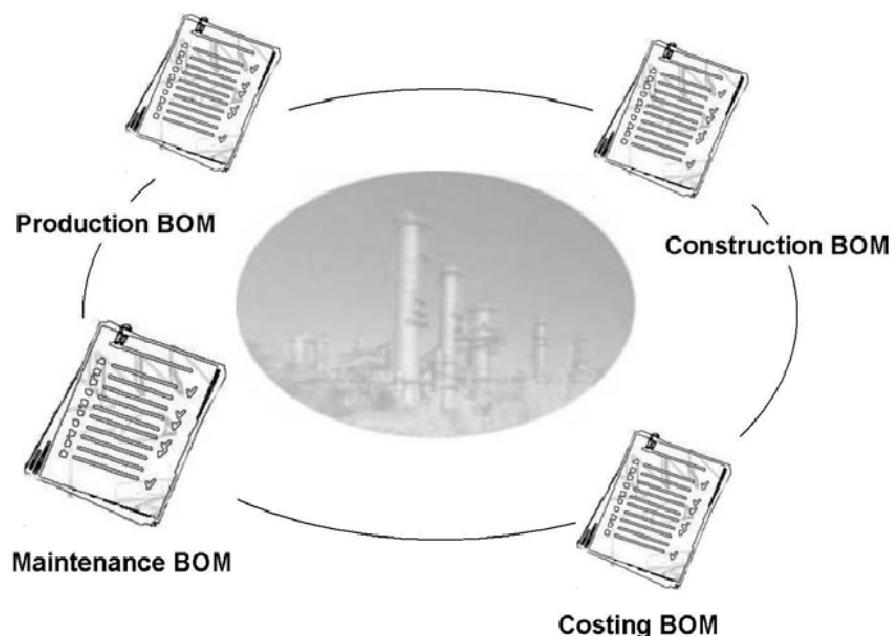


Figure 48: Bills of Material in Company

Bills of material are used for different purposes. The usage depends on the enterprise area:

- The **engineering/design bill of material** includes all the elements of the product (from an engineering viewpoint) and contains the technical data.
- The **production bill of material** includes the items (from a production viewpoint) and assembly conditions. For the assembly, for example, only items relevant to production with process-oriented data are required.
- The **costing bill of material** reproduces the product structure and forms the basis for automatic determination of the material usage costs for a product. Items that are not relevant for costing are not included in this bill of material.

Instead of a uniform bill of material, these areas use “their own” bill of material with area-specific data (for example, production) and also only evaluate bills of material with area-specific data. This results in a targeted bill of material explosion, whereby only the area-specific data is made available. Data selection is controlled using the definition of application.

Bills of Material in Plant Maintenance

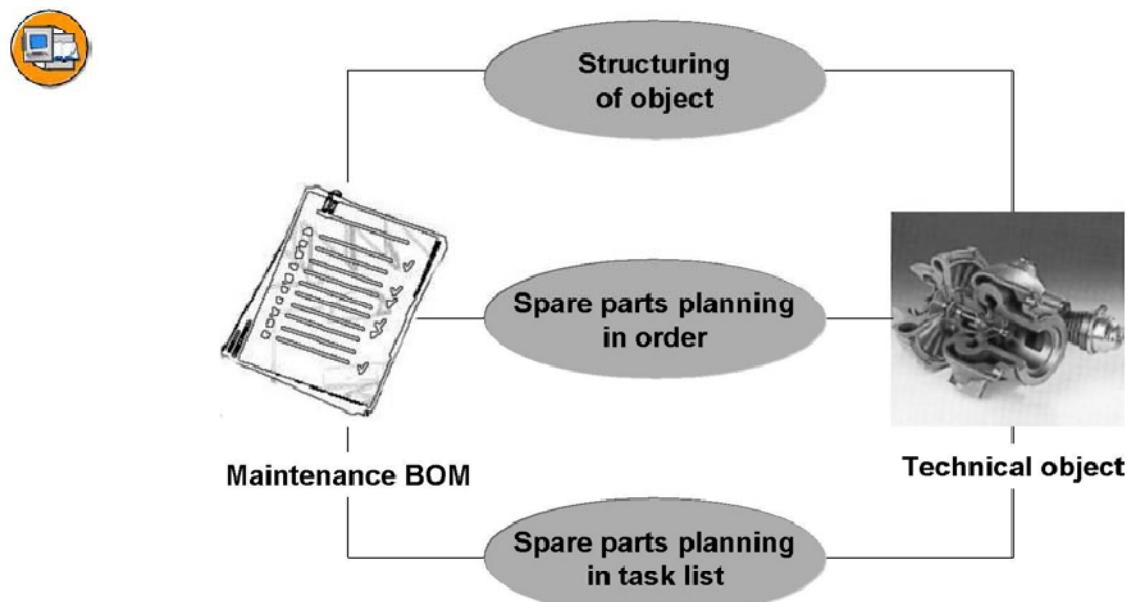


Figure 49: Bills of Material in Plant Maintenance

The maintenance bill of material differs from other BOMs in that it only contains items relevant to Plant Maintenance. The maintenance bill of material has three important functions:

Structuring of the object

The structure of an object should be displayed as clearly as possible from a maintenance viewpoint.

Spare parts planning in the order

If a technical object uses a bill of material, you can use this simply during the planning or a maintenance order to plan spare parts.

Spare parts planning in the task list

Spare parts can be planned in the task list based on a bill of material.

There are three categories of maintenance bill of material:

- Material BOM
- Equipment BOM
- Functional location BOM

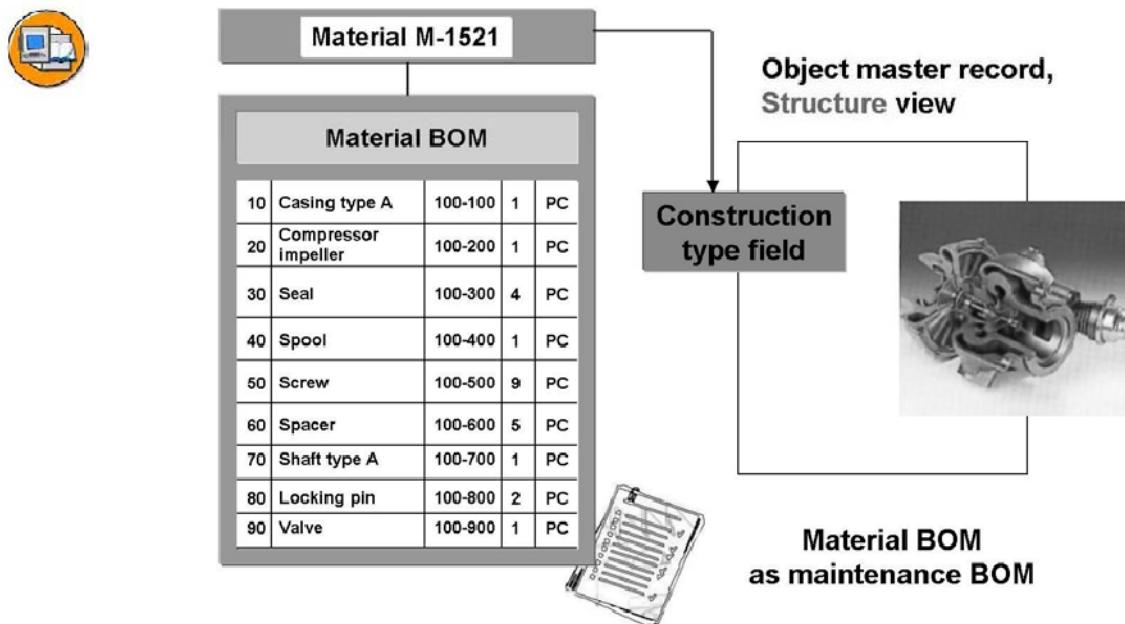


Figure 50: Using a Material BOM as a Maintenance BOM

Material BOMs are always used in Plant Maintenance if a **number of similarly constructed** objects have to be maintained. The aim is not to create a bill of material for each technical object, but to create just one bill of material and then assign this to the technical objects. This avoids the use of redundant bills of material.

A material BOM is a bill of material that is first created for a material independently of a technical object. To do this, you must:

- Create a material
- Create a material BOM for the material

The bill of material must then be assigned to one or more technical objects (equipment or functional location). You can make the assignment(s) in the respective master record using the *Structure* view. The number of the corresponding material is entered in the *Construction type* field.

Exercise 8: Bills of material

Exercise Objectives

After completing this exercise, you will be able to:

- Explain the purpose of bills of material in Plant Maintenance
- Display the bill of material for a piece of equipment
- Assign a material BOM to a piece of equipment

Business Example

At IDES, all the individual parts for functional locations and pieces of equipment, for which no history is required but where spare parts planning is important, should be represented using bills of material.

Task 1:

The structure of your equipment **TEZ-##** should be represented for Plant Maintenance using a material BOM.

Since **TEZ-##** and **TEQ-##** are constructed in the same way, you can use the same material BOM **P-1000**.

1. Assign the material BOM **P-1000** to your piece of equipment. How do you proceed?

Task 2:

Material number

1. What is the material number of the pressure cover for the pump and how can this be determined from the master record for the equipment?

Solution 8: Bills of material

Task 1:

The structure of your equipment **TEZ-##** should be represented for Plant Maintenance using a material BOM.

Since **TEZ-##** and **TEQ-##** are constructed in the same way, you can use the same material BOM **P-1000**.

1. Assign the material BOM **P-1000** to your piece of equipment. How do you proceed?

a) Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Change.*

Structure tab page

Construction type field: Enter material **P-1000**

Save the piece of equipment.

Task 2:

Material number

1. What is the material number of the pressure cover for the pump and how can this be determined from the master record for the equipment?

a) *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Change*

Pushbutton *Structure list*

or

Structuring → Structure list

Material number for pressure cover: **401-400**



Lesson Summary

You should now be able to:

- Explain the concept of maintenance bills of material



Unit Summary

You should now be able to:

- Describe the concept and criteria for functional locations
- Explain the basic idea behind the structure indicator
- Explain the concept of equipment
- Create and install a piece of equipment
- Explain the advantages of the usage list
- Explain the concept of maintenance bills of material

Unit 4

Breakdown Maintenance

Unit Overview

This lesson shows the process of breakdown maintenance. The emphasis here is on creating a maintenance order quickly and directly.



Unit Objectives

After completing this unit, you will be able to:

- Explain the breakdown maintenance process
- Enter a breakdown order
- Enter a time confirmation for the order
- Complete the order

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Lesson: Breakdown Maintenance

Lesson Overview

This lesson shows the processing of a breakdown maintenance order as a way of reacting quickly to a malfunction.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the breakdown maintenance process
- Enter a breakdown order
- Enter a time confirmation for the order
- Complete the order

Business Example

For breakdown maintenance, the data required for the other business processes needs to be entered quickly and easily so that the subsequent steps can be executed.

You should also be able to evaluate time and material consumption for breakdown maintenance orders. Therefore, time confirmations and material withdrawals must be posted for these orders.

Breakdown Maintenance Order

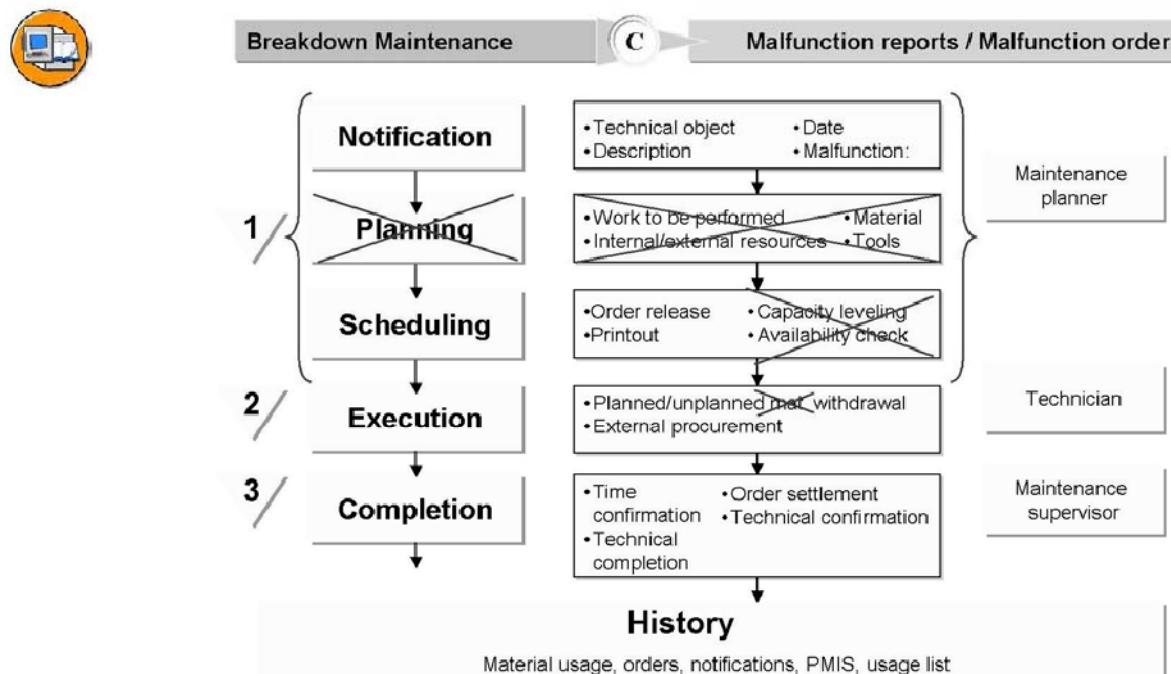


Figure 51: Breakdown Maintenance Process

The five-step cycle of corrective maintenance processing is reduced to a three-step cycle for breakdown maintenance:

Step 1: The starting point is the creation of a maintenance order (possibly using data from the maintenance notification) for damage or a malfunction. This maintenance order is not planned, but is immediately released for processing. Any order papers required are also printed.

Step 2: The execution phase comprises the removal of spare parts from stock and the actual execution of the order.

Step 3: In the completion phase, the actual time required is confirmed. Technical confirmations are also entered to record the repair and condition of the technical system. The order is settled in Controlling.

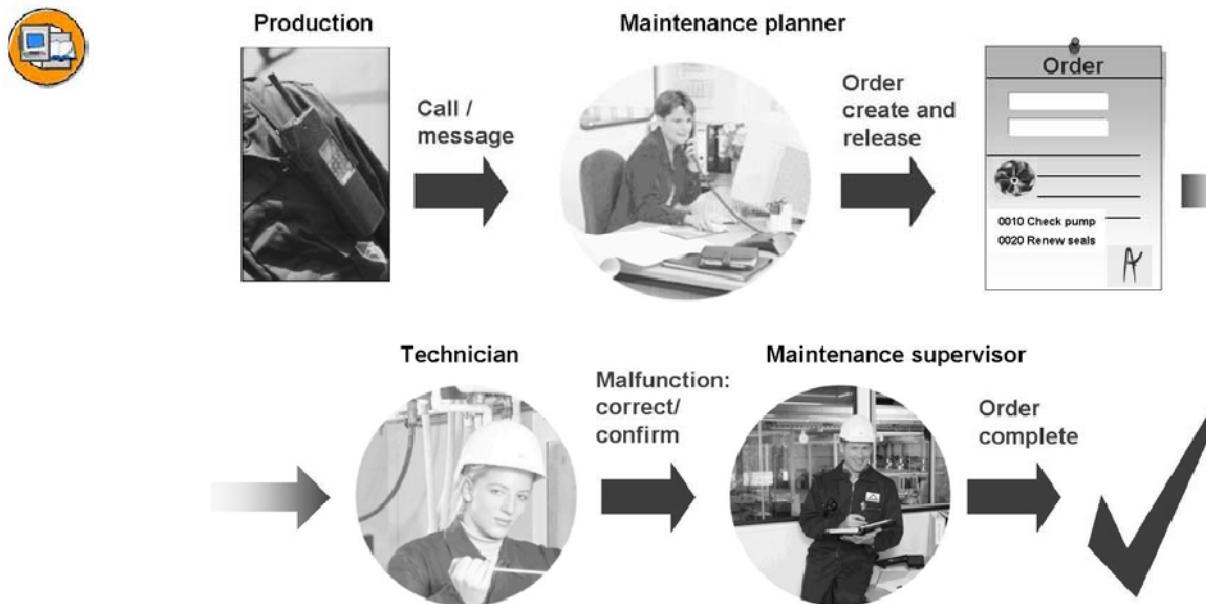


Figure 52: Possible Flow of Breakdown Process

Breakdown maintenance involves the creation and release of the maintenance order in one work step after a malfunction has been reported (for example, by an employee in Production).

Depending on the organization, this step is performed by the maintenance supervisor or the central maintenance planner.

The malfunction is corrected by a maintenance work center named in the order. After the malfunction has been corrected, the order is confirmed by the person performing the task, the maintenance supervisor, or the maintenance planner. The order is then completed by either the supervisor or the maintenance planner.

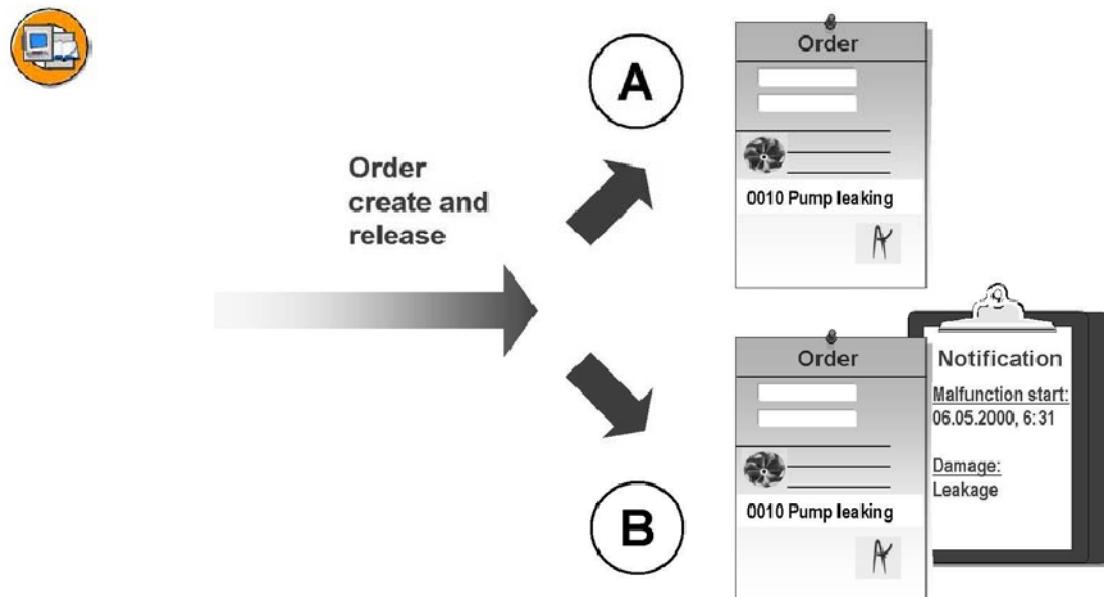


Figure 53: Order With or Without Notification

The breakdown order can be created directly without any previous requisition note (A). The order usually refers to a technical object (functional location or equipment) and is configured at a work center. In the first operation, the malfunction to be corrected is broadly described.

However, the breakdown order can also be created in combination with a maintenance notification (B), if malfunction data should be stored at this time for later documentation (for example, malfunction start or damage). The order thereby contains the same data as in case A and the notification contains all the data relevant for the documentation or history.

The order and notification data can be entered on the same screen. The notification information can be supplemented and completed at a later time.

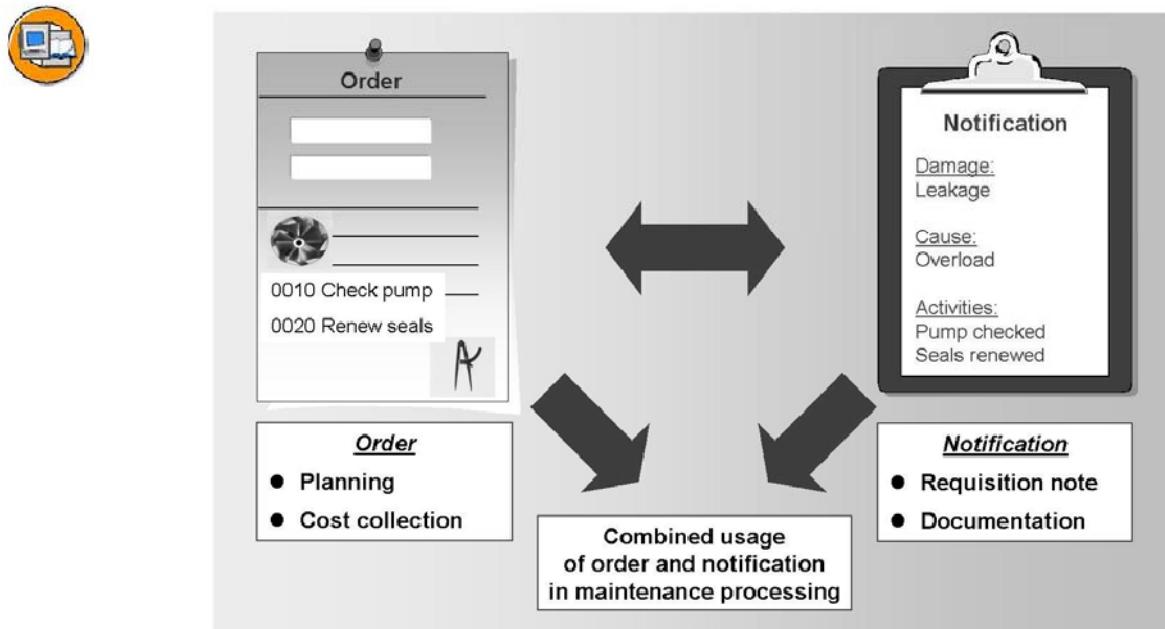


Figure 54: Maintenance Processing Instruments

Two instruments are available for processing maintenance tasks:

Orders are used to plan maintenance tasks and plan or track the costs incurred. Planning functions do not necessarily need to be executed. Orders can also be created as immediate orders without any planning whatsoever.

Notifications are used to convey maintenance requirements and the documentation for technical findings and activities performed. Orders and notifications can be used independently of one another. However, they are usually combined to utilize the advantages of both instruments.

Special case: entering order and notification in one work step

During breakdown maintenance processing, the breakdown order can be created with a malfunction report. The notification areas *malfunction data*, *damage*, and *notification dates* are shown on the order header. This provides the flexibility to enter important order and malfunction data on a single screen.

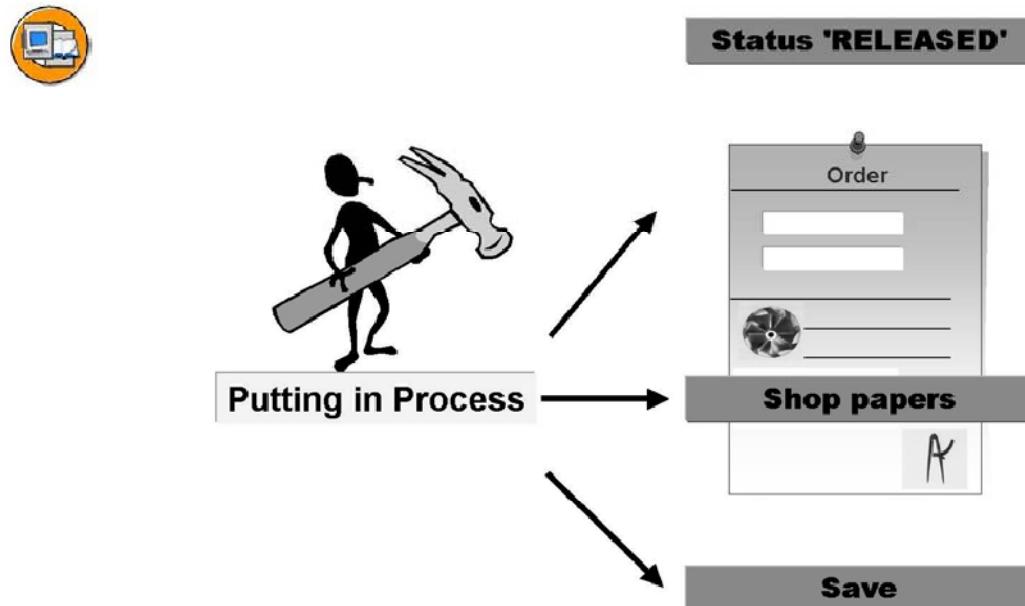


Figure 55: Putting the Maintenance Order into Process

The function *Put in Process* releases the order, prints the required order papers, and saves the order.

You can execute the following activities after releasing the order:

- Withdraw material
- Book goods receipts
- Enter time confirmations

Time Confirmation

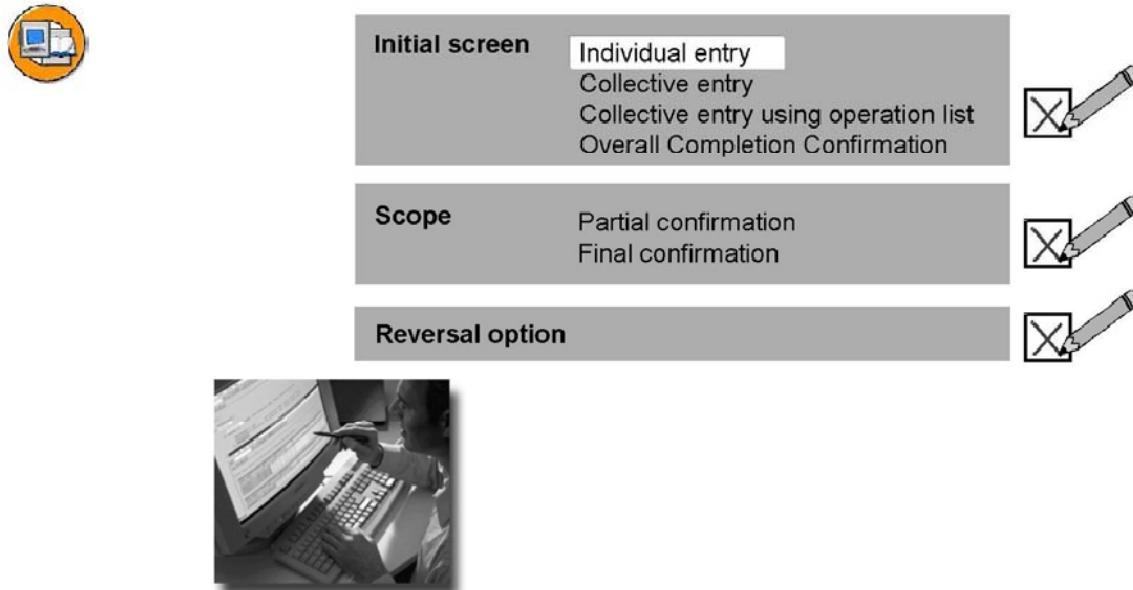


Figure 56: Time Confirmation Options

In most cases, breakdown maintenance involves one order with only one operation. For this reason, you can use the **individual entry** function for time confirmation. Here you can enter the actual time directly on the detail screen for the operation confirmation.

If confirmations were entered for the operations of a maintenance order, the system automatically sets the status PCNF (partially confirmed) for the operations or CNF if the final confirmation indicator was set and the operation was therefore reported as being finished.

As soon as all the operations for a maintenance order have been completely confirmed, the order (at header level) is assigned the status CNF (Confirmed).

There is always a risk of completion confirmations being assigned to the wrong operations or entered with the wrong data. The system therefore allows you to **reverse** completion confirmations if required.

Instead of using individual entry, you can use the overall completion confirmation function to enter not only the times, but also, for example, material withdrawals or counter readings, on a single screen.

Maintenance Order: Technical Completion

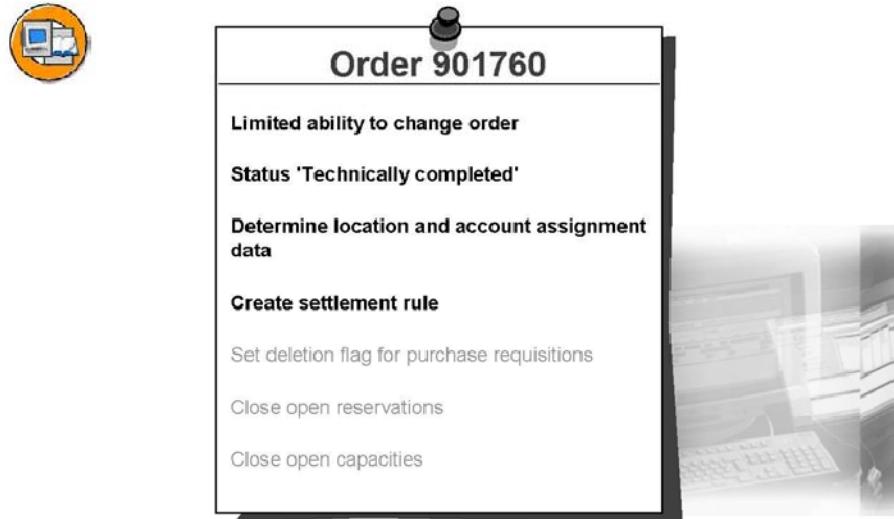


Figure 57: Technical Completion of Maintenance Order

The maintenance order obtains the status TECO (Technically completed) after the maintenance work required for this order has been completed.

The maintenance order can then only be changed online as follows:

- It can be locked or unlocked.
- The deletion flag can be set.
- You can still change the settlement rule.

Most fields in an order are fixed and can no longer be changed. However, the order can still receive costs, for example, invoice receipts for materials delivered and consumed.

If a settlement rule has not been generated for the maintenance order yet, it is created automatically by the system. If this is not possible, because data is missing, the system directs you to where the settlement rule can be maintained.

Exercise 9: Order Entry

Exercise Objectives

After completing this exercise, you will be able to:

- Create a breakdown maintenance order and put it in process

Business Example

When a machine or technical system breaks down, a breakdown order should be created, in which only the most important data is recorded, to ensure a quick response.

Task 1:

Create a maintenance order without a maintenance notification

Use order type PM01 to do this and set up a maintenance order as a breakdown maintenance task for piece of equipment **TEQ-##**. Set the priority to *Very high*.

1. How do you proceed?
2. What start and end dates are displayed based on the priority?

Start date:

Finish date:

3. What other data is proposed? Where does this data come from?
4. What system status does the order have at this point?
5. Put the order in process without printing it.

What order number is assigned?

How has the system status changed?

Task 2:

Creating an Order with a Notification

Create a maintenance order for a breakdown maintenance task. Choose the order type that combines a maintenance order with a notification. This enables you to determine malfunction data now and add further documentation later. Configure the maintenance order for your piece of equipment **TEQ-##** and assign the priority “Very high”.

1. What order type do you choose?

Continued on next page

2. Enter a malfunction start (date, time) and select the switch field for a breakdown. Enter a suitable damage code. How do you proceed?

Put the order in process without printing it.

What order number was assigned?

Task 3:

Confirm the breakdown order

1. Enter an individual confirmation for both your maintenance orders created above.

What menu path do you use?

Set the final confirmation indicator.

Task 4:

Technical Confirmation

1. Complete the maintenance notification and the second order that you created.

Enter a malfunction end and a suitable cause of damage.

How do you proceed?

Task 5:

Completing a breakdown order

1. Which status does the order have before the technical completion?
2. Technically complete your maintenance orders. How do you proceed?
3. For the second order, complete the maintenance notification together with the order. Which indicator do you set?
4. Which status does the order have after the technical completion?

Solution 9: Order Entry

Task 1:

Create a maintenance order without a maintenance notification

Use order type PM01 to do this and set up a maintenance order as a breakdown maintenance task for piece of equipment TEQ-##. Set the priority to *Very high*.

1. How do you proceed?
 - a) Choose SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General).

Field name or data type	Values
Order type	PM01

2. What start and end dates are displayed based on the priority?

Start date:

Finish date:

- a)

Field name or data type	Values
Start date	Current date
Finish date	Current date + 1

3. What other data is proposed? Where does this data come from?

- a) Default data:

Field name or data type	Values
From the equipment master	Maintenance planner group Main work center Functional loc.
From Customizing	Maintenance activity type

Continued on next page

4. What system status does the order have at this point?

- a) System Status

Field name or data type	Values
CRTD	Created
MANC	Material availability not checked
NTUP	Dates are not updated

5. Put the order in process without printing it.

What order number is assigned?

How has the system status changed?

- a) Choose

Put in process (white paper with cogwheels)

Order number: xxxxxx (assigned by the system)

Order → Change

System Status

Field name or data type	Values
REL	Released
SETC	Settlement rule created
NMAT	No material components
PRC	Pre-costed

Continued on next page

Task 2:

Creating an Order with a Notification

Create a maintenance order for a breakdown maintenance task. Choose the order type that combines a maintenance order with a notification. This enables you to determine malfunction data now and add further documentation later. Configure the maintenance order for your piece of equipment TEQ-## and assign the priority “Very high”.

1. What order type do you choose?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General)*.

Field name or data type	Values
Order type	PM05

2. Enter a malfunction start (date, time) and select the switch field for a breakdown. Enter a suitable damage code. How do you proceed?

Put the order in process without printing it.

What order number was assigned?

- a) Choose *Malfnctn Data* (belongs to the notification and is displayed on the order header), enter a breakdown start and set the Breakdown indicator.

Choose *Damage* and specify an appropriate damage. To do this, place the cursor in the *Damage* field and use the F4 help to select a damage (for example from the code group PUMP/100).

Choose *Put in process* (white paper with cogwheels).

Task 3:

Confirm the breakdown order

1. Enter an individual confirmation for both your maintenance orders created above.

What menu path do you use?

Continued on next page

Set the final confirmation indicator.

- a) Confirm the breakdown order

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Individual Time Confirmation*

Field name or data type	Values
Actual work	For example, 5 hours
Final confirmation	Set indicator

Task 4:

Technical Confirmation

1. Complete the maintenance notification and the second order that you created.

Enter a malfunction end and a suitable cause of damage.

How do you proceed?

- a) *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Choose *Change* (yellow pen to the right of the notification number) to branch from the order header to the notification.

Enter the malfunction end in the area *Malfunction data*.

In the *Item* area, choose the cause code.

To do this, place the cursor in the field *Cause code* and use the F4 help to select a cause (for example from the code group PM01).

Continued on next page

Task 5:

Completing a breakdown order

1. Which status does the order have before the technical completion?
a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

System Status

Field name or data type	Values
REL	Released
CNF	(Finally) confirmed
SETC	Settlement rule created
NMAT	No material components
PRC	Pre-costed



Note: You can use the *i-button* at the end of the status line to display information about the abbreviations for the system statuses.

2. Technically complete your maintenance orders. How do you proceed?
a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Field name or data type	Values
Technically complete the order	<i>Technical Completion</i> icon (black and white flag)

3. For the second order, complete the maintenance notification together with the order. Which indicator do you set?
a)

Field name or data type	Values
Complete pop-up	<i>Complete Notifications</i> indicator

Continued on next page

4. Which status does the order have after the technical completion?

- a) System Status

Field name or data type	Values
TECO	Technically completed
CNF	Confirmed
SETC	Settlement rule created
NMAT	No material components
PRC	Pre-costed



Lesson Summary

You should now be able to:

- Explain the breakdown maintenance process
- Enter a breakdown order
- Enter a time confirmation for the order
- Complete the order



Unit Summary

You should now be able to:

- Explain the breakdown maintenance process
- Enter a breakdown order
- Enter a time confirmation for the order
- Complete the order

Unit 5

Corrective Maintenance

Unit Overview

This lesson covers the five phases of corrective maintenance. These phases are: entering requirements, planning orders with operations and materials, monitoring the cost, performing the tasks, and completing the overall process.

The lesson also shows how you can plan external companies into your order.

The lesson is rounded off with a description of the mobile applications that are available within Plant Maintenance.



Unit Objectives

After completing this unit, you will be able to:

- Describe the phases of corrective maintenance
- Create maintenance notifications
- Describe the structure of the maintenance task list
- Select and process maintenance notifications
- Describe the planning phase in the corrective maintenance cycle
- Create a maintenance order
- Describe and execute material planning
- Describe the control phase in the corrective maintenance cycle
- Select the required maintenance orders
- Release and print the maintenance orders
- Describe the execution phase as part of the preventive maintenance
- Execute the material withdrawals
- Describe and perform the partial stages of the completion phase
- Describe the consequences of the technical completion for the order and notification
- Perform an external service via individual purchase order
- Create a goods receipt for the individual purchase order

- Perform an external service via individual purchase order in connection with service processing
- Perform a service entry with approval
- Process external service in connection with external work centers
- Describe the scope of the area of *Mobile Asset Management*
- Describe the technical prerequisites for the mobile solutions

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Lesson: Corrective Maintenance Process

Lesson Overview

This lesson covers the different phases of corrective maintenance.

The corrective maintenance process is divided into the notification, planning, control, execution, and completion phases.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the phases of corrective maintenance

Business Example

In a company, the maintenance requirements should first be recorded in the system, then they should be viewed and valued, and finally they should be converted to orders.

An order should be used to plan, control, and monitor all required resources. It should be possible to call an overview of the costs for an order at any time.

Phases of Corrective Maintenance

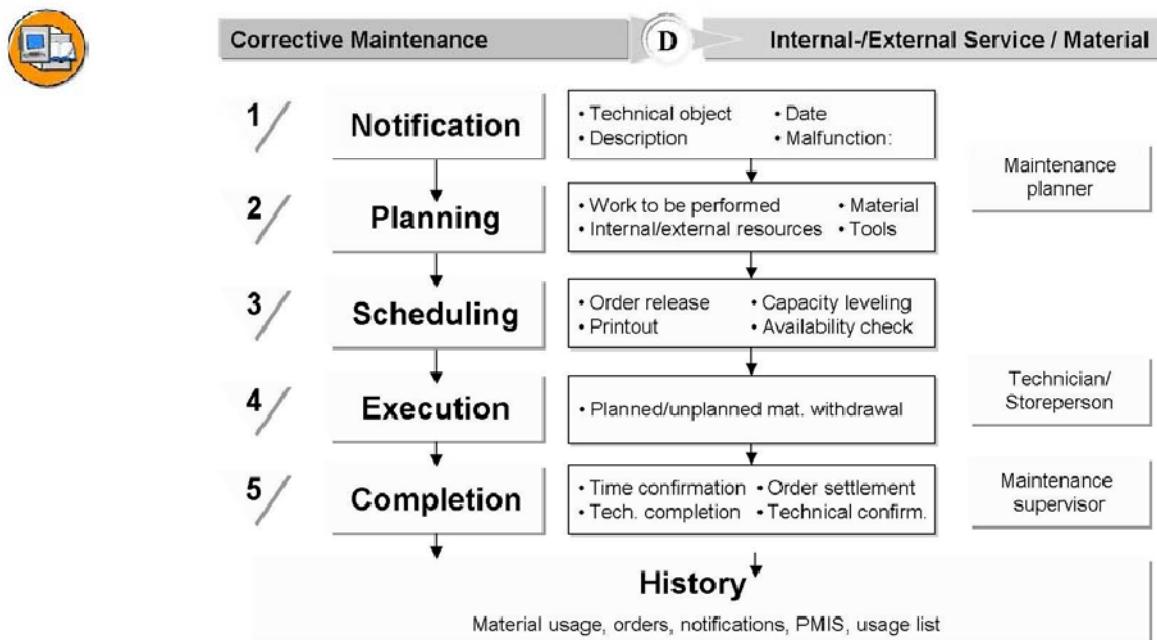


Figure 58: Corrective Maintenance

The corrective maintenance process is divided into the following phases:

Phase 1 - Notification: Malfunctions and other requirements are recorded in a notification. Notifications can be accessed and processed via a list.

Phase 2 - Planning: In this phase, orders are created and planned on the basis of the reported requirements. The planning encompasses the steps that are to be performed, the material required, as well as any utilities that may be necessary such as measurement devices, cranes, etc.

Phase 3 - Control: In this phase, the order runs through different checks, such as material availability checks and capacity planning, which are important for the release of the order. If no problems arise during these checks, the order is put in process. The shop papers are usually printed at this point.

Phase 4 - Execution: The order is executed in this phase. The required material for the order is withdrawn. Even material that has not been planned and therefore not reserved by the order, can be withdrawn for the order.

Phase 5 - Completion: This phase consists of the partial steps time confirmation, technical confirmation, and technical completion. The settlement of the order by Controlling can be performed before or after the technical completion.



Lesson Summary

You should now be able to:

- Describe the phases of corrective maintenance

Lesson: Notification of Maintenance Requirements

Lesson Overview

This lesson describes the notification phase as the first of the five phases in the corrective maintenance process.



Lesson Objectives

After completing this lesson, you will be able to:

- Create maintenance notifications
- Describe the structure of the maintenance task list
- Select and process maintenance notifications

Business Example

In companies, maintenance requirements should first be created in the system in the form of notifications, to facilitate triage and coordination.

The notification should also include all the findings that are important for the history and thus for later evaluations.

Create Notification

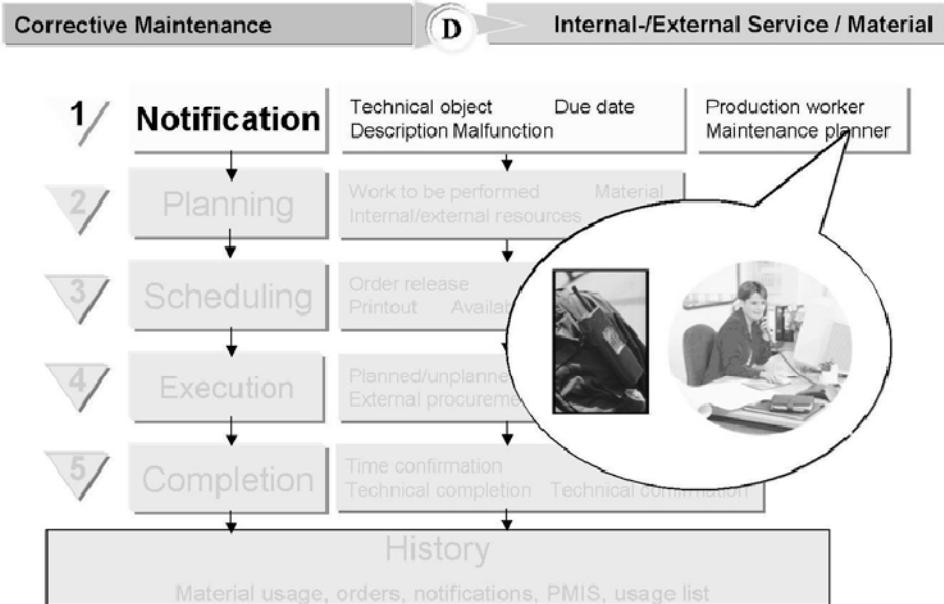


Figure 59: Cycle for Corrective Maintenance

The starting point for corrective maintenance (step 1) is the notification of damage, a malfunction, or some other request (for example, a request for modification work).

The notification usually refers to a technical object and contains a description of the malfunction or requirements. A notification can also contain data for constructing a history (for example, damage, causes, and so on).

A maintenance task, which is very frequently processed using a maintenance order, is introduced owing to the request or malfunction.

A notification does not necessarily lead to the creation of an order.

Maintenance Notification: Structure

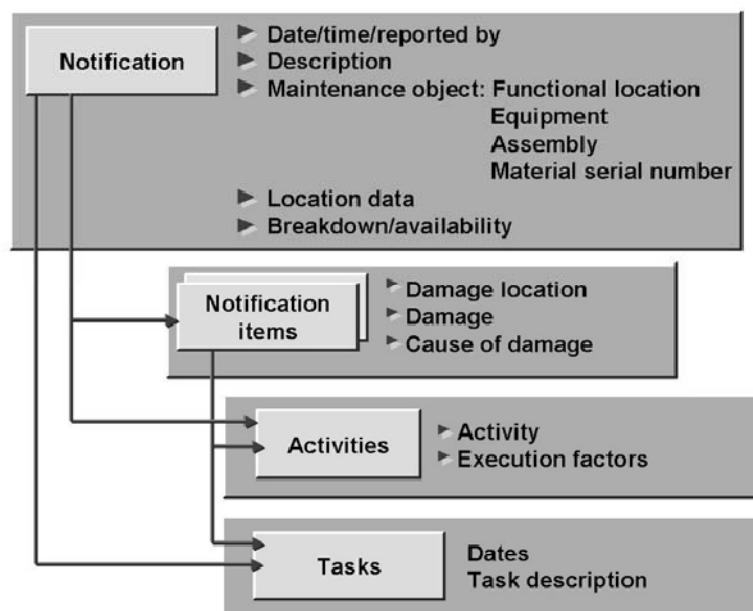


Figure 60: Maintenance Notification - Structure

Each maintenance notification contains **header data**. Header data is information used to identify and manage the maintenance notification. This data is valid for the complete maintenance notification.

You enter and maintain data in a **notification item** to determine a problem, damage, or the activity executed in greater detail. A notification can contain several items.

Activities document the work performed for a notification. They are particularly important for inspections, because they prove that certain tasks have been performed.

The **tasks** describes activities that should still be performed, and which may have only arisen after the maintenance task was executed (for example, creating a report).

However, in some cases, you can also use tasks for planning purposes (for example, if order processing is not active). In this case, you can plan to use different people to process the notification, and monitor the execution of activities for specific periods of time. Note, however, that no cost monitoring, material planning or capacity requirements planning is possible for this type of processing.

Objects in Maintenance Notification

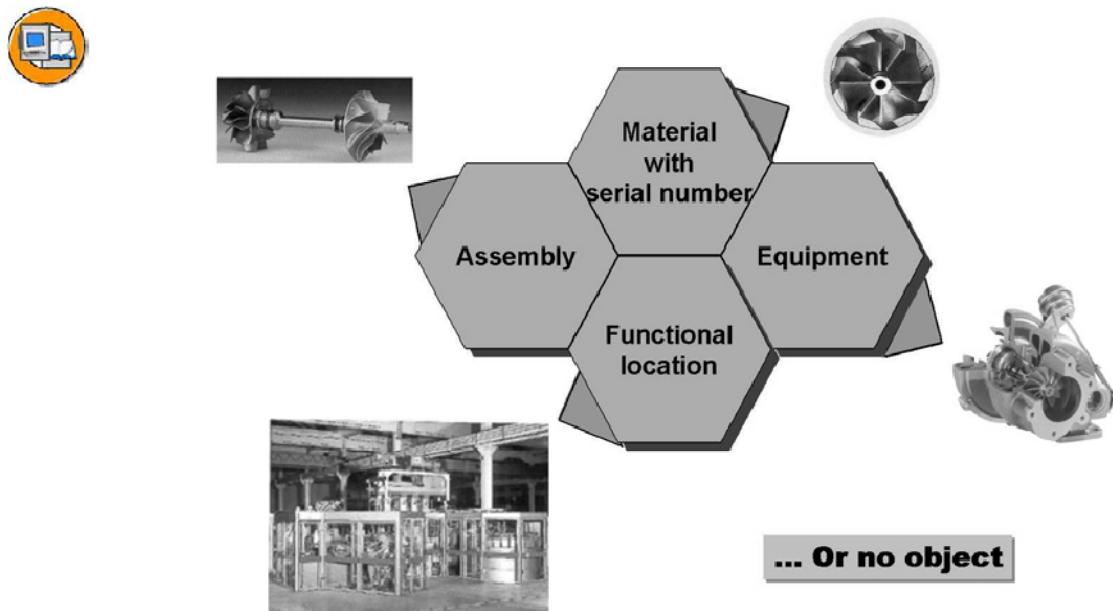


Figure 61: Objects in Maintenance Notification

All the maintenance notification types can be created for a functional location or for an equipment, respectively with or without an assembly, or for a material with a serial number. The hierarchy of this object corresponds to the sequence specified. This means, if you enter a maintenance notification for an assembly on a piece of equipment, which is assigned to a functional location, the system transfers all the relevant data for the piece of equipment and the functional location.

However, you can also enter these maintenance notifications without specifying an object number. This is the case, for example, if a malfunction report refers to an object that is not managed in the system under a number, or if a maintenance request refers to a new object to be provided for an investment program.

The view for the reference object can be selected for an individual notification or notification type as follows:

- Functional location + Equipment + Assembly (standard setting up to now)
- Functional location + Equipment + Assembly, whereby if a functional location has only one piece of equipment, that piece of equipment is automatically set for it.
- Functional location
- Equipment (alternatively with and without assembly)
- Material number + Serial number (alternatively with and without equipment number)
- without reference object

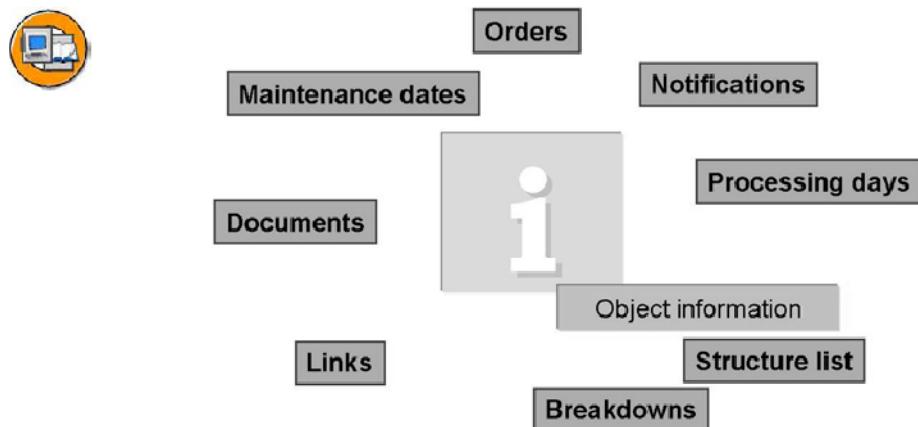


Figure 62: Maintenance Notification - Object Information

You can use the object information to obtain a swift overview of the condition and history of the object concerned.

The dialog box contains data (where available) about the classification of the object. It displays statistics for the maintenance notifications related to the object and the last three maintenance notifications entered for this object with short text, date, and completion. You can also call up information about orders, maintenance items, and maintenance dates.

The dialog box can be displayed automatically if required, provided that certain conditions are fulfilled. For example, you can make settings in Customizing so that the object information is always displayed if notifications for the object are outstanding in a certain period of time. In this way, you (as the person who entered the notification) automatically receive any important information at this point.

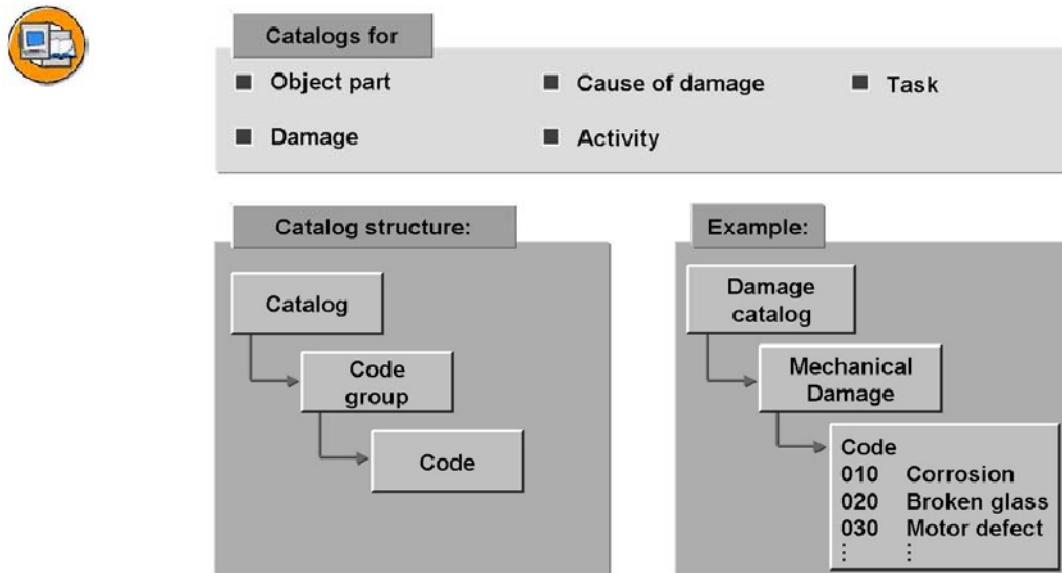


Figure 63: Catalogs

Catalogs are used when maintaining notifications for the coded entry of results and activities. Coded entry is particularly useful for analysis. There are certain standard analyses in the Plant Maintenance Information System (PMIS), which can be used to analyze these codes.

- Catalog: A combination of code groups grouped together by their content (for example, damages, causes of damage).
- Code groups: Combination of code groups, grouped together according to content (for example, damage to vehicles, pumps, motors... or mechanical damages, electrical damages, and so on.)
- Codes: Description of damage, an activity, and so on.

Advantages of catalogs:

- No incorrect entries
- Codes can be used as the starting point for workflows and follow-up actions
- Statistical evaluations are possible using the standard analyses in the Plant Maintenance Information System

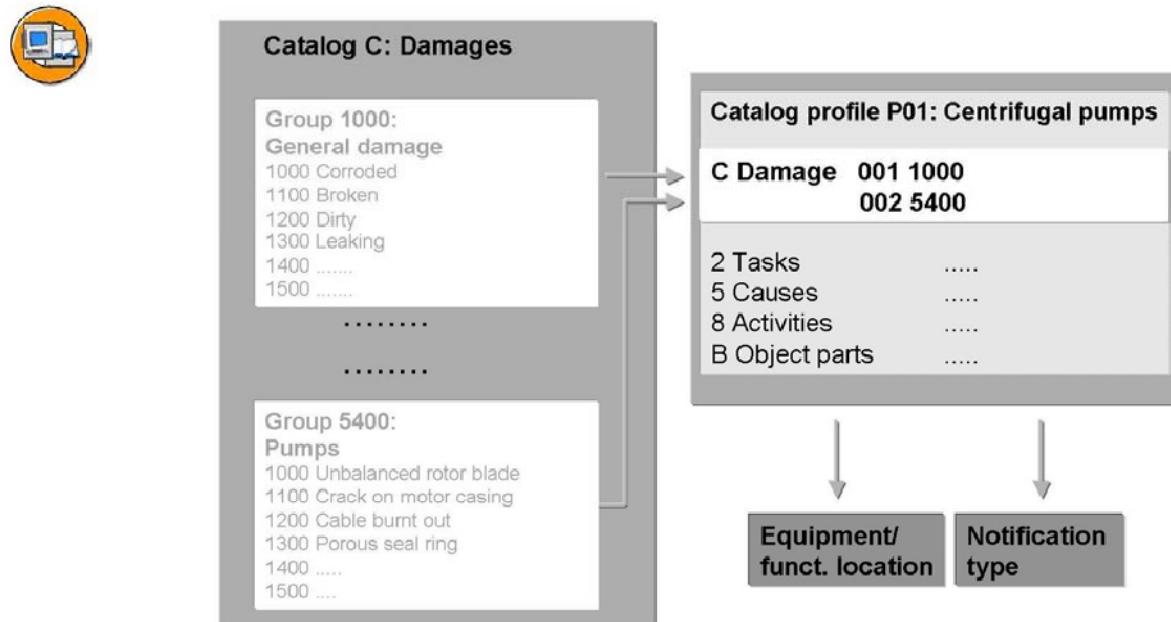


Figure 64: Catalogs and Catalog Profiles

In the catalog profile, you can define which code groups can be used when processing a specific object. The advantage here is that only the code groups relevant for the object are displayed.

Select Maintenance Notifications

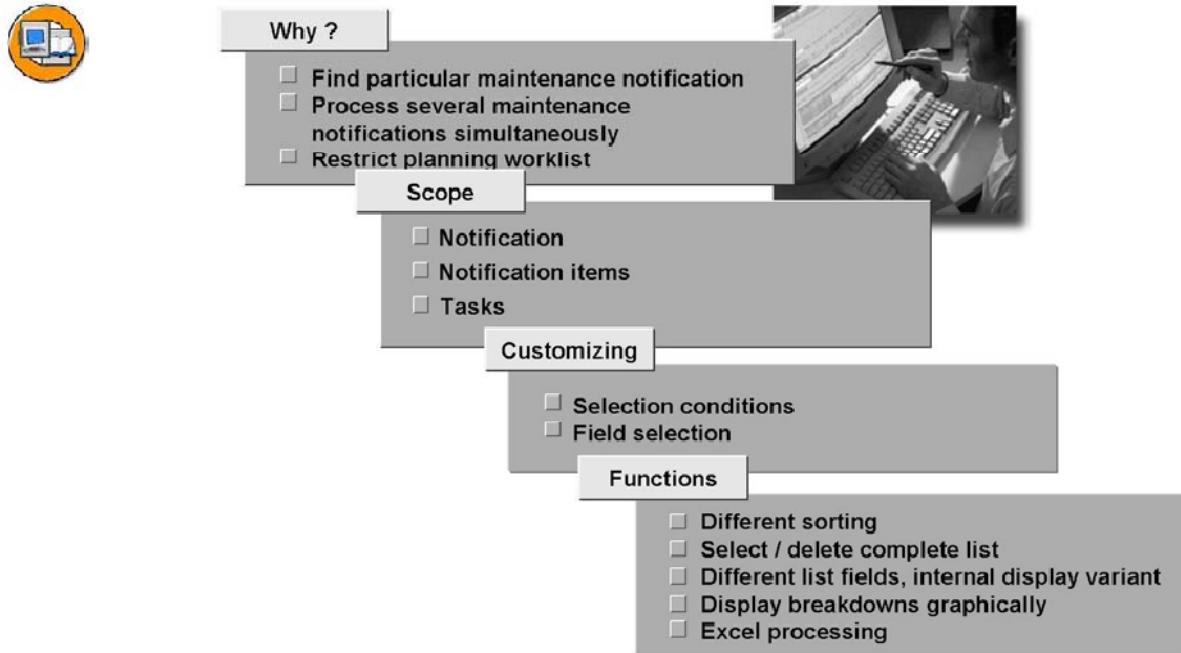


Figure 65: Select Maintenance Notifications

There are many reasons why the system has to support you when selecting maintenance notifications, tasks, and items. For example, if you want to:

- Change or display a specific maintenance notification, but do not know its number.
- Change or display several maintenance notifications which have certain features.
- Execute a specific function simultaneously for several maintenance notifications which have certain features (for example, printing, creating an order).
- Obtain an overview of all the notification tasks that meet specific criteria.
- Have a list of all the notification items that meet specific criteria.



- Sorting according to several columns
- Drag&Drop
- User-specific variants

Selected	Notification	Description	Created
✓	10000497	Breakdown	Martin
✓	10000498	Malfunction:	Martin
	10000499	Cleaning required	Martin
	10000500	Check pump	Martin

Figure 66: SAP List Viewer hitlist selection

The SAP List Viewer, which allows you to flexibly represent and process lists, is available for displaying the results of a selection. For example, you have the option

- Use Drag&Drop to move columns
- To make columns wider and narrower
- To select hits
- To sort hits

The list can also be sorted by several columns simultaneously (for example, by notification date and notification number).

You can also use a customer exit to change lists (for example, to add headings or to change print parameters).

Exercise 10: Notifications

Exercise Objectives

After completing this exercise, you will be able to:

- Describe the structure of the maintenance task list
- Create maintenance notifications
- Select and process maintenance notifications

Business Example

As a preliminary stage in order planning, notifications are collected in the form of requests or malfunction reports and converted into orders by the maintenance planner or combined in an order, for example, according to object.

Task 1:

Creating a Maintenance Request

1. Create a maintenance request for equipment *TEQ-##*, a new welded joint is to be made on the casing of the pump motor.

Enter a damage description and a long text and assign the maintenance request to your maintenance planner group *##* and your work center *T-ME##*.

Which notification number is assigned?

2. Assign an assembly

Select an appropriate maintenance assembly. How do you proceed? What did you select?

3. Object information

Obtain information about the equipment from the object information screen.

What is the practical use of the object information?

What information is offered?

Task 2:

Creating a Malfunction Report

1. Create a malfunction report for your pump *TEQ-##*, the pump is leaking and some of the seals will have to be renewed.

Continued on next page

Enter a malfunction start in the malfunction report and set the breakdown indicator.

Which notification number is assigned?

2. Damage code and cause code

Specify an appropriate damage in your malfunction report and, if already known, a cause of damage. What did you select?

Damage/code group:

Cause/code group:

Task 3:

Selecting Maintenance Notifications

1. Select all the maintenance notifications created in this course (in display mode). Which selection criteria do you choose?
2. Display the list so that you can see who created the maintenance notifications and when; then sort the list alphabetically by the name of the person who entered the notification. How do you proceed?
3. You want to save the settings that you just made in the list for future list displays. How do you save the current settings as a layout?
How can this variant be set as the standard layout?

Solution 10: Notifications

Task 1:

Creating a Maintenance Request

1. Create a maintenance request for equipment *TEQ-##*, a new welded joint is to be made on the casing of the pump motor.

Enter a damage description and a long text and assign the maintenance request to your maintenance planner group *##* and your work center *T-ME##*.

Which notification number is assigned?

- a) Creating a Maintenance Request

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Create (Special) → Maintenance Request*

Field name or data type	Values
Short text	Provide new weld joint
Long text (Create Text button)	Enter text as required
Reference object (equipment)	TEQ-##
Maintenance planner group	I##
Maintenance work center	T-ME##

Notification number assigned: 10000xxx

2. Assign an assembly

Select an appropriate maintenance assembly. How do you proceed? What did you select?

- a) Assign an assembly

The assembly is part of the object structure (object BOM) and is used to precise the damage location.

Structure list symbol in the reference object screen area.

The structure list of the equipment is expanded.

Select material 100-100 (pump housing).

3. Object information

Continued on next page

Obtain information about the equipment from the object information screen.

What is the practical use of the object information?

What information is offered?

a) Object information

Choose the *I-button (blue-white)* in the reference object screen area.

The object information gives an overview of the overall situation of the reference object. This makes it possible to coordinate different areas, such as breakdown processing and maintenance orders. The object information shows you whether there is a maintenance order in the near future which could potentially be extended to repair the malfunction. This saves having to create a separate breakdown order.

The information displayed includes:

- Data on the reference object
- Documents (for example, technical drawings)
- Maintenance dates
- Various key figures
- The last three notifications for the reference object
- The last order for the reference object

Task 2:

Creating a Malfunction Report

1. Create a malfunction report for your pump *TEQ-##*; the pump is leaking and some of the seals will have to be renewed.

Enter a malfunction start in the malfunction report and set the breakdown indicator.

Which notification number is assigned?

a) Creating a Malfunction Report

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Create (Special) → Malfunction Report*

Notification number: 10000xxx

2. Damage code and cause code

Continued on next page

Specify an appropriate damage in your malfunction report and, if already known, a cause of damage. What did you select?

Damage/code group:

Cause/code group:

- a) Damage code and cause code

Field name or data type	Values
Damage/code group	For example: PUMP/100 1000
Cause of damage/code group	For example: PM01 1004

Task 3:

Selecting Maintenance Notifications

1. Select all the maintenance notifications created in this course (in display mode). Which selection criteria do you choose?
 - a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List Editing → Display*
Selection criteria:
For example, *Notification Date Course Start until Course End* and *Created by PLM300**
2. Display the list so that you can see who created the maintenance notifications and when; then sort the list alphabetically by the name of the person who entered the notification. How do you proceed?
 - a) Display and sort list:
Settings → Display Variants → Current
Select *Created on* and *Created by*.
Choose the *arrow to the left* and *Copy*.
Column *Created by* and symbol *Sort Ascending*.
3. You want to save the settings that you just made in the list for future list displays. How do you save the current settings as a layout?

Continued on next page

How can this variant be set as the standard layout?

- a) *Settings → Display Variants → Save as Variant*

Enter the variant name and the variant description and save the entry. A user-specific variant is created.

Settings → Display Variants → Administration

Click in the *Entry Variants* field. A green checkmark appears, **save!**



Lesson Summary

You should now be able to:

- Create maintenance notifications
- Describe the structure of the maintenance task list
- Select and process maintenance notifications

Lesson: Order Planning

Lesson Overview

This lesson covers the planning phase in the corrective maintenance cycle. You create maintenance orders and plan these with regard to the resources required.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the planning phase in the corrective maintenance cycle
- Create a maintenance order
- Describe and execute material planning

Business Example

The order is the most important instrument in planning maintenance tasks. Operations and spare parts are planned and costs collected in the order.

Order Planning

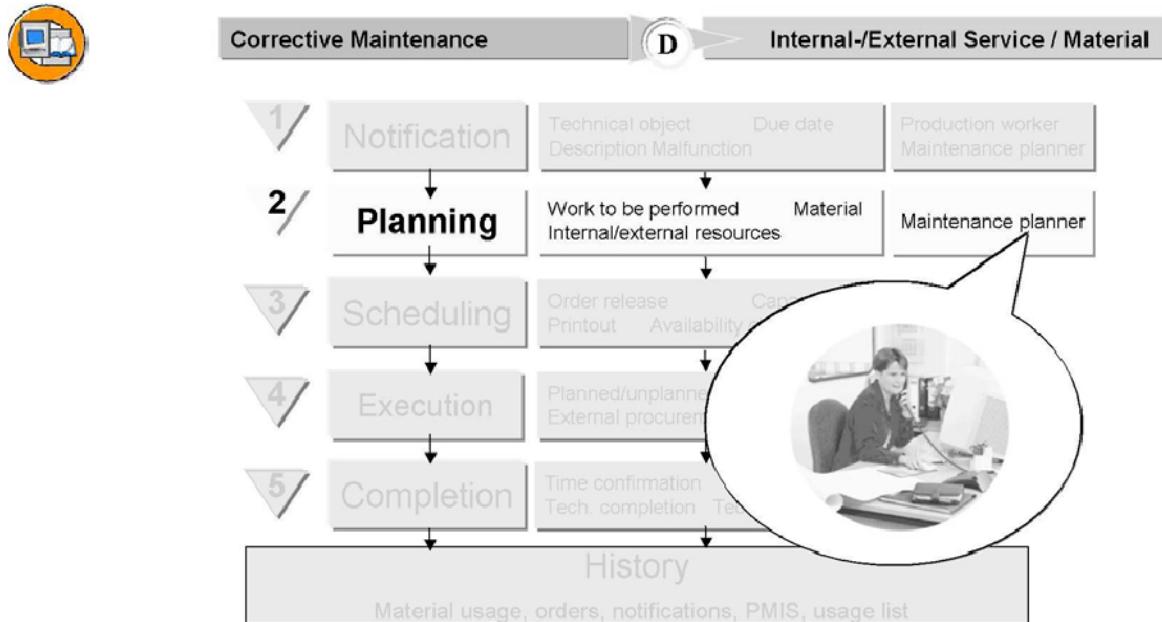


Figure 67: Cycle for Corrective Maintenance

In step 2, the order is created and planned from the notification. Typical planning tasks include creating operations, reserving spare parts, or planning usage times.

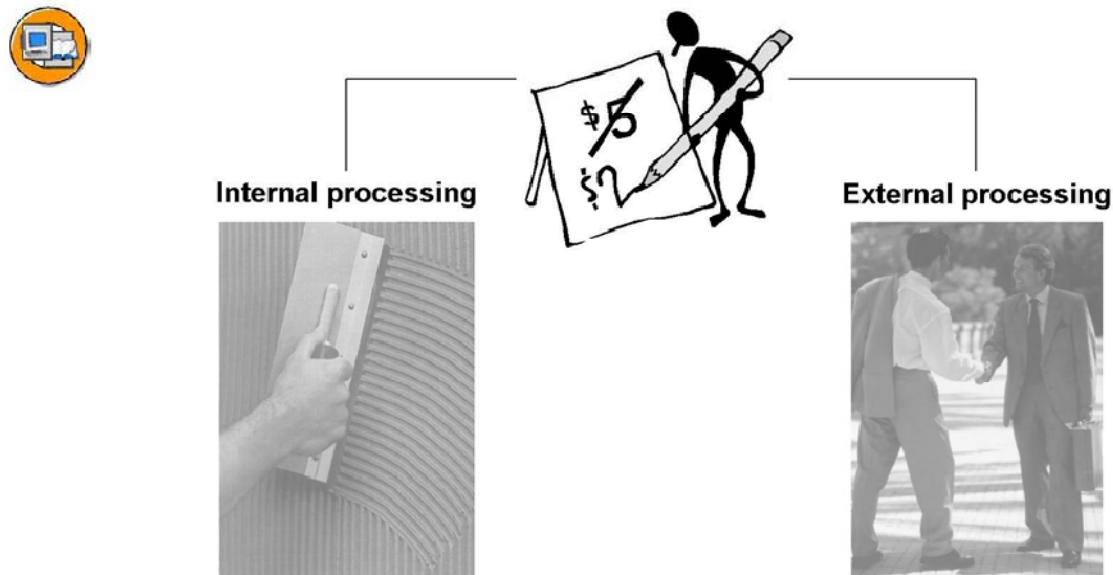


Figure 68: Planning alternatives for internal or external processing

In corrective maintenance, there are basically two options for assigning work to be performed:

- For **internal processing**, internal workshops, which are defined in the system as maintenance work centers, execute the work.
- For **external processing**, external companies are hired. There are three ways of representing this external service.

Operation Planning

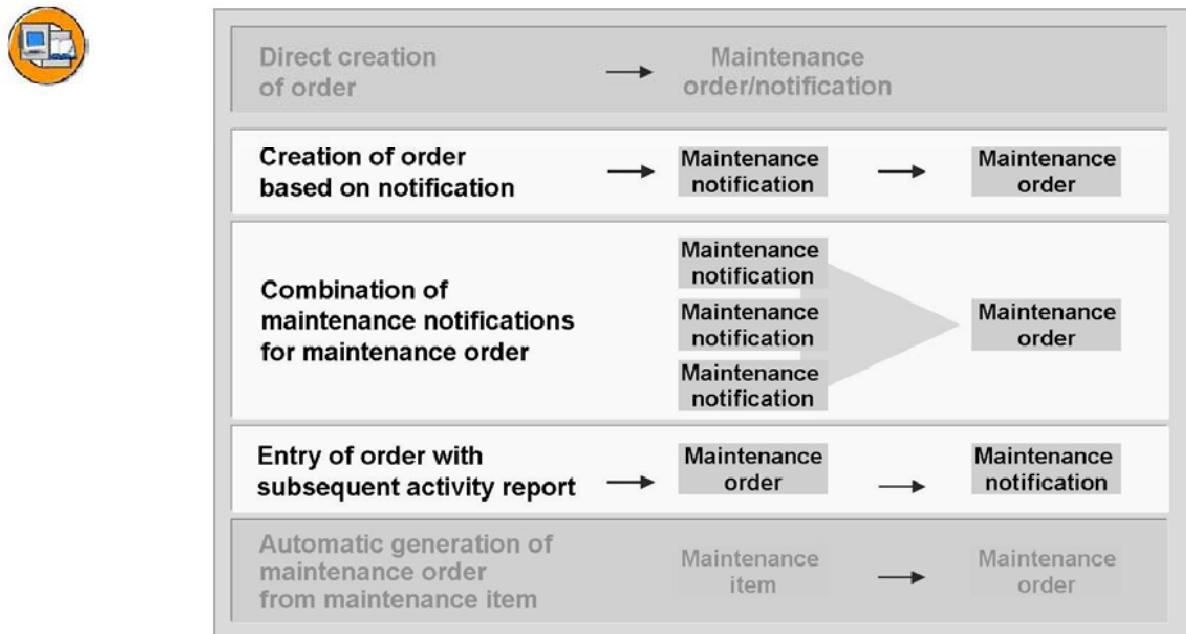


Figure 69: Create Maintenance Orders

1. Case: The maintenance order is created directly (for example, breakdown order)
2. Case: The maintenance notification is not entered centrally. The maintenance order is created for the maintenance notification by the person responsible.
3. Case: In a maintenance order, several maintenance notifications are combined into one or more objects
4. Case: An activity report for an existing maintenance order is entered subsequently as a technical confirmation
5. Case: A maintenance order is automatically generated from a maintenance item by the maintenance plan

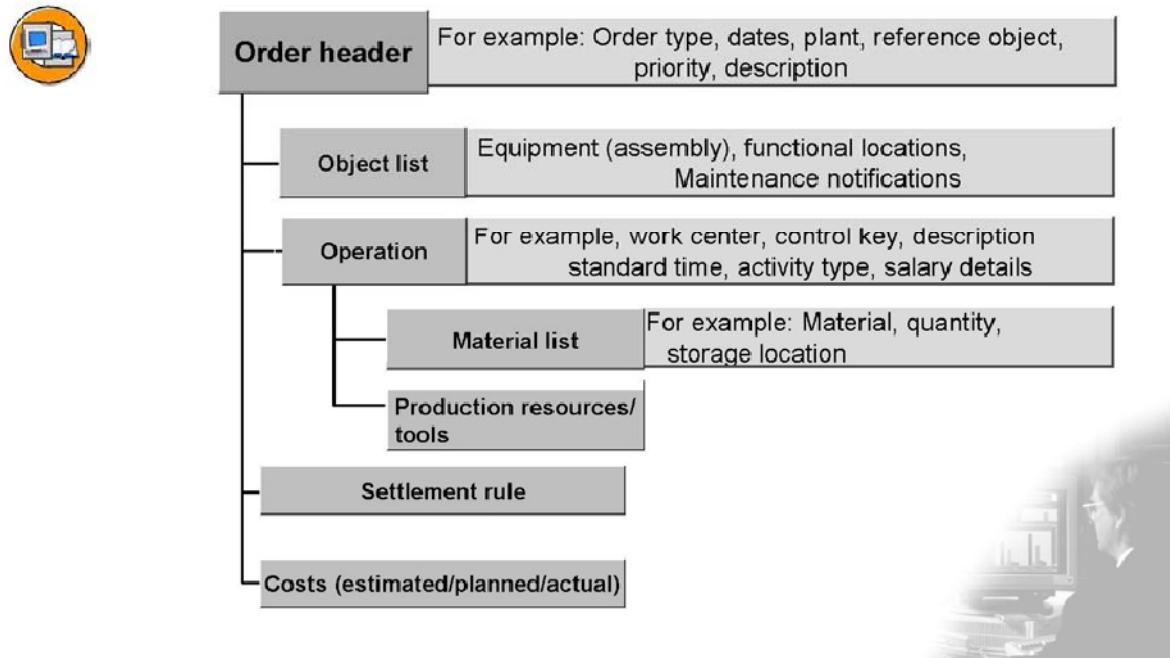


Figure 70: Elements of Maintenance Order

The **header data** contains information that serves to identify and manage the maintenance order. It is valid for the whole maintenance order - for example, the number, description and type of order, scheduled dates for order execution, priority of tasks, creator, last person who changed the order and so on.

The **object list** contains the objects to be processed (functional locations, equipment, assemblies, serial numbers) and is implemented if the same activity must be performed at multiple objects of the same type.

The **order operation** describes the tasks that should be performed for the maintenance order and who performs them with what guidelines.

The **material list (component list)** contains spare parts, which are required and used when the maintenance order is executed.

Production resources/tools (for example, tools, protective clothing, trucks) are required to execute the maintenance order, but are not used up.

The data in the **settlement rule** provides information on who should bear the costs. It is proposed from the master record for the reference object and can be changed when the first settlement rule is maintained for the order.

The **costs** view tells you how much the estimated-, plan-, and actual costs are in the value categories for this order. There is a technical view and a Controlling view available.



Operations List				
Operation	Work center	Control key	Description	...
0010	Unit	PM01	Oil change	
0020	Unit-1	PM01	Drain oil	
0030	Unit-1	PM01	Change oil filter	
0040	Unit-1	PM01	Add new oil	
0050	EL-1	PM01	Renew electrics	
0060	EL-1	PM01	Change battery	
0070	EL-1	PM01	Check cables	
0080	EL-3	PM01	Replace lights	

Figure 71: Operations in Maintenance Order

When you prepare work using operations, you can plan at three different detail levels, depending on the type of maintenance order and the scope of the work planned:

For minor orders with only one operation (fast entry) you can enter the data for an operation in the header data screen in the bottom section of the screen without changing the screen. This operation can be either an internal or external process.

Comprehensive orders without detailed planning: You use the operation overview for these orders. Here, you can enter any number of operations in list form.

Short or comprehensive orders with detailed planning: You use the operation overview and the operation detail screens for these orders. For detailed information about internal processing, use the Operation Internal Processing screen. For detailed information about external processing, use the Operation External Processing screen.

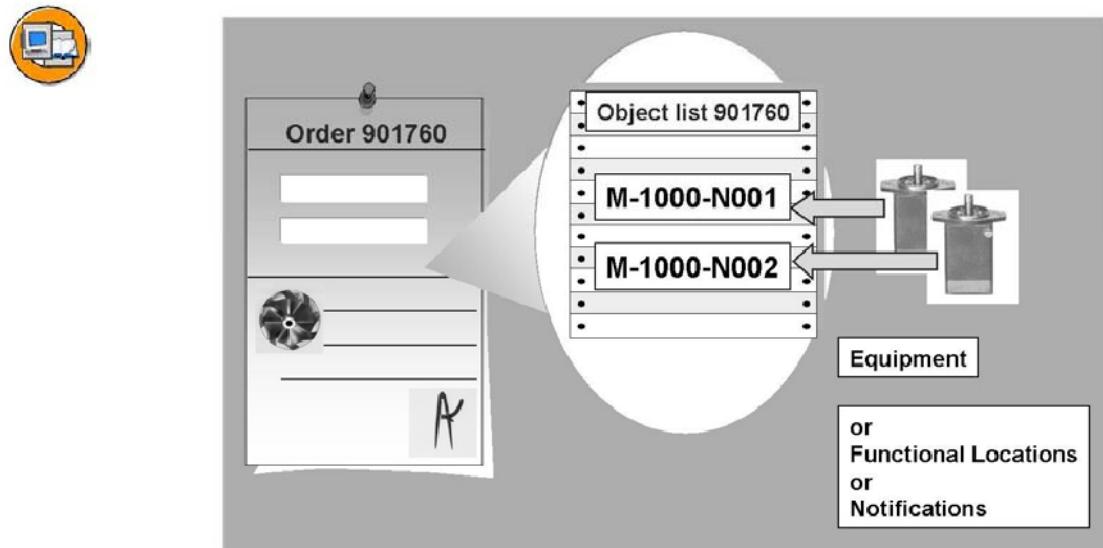


Figure 72: Maintenance Order - Object List

The object list is an integral part of the maintenance order. This is used to compile multiple notifications and also to assign several technical objects to the order.

Even if no reference object has been specified for the maintenance order on the header data screen, you can assign technical objects and/or maintenance notifications to the maintenance order in the object list.

If notifications are assigned to the order using the **object list**, the first notification in the order header appears in the 'Notification' field. The first notification is indicated as the header notification.

Both the header notification and the other notifications in the object list can be separated from the order again.

The object list does not "control" the order - no adjustment of work to be performed, update of history or cost distribution will take place.

You can use **customer exit IWO10027** to distribute the order costs proportionately to the objects in the object list. Customer exits are dealt with in the following courses.

Material planning

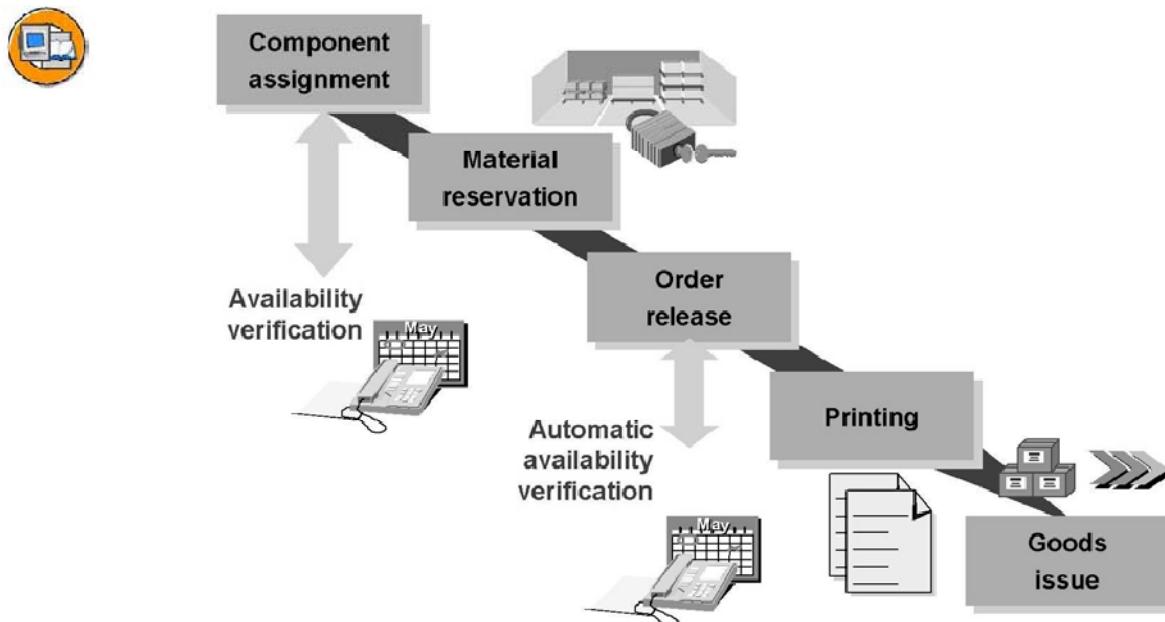


Figure 73: Planning of Stock Material - Process Flow

You can plan materials, which are required to execute the task, for each operation in the maintenance order. The materials can be bill of material components for the reference object or freely assigned materials.

The materials that you plan for the maintenance order will be reserved in the warehouse, if they are kept in stock. You can set the reservation time in your system using the Customizing function. In Customizing, it is decided for each order type, whether the system should make the material reservation effective or generate the purchase requisition immediately or only when the order is released.

An availability check can be called up when components are assigned in the order.

An automatic availability check is performed when the order is released. The order can also be released if there is no availability.

A material provision list and material withdrawal slips can be printed together with the order papers.

Planned goods issues are entered with reference to the reservation (reservation number), unplanned goods issues with reference to the order number.

The goods issues entered appear in the document flow of the order.

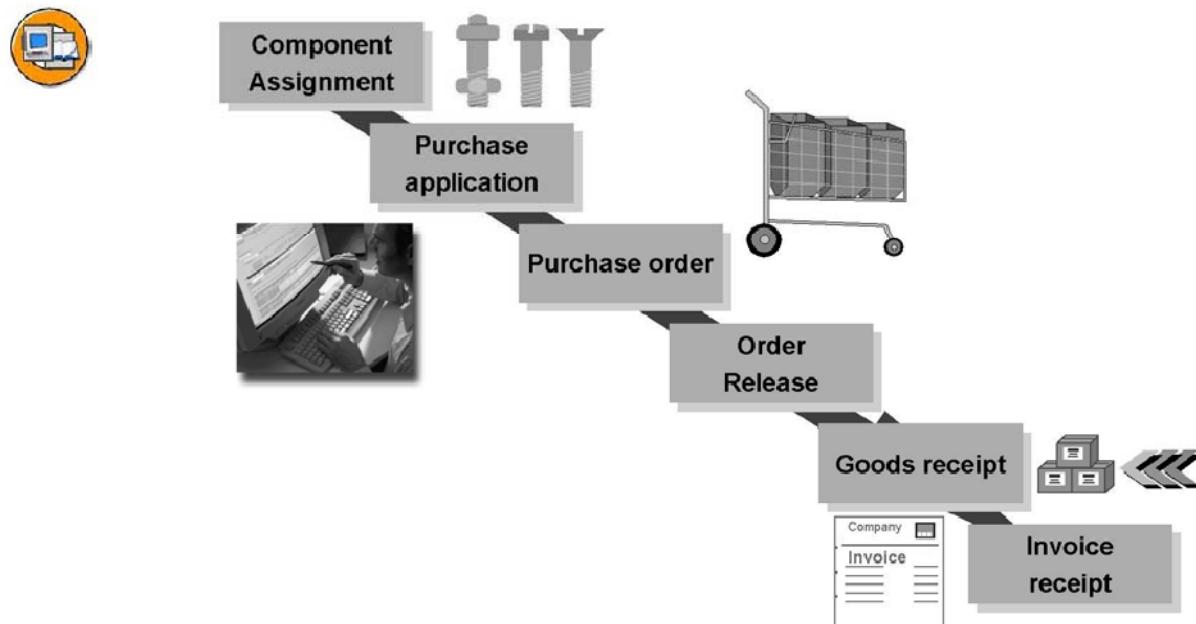


Figure 74: Planning of Non-Stock Material - Process Flow

When components are assigned in the order, additional purchase information can be entered.

Depending on the order type, the purchase requisitions are generated either when the order is saved or released.

In purchasing, purchase orders are generated from purchase requisitions. The purchase order items are assigned to the maintenance order.

Goods receipts are entered with reference to the purchase order after the order has been put in process. The account assignment of the purchase order to the order instigates the posting to the order.

When goods receipts are entered, the maintenance order is debited with the purchase order value.

When the invoice is received, any invoice differences are automatically credited to, or debited from the maintenance order.

The goods receipts entered appear in the document flow of the order.



Direct Catalog Access



Catalog access through EBP

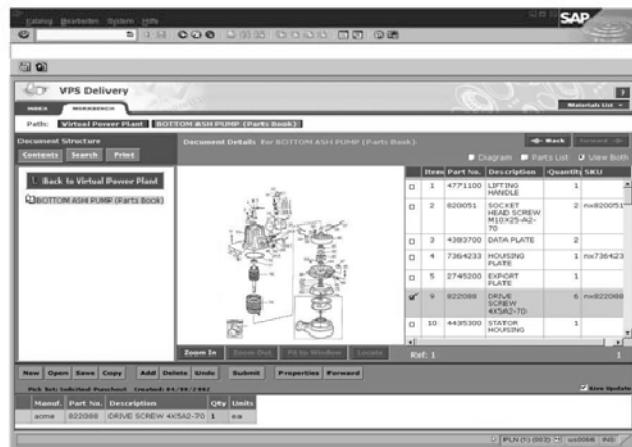
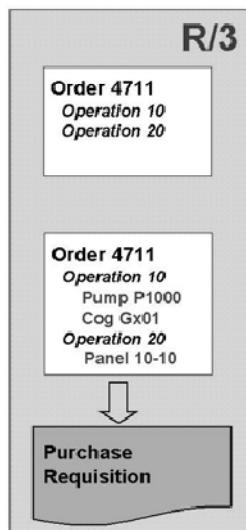


Figure 75: Material Through Internet Catalog

The material planning in the maintenance order can be based on **Internet catalogs**, as well as on direct material assignment and the use of BOMs.

From the order you can access an external catalog directly (as of Enterprise release) or you can connect to the catalog through the **SAP Enterprise Buyer** component (previously known as EBP - Enterprise Buyer Professional) (R/3 4.6C).



To the catalog

1

Components transfer

3

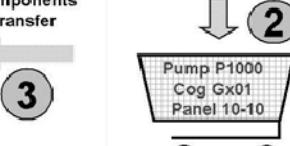
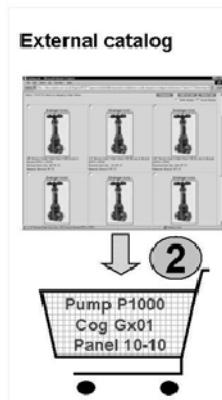


Figure 76: Direct Catalog Access

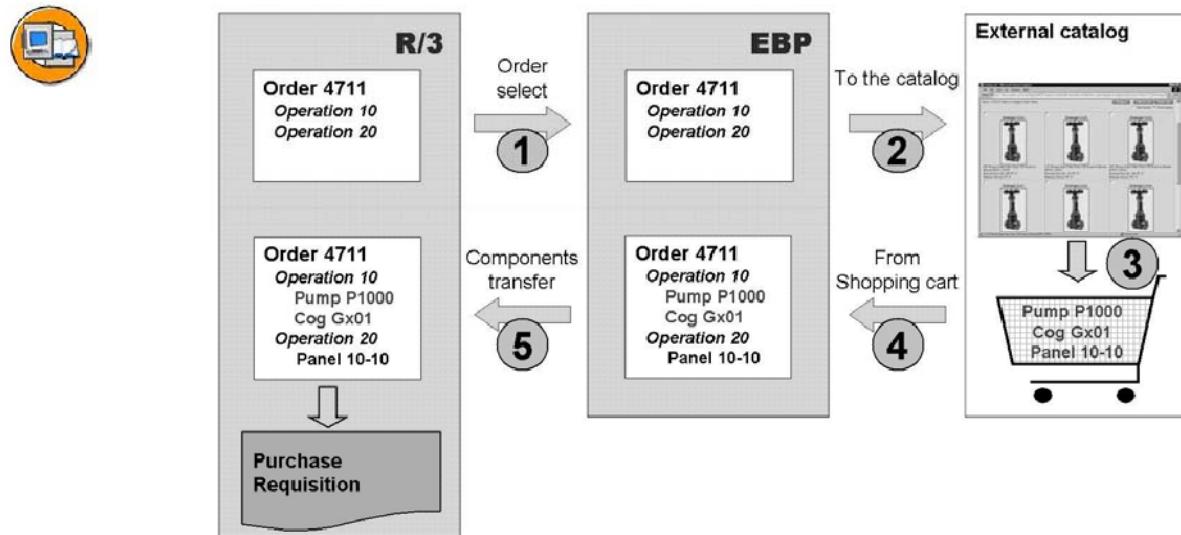


Figure 77: Access to catalog via the SAP Enterprise Buyer

A prerequisite for this process is that the EBP system's Customizing must be set up on the back-end system (R/3). EBP and the back-end system are linked to each other.

A possible process could be as follows:

Maintenance order is created in the backend system.

EBP system is started through the URL (<http://...>).

Component planning is started and the system looks for the order.

An operation is selected.

Components are sought in and selected from a catalog defined in the EBP.

The component list is transferred to the EBP where it is completed or changed.

The component list is then transferred to the back-end system.

The component list is copied and added to the operation (usually as a non-stock item).

When you save or release the order, a purchase requisition application is generated.

You can find further information on this topic in the PLM315 and EPR210 courses.

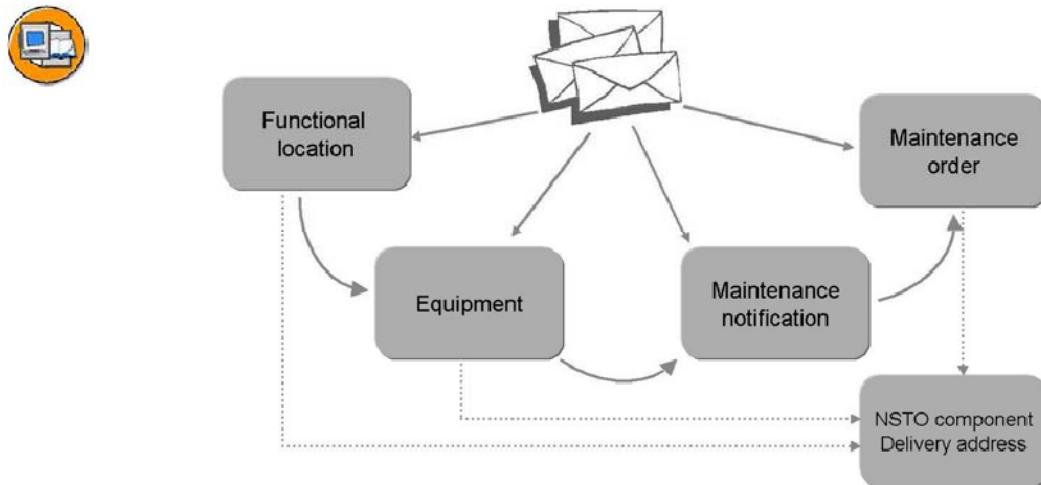


Figure 78: Central Address Management

The following objects are linked to address management:

- Functional location
- Equipment
- Notification
- Order
- Components for non-stock material (order)

You also have the option of specifying the delivery address for non-stock material in the order and transferring it to purchasing. The delivery address can also be derived automatically using definable rules.

Cost Analysis

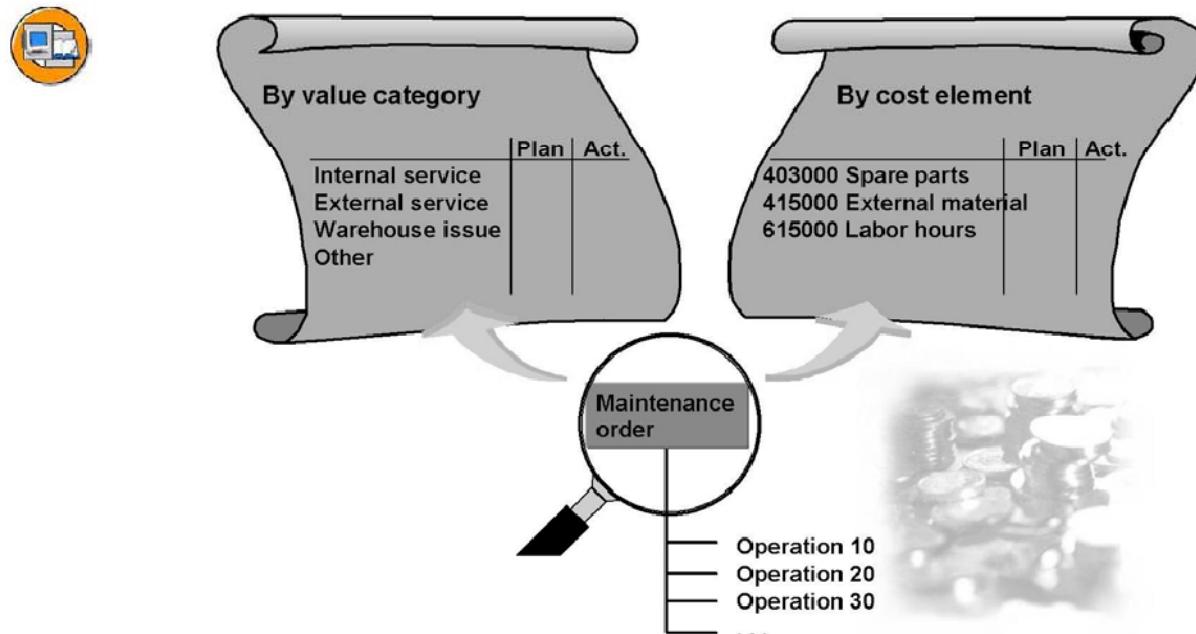


Figure 79: Cost Analysis in Maintenance Order

You can display the expected costs in two ways:

- At cost element level (Controlling view)
- At value category level (Maintenance view)

In Customizing, cost elements are assigned to value categories.

Exercise 11: Planning Orders

Exercise Objectives

After completing this exercise, you will be able to:

- Describe the structure of a maintenance order
- Create operations
- Plan material
- Structure an object list
- Manage addresses
- Display the cost overview

Business Example

The order is the most important instrument in planning maintenance tasks. Operations and spare parts are planned and costs collected in the order.

Task 1:

Creating Orders

Maintenance orders can be created in different ways:

- From the notifications list
 - From an individual notification
 - Directly (without a notification)
1. You are the responsible maintenance planner and want to plan orders on the basis of your notifications list.

Create a maintenance order for your malfunction report from the notification list (order 1).

How do you select your notifications?

How do you proceed?

Note the number of the order:

2. Which order type and which additional data is proposed and why?

Save the order. Which number is assigned to it?

Continued on next page

Task 2:

Create an order from the processing of an individual maintenance notification.

1. Create a maintenance order (order 2) for your maintenance request and assign the order type PM03.

Assign the order to your work center *T-ME##* and assign the business area 1000.

How do you proceed?

Save the order and make a note of the order number:

2. Which data from the notification has been transferred to the order header?

Order short text	
Order long text	
Priority	
Maintenance planner group	
Required start date	
Required end date	

Task 3:

Create an order directly

1. The electric supply cables for three pumps in the clarification plant C1 are to be replaced. Create an order for this work directly (that is, without reference to a maintenance notification). Use order type PM01. Make the necessary entries in the object list.

How do you make entries in the object list and what equipment have you selected?

Save the order.

Note the number of the order:

Task 4:

Operations

1. Enter operations for your maintenance orders. Use the existing standard text (=standard text key) to do this.

Order 1: _____

Continued on next page

Order 2: _____

Order 3: _____

Which standard texts have you used?

2. What extra step must be performed for order 3 (order with object list) with regard to the objects? When should you perform this step?

Task 5:

Material planning – Material general material list

1. Assign material from the general material list to an operation in order 1 (renew seals).

Order	
Operation	
Material number	
Required quantity	

2. Material planning - Material from the bill of material

In addition, assign a material to another operation in order 1 (renew seals) using the bill of material.

How should you proceed?

Which bill of material is proposed? Why?

Order	
Operation	
Material number (in BOM)	
Quantity according to BOM	

3. Material planning – Non-stock material

Assign a non-stock item to order 1 (renew seals).

Operation	
Material number	
Item category	

Continued on next page

Purchasing group	
Price	
Vendor	
G/L account	
Material group	

4. Material planning – Delivery address non-stock material

Check the delivery address for your non-stock item. Which menu path do you use? Which specifications are made? Why? If you have not found a delivery address, enter a new one.

Name	
Postal code, City:	
Street	

Task 6:

Standard cost estimate – cost overview

1. Display the cost overview for your order.

Which menu path do you use?

Which valuation categories contain planned costs?

Value category	Planned costs

2. Cost analysis - Planned/actual comparison

Determine the cost elements used by planned costs in your order.

Which menu path do you use?

Solution 11: Planning Orders

Task 1:

Creating Orders

Maintenance orders can be created in different ways:

- From the notifications list
- From an individual notification
- Directly (without a notification)

1. You are the responsible maintenance planner and want to plan orders on the basis of your notifications list.

Create a maintenance order for your malfunction report from the notification list (order 1).

How do you select your notifications?

How do you proceed?

Note the number of the order:

- a) Create an order from the notification list

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List Editing → Change*

Select notification(s) and then *Notification ? Create order*.

or

Choose *Generate Order*.

2. Which order type and which additional data is proposed and why?

Continued on next page

Save the order. Which number is assigned to it?

a)

Field name or data type	Values
Order type	The order type is proposed on the basis of a Customizing setting Important: The order type can no longer be changed here
Data from malfunction report	Short text Long text (depending on Customizing) Basic dates Reference object Priority
Order number	xxxxxx (assigned by the system after saving)

Task 2:

Create an order from the processing of an individual maintenance notification.

1. Create a maintenance order (order 2) for your maintenance request and assign the order type **PM03**.

Assign the order to your work center *T-ME##* and assign the business area 1000.

How do you proceed?

Continued on next page

Save the order and make a note of the order number:

- a) Create an order from the processing of an individual maintenance notification.

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List Editing → Change*.

Select notification

GoTo → Notification

(from the notification header)

Maintenance notification → Order → Create → Directly

or

SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Change

Enter notification number

Choose (from the notification header) *PM Notification → Order → Create → Directly*.

2. Which data from the notification has been transferred to the order header?

Order short text	
Order long text	
Priority	

Continued on next page

Maintenance planner group	
Required start date	
Required end date	

- a) Data copied to the order header:

Field name or data type	Values
Order short text	Yes
Order long text	Depending on Customizing
Priority	Yes
Maintenance planner group	Yes
Required start date	Yes
Required end date	Yes

Task 3:

Create an order directly

1. The electric supply cables for three pumps in the clarification plant C1 are to be replaced. Create an order for this work directly (that is, without reference to a maintenance notification). Use order type PM01. Make the necessary entries in the object list.

How do you make entries in the object list and what equipment have you selected?

Save the order.

Continued on next page

Note the number of the order:

- a) Choose

SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General).

Order type *PM01*, Functional Location *K1*

Select equipment items in order header

Objects tab page, *Equipment selection* button

Selection conditions:

Object description *pump*

Functional location *K1**

Equipment:

For example:

Field name or data type	Values
P-1000-N001	Electric pump 001
P-1000-N002	Electric pump 002
P-1000-N003	Electric pump 003



Note: Several items of equipment can be chosen from the list by holding down the CTRL key and selecting the row for each item of equipment using the mouse. Then click the icon with the green check mark to transfer the equipment.

Task 4:

Operations

- Enter operations for your maintenance orders. Use the existing standard text (=standard text key) to do this.

Order 1: _____

Order 2: _____

Order 3: _____

Continued on next page

Which standard texts have you used?

- a) Plan order operations

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Operations tab page

Choose F4 in the operation line for the *Std txtfield*:

For example, deactivate standard text key PM000001 and security check, and so on.

2. What extra step must be performed for order 3 (order with object list) with regard to the objects? When should you perform this step?

- a) Order 3 with object list:

You must set the execution factor for the operations according to the equipment entered in the object list.

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*.

Operations tab page

Mark operation, *Exec.fact.* button (bottom right)



Hint: If possible, the factor should only be set if the operations have been fully planned (and therefore after material planning), so that times and materials can be projected accordingly.

Task 5:

Material planning – Material general material list

1. Assign material from the general material list to an operation in order 1 (renew seals).

Continued on next page

Order	
Operation	
Material number	
Required quantity	

a) Material planning – Material general material list

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Operations tab page, double click on the operation number

In the operation detail *Components* tab page

In the *Components* field, click F4 for input help and search for the material using the material short text - enter *Dens** in this case, for example - or enter the material number directly into the *Components* field.

Field name or data type	Values
Order	See previous exercises
Operation	For example: 0010
Material number	For example: 100 -100
Required quantity	For example: 12 pc
Item category	L (stock item – usually inserted automatically)

2. Material planning - Material from the bill of material

In addition, assign a material to another operation in order 1 (renew seals) using the bill of material.

How should you proceed?

Which bill of material is proposed? Why?

Continued on next page

Order	
Operation	
Material number (in BOM)	
Quantity according to BOM	

- a) Material planning - Material from the bill of material

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Operations tab page, double click on the operation number

In the operation detail *Components* tab page

List button (=structure list)

Bill of material:

The system proposes the bill of material of material P-1000.

Reason: The piece of equipment does not have an equipment BOM, but is assigned to construction type P-1000 (= material P-1000) which has a material BOM.

Field name or data type	Values
Order	See exercises 2-1 to 2-3
Operation	For example: 0020
Material number (in BOM)	For example: 100 -400
Quantity according to BOM	For example: 1 pc

3. Material planning – Non-stock material

Assign a non-stock item to order 1 (renew seals).

Operation	
Material number	
Item category	
Purchasing group	
Price	

Continued on next page

Vendor	
G/L account	
Material group	

- a) Material planning – Non-stock material

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Choose *Operations* and confirm by double-clicking on the operation number.

In the operation detail *Components* tab page

Field name or data type	Values
Item	0010
Description	Enter as required
Material number	None
Required quantity	For example: 5
Item category	N
Unit of measure	For example: pc

Select the item and choose *Purchasing*.

Purchasing group	007
Price	For example, 25 per 1 unit of measure
Vendor	1000
G/L account	415000
Material group	For example: 007

4. Material planning – Delivery address non-stock material

Check the delivery address for your non-stock item. Which menu path do you use? Which specifications are made? Why? If you have not found a delivery address, enter a new one.

Continued on next page

Name	
Postal code, City:	
Street	

- a) Material planning – delivery address non-stock material

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Operations tab page, double click on operation number

In the operation details, choose *Components*.

Mark item and symbol with envelope (delivery address)

Field name or data type	Values
Name	Astralis GmbH
Postal code, City:	DE 69190 Walldorf
Street	Am neuen Schulhaus 4

Task 6:

Standard cost estimate – cost overview

1. Display the cost overview for your order.

Which menu path do you use?

Which valuation categories contain planned costs?

Value category	Planned costs

Continued on next page

- a) Cost analysis – Cost overview

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Costs tab page

Value categories:

Value category	Planned costs
Internal material	Depending on planning
External material	Depending on planning
Internal labor	Depending on planning

2. Cost analysis - Planned/actual comparison

Determine the cost elements used by planned costs in your order.

Continued on next page

Which menu path do you use?

- a) Cost analysis - Planned/actual comparison

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Costs tab page

Extras → Cost Reports → Planned/actual comparison

or

Or the button *Planned/actual comparison* in the cost overview

Cost element	Planned costs
400000 Raw materials consumed	Depending on planning
415000 External procurement	Depending on planning
615000 Direct settlement of services	Depending on planning
890000 Consumption of semi finished products	Depending on planning



Lesson Summary

You should now be able to:

- Describe the planning phase in the corrective maintenance cycle
- Create a maintenance order
- Describe and execute material planning

Lesson: Scheduling of Maintenance Tasks

Lesson Overview

In this lesson you will get to know the control phase in the corrective maintenance cycle. You will select orders, release them and print the relevant order papers.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the control phase in the corrective maintenance cycle
- Select the required maintenance orders
- Release and print the maintenance orders

Business Example

The maintenance planner is responsible for ensuring that the orders are processed in time. The planner must ensure that the materials are available, shop papers printed, and order released for processing.

Select Orders and Check Material Availability

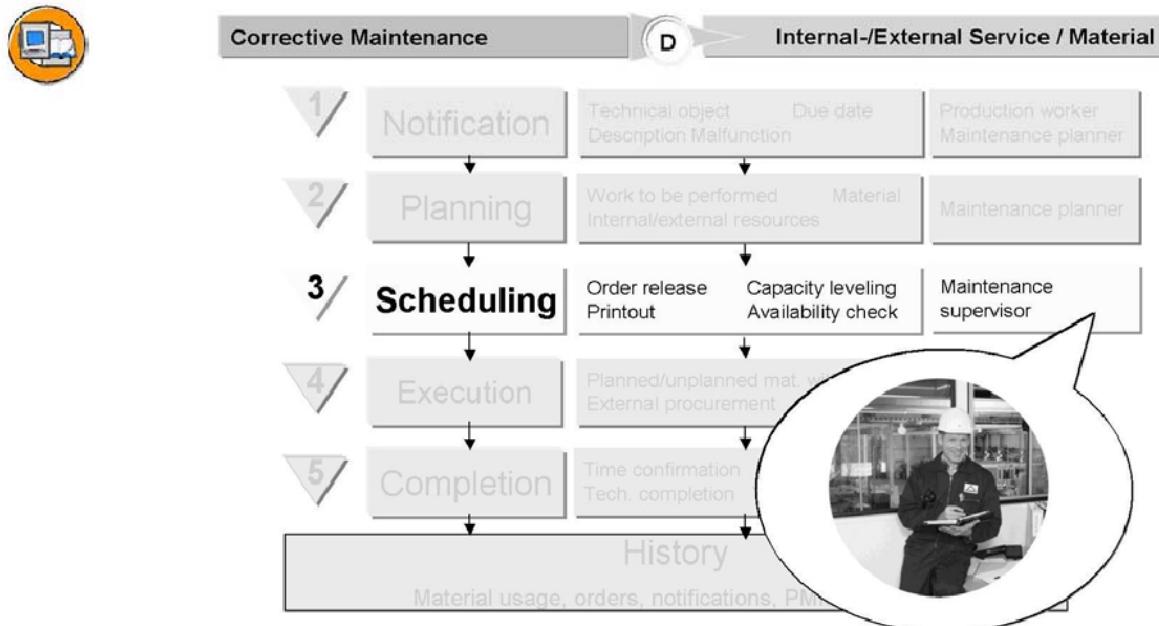


Figure 80: Cycle for Corrective Maintenance

In step 3, the order is subjected to various checks: The material availability and the capacities required are checked and the required shop papers are printed.

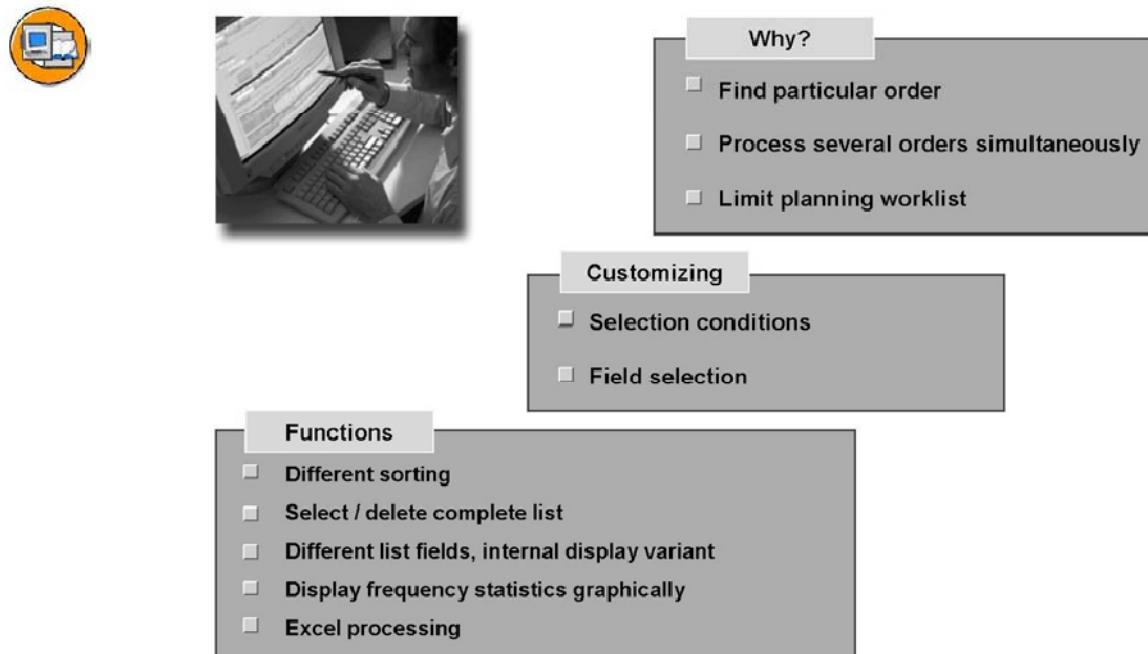


Figure 81: Select Maintenance Orders

You use the selection function for maintenance orders if you want to:

- Change or display a particular maintenance order, whose number number you do not know
- Change or display several maintenance orders which have certain features
- Obtain an overview of specific maintenance orders which have certain features
- Execute the same function for certain maintenance orders, for example, release, print, or complete them

If you have created a list, which includes all the maintenance orders or operations required, you can process it using the following functions:

- Re-sort list
- Search for particular character sequences in the list
- Mark list and list entries
- Change field selection on the list
- Change field selection on the list
- Process list with spreadsheet
- Display graphic for frequency statistics
- Display scheduling overview
- Execute order functions in list
- Perform download for order data in list

The SAP List Viewer (similar to the notification list) is used to display the hit list selection.

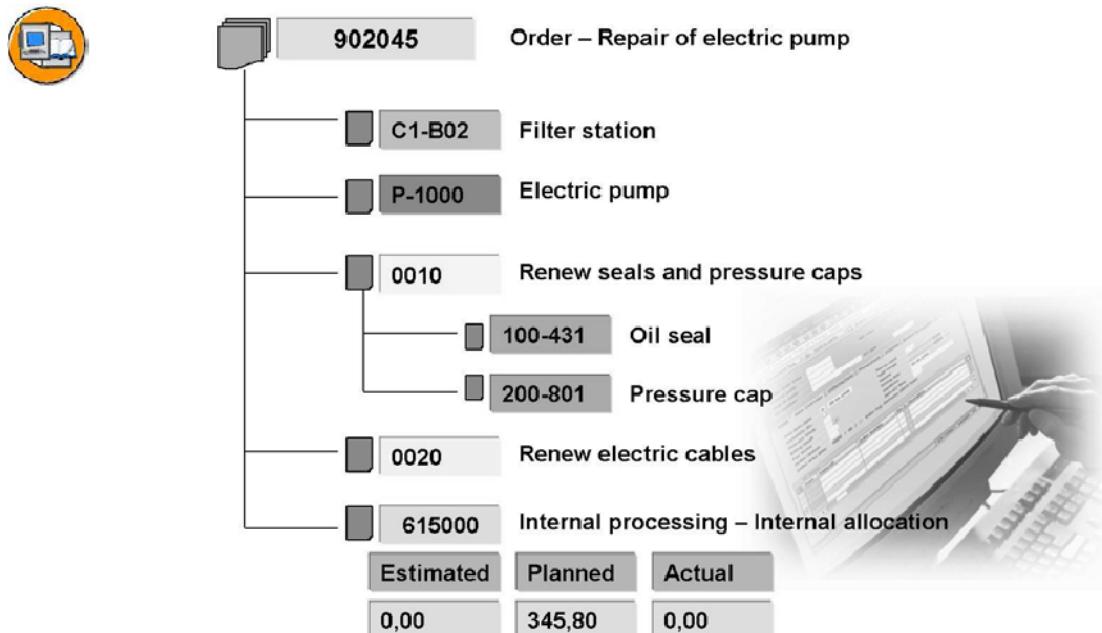


Figure 82: Multi-Level Order Lists

When you create a multi-level order list, you receive a color-coded list containing all the groups of data that you requested on the selection screen. This provides you with an overview of all the important data contained in the maintenance order.

To process the list further, you can now also:

- Display the color legend
- Show and hide data
- Select the fields, which you want to display in the list, for each data group that you choose from the selection screen
- Display the master record for each technical object in the list
- Display the resources for each maintenance order required in the list
- Download the data for maintenance orders in the list

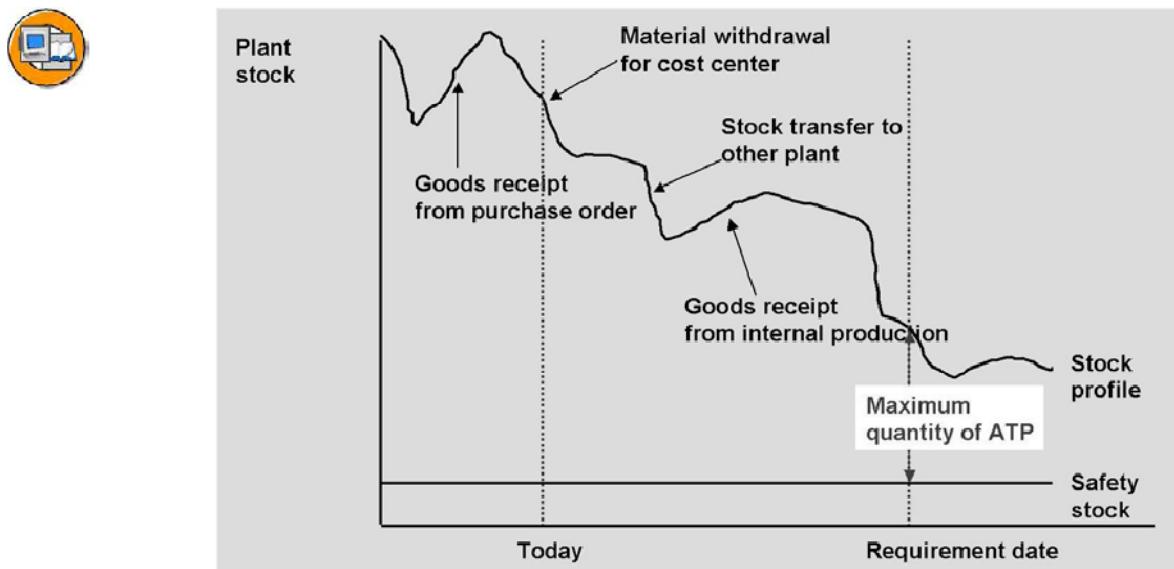


Figure 83: Availability Check for Stock Material as Part of Resource Planning

When you schedule stock materials to execute order operations, the system can check in a single step whether all the materials in the maintenance order are available in sufficient quantities. You use the availability check function for this.

The system now performs an availability check for all the materials, which have been assigned to the maintenance order in its operations, in accordance with the system settings and entries in the material master records. The system informs you of the result in an online message. If there is a lack of availability, you can display an error log that contains detail data about the result of the check.

When you release a maintenance order, the system performs an availability check for planned materials, depending on your Customizing settings. If this check reveals that certain planned materials are not available in sufficient quantities, you may or may not be able to release the maintenance order, depending on your system settings.

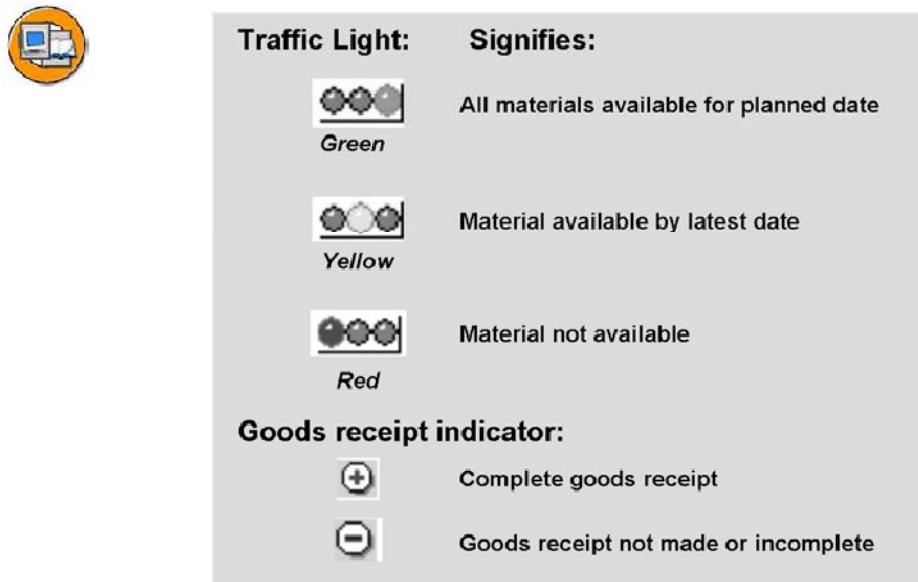


Figure 84: Material Availability List

You can display information about the availability of materials, which have been planned for an order, in the material availability list.

For non-stock items, the list enables you to see whether the date for the planned goods receipt (from a purchase requisition or purchase order) is sufficient to meet the earliest or latest start date for the operation. You can also see why it may not be possible to meet the deadline for a planned goods receipt.

For stock items, the quantity determined and confirmed by the material availability check is compared with the quantity required.

→ **Note:** The data in the list is not simulation data used to determine the most favorable start date. The list displays valid material availability for the order that the system has determined based on valid data.

You can also flag individual order components as not relevant for planning. This means that no reservation or purchase requisition is generated from such a component.

The availability list can be started within an order and from the list editing function for orders.

If you call up the availability list from list editing, the hit list can be displayed at different summation levels (order level, orders with operations, orders with operations and material items and so on).

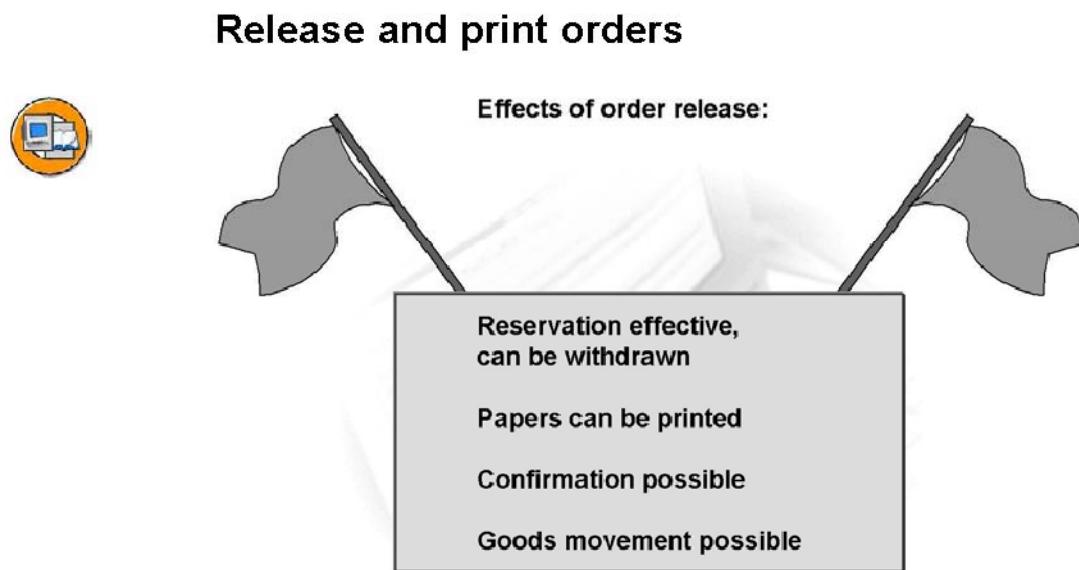


Figure 85: Order release

When you release a maintenance order, the system checks the availability of material, production resources/tools, and the necessary permits. At the time of release (at the latest), material reservations become relevant for materials planning, materials can be withdrawn, and purchase requisitions generated.

The following activities can only be performed after you have released the order:

- Print shop papers
- Withdraw material
- Book goods receipts
- Enter time confirmations
- Complete task

You can release a maintenance order immediately after it has been created. This option is also available for maintenance orders created automatically by the system (for example, orders from maintenance plans).

To enable these orders to be released upon creation, the indicator *Release immediately* must be set for the required order types by the system administration in Customizing.

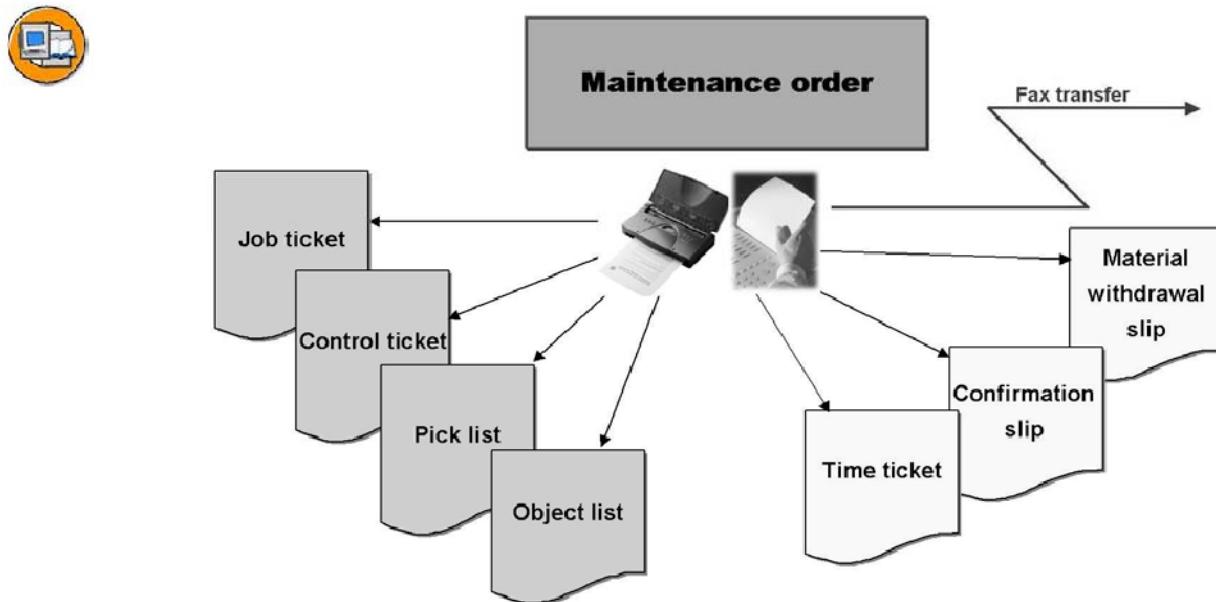


Figure 86: Print Maintenance Order

Job ticket: The job ticket is a document which gives the person executing the maintenance work a complete overview of the order. If your system is connected to the Document Management System (DMS), you can also print graphics (for example, engineering/design drawings of the technical system concerned) on the job ticket.

Operation control ticket: Shows the maintenance engineer responsible a complete overview of the maintenance order. It also contains information about permits.

Material pick list: Shows the warehouse clerk which materials have been planned for each operation in this order.

Object list: Shows an overview of the objects (technical objects, notifications) involved in the order.

Time ticket: Contains the standard time and duration, and is only printed for operations with the corresponding control key. For each manual worker involved on the order, time tickets are printed in the numbers specified for each operation. The worker enters the time required to execute the operation on the time ticket.

Confirmation slip: Used by workers as an entry sheet for their work times.

Material withdrawal slip: Authorizes the person executing the maintenance work to take the materials required for the order from the warehouse. One material withdrawal slip is printed for each material component.

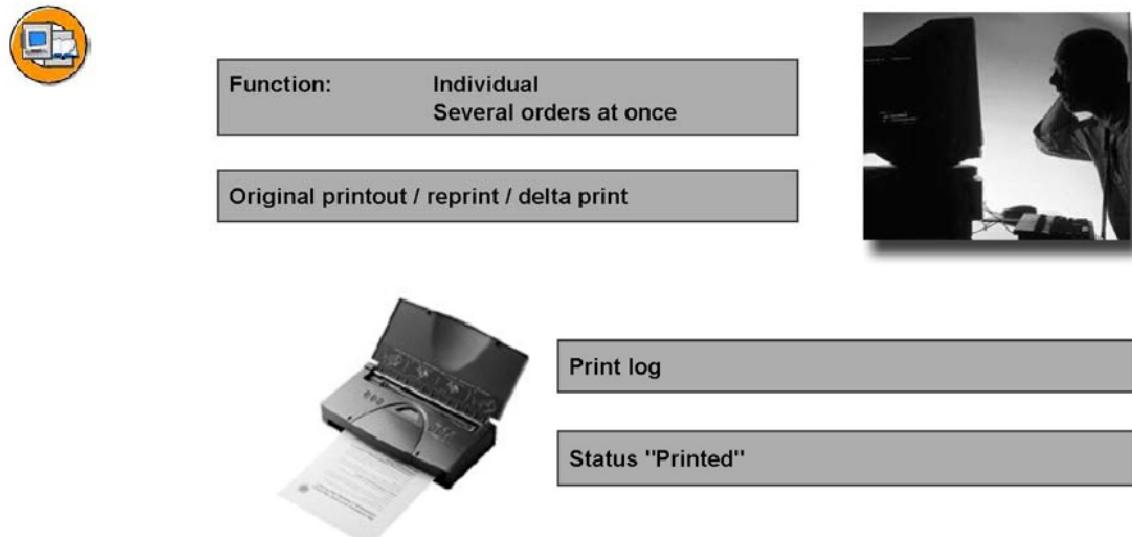


Figure 87: Delta printing

You have the option of incorporating all changes and enhancements to an order in one printout. This is **delta printing**. You can only use delta printing if your system is set up accordingly. The required Customizing setting must be made for this by your system administration.

Result of delta printing:

- Only new operations (operations which have not been printed) appear on the job ticket and operation control ticket.
- Time tickets are only printed if they do not yet have the status "Printed".
- Components are only printed if they have not been printed before on a component slip (for example, the material withdrawal slip).
- The printouts are identified as delta printouts.

As soon as you have printed shop papers for a maintenance order, the system automatically assigns the status "Printed" to the order and creates a print log. You can use the print log to determine the following:

- Which papers have already been printed for a maintenance order
- Who initiated the printing
- When the papers were printed

There is also an internal transaction (IW3D) for employees who have to print orders but who should not have the authorization to change the overall order.

Exercise 12: Controlling Maintenance Tasks

Exercise Objectives

After completing this exercise, you will be able to:

- Select lists of maintenance orders
- Perform an availability check for resources
- Release orders
- Print orders

Business Example

The maintenance planner is responsible for ensuring that the orders are processed in time. The planner must ensure that the materials are available, shop papers printed, and the order released for processing.

Task 1:

1. Select all orders either outstanding or in process for order types *PM01* and *PM03* up to the current date. Show the planned and actual costs in the selection result.

How do you proceed?

2. Sort the selection result according to order type (first criterion) and basic start date (second criterion).

How do you proceed?

Create a totals line for the planned and actual costs and generate a subtotal for each order type.

How do you proceed?

Task 2:

Order selection

1. Select all the maintenance orders you have created during this course.

Which selection criteria do you choose?

How can you save these selection criteria for future selections?

Continued on next page

2. Configure the columns *Equipment*, *Notification* and *System status* in the resulting hit list.

How do you proceed?

How can this display variant be saved and defined as the standard variant?

Task 3:

1. Check the availability of all materials in stock required for your order 1 (renew seals). What function do you use?

What system message do you receive?

Which entries are shown in the availability log?

Task 4:

1. Get an overview of the overall situation of all the materials in all of your orders (that is, the materials in stock and those not in stock).

Which orders have missing parts?

Task 5:

Order release

1. Release all your outstanding orders. How do you proceed?

What are the consequences of the order release?

Task 6:

Shop paper printing

1. Print orders with print preview

Display the print preview for one of your orders, and print it on the default printer.

Which shop papers are printed?

2. Print log

Call up your order again, and display the print log.

Which entries are included?

Solution 12: Controlling Maintenance Tasks

Task 1:

1. Select all orders either outstanding or in process for order types *PM01* and *PM03* up to the current date. Show the planned and actual costs in the selection result.

How do you proceed?

- a) Order selection:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change*

Set the statuses *Outstanding* and *In Process*. Choose *Multiple Selection* (yellow arrow to the right of the order type line) and set the order types *PM01* and *PM03*. Delete the *From-Date* for the period and then confirm.

Display / Sort fields:

Settings → Display Variants → Current

Select *Total Planned Costs* and *Total Actual Costs*.

Choose the *arrow to the left* and copy.

2. Sort the selection result according to order type (first criterion) and basic start date (second criterion).

How do you proceed?

Create a totals line for the planned and actual costs and generate a subtotal for each order type.

Continued on next page

How do you proceed?

- a) Sorting:

Select the column *OrdType*. Click on the column header, keep the left mouse button pressed and Drag&Drop it to the column *Basic Start*.

Select the columns *OrdType* and *Basic Start* and choose the pushbutton for ascending sorting.

They are sorted according to order type and within order type according to basic start date.

Totals row:

Select the column *Total Planned Costs* and choose *Total*.

The select the column *Order Type* and choose *Subtotal*.

A subtotal for planned costs and actual costs is created for each order type at the end of the table for the respective subtotal.

Task 2:

Order selection

1. Select all the maintenance orders you have created during this course.

Which selection criteria do you choose?

How can you save these selection criteria for future selections?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change*.

For example:

Created By PLM300-## or

Maintenance Planner Group I## and

Entry Date from beginning of course to end of course

Save the selection variant

GoTo → Variants → Save as Variant Variant name:

U_PLM300-## (this is thereby the standard variant for the user PLM300-##)

Description: For example, my orders

Continued on next page

2. Configure the columns *Equipment*, *Notification* and *System status* in the resulting hit list.

How do you proceed?

How can this display variant be saved and defined as the standard variant?

- a) *Settings → Display Variants → Current*

In the hidden fields area, select *Equipment*, *Notification* and *System status* and copy them to the active area.

Settings → Display Variants → Save as Variant

Enter variant name and description

Choose *Settings → Display Variants → Administration*

In the field *Default Setting* set the green checkmark.

Task 3:

1. Check the availability of all materials in stock required for your order 1 (renew seals). What function do you use?

What system message do you receive?

Which entries are shown in the availability log?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Order → Functions → Availability → Check Stock Material

Message

All materials checked for order xxxxxx are available.

Availability log

Choose *GoTo → Logs → Material Availability*

“Information message CO282: No material missing for order xxxxxx”

→ **Note:** The availability log is not saved together with the order.

Task 4:

1. Get an overview of the overall situation of all the materials in all of your orders (that is, the materials in stock and those not in stock).

Continued on next page

Which orders have missing parts?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change*

Selection criteria are the same as previously; Execute

Select all orders



Hint: You can select several lines in the order list (selection hit list) by clicking on the desired line while simultaneously pressing the **SHIFT** button (select block) or **CTRL** button (select several individual notifications).

GoTo → List of Available Material

There are no missing parts for orders with a green traffic light symbol, that is, both stock and non-stock materials are available.



Hint: Before the *Availability list* function can be used, at least one regular availability check must have been executed for the order.

Task 5:

Order release

1. Release all your outstanding orders. How do you proceed?

Continued on next page

What are the consequences of the order release?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change*

Selection criteria are the same as previously; Execute

Release symbol (green flag)

or

- Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Order → Functions → Put in process or Release

Field name or data type	Values
Consequences	<ul style="list-style-type: none"> • The order can be printed. • Reservations become effective. • Material movements are possible. • Confirmations can be recorded.

Task 6:

Shop paper printing

1. Print orders with print preview

Display the print preview for one of your orders, and print it on the default printer.

Continued on next page

Which shop papers are printed?

a) *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Order → Printing → Order

Print orders with print preview

Field name or data type	Values
Shop papers	Control ticket Material withdrawal slip Job ticket Material pick list Order object list Time ticket

2. Print log

Call up your order again, and display the print log.

Continued on next page

Which entries are included?

- a) SAP Menu → Logistics → Plant Maintenance → Maintenance Processing
→ Order → Change
GoTo → Logs → Printing
Print log

Field name or data type	Values
For each printed shop paper	Output device Delta printing Copy User Date Time



Lesson Summary

You should now be able to:

- Describe the control phase in the corrective maintenance cycle
- Select the required maintenance orders
- Release and print the maintenance orders

Lesson: Execution of Maintenance Tasks

Lesson Overview

This lesson shows the execution phase in the preventive maintenance cycle. This includes, from a system-technical perspective, the withdrawal of the materials required.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the execution phase as part of the preventive maintenance
- Execute the material withdrawals

Business Example

You must first withdraw the required materials when performing a task. Both planned withdrawals (the material was previously planned in the order and reserved) and unplanned withdrawals can be executed.

Execute Orders

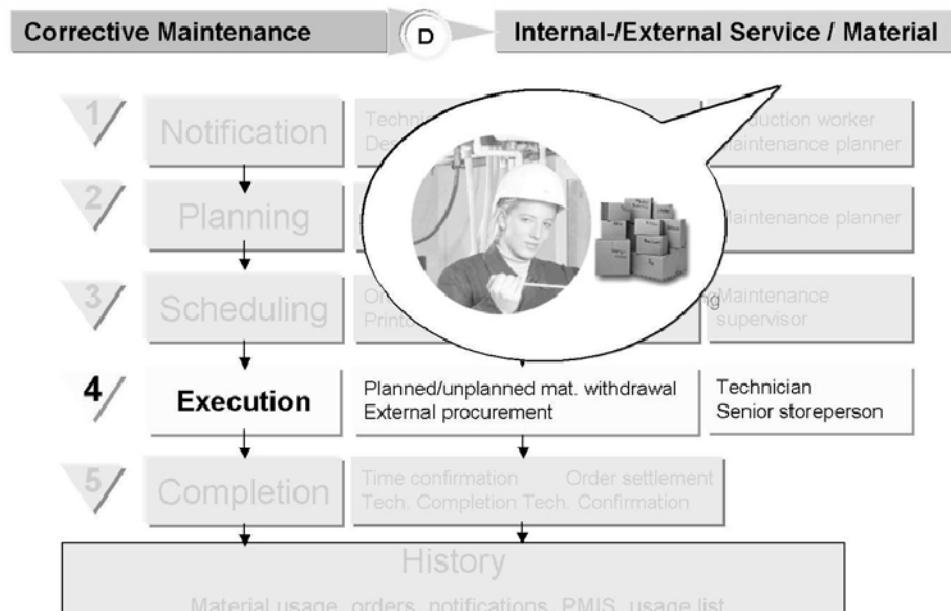


Figure 88: Cycle for Corrective Maintenance

The execution phase (step 4) involves the withdrawal of spare parts from the warehouse and the actual execution of the order.

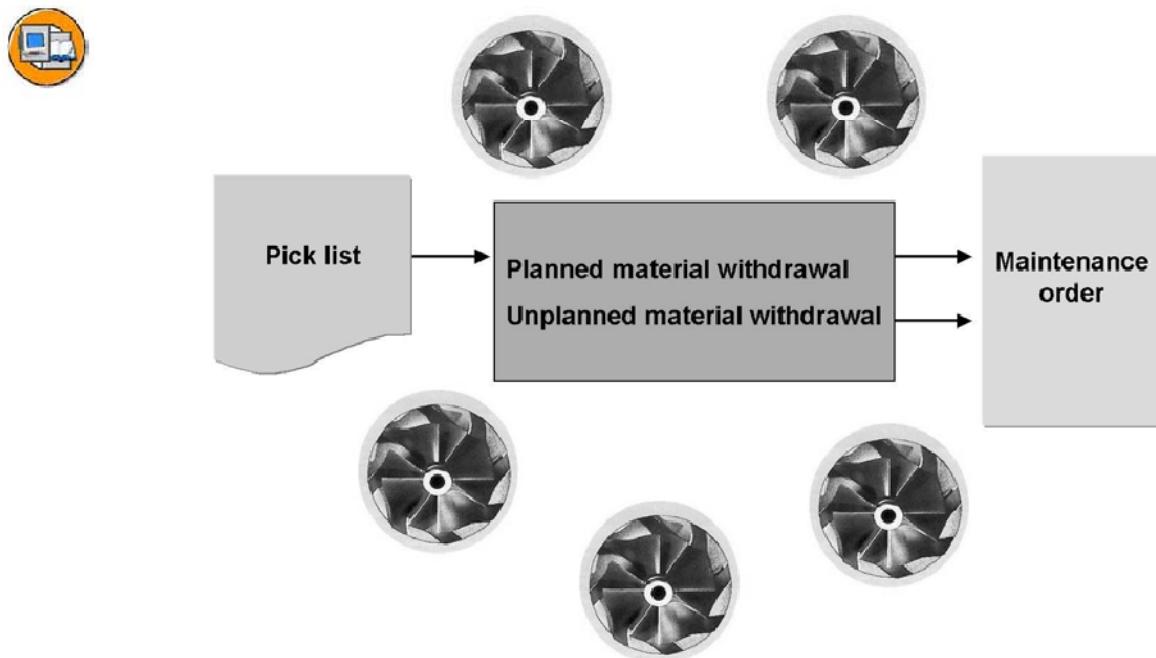


Figure 89: Material withdrawal

Manual workers withdraw materials from the warehouse to perform maintenance tasks. There are two types of withdrawal:

- Make a planned withdrawal of stock material
- Make an unplanned withdrawal of stock material

Materials can also be procured externally.

The goods movements for a maintenance order are displayed in the document flow of the order.

The Material Where-Used List (IW13) lets you check which withdrawals for a material were planned and which were unplanned.

Exercise 13: Execution of Maintenance Tasks

Exercise Objectives

After completing this exercise, you will be able to:

- Make planned withdrawals of material
- Make unplanned withdrawals of material

Business Example

To execute a maintenance task, materials and spare parts must be withdrawn from the stocks of the plant(s) and entered for the accounting department.

Both planned and unplanned withdrawals should be executed.

Task 1:

Planned Material Withdrawal

1. Withdraw the reserved material with reference to the order number. How do you proceed?

Which materials do you withdraw?

Material	Planned quantity	Quantity withdrawn

Which document number is assigned?

Task 2:

Unplanned Material Withdrawal

1. Make an additional, unplanned withdrawal of material for one of your orders.

Movement type 261

Plant 1000

Storage location *

Which material have you withdrawn?

Which document number is assigned?

Solution 13: Execution of Maintenance Tasks

Task 1:

Planned Material Withdrawal

1. Withdraw the reserved material with reference to the order number. How do you proceed?

Which materials do you withdraw?

Material	Planned quantity	Quantity withdrawn

Continued on next page

Which document number is assigned?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Movement → Goods Movement.*

Field name or data type	Values
Movement type	261
Plant	1000
Storage location	0001

Choose *To Order > Enter Order Number.*

Material	Planned quantity	Quantity withdrawn
100-400	1	2
100-600	2	2

Document number: 4900xxxx

or

Choose *SAP Menu → Logistics → Materials Management → Inventory Management → Goods Movement → Goods Movement (MIGO)*

First choose *Settings → Default Values.*

Enter the *Storage Location: 0001* and *Plant: 1000* and select *Propose the OK Function in Future.*

Choose *Goods Issue, Order* and enter the order number.

Task 2:

Unplanned Material Withdrawal

1. Make an additional, unplanned withdrawal of material for one of your orders.

Movement type 261

Plant 1000

Storage location *

Which material have you withdrawn?

Continued on next page

Which document number is assigned?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Movement → Goods Movement.*

Field name or data type	Values
Movement type	261
Plant	1000
Storage location	0001

Then choose *ENTER*(not: *To Order*).

Field name or data type	Values
Material	For example: 100 -100
Order number	Your order number

Document number: 4900xxxx



Hint: Entry using the *To Order* button means that the system automatically searches for reservations in the order, that is, only planned withdrawals can be made using this entry.

For unplanned withdrawals, which should nonetheless be posted to the order, the system should not search for reservations, that is, entry should be after you have input the movement type, plant, and storage location simply by pressing *ENTER* (the *Enter* key). Only then is the order number entered.

or:

Choose *SAP Menu → Logistics → Materials Management → Inventory Management → Goods Movement → Goods Issue (MIGO)*

Select *Goods Issue., Other*

Enter the material number in the item detail in the *Material* field. In the corresponding tab pages, enter the following: *Quantity 1 piece; Wk Movement Type 261; Plant 1000, Storage Location 0001; Account Assignment, Order Order Number.*



Lesson Summary

You should now be able to:

- Describe the execution phase as part of the preventive maintenance
- Execute the material withdrawals

Lesson: Completion of Notifications and Orders

Lesson Overview

This lesson shows the completion phase within the cycle of preventive maintenance.

The phase is divided into time confirmation, technical confirmation, and technical completion.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe and perform the partial stages of the completion phase
- Describe the consequences of the technical completion for the order and notification

Business Example

If the maintenance task has been technically completed, the working times are entered in the time confirmation, and the activities, damage, and causes of damage entered in the technical confirmation. The order and notification are then completed.

Order Confirmation: Times/Activities

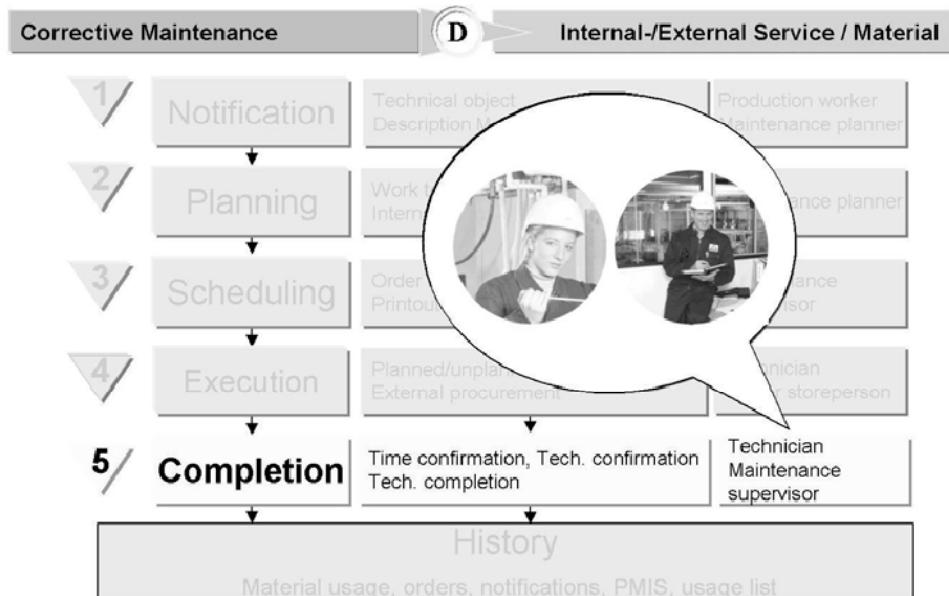


Figure 90: Cycle for Corrective Maintenance

After the work has been completed, the actual time required is confirmed in the fifth and final step. The technical findings (damage, cause of damage, repairs performed, and so on) and the effects of the damage on the asset's condition are recorded in the technical confirmation.

The technical confirmation indicates that the order is finished for Plant Maintenance.

The business completion performed by Controlling takes place after the order has been settled (also by Controlling), and marks the final completion of the order. Settlement and business completion are dealt with in the PLM316 course.

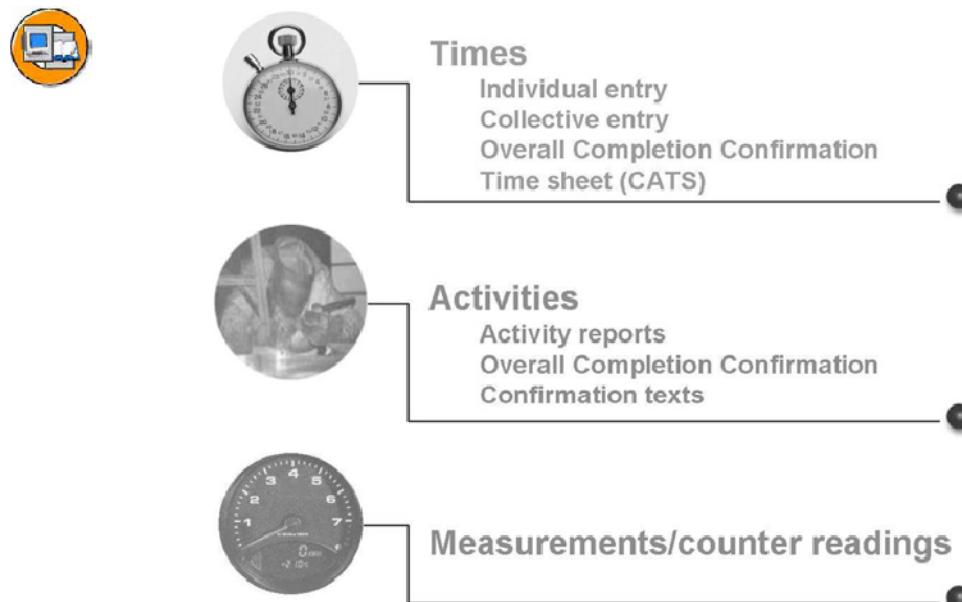


Figure 91: Order Confirmation - Times/Activities

There are three different ways to confirm the time required for work on a maintenance order:

- Collective entry by direct entry or using an operation list
- Overall completion confirmation: Times, activities, measurement values, and so on, on a collective screen
- Entry using the cross-application time sheet (CATS)

Once completion confirmations for operations/sub-operations in a maintenance order have been entered, the system automatically assigns the status PCNF (Partially confirmed) to these operations/sub-operations, if no setting has been made in Customizing that a final completion confirmation should be proposed automatically. As soon as all the operations or sub-operations in a maintenance order have been completely confirmed, the order itself is assigned the status CNF (Finally confirmed).

There is always a risk of completion confirmations being assigned to the wrong operations or sub-operations or entered with the wrong data. The system therefore allows you to **reverse** completion confirmations if required.

The activities performed are entered as maintenance notifications with notification type *Activity report* and assigned to the corresponding order. Alternatively, confirmation texts can be entered with confirmations of time. However, these are not as easy to structure and analyze as activity reports.

Measurement values and counter readings are entered as measurement documents for the reference object.

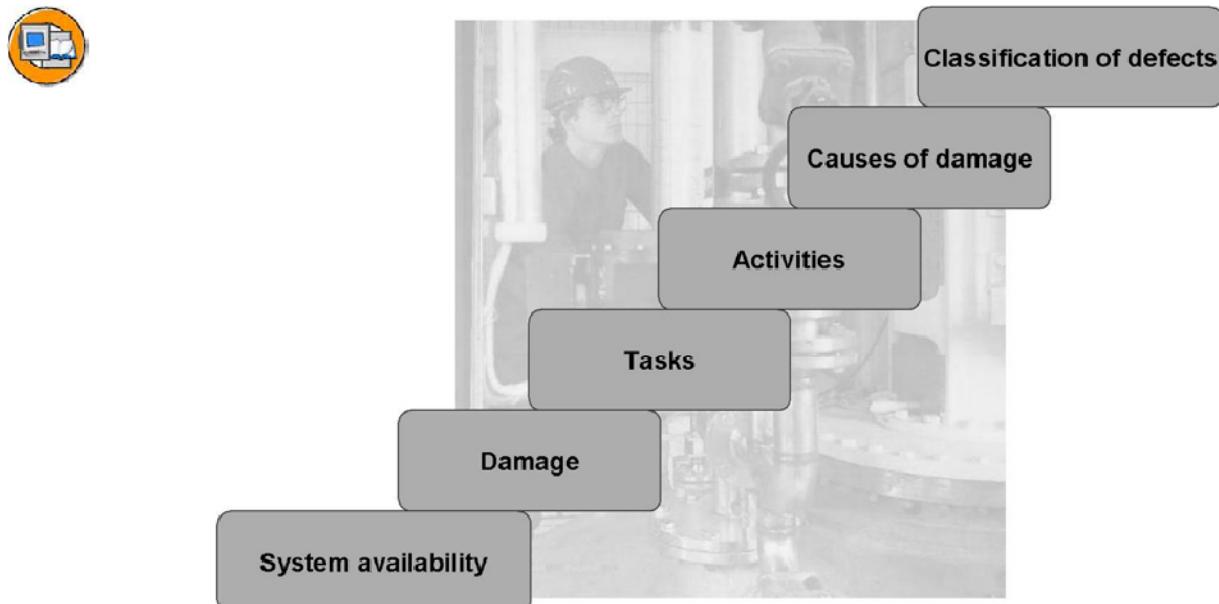


Figure 92: Technical Confirmation (1)

When technical objects are maintained, the most detailed technical findings possible form the basis of a subsequent evaluation. Technical findings can provide information on:

- The cause of damage
- Work executed (activities, tasks)
- Exact location of damage and symptoms
- Machine downtimes and system availability during and after the maintenance task (system availability)

The findings can be entered either in the malfunction report or request that forms the basis of the order (if there is one) or in an activity report entered later for the order.

When you complete the maintenance notification, the data is transferred to the notification history. It is a part of the maintenance history and contains information for each technical object about damage, malfunctions, causes, findings, and maintenance work performed.

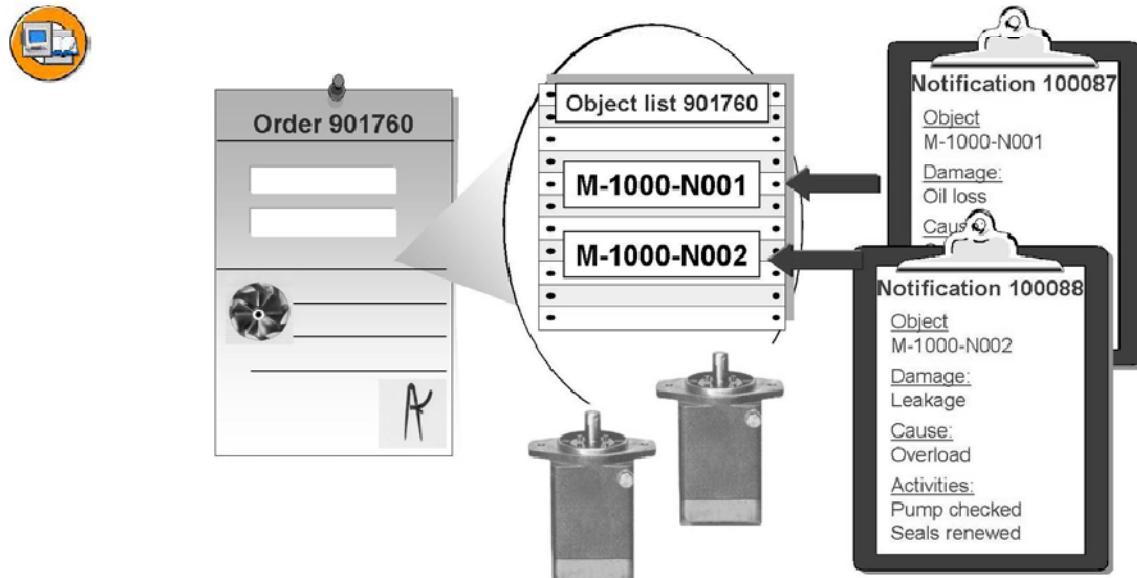


Figure 93: Technical Confirmation (2)

If the order includes several technical objects that were assigned to the order using the object list, from the object list open a new maintenance notification for the respective object. This means that each technical object has its own technical confirmation.

If the order was created on the basis of several notifications, these are in the object list and can be used directly to record the technical findings.

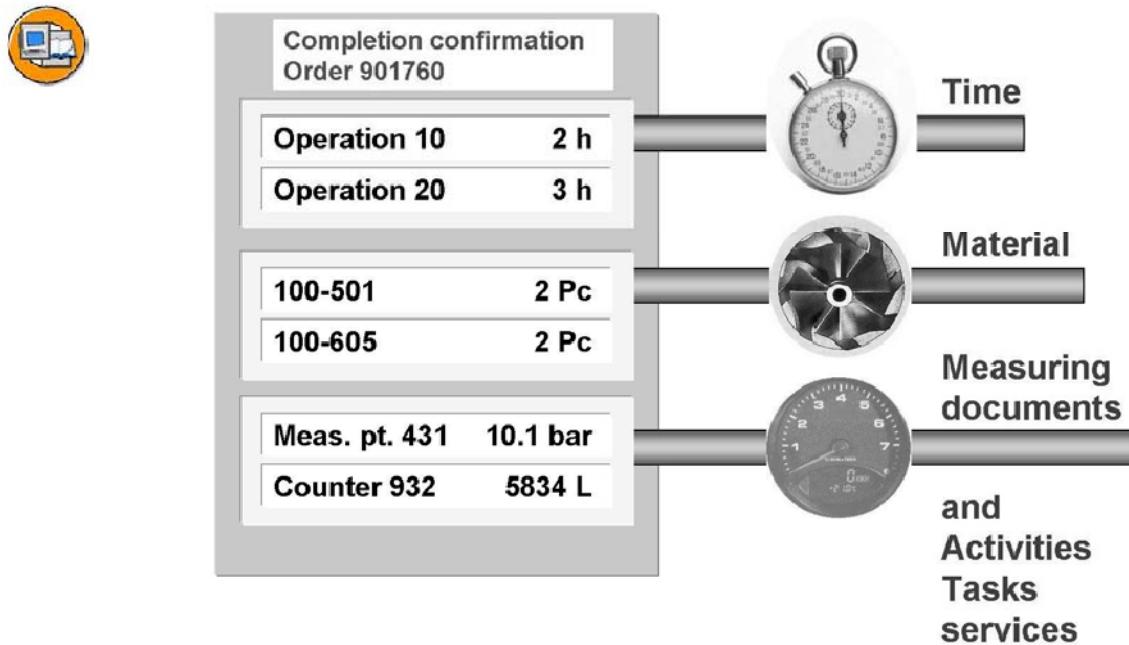


Figure 94: Overall Completion Confirmation

The overall completion confirmation enables you to confirm not only working times, but all the relevant details for an order on a single screen, configured to suit your individual requirements. Time confirmations and technical confirmations can therefore be processed in the same way.

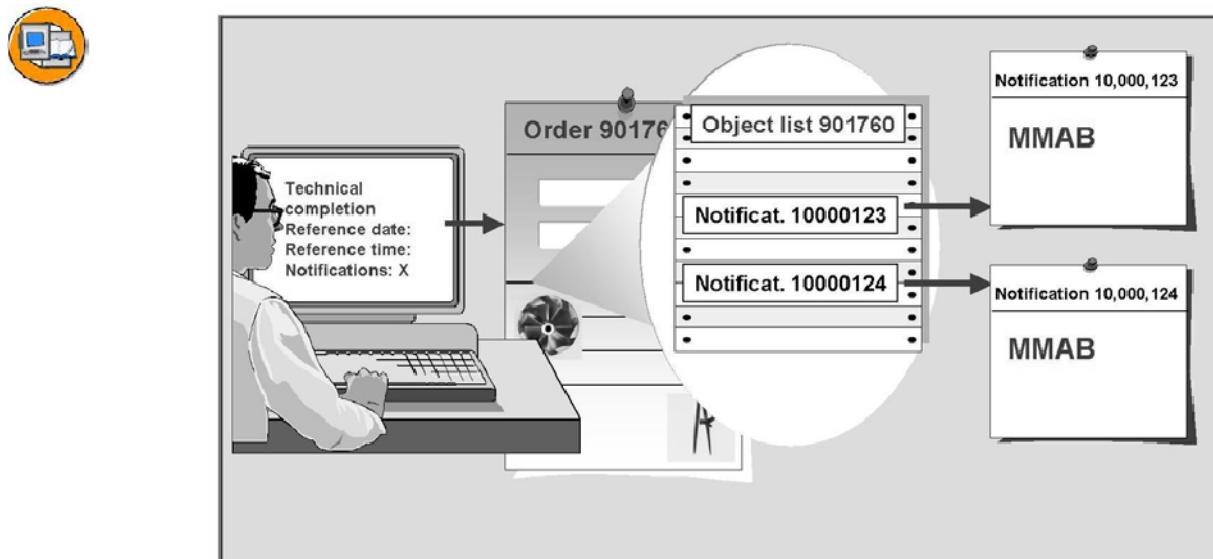


Figure 95: Maintenance Order: Technical Completion (1)

You have two options:

- Complete the maintenance order and notification separately
- Complete the maintenance order together with assigned notifications

To complete the order and notification together, there must not be any outstanding tasks in the notification.

If there are any outstanding tasks (status OSTS) in a notification, the notification cannot be completed. The tasks must first be marked as finished. The order belonging to the notification can, however, be completed, as the outstanding tasks must not necessarily belong to the order performed (in certain circumstances, a new order may be required for this).

All notifications with outstanding tasks can be identified easily from their status (OSTS) and then processed.

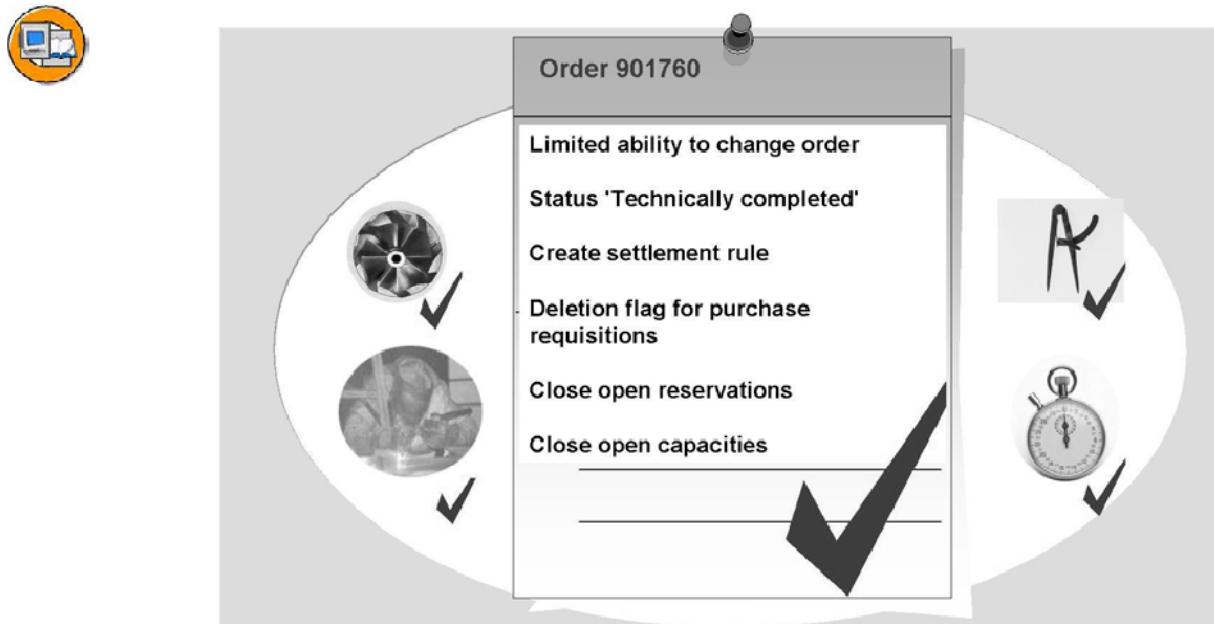


Figure 96: Maintenance Order: Technical Completion (2)

The maintenance order obtains the status TECO (Technically completed). In other words, the maintenance work required for this order has been completed.

The maintenance order can then only be changed online as follows:

- It can be locked or unlocked.
- The deletion flag can be set.
- Goods movements that are still outstanding, and confirmations and invoice receipts can be entered.
- You can still change the settlement rule.

If you have not maintained a settlement rule for the maintenance order, it is created automatically by the system. If this is not possible, because data is missing, the system directs you to where the settlement rule can be maintained.

All the purchase requisitions for which there are no purchase orders that still exist for the maintenance order are marked with a deletion flag.

All open reservations and capacities that still exist for the maintenance order are closed.

A reference date and time must be entered during the technical completion. This depends on what periods are assigned to the order in the Plant Maintenance Information System (PMIS).

However, the reference date has no influence on the determination of the location-and account assignment data. This is determined from and set to the day's date when the order is created. If, for example, the cost center of the equipment changes during the order processing, you can, if necessary, use the context menu (*Update Reference Object Data*) to update the order.

The order data and the data from maintenance notifications and usage histories are available in the maintenance history and can be used for the evaluation of past work and the planning of new work.

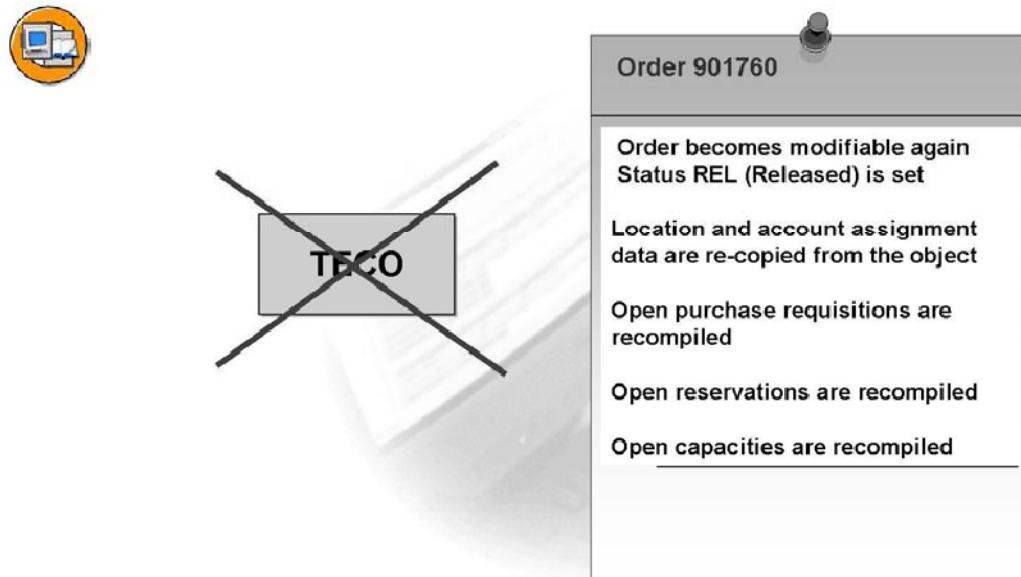


Figure 97: Reverse Technical Completion

You can reverse the status TECO (technically completed), if required.

The order is given the status that it had before the technical completion, in other words, capacity requirements and reservations are restructured and the deletion indicator is reset again for unconverted purchase requisitions.

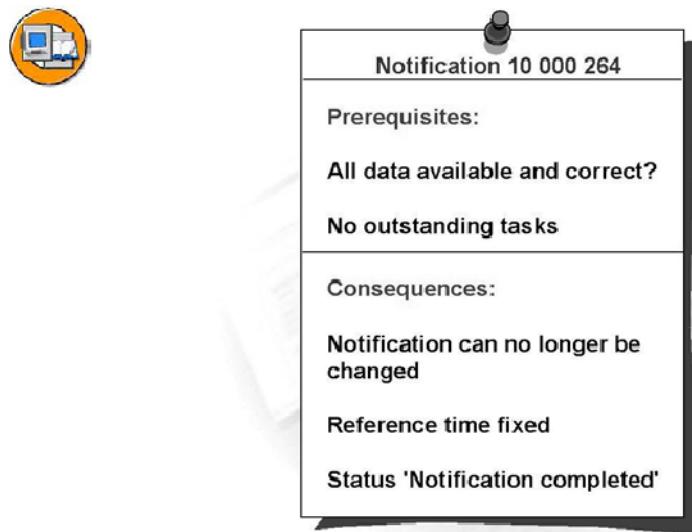


Figure 98: Maintenance Notification - Completion

Before you complete a maintenance notification, check the following:

- All data, which refers to the reference object for the maintenance notification, is available and correct.
- All the relevant item data is available and correct.
- All the relevant task data is available and correct.
- All tasks have been completed or released; there are no more outstanding tasks.
- All technical data related to the breakdown and availability of the technical system is available and correct.

When you complete a maintenance notification, the following occurs:

Reference date and -time determine what periods are assigned to the notification in the Plant Maintenance Information System (PMIS).

The maintenance notification is locked for changes, which means that you can no longer change notification data.

The notification is assigned the status NOCO (Notification completed).



Who changed what and when?



Figure 99: Action Log

Changes to notifications, orders, equipment, and functional locations are displayed in chronological order in an **action log**. This enables you to track who has changed the data or status of which fields and when.

To use this function, the creation of change documents for the respective objects must be activated.

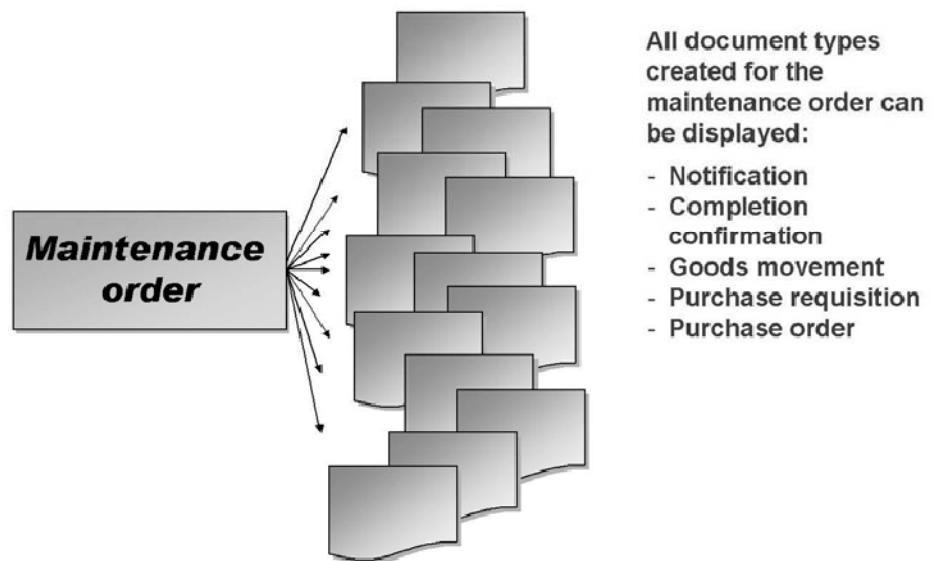


Figure 100: Document Flow

Exercise 14: Completion of Order and Notification

Exercise Objectives

After completing this exercise, you will be able to:

- Enter time confirmations
- Enter technical confirmations
- Technically complete an order

Business Example

If the maintenance task has been technically completed, the working times are entered in the time confirmation, and the activities, damage, and causes of damage entered in the technical confirmation. The order and notification are then completed.

Task 1:

1. What options for time confirmation do you know, and what characterizes accessing each of these options?

Task 2:

Overall Completion Confirmation

1. Confirm your order 1 (renew seals) using the overall completion confirmation function.
Which menu path do you use?
How can you adapt the confirmation screen?

Task 3:

Technical completion confirmation in an existing maintenance notification

1. Enter a technical confirmation for order 2 (on basis of maintenance request).
How do you proceed?
Enter the following, if necessary:

Continued on next page

general technical description	
damage	
cause of damage	
activities	
tasks	

What did you select?



Hint: If tasks are entered in the notification, these always refer to work still to be executed.

The notification thereby obtains the system status OSTS.

Tasks must always be marked as completed before the notification can be completed.

Task 4:

Technical confirmation as a new maintenance notification

1. Technical confirmation as a new maintenance notification

Enter a technical confirmation for your order 3 (order with object list) by creating a new maintenance notification for the order in retrospect.



Note: Note that the technical confirmation can be entered either with reference to the entire order or to the individual equipment items in the object list. If a notification is created from the object list for equipment the equipment history is updated.

How do you proceed?

Enter the following, if necessary:

Continued on next page

general technical description	
damage	
cause of damage	
activities	
tasks	

What did you select?

Save the maintenance notification. Which number is assigned to the notification?

Is the maintenance notification number transferred to the maintenance order?

Task 5:

Technical completion

1. Complete all your maintenance orders and notifications. Use the order list for this.
Which criteria do you enter to select all your maintenance orders?
2. How are maintenance orders completed technically?
3. Complete the maintenance notifications at the same time. What do you have to do?
4. What are the consequences of the technical completion of a maintenance order?
5. What are the consequences of the completion of a maintenance notification?

Task 6:

1. Which status does the order have after the technical completion?

What stages must the order go through after the technical completion?

Task 7:

Cost overview

1. Switch to the cost overview. Which value categories have estimated, planned, or actual costs?

Continued on next page

Value category	Estimated costs	Planned costs	Actual costs

Solution 14: Completion of Order and Notification

Task 1:

1. What options for time confirmation do you know, and what characterizes accessing each of these options?

- a) Option 1:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Individual Time Confirmation.*

Usually used with an operation for the completion of an order.

Properties:

Goods movement possible, processing of the object list possible, measurement documents can be entered, maintenance notification can be created.

Option 2:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Collective Time Confirmation → With/Without Selection.*

Confirmation of several orders with more than one operation, either from an empty list or from a selection screen.

Properties:

Enter time data, time adjustment with HR (when an employee number is entered); if the operation detail data is called up, the functions can be executed as under Option 1 (apart from goods movements).

Option 3:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Overall Completion Confirmation.*

Confirmation of an order with the option of performing an integrated technical completion.

Properties:

Continued on next page

Confirmation of times, technical findings, counter readings/measurement documents, services, materials.

Option 4:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change*.

Enter the selection parameters and confirm your entries.

Select the desired orders in the order list and choose:

Order → Collective Confirmation or Order → Overall Completion Confirmation

Properties:

See options 2 and 3.

Task 2:

Overall Completion Confirmation

1. Confirm your order 1 (renew seals) using the overall completion confirmation function.

Which menu path do you use?

Continued on next page

How can you adapt the confirmation screen?

- a) Overall completion confirmation:

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Overall Completion Confirmation*.

Choose *Extras → Settings*, to determine a profile for the layout of the confirmation screen. The profiles are defined in Customizing.

Enter the order number and choose *Enter*.

All the operations for the order are copied into the confirmation list.



Hint: If material withdrawals should also be posted in the overall completion confirmation, proceed as follows:

In the *time confirmation* area, select the corresponding operation, and press the magnifying glass symbol in the same line (data for the operation).

Materials which belong to the operations are displayed in the *goods movement* area (either subscreen or pushbutton).

Task 3:

Technical completion confirmation in an existing maintenance notification

1. Enter a technical confirmation for order 2 (on basis of maintenance request).

How do you proceed?

Enter the following, if necessary:

general technical description	
damage	
cause of damage	
activities	
tasks	

Continued on next page

What did you select?



Hint: If tasks are entered in the notification, these always refer to work still to be executed.

The notification thereby obtains the system status OSTS.

Tasks must always be marked as completed before the notification can be completed.

- a) Technical completion confirmation in an existing maintenance notification

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change*

Choose *Notification*.

or

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Change*.

Enter notification number

Field name or data type	Values
Damage	Tasks (code group/code)
Cause of damage	For example: PM 02 1001
Activities (code group/code)	For example: pump/101 2003 or pump/101 2004 or pump/101 2006
Tasks (code group/code)	For example: PM 01/1000

Task 4:

Technical confirmation as a new maintenance notification

1. Technical confirmation as a new maintenance notification

Continued on next page

Enter a technical confirmation for your order 3 (order with object list) by creating a new maintenance notification for the order in retrospect.



Note: Note that the technical confirmation can be entered either with reference to the entire order or to the individual equipment items in the object list. If a notification is created from the object list for equipment the equipment history is updated.

How do you proceed?

Enter the following, if necessary:

general technical description	
damage	
cause of damage	
activities	
tasks	

What did you select?

Save the maintenance notification. Which number is assigned to the notification?

Continued on next page

Is the maintenance notification number transferred to the maintenance order?

- a) Technical confirmation as a new maintenance notification

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order list → Change.*

Open the order and choose *Create Notification (white page)* in the order header and enter the notification type.

Alternatively, starting with the object list - *Objects* tab - you can allocate a new maintenance notification for each item of equipment for technical confirmation purposes. Select the row for the item of equipment and choose *Create Notification (white page at bottom of screen)*.

Field name or data type	Values
Damage	Tasks (code group/code)
Cause of damage	For example: PM 02 1001
Activities (code group/code)	For example, pump/101 2003 for example pump/101 2004 for example, pump/101 2006
Tasks (code group/code)	For example: PM 01/1000

Notification number: 10000xxx

Is the maintenance notification number transferred to the maintenance order?

Select yes if the notification was created with reference to the order.

Task 5:

Technical completion

1. Complete all your maintenance orders and notifications. Use the order list for this.

Which criteria do you enter to select all your maintenance orders?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order list → Change.*

For example: Created by *PLM300-##* or Planner Group *I##* and period from *Course Start* until *Course End*

Continued on next page

2. How are maintenance orders completed technically?

- a) Select the orders.

Choose *Order → Completion → Complete Technically* or

within an order, choose *Complete Technically*.

3. Complete the maintenance notifications at the same time. What do you have to do?

- a) Completing the notification

Choose *Include Notifications* when completing from the order list.

Choose *Complete Notifications* in the pop-up menu for the reference time when completing from the individual order processing.

4. What are the consequences of the technical completion of a maintenance order?

- a)

Field name or data type	Values
Consequences of order completion	<ul style="list-style-type: none">no more changes possibleStatus TECOOutstanding reservations are clearedOutstanding capacity loads are removedOutstanding purchase order requests are assigned a deletion flag

Continued on next page

5. What are the consequences of the completion of a maintenance notification?
- a)

Field name or data type	Values
Consequences of notification completion	<ul style="list-style-type: none"> Notification can no longer be changed Status NOCO

Task 6:

1. Which status does the order have after the technical completion?
 What stages must the order go through after the technical completion?
 a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*
 System Status

Field name or data type	Values
TECO	Technically completed
CNF	(Finally) confirmed
PRT	Printed
SETC	Settlement rule created
MACM	Material committed
PRC	Pre-costed

The order must still go through the following stages of the process:

- Posting of delayed confirmations
- Possible receipt of invoices for external procurement
- Order settlement (performed by Controlling)
- Business completion (performed by Controlling)

Continued on next page

Task 7:

Cost overview

1. Switch to the cost overview. Which value categories have estimated, planned, or actual costs?

Value category	Estimated costs	Planned costs	Actual costs

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Costs tab page

Value category	Estimated costs	Planned costs	Actual costs
Internal material			
External material, internal person			
Internal labor			



Lesson Summary

You should now be able to:

- Describe and perform the partial stages of the completion phase
- Describe the consequences of the technical completion for the order and notification

Lesson: Processing of External Services

Lesson Overview

This lesson introduces three options for procuring external services.

When procuring external services, we distinguish between the following three options:

- The individual purchase order with goods receipt
- The individual purchase order with service processing and service entry sheet
- The processing of external services via external work centers



Lesson Objectives

After completing this lesson, you will be able to:

- Perform an external service via individual purchase order
- Create a goods receipt for the individual purchase order
- Perform an external service via individual purchase order in connection with service processing
- Perform a service entry with approval
- Process external service in connection with external work centers

Business Example

Internal workshops cannot always provide the services required. These services must then be performed by external companies. Depending on the type of activity to be performed or the relationship to the external company, different processes can be used here.

External Services

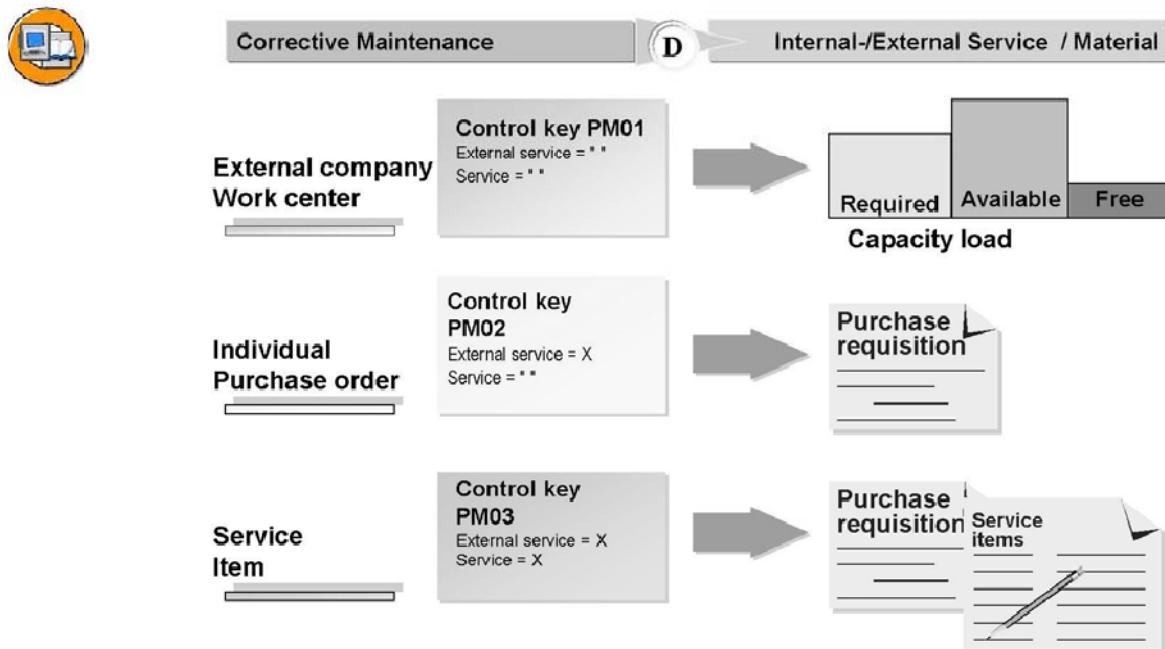


Figure 101: How is an external service processed?

External services can be processed in three different ways:

- Individual purchase order for sporadic requirements
- External firm work center for regular requirements
- Service item with individual purchase order and service specifications and subsequent service entry.

The external assignment is triggered by the control key in the maintenance order or the work center of the operation.

The control key determines the type of external service assignment:

- PM01: The external assignment is processed using an internal order with an external work center.
- PM02: The external assignment is processed using a purchase requisition and a standard individual normal purchase order.
- PM03: The external assignment is processed using an external operation with service specifications and subsequent service entry.

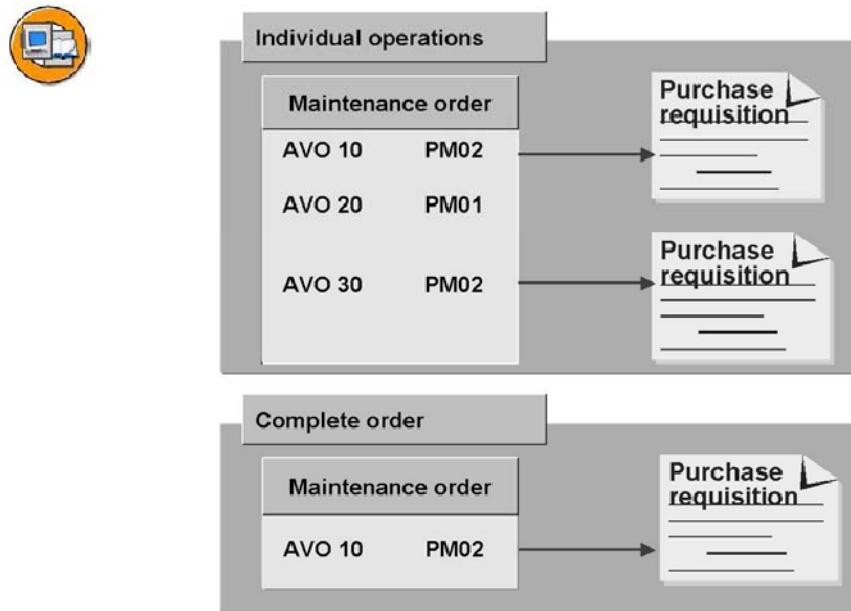


Figure 102: Outsourcing

If you want to assign **part of the work** in a maintenance order to external companies, you can do this using operations. In this way you divide up a maintenance order into operations that are performed by internal work centers and operations that are performed by external work centers.

In certain cases, you may need to assign a **complete maintenance order** to an external company. To do this, you create a maintenance order with only one operation, which you assign to an external company.

External services can be assigned in two ways:

- As vendor master records
- As external work center

Individual Purchase: Process

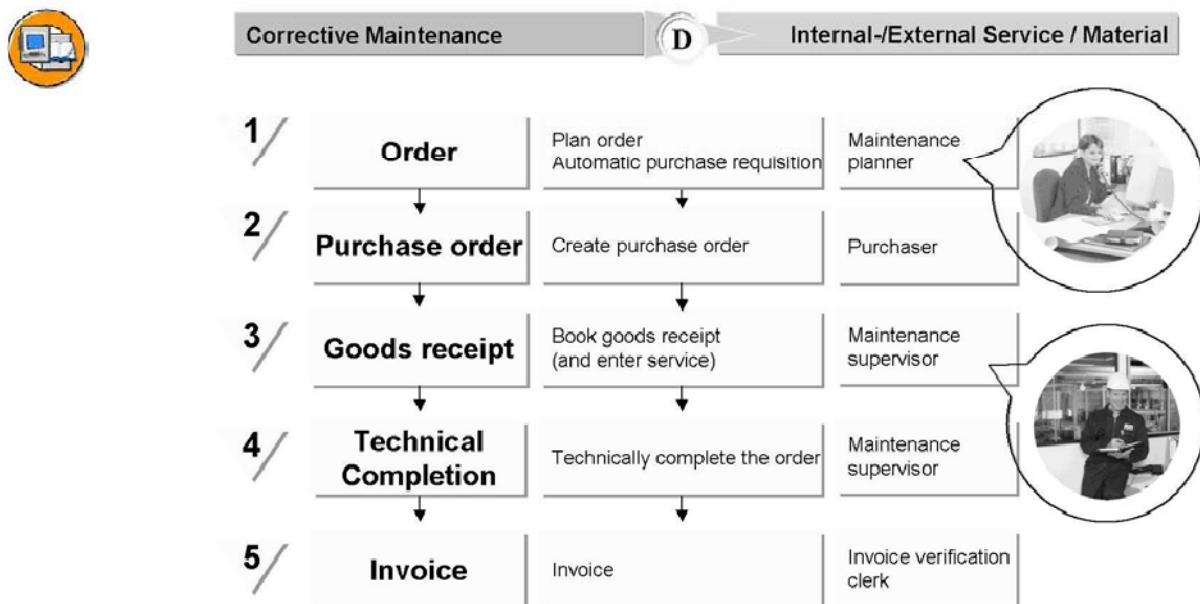


Figure 103: Individual purchase order

When external services are planned in a maintenance order, a purchase requisition is automatically triggered in the background. You find the number of the **purchase requisition** on the detail screen for external processing of the operation.

The purchasing department (or maintenance planner) converts the purchase requisition into a **purchase order**.

External services are not confirmed with time confirmations, but using a **goods receipt** for the purchase order. The service is therefore given the value of the purchase price and entered in the accounts for Financial Accounting. The maintenance order used to order the service is debited with this value.

In the maintenance order, you can see on the external processing screen for the operation whether a goods receipt has been posted for the purchase order.

You can see the posted goods receipt quantity in the corresponding field *GR Quantity*.

The vendor invoice usually arrives after the delivery. For this reason, the offsetting entry is put on a GR/IR clearing account (goods receipt - invoice receipt clearing account) and automatically written off upon **invoice receipt**. Any differences between the purchase order value and invoice value are subsequently debited from the order or credited to it.

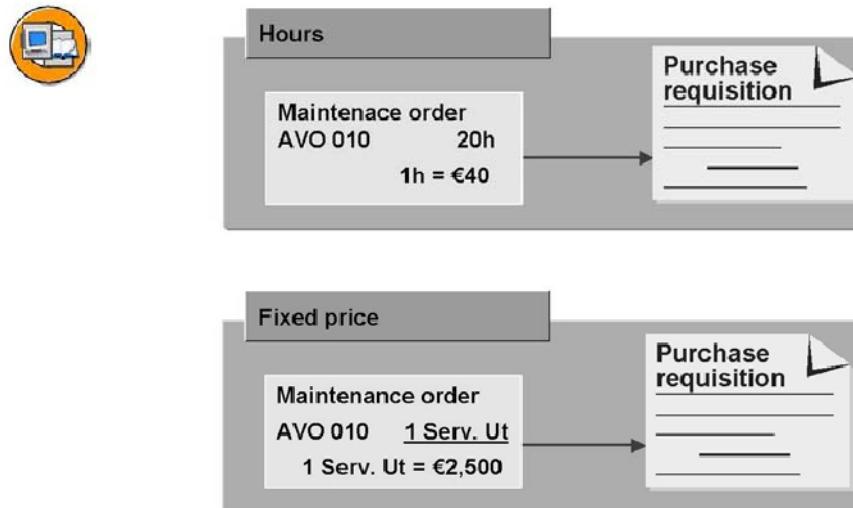


Figure 104: External Assignment Based on Hours or Fixed Price

You can assign an external operation on an hourly basis. The number of hours and respective unit and price per hour (if known) are entered here on the external data screen for the operation.

However, you can assign an external operation based on a fixed price. For this, 1 service unit (SU) for a fixed price is entered on the external data screen for the operation.

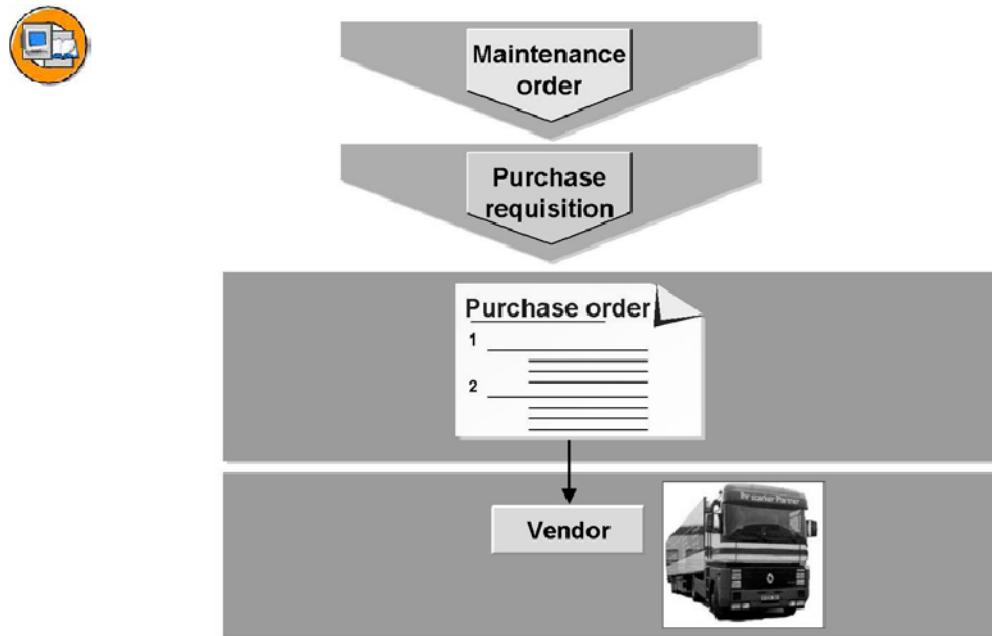


Figure 105: Creating an Individual Purchase Order

A purchase order is usually created by the purchaser and is therefore not part of Plant Maintenance, but of Materials Management.

A purchase order can contain items for stock material, consumable material, or services.

Multiple account assignment for one item is possible. The goods receipts for this item are entered without values.

Schedule lines can be used for a purchase order item, in which to inform the vendor about the different delivery times.

Goods Receipt and Invoice Check

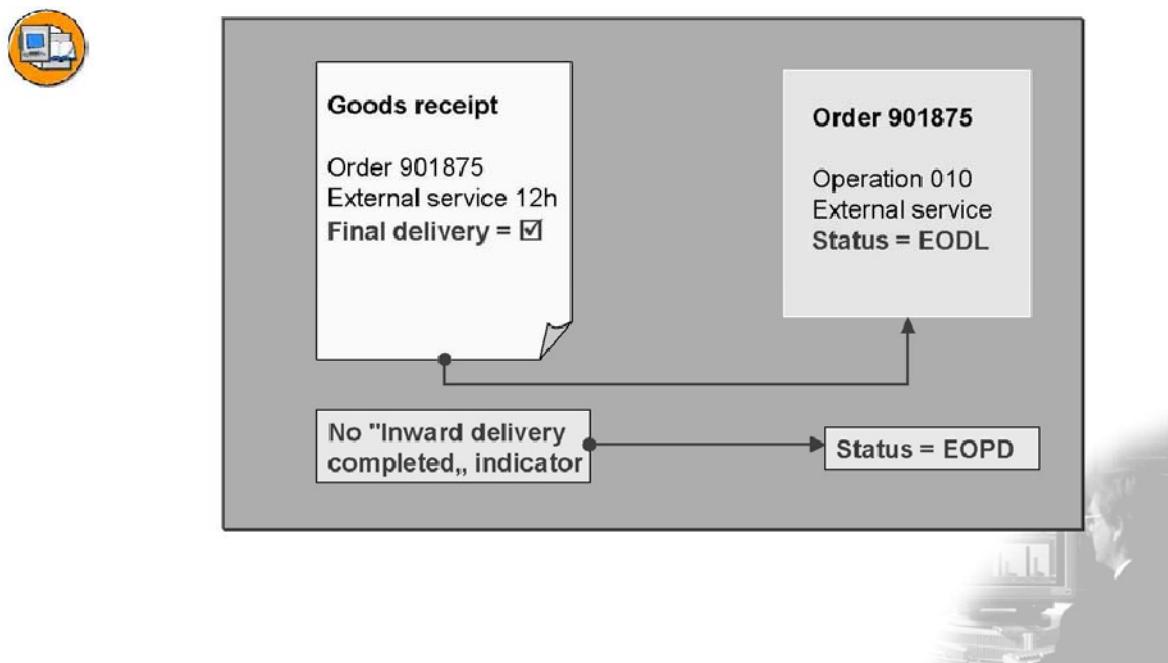


Figure 106: Order Status for Goods Receipt

After a goods receipt for an external operation, the status **External operation partially delivered (EOPD)** is set in the external operation.

If you have set the final delivery indicator on goods receipt for an external service, the status **External operation delivered (EODL)** is set.

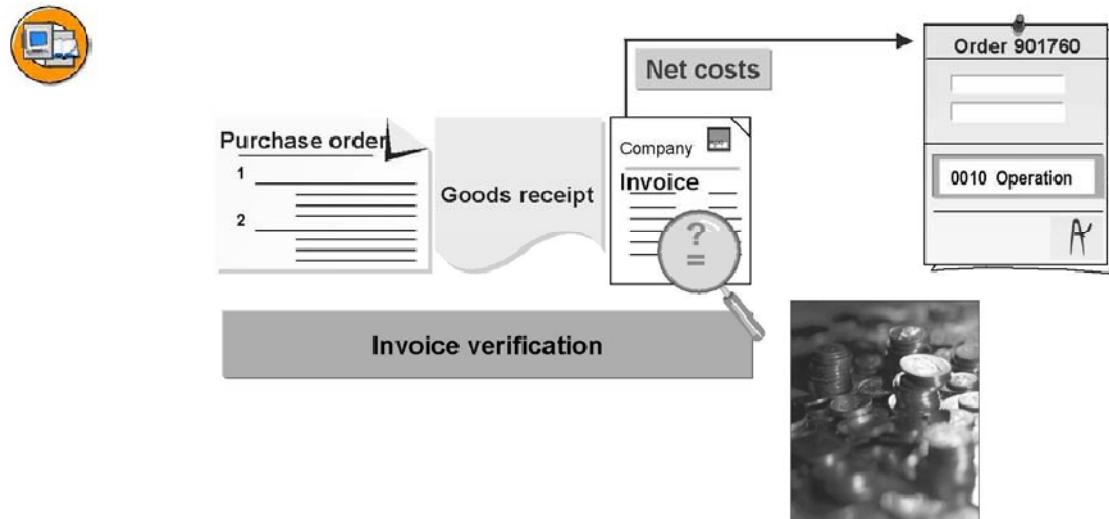


Figure 107: Invoice verification

The vendor invoice usually arrives after the delivery. For this reason, the offsetting entry is put on a clearing account and automatically written off upon **invoice receipt**. Any differences between the purchase order value and invoice value are subsequently debited from the order or credited to it.

External Work Center: Process

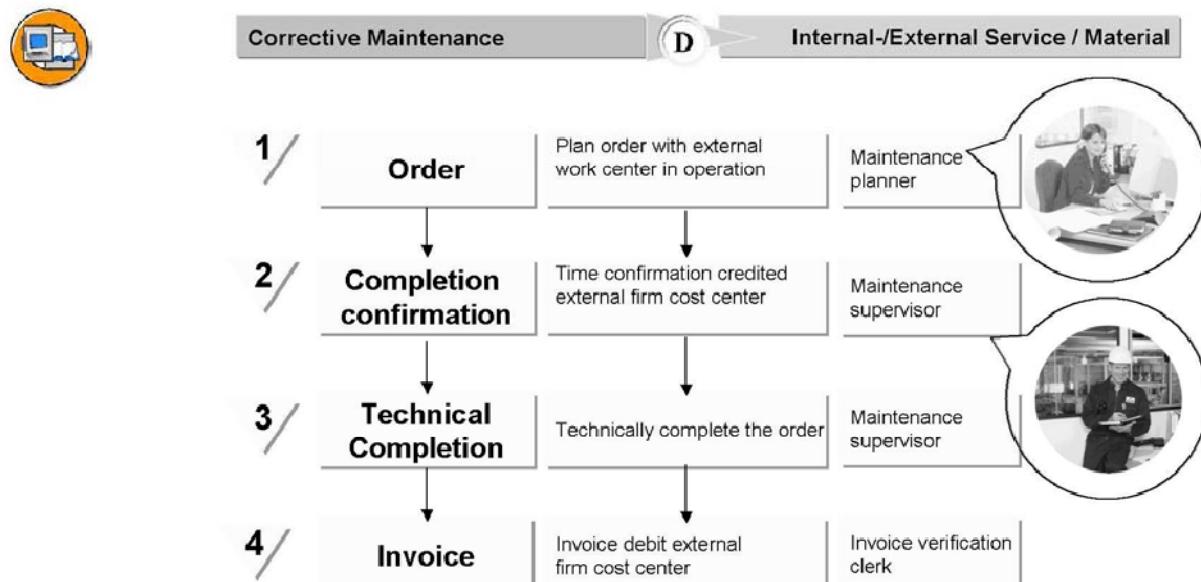


Figure 108: External work center

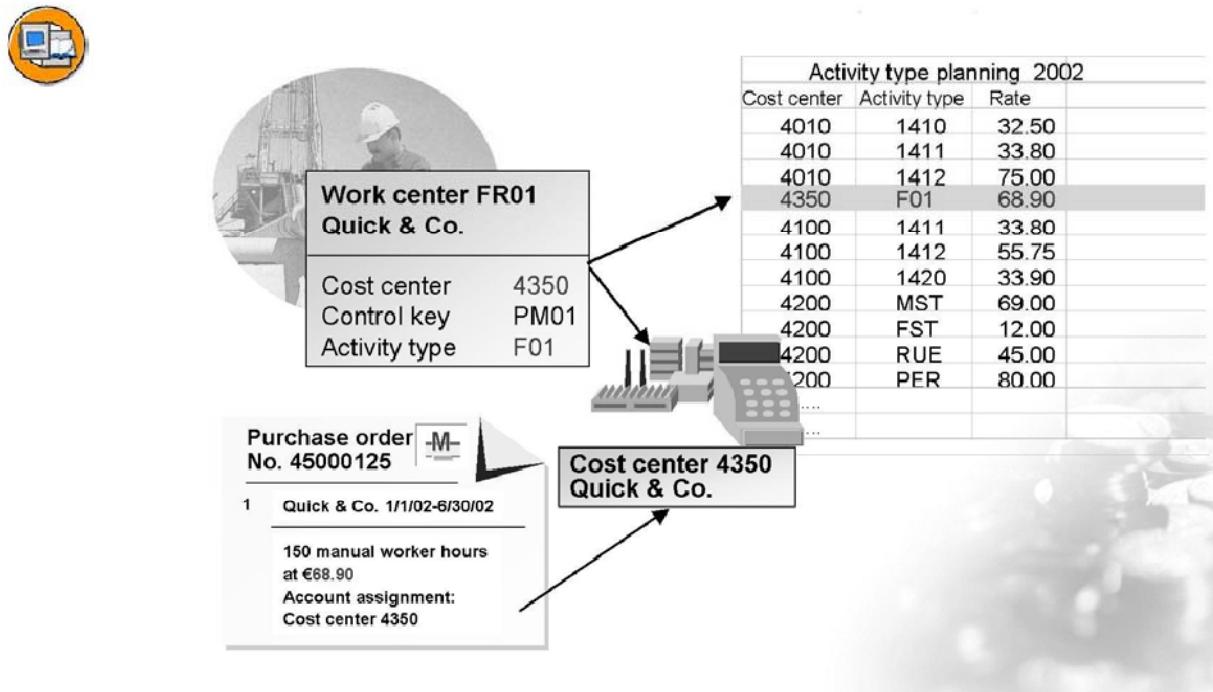


Figure 109: Prerequisites

To process maintenance orders for external companies using external company work centers, the following master data prerequisites must first be created:

- In Controlling a common cost center is created for all external companies, or individual **cost centers** are created for each external company.
- In Controlling, one or more **service types** are created, depending on
 - Whether you are using one or more cost centers
 - Whether the external company has one charge rate or several different ones

For the current fiscal year, you plan the rate for the cost center(s) and activity type(s).

You set up a **maintenance work center** for the external company,

- that has similar default values to internal work centers (for example, control key PM01)
- that has a link to the cost center and activity type

You release a **purchase order** to the external company (vendor) that has:

- Been assigned to the cost center of the external company
- A certain validity period
- The rate for the activity type as item price



Order 901760

0010 PM01 Electric cables...

A

Renew electric cables

Work center: FR01 Quick & Co.

Control key PM01 12 h

.... that is, like an internal order

Figure 110: Set Up Order

External orders are created and processed in the same way as internal orders.



Order 901760

0010 PM01 Electric cables...

A

Renew electric cables

Work center: FR01 Quick & Co.

Actual time 10h

Date 1/20/02

... that is, like an internal order

Figure 111: Confirm Order

External orders are confirmed in the same way as internal orders.

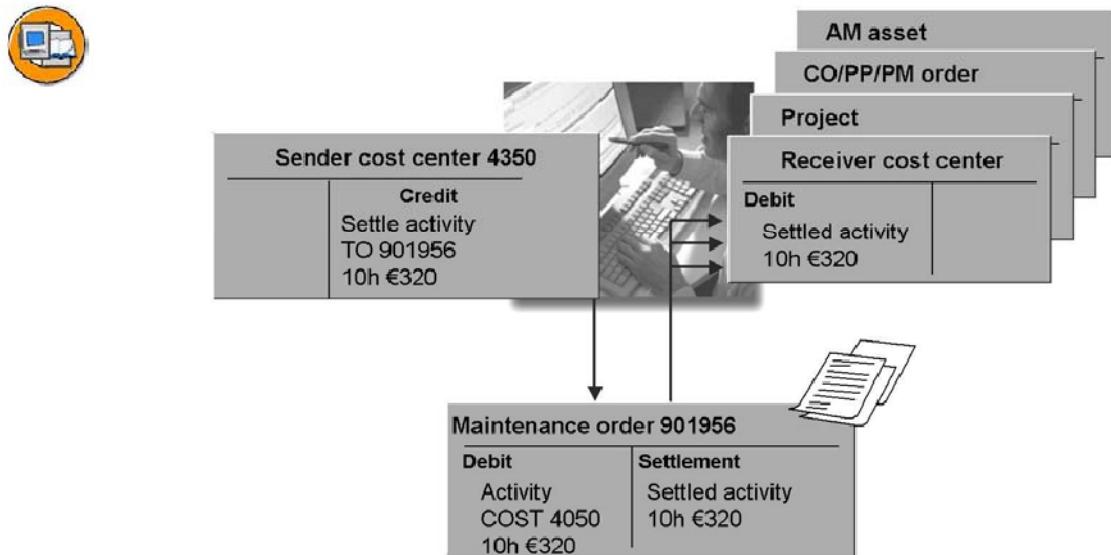


Figure 112: Settling a Maintenance Order

When you use an external company, the amount involved is credited to the cost center of the external company and debited against the maintenance order. The credit entry is made using the time confirmation.

The costs temporarily collected on the maintenance order are forwarded during settlement to the receiver cost center specified in the settlement rule of the maintenance order (for example, equipment cost center).

To settle a maintenance order, the following prerequisites must be fulfilled:

- The maintenance order must have the status **SETC** (Settlement rule created).
- Costs not yet settled should be accumulated on the maintenance order.

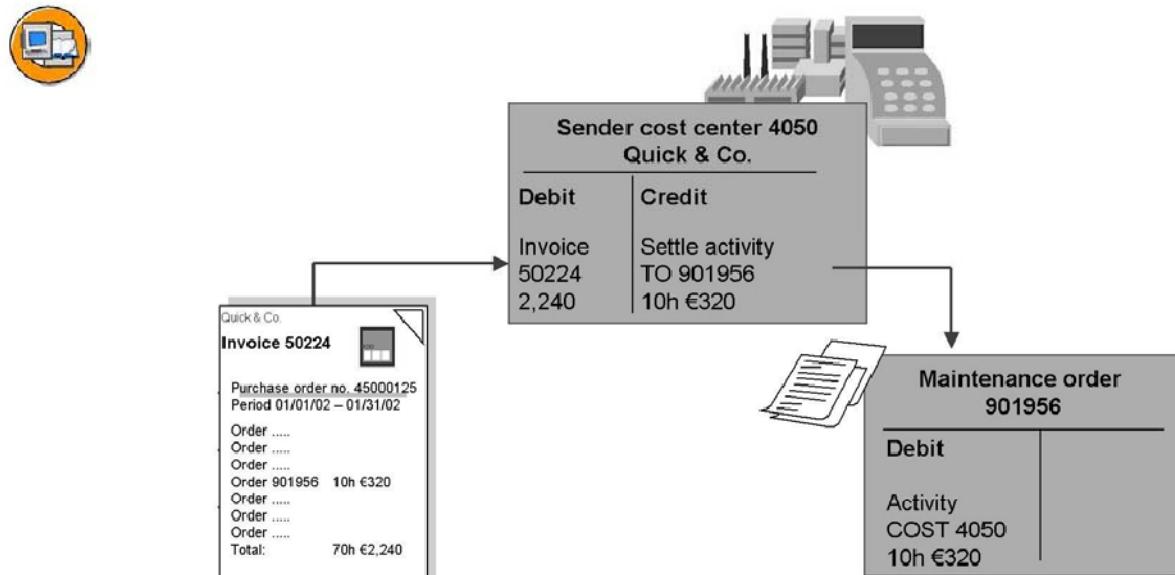


Figure 113: Billing Document and Controlling

Invoices are not received for every single activity, but periodically (for example, monthly).

The invoice total includes the value of all activities that have been performed since the previous invoice. We recommend including the list of orders executed.

The invoice is assigned to the cost center of the external company (not to the individual orders).

The cost center of the external company must be balanced in the medium term, in other words, the total of all credited amounts (maintenance orders) = the total of all debited amounts (billing documents).

Procurement of Services

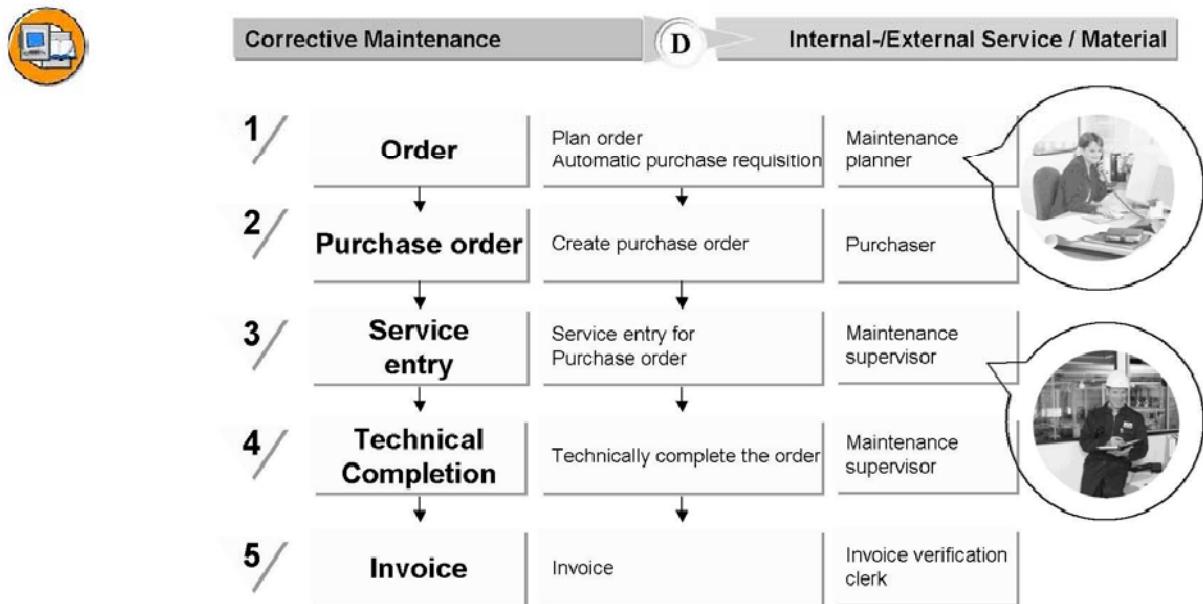


Figure 114: Procurement of Services

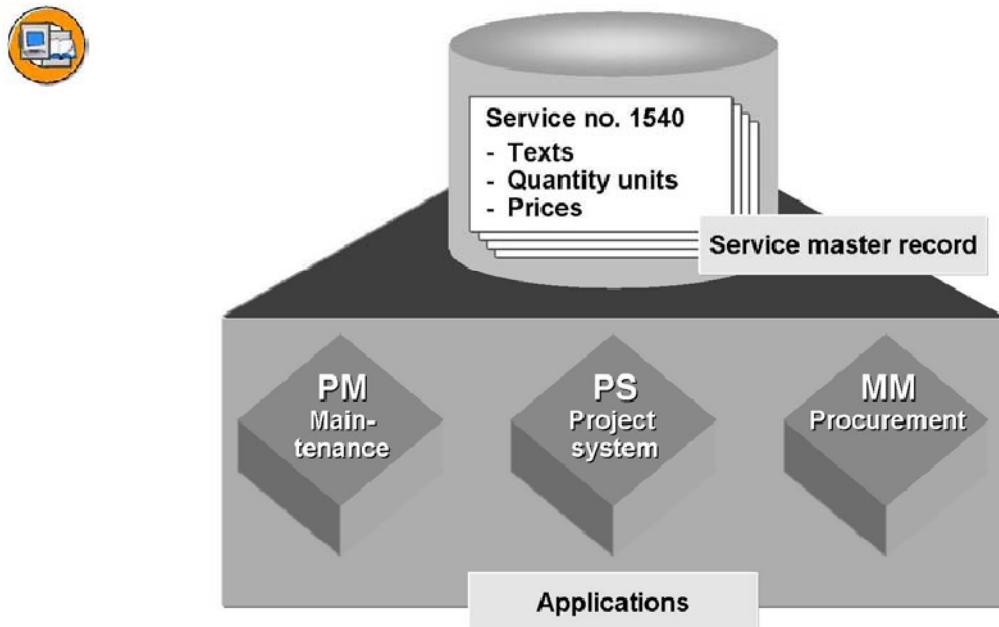


Figure 115: Service Master Record

The service master record is created in Materials Management and contains a service description and a unit of measure.

Every service master record can be linked with connections, which are then automatically proposed during order planning.

This data can be drawn from different SAP application components.

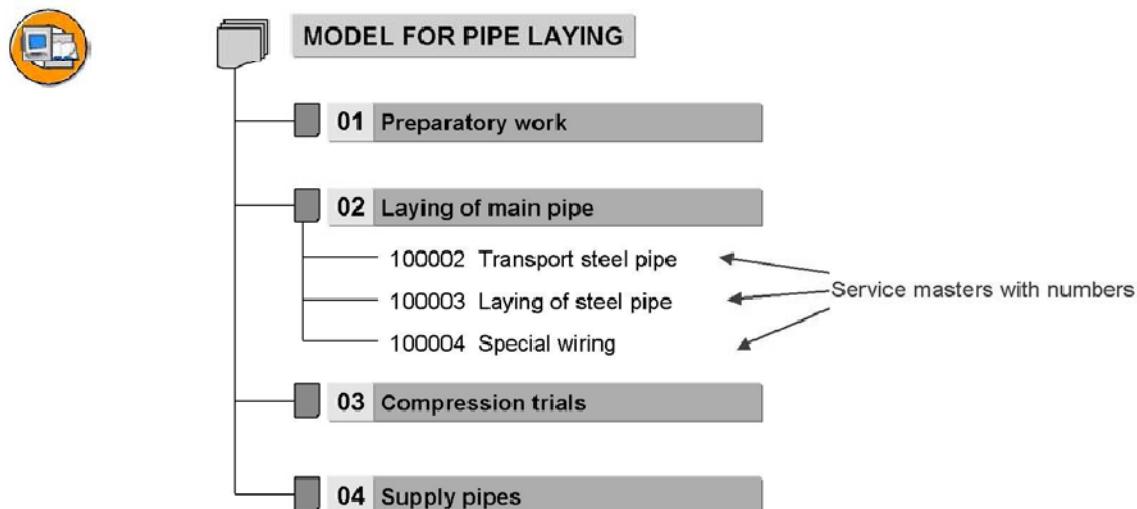


Figure 116: Model Service Specifications

You can schedule services in a maintenance order as individual service master records (service numbers) or using model or standard service specifications.

Model service specifications are used to store frequently used service specifications. They form part of the service master data and are therefore maintained in Materials Management.

This form of storage is suitable for all services, which you want to use repeatedly in a particular combination for different procurement operations.

For example, you can store all services, which are required for different pipe laying work (if necessary, grouped according to service areas), in a set of model service specifications *Pipe-Laying Work* and use these model service specifications again later. This enables you to reduce the work required to create purchasing documents considerably.

You can use the model service specifications to assign services with the service selection function on the detail screen for the operation (processed internally or externally).

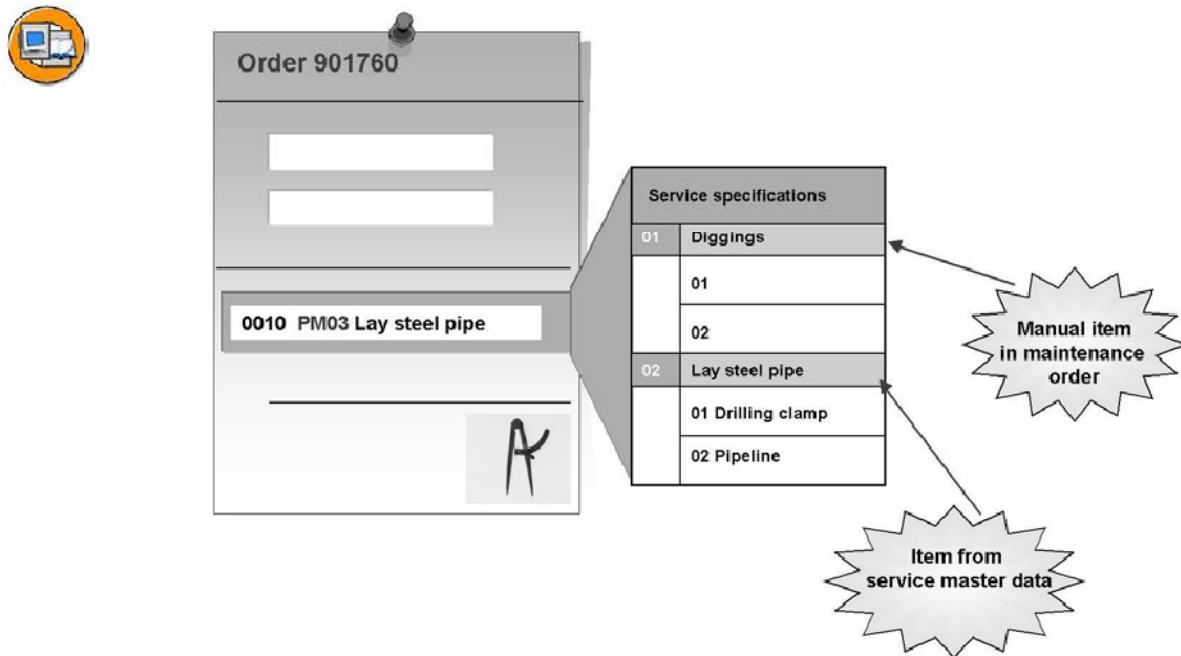


Figure 117: Maintenance Order with Service Items

You can plan the maintenance order, which contains service items, as a complete external order (possibly with its own order type) or as a combined order with internally processed operations and operations with service items.

The service item is generated in the operation using the **control key**. The control key carries the "Service" indicator (control key PM03 in the standard system).

If a control key is set in the operation using the service indicator, the tab page *Services* (used to access service specifications) is added to the detail screen for the operation.

Within the service specifications, you either schedule the required services using a service number (service master record) or by entering them manually without a service number.

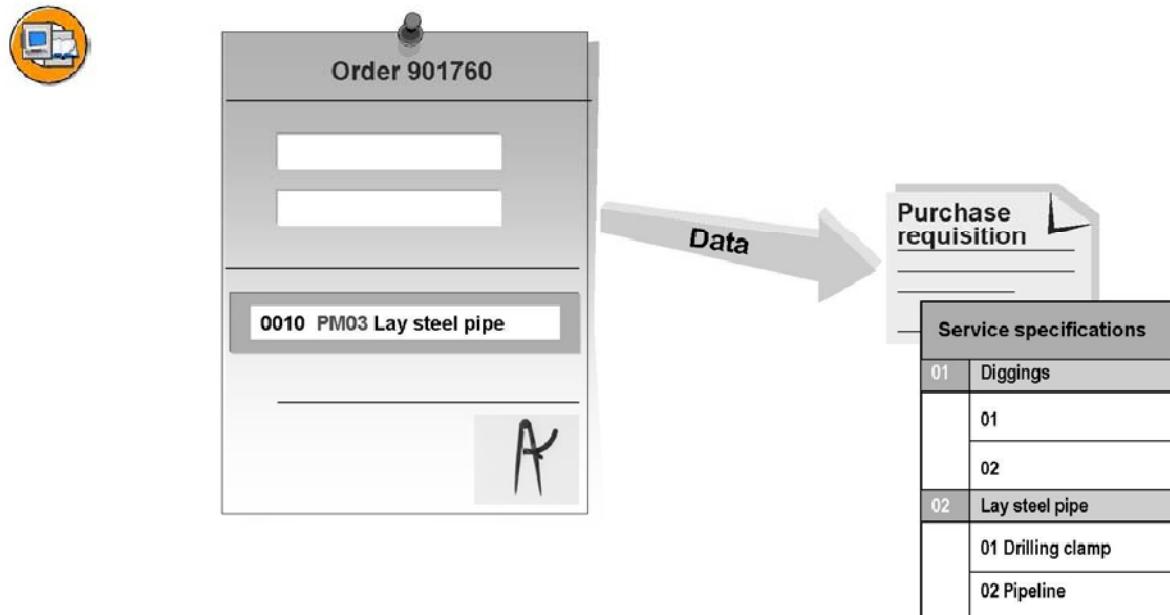


Figure 118: Maintenance Order and Purchase Requisition

When you save or release the order, a purchase requisition is generated automatically. The purchase requisition contains the service specifications for the operation.

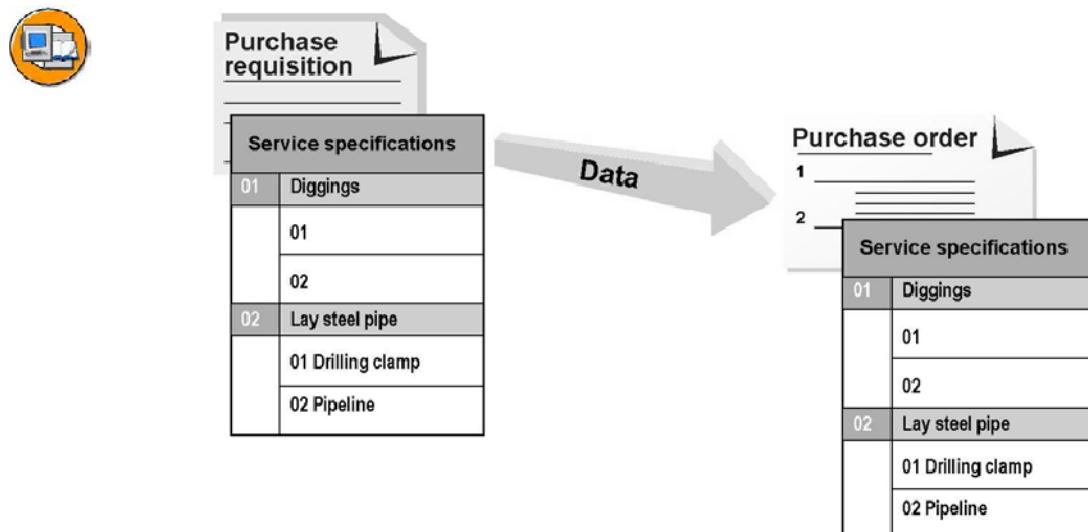


Figure 119: Purchase Requisition and Purchase Order

In purchasing, a purchase order is created from the purchase requisition.

The purchase order item copies the service specifications from the purchase requisition.

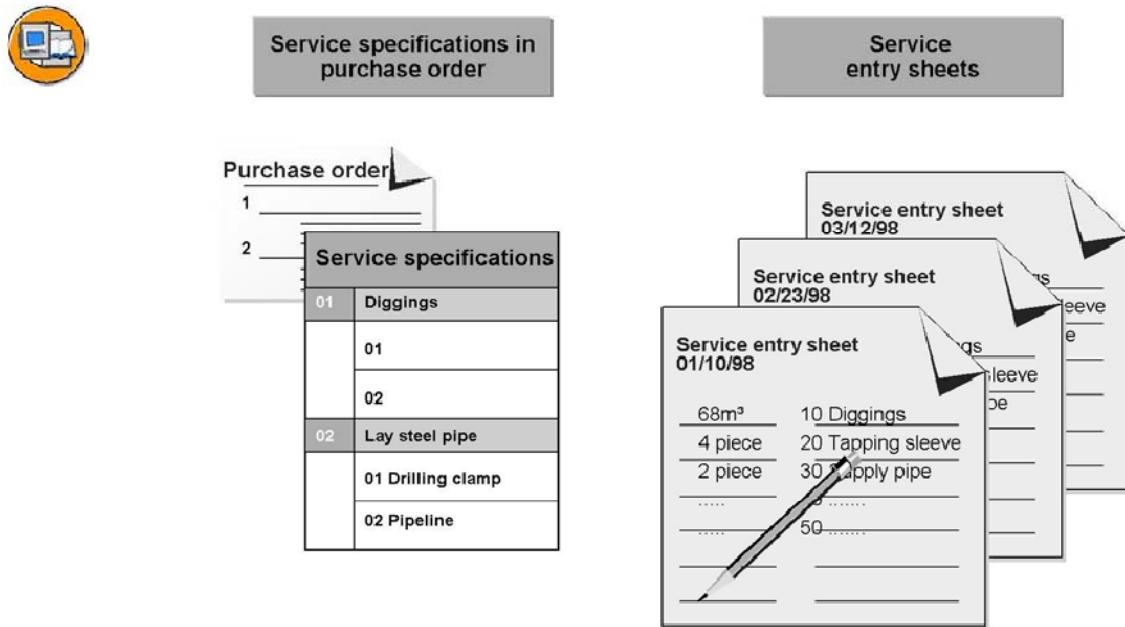


Figure 120: Entry Sheets for Services Provided

If a service has been provided by the external company, the **service is entered** using a **service entry sheet**, which is created with reference to the purchase order number.

The entry of the service performed is a function in Materials Management, but it can also be executed from Plant Maintenance using the completion confirmation.

Data such as service location, internal and external employees are first entered in the service entry sheet. You then enter the actual services provided in the service specifications, which are copied to the service entry sheet.

Once you have entered all the services, the service entry sheet must be accepted.

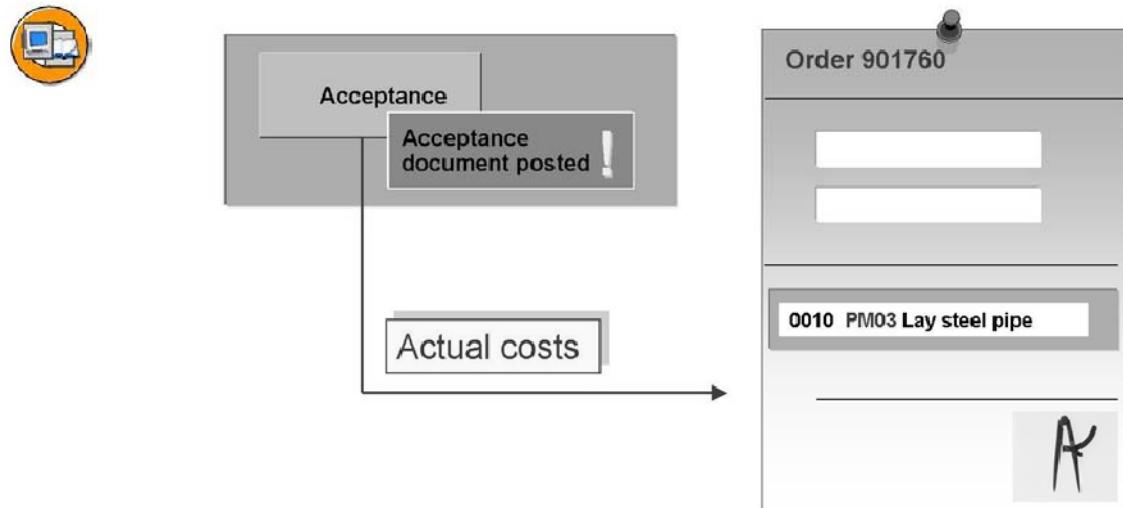


Figure 121: Cost Update in Order

When the service entry sheet is accepted, the costs for the order are updated.

Exercise 15: Processing of External Services

Exercise Objectives

After completing this exercise, you will be able to:

- Configure a maintenance order for an external company that triggers an individual purchase order
- Describe the additional steps in external service processing

Business Example

Internal workshops cannot always provide the services required. These services must then be performed by external companies. Different processes can be used in PM depending on the type of activity to be performed or the relationship to the external company.

Task 1:

Maintenance Order with External Service

1. Create an order (order type PM01) for your piece of equipment TEQ-##. Create an operation for this order. However, the task should now be performed by an external company.

Which control key must you use?

The external data screen appears. Enter the following data:

Operation quantity: 1 SU

Price: 5000 for 1

Vendor: 1000 (optional)

The following data should appear automatically based on a setting in Customizing:

Cost element: 417000

Material group: 007

Purchasing group: 008

Continued on next page

Purchasing organization: 1000



Hint: If you are not automatically taken to the external data screen (depending on Customizing), call up the detailed view from the operation list by double-clicking on the operation number.

Save your order.

Which order number is assigned?

Task 2:

Purchase Requisition

1. Display your maintenance order again and determine which purchase requisition number has been generated.

Which menu path do you use?

What is the purchase requisition number?

Double-click on the purchase requisition and determine the following data:

Delivery date	
Desired vendor	
Fixed vendor	
Account assignment category	

Task 3:

Additional steps:

1. After the order has been created, what are the additional steps in processing external services based on an individual purchase order? (Just note them down. As a further exercise, you can also execute these steps in the system.)

Solution 15: Processing of External Services

Task 1:

Maintenance Order with External Service

1. Create an order (order type PM01) for your piece of equipment TEQ-##. Create an operation for this order. However, the task should now be performed by an external company.

Which control key must you use?

The external data screen appears. Enter the following data:

Operation quantity: 1 SU

Price: 5000 for 1

Vendor: 1000 (optional)

The following data should appear automatically based on a setting in Customizing:

Cost element: 417000

Material group: 007

Purchasing group: 008

Purchasing organization: 1000



Hint: If you are not automatically taken to the external data screen (depending on Customizing), call up the detailed view from the operation list by double-clicking on the operation number.

Save your order.

Continued on next page

Which order number is assigned?

- a) Maintenance Order with External Service

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General)*.

Choose *Operations*, Control Key: *PM02*

External processing screen:

Field name or data type	Values
Operation quantity	1 AU
Price	5000 for 1
Cost element	417000
Material group	007
Purchasing group	008
Vendor	1000 (optional)
Purchasing organization:	1000

Put order in process immediately, if necessary.

Order number: xxxxxx

Task 2:

Purchase Requisition

1. Display your maintenance order again and determine which purchase requisition number has been generated.

Which menu path do you use?

What is the purchase requisition number?

Double-click on the purchase requisition and determine the following data:

Continued on next page

Delivery date	
Desired vendor	
Fixed vendor	
Account assignment category	

a) Purchase Requisition

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.*

Choose *Operations*, double-click on operation number

In the detail screen, choose the *Actual Data* tab page.

Purchase requisition number: 1000xxxx

Purchase requisition details:

Delivery date	Operation start date (*)
Desired vendor	1000
Fixed vendor	1000
Account assignment category	F (= Order)

(*) The operation start- and –end date are identical here, as control key PM02 is not used for scheduling. That is, even if the duration of an operation was set, this does not mean that an end date is calculated for the operation.

Continued on next page

Task 3:

Additional steps:

1. After the order has been created, what are the additional steps in processing external services based on an individual purchase order? (Just note them down. As a further exercise, you can also execute these steps in the system.)

a) Additional steps:

1. The purchase requisition is converted to a purchase order in Purchasing.

Transaction: ME21N or ME21

2. A goods receipt is made for the purchase order. This is then updated to the order.

Transaction: MIGO_GR

3. An invoice receipt is made for the purchase order. If there are discrepancies between the goods and invoice receipts, these are credited or debited to the order.

Transaction: MIRO

Exercise 16: External Services as Service Items

Exercise Objectives

After completing this exercise, you will be able to:

- Configure a maintenance order, in which the contents of the work to be performed are described using service items
- Display the relevant purchase requisition
- Describe the additional processing steps

Business Example

The planning of external services using service master records enables you to assign all the important details, such as the standard description, unit of measure, and price to the external operation using a service number without having to enter it manually.

Task 1:

1. Maintenance Order with Service Items

Enter an order (order type PM01) for your clarification plant ## in which pipes are to be laid. Create an operation for this order. The task should be performed by an external company. The work should be described using service items.

Which control key must you use?

2. Manual Service Item

Create at least one service item manually, that is, without reference to a service master record (for example, cost plus work hours for a pump fitter). Which data must you enter for this?

3. Service item with service master record

Create at least one service item by selecting an item using the keyword *Pipe* from the general service masters. How do you proceed?

Which service master records have you selected?

Service	Description	Quantity/Unit	Price

Continued on next page

Which planned total value is displayed?

4. General purchasing data

Go to the general external data screen. Enter the following data if this has not been pre-defined using the relevant Customizing setting:

Cost element: 417000

Material group: 007

Purchasing group: 008

Vendor: 1000

Purchasing organization: 1000

Save your order. Which order number is assigned?

Task 2:

Purchase Requisition

1. Display your maintenance order again and determine which purchase requisition number has been generated.

Which menu path do you use?

What is the purchase requisition number?

Double-click on the purchase requisition and determine the following data:

Delivery date	
Desired vendor	
Fixed vendor	
Account assignment category	

Check whether or not the services you requested have been transferred to the purchase requisitions. How do you proceed?

2. Additional steps:

After the order has been created, what are the additional steps in processing for external services based on service items? (Just note).

Solution 16: External Services as Service Items

Task 1:

1. Maintenance Order with Service Items

Enter an order (order type PM01) for your clarification plant ## in which pipes are to be laid. Create an operation for this order. The task should be performed by an external company. The work should be described using service items.

Which control key must you use?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Order → Create (General)*.

Field name or data type	Values
Order type	PM01
Functional location	##
Control key in operation	PM03

2. Manual Service Item

Create at least one service item manually, that is, without reference to a service master record (for example, cost plus work hours for a pump fitter). Which data must you enter for this?

- a) In the operation list for the order, double-click on the *operation number*, the service specifications can be displayed on the detail screen underneath the external data using an internal tab page.

Field name or data type	Values
Service number field	Do not complete
Short text	For example: Earth excavation
Quantity	For example: 15
Unit of measure	For example, m ³ (= cubic meters)
Price	For example, €85 (per cubic meter)

3. Service item with service master record

Continued on next page

Create at least one service item by selecting an item using the keyword *Pipe* from the general service masters. How do you proceed?

Which service master records have you selected?

Service	Description	Quantity/Unit	Price

Which planned total value is displayed?

- a) Service item with service master record

Position the cursor in the *Service Number* field. Choose *Service Short Text* via the F4 help and enter *Pipe**. Select individual services from the list of the service masters.

Service master records, for example:

Service number	Description	Quan- tity/Unit	Price
100020	Pipe-laying plastic pipe	1 piece	€47
100021	Pipe-laying prestressed concrete pipe	1 piece	€130

Which planned total value is displayed?

Total of the Individual Conditions

4. General purchasing data

Go to the general external data screen. Enter the following data if this has not been pre-defined using the relevant Customizing setting:

Cost element: 417000

Material group: 007

Purchasing group: 008

Vendor: 1000

Purchasing organization: 1000

Continued on next page

Save your order. Which order number is assigned?

- a) General purchasing data

Double-click on the operation number in the operation list of the order and make the entries in the external data screen.

The *External* tab page is activated automatically when you double-click on the operation number.

Order number: xxxxxx

Task 2:

Purchase Requisition

1. Display your maintenance order again and determine which purchase requisition number has been generated.

Which menu path do you use?

What is the purchase requisition number?

Double-click on the purchase requisition and determine the following data:

Delivery date	
Desired vendor	
Fixed vendor	
Account assignment category	

Continued on next page

Check whether or not the services you requested have been transferred to the purchase requisitions. How do you proceed?

a) Purchase Requisition

In the operation list for the order, double-click on the operations number; *Actual Data* tab page.

Purchase requisition number: 1000xxxx

Check the purchase requisition:

Double-click on the purchase requisition number. Choose **ENTER**, to confirm the *Service Details* screen. Select *Item* and choose *Item Detail* (puzzle symbol), to branch to the detailed overview of the *Item*:

Delivery date	Required end date of operation
Desired vendor	1000
Fixed vendor	1000
Account assignment category	F (= Order)

Check services in the purchase requisition:

Double-click on the purchase requisition number. Choose **ENTER**, to confirm the *Service Details* screen. Select *Item* and choose *Service* (hammer and wrench symbol), to branch to the service specifications.

2. Additional steps:

Continued on next page

After the order has been created, what are the additional steps in processing for external services based on service items? (Just note).

a) Additional steps:

1. The purchase requisition is converted to a purchase order in Purchasing.
Transaction: ME21N or ME21.
2. A service entry is made for the purchase order using a service entry sheet (it is also possible to have several service entries using several service entry sheets for a purchase order)
Transaction: ML81N or ML81
3. The service entry sheet is released (if a release strategy has been defined in MM Customizing) The release is triggered by entering release codes corresponding to the release strategy.
Transaction: ML81N or ML81
4. The service entry sheet is accepted. Acceptance enables the actual costs to be posted to the order.
Transaction: ML81N or ML81
5. Finally, the invoice is received. Differences between purchase value and invoice value are credited or debited to the order.
Transaction: MIRO



Lesson Summary

You should now be able to:

- Perform an external service via individual purchase order
- Create a goods receipt for the individual purchase order
- Perform an external service via individual purchase order in connection with service processing
- Perform a service entry with approval
- Process external service in connection with external work centers

Lesson: Mobile Solutions

Lesson Overview

This lesson introduces the area *Mobile Asset Management (MAM)* as part of the *mySAP Mobile Solutions*.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the scope of the area of *Mobile Asset Management*
- Describe the technical prerequisites for the mobile solutions

Business Example

The maintenance technician in the company should enter the data and findings from inspections on site using a mobile device or PDA (Personal Digital Assistant).

Counter readings should be entered online using a WAP-enabled mobile telephone and transferred directly to the SAP system.

Malfunction reports should be entered offline on a PDA and later transferred to the SAP system.

Mobile Solutions: Introduction

The *mySAP Mobile Business* solution is divided into two principal components:

- The technological infrastructure - *Mobile Infrastructure (MI)*
- The mobile applications - *Mobile Applications*

The mobile infrastructure contains:

- the MI-server

This makes available the necessary components for online and offline operation.

- the MI-client

This contains the components of the local installation that are required for operating a mobile device offline.

The mobile infrastructure (MI) is a component of the **SAP Netweaver** technology platform (People Integration area).

The mobile applications include:

- Mobile Asset Management (MAM)
- Mobile Service
- Mobile Sales
- Mobile Procurement
- among others.

Mobile Asset Management (MAM)



- Online

Advantages:

- Location-independent
- Instant data entry
- Improved data quality through prevention of transfer errors
- Up-to-date data can be accessed at any time

Technology:

- Mobile telephone – WAP service IK72w
- Wireless PDA – HTML service IK72hh



Figure 122: Online scenario

Various inspection tasks in the area of Plant Maintenance and Customer Service can be carried out with PDAs.

The following scenarios are supported:

- Entering measurement values and counter readings
- Entering damage codes
- Entering malfunction reports (optional)
- Entering short texts (only via HTML scenario)
- Plausibility check of the values entered

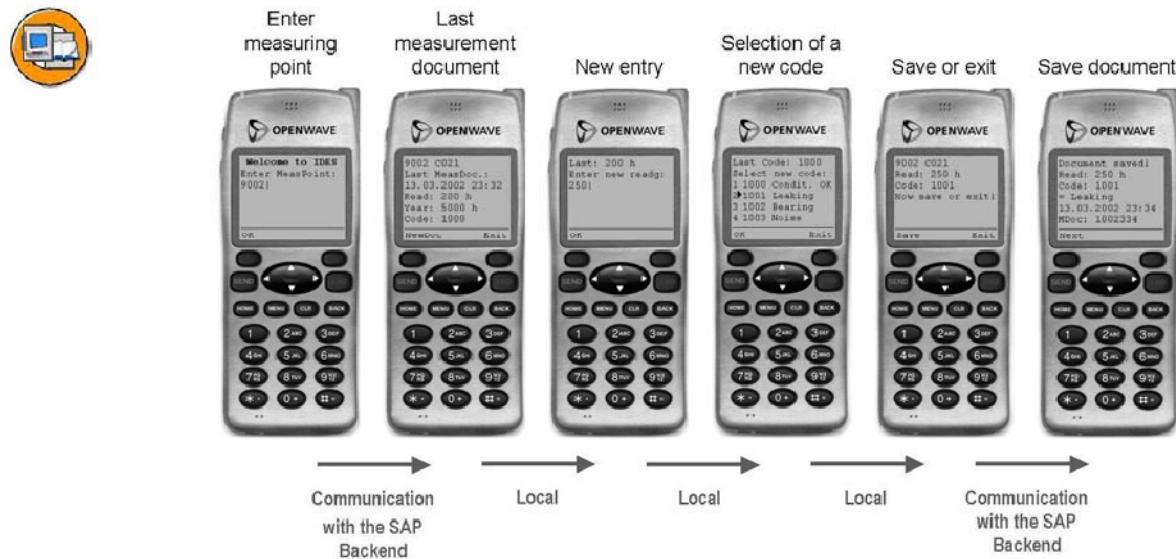


Figure 123: Measurement value entry (online scenario)



Figure 124: Damage code entry (online scenario)

Advantages of the online scenario:

- Location-independent
- Instant data entry
- Improved data quality through prevention of transfer errors
- Up-to-date data can be accessed at any time

Technology

Mobile telephone – WAP service IK72w

- Delivery with SAP R/3 Enterprise (4.7)
- SAP R/3-Backend can be used as of release 4.0

Wireless PDA – HTML service IK72hh

- Delivery with SAP R/3 Enterprise (4.7)
- R/3-Backend can be used as of release 4.0

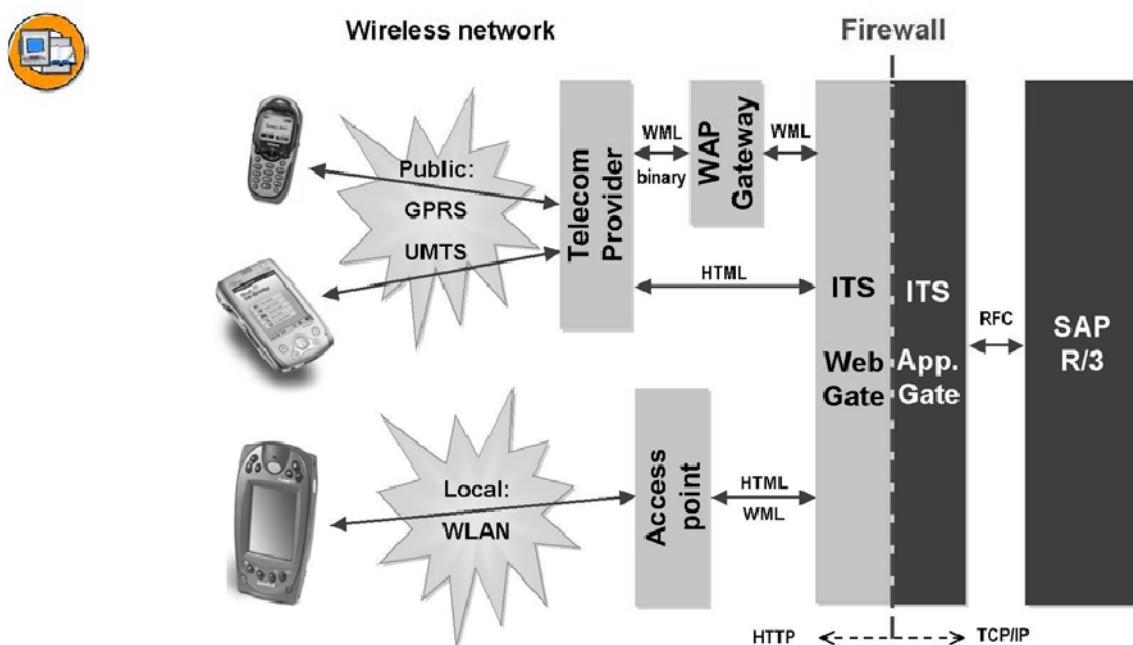


Figure 125: System landscape for wireless applications

For more detailed information on the WAP scenario, see the SAP Note 367222.

For more detailed information on the HTML scenario, see the SAP Note 507570.



- Offline

Advantages:

- Mobile processing of complex maintenance tasks
- Offline scenario
- Runs on almost any PDA

Technology:

- Mobile Engine (mySAP Mobile Business)



Figure 126: Offline scenario

The *Mobile Engine* (part of the *mySAP Mobile Business* solution) enables you to process complex maintenance tasks on a PDA without having to be constantly connected to the backend system.

The mobile engine provides:

- Transfer of data to the PDA
- Database for saving data locally
- Synchronization with the SAP Backend

The following functions are available:

- Display technical objects
- Display notifications with order assignment
- Confirmation of actual times
- Post goods issue for the order
- Local availability check
- Creation and processing of notifications and orders
- Installation and removal of equipment
- Enter measurement documents
- Local materials management

Customer-specific entry screens can be created via a Local Profile Manager (LPM).

Advantages of the offline scenario:

- Mobile processing of complex maintenance tasks
- Offline scenario
- Runs on almost any PDA

Technology

- *Mobile Engine (mySAP Mobile Business)*

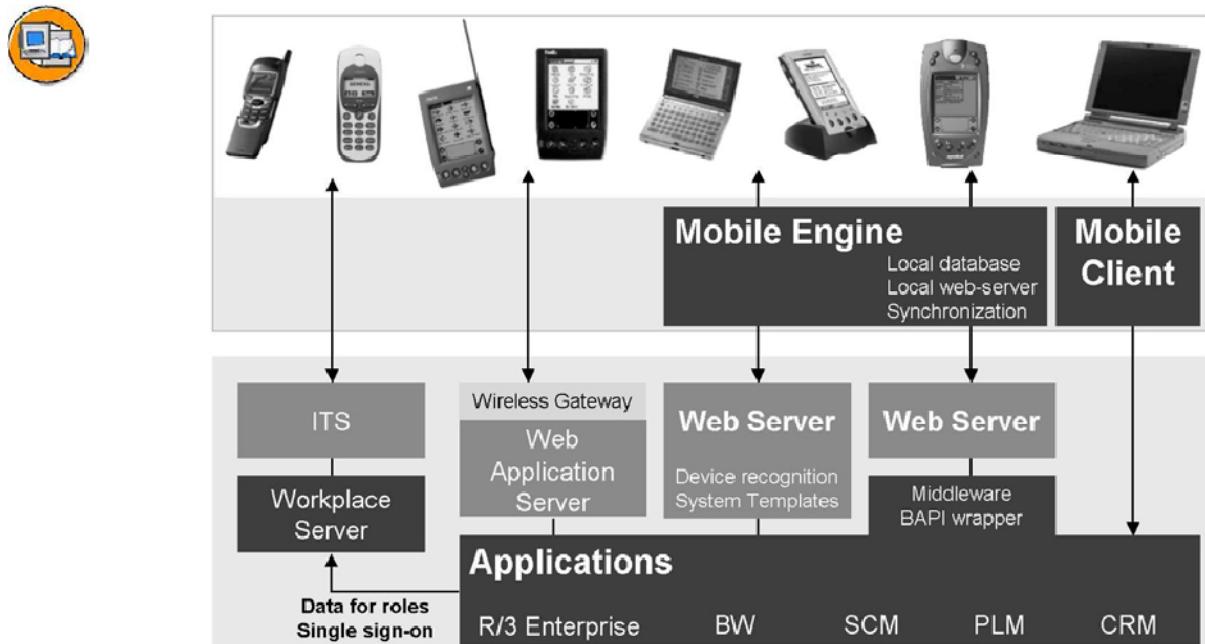


Figure 127: Mobile business architecture

System prerequisites for *Mobile Engine*

Client

- Mobile Engine 2.1 (with Java Virtual Machine)
- Web-Browser
- PDA (Pocket PC) or Laptop (Win OS)

Backend

- Web Application Server 6.20 or higher
- Web-Server with Java-Servlets-support
- Synchronization server
- One of the following components must be installed, depending on the solution:
SAP R/3 4.6B, 4.6C or Enterprise - Plant Maintenance
mySAP ERP - Enterprise Asset Management
mySAP PLM Asset Lifecycle Management or Enterprise Asset Management

For more detailed information:

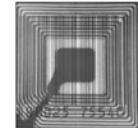
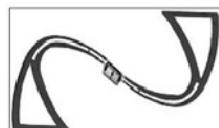
www.sap.com/solutions/mobilebusiness

Radio Frequency Identification (RFID)

RFID is the technology that uses small radio chips for identifying objects.

The funk chip is furnished with an antenna, which it uses to send, receive, and store data.

The RFID technology is integrated into the mobile application *Mobile Asset Management* and supports maintenance and service.



Chip
Antenna

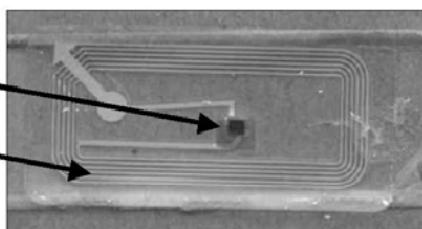


Figure 128: RFID-tags

The RFID-tag can store a wide variety of different information:

- Manufacturer data
- Security information
- ID of the technical object
- Document numbers (notifications or orders)
- Measurement values and counter readings
- and many more.

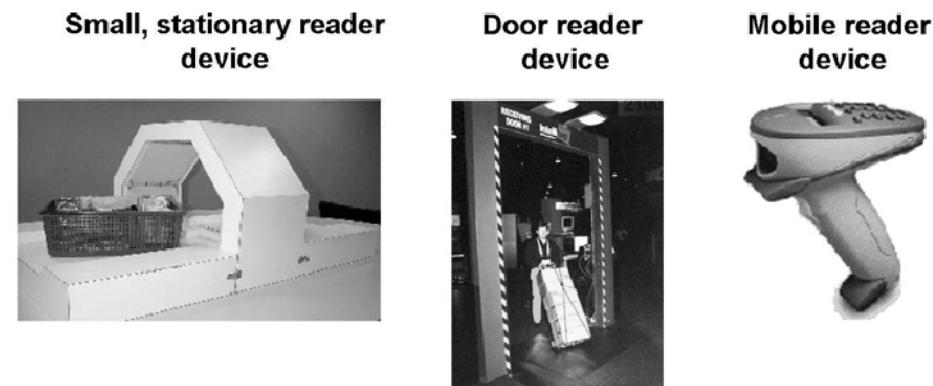


Figure 129: RFID-readers

Tags are differentiated on the basis of their memory design (ROM, EEPROM, and so on), their power supply (passive or active), their band or frequency range, and their range.

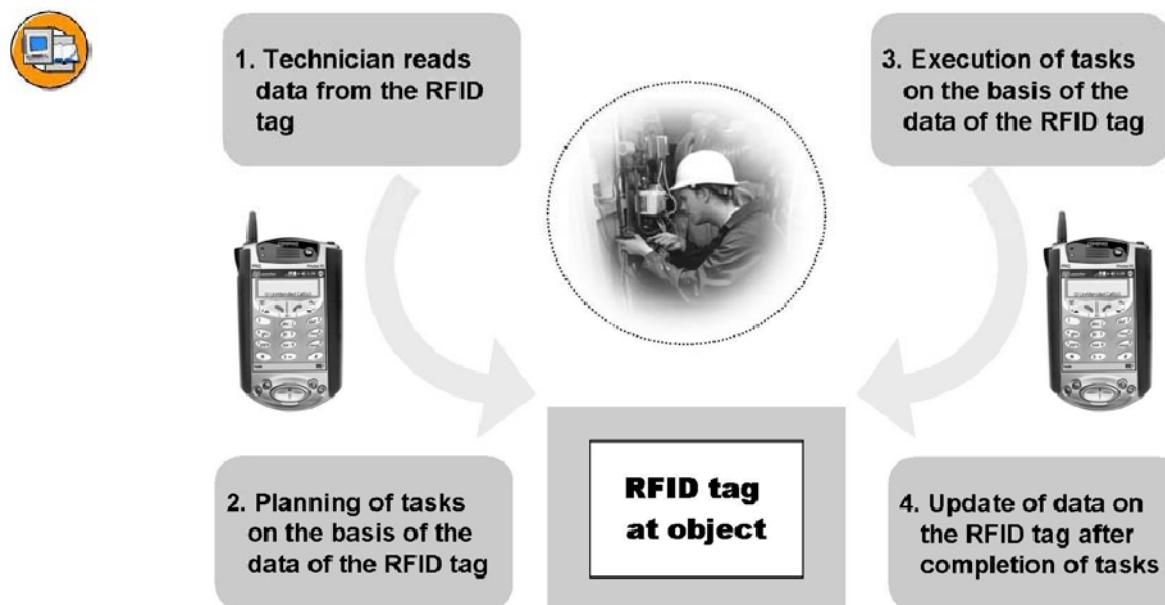


Figure 130: RFID - Process

Scenarios supported by *Mobile Asset Management*:

- Automatic finding and opening of the current order by reading the ID of the technical object
- Update of the RFID-tags after completing the tasks (maintenance technician, date, time, damage, free text)
- Scanning the ID of the technical object speeds up the creation of notifications and orders

Advantages of the RFID-technology:

- Automatic object recognition (no manual entry or search)
- Storage of relevant asset data
- Accelerated processing of maintenance tasks
- Suitable for workshop environment, as it is not sensitive to dirt (no “intervisibility” to the reader device is necessary for most types of tags)

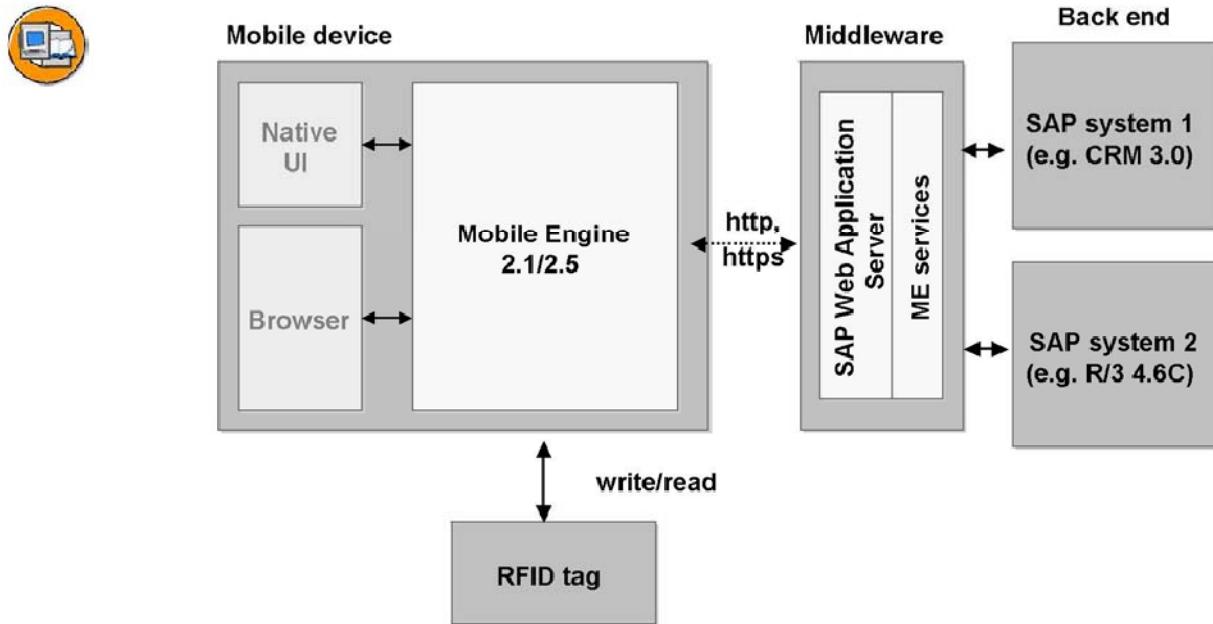


Figure 131: RFID - architecture (1)

2

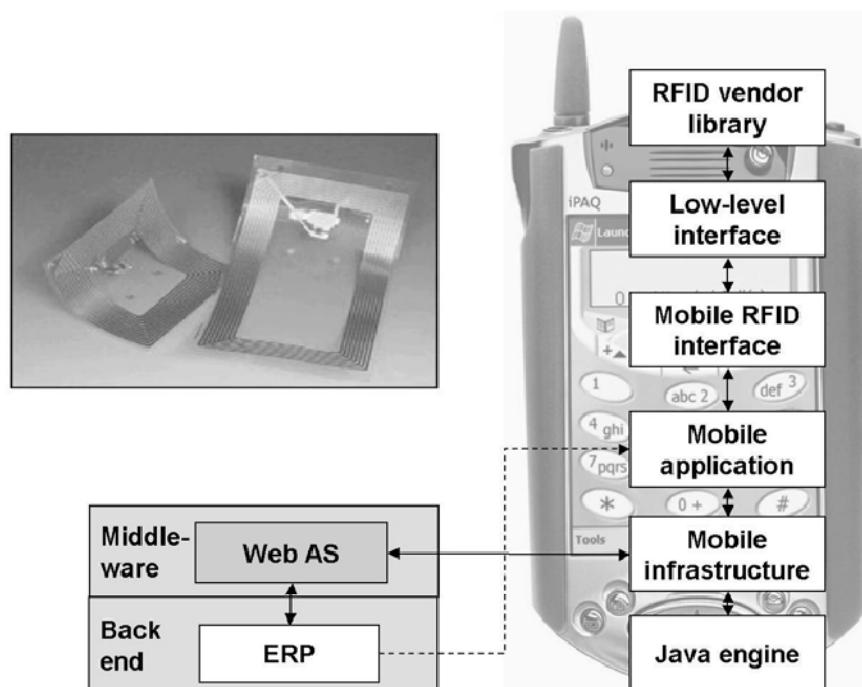


Figure 132: RFID - architecture (2)



Lesson Summary

You should now be able to:

- Describe the scope of the area of *Mobile Asset Management*
- Describe the technical prerequisites for the mobile solutions



Unit Summary

You should now be able to:

- Describe the phases of corrective maintenance
- Create maintenance notifications
- Describe the structure of the maintenance task list
- Select and process maintenance notifications
- Describe the planning phase in the corrective maintenance cycle
- Create a maintenance order
- Describe and execute material planning
- Describe the control phase in the corrective maintenance cycle
- Select the required maintenance orders
- Release and print the maintenance orders
- Describe the execution phase as part of the preventive maintenance
- Execute the material withdrawals
- Describe and perform the partial stages of the completion phase
- Describe the consequences of the technical completion for the order and notification
- Perform an external service via individual purchase order
- Create a goods receipt for the individual purchase order
- Perform an external service via individual purchase order in connection with service processing
- Perform a service entry with approval
- Process external service in connection with external work centers
- Describe the scope of the area of *Mobile Asset Management*
- Describe the technical prerequisites for the mobile solutions

Unit 6

Refurbishment of Spare Parts

Unit Overview

This lesson gives an overview of the refurbishment of spare parts.

In this context, the prerequisites in Materials Management, the processing in Plant Maintenance, as well as the value-based mapping in Accounting, are taken into account.



Unit Objectives

After completing this unit, you will be able to:

- Describe the refurbishment processing
- Describe the prerequisites for the refurbishment in the material master
- Describe the concept of the separate evaluation
- Execute a refurbishment order
- Describe and check the effects of the refurbishment on the stock value

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Lesson: Refurbishment of Spare Parts

Lesson Overview

This lesson introduces the refurbishment of spare parts. First, we show the prerequisites in the material master, and then the processing of a refurbishment order and the effects of the refurbishment on the stock value.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the refurbishment processing
- Describe the prerequisites for the refurbishment in the material master
- Describe the concept of the separate evaluation
- Execute a refurbishment order
- Describe and check the effects of the refurbishment on the stock value

Business Example

In the company, defective or worn-out spare parts in storage should be refurbished.

A material with condition-based valuation is used for this.

In exceptional cases, equipment is also refurbished.

Refurbishment of Spare Parts: Process

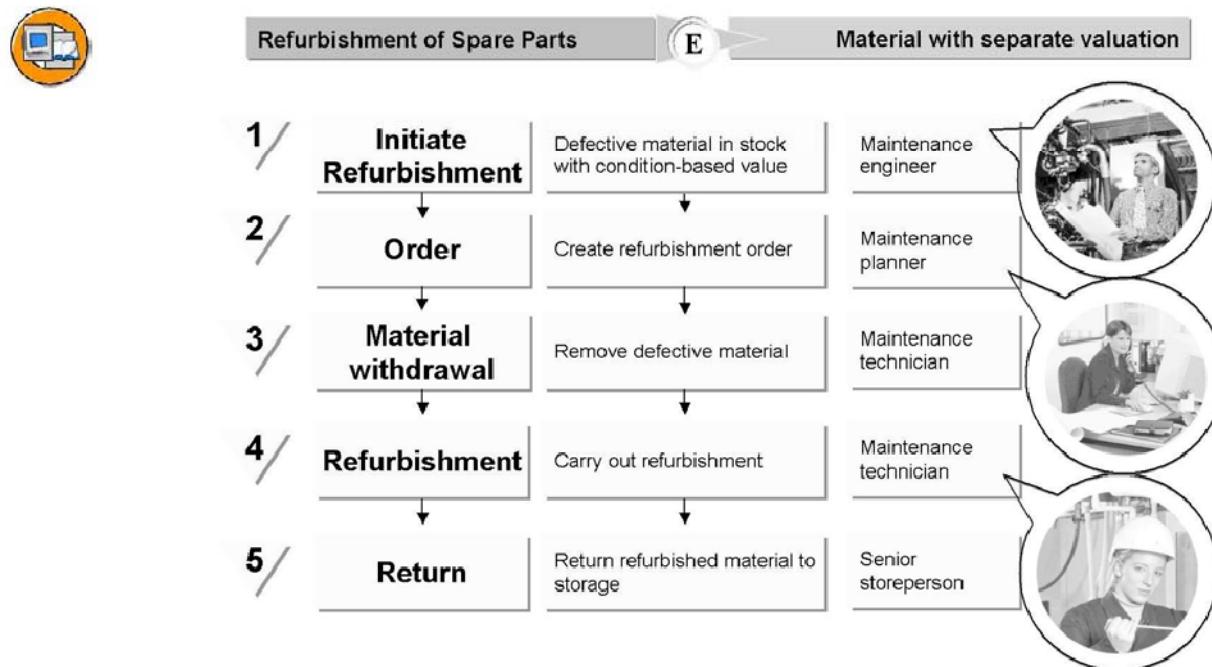


Figure 133: Refurbishment of Spare Parts

Step 1: The first step is to instigate the refurbishment on the basis of a certain amount of defect spare parts in storage.

Step 2: As soon as the number of defective repairable spares in the warehouse has reached a certain level, the maintenance planner responsible creates a refurbishment order. The planner defines the time allowed for the refurbishment and plans all the operations, materials, tools, and so on required for the refurbishment. After planning has been completed, the refurbishment order is released.

Step 3: The employees responsible withdraw the defective/used repairable spares and any other materials planned in the order, which are required for the refurbishment, from the warehouse.

Step 4: Time and material resources are needed for the refurbishment.

The repaired/refurbished repairable spares are returned to the warehouse per goods receipt in accordance with the order planning. The order is confirmed and completed.

The Material Master

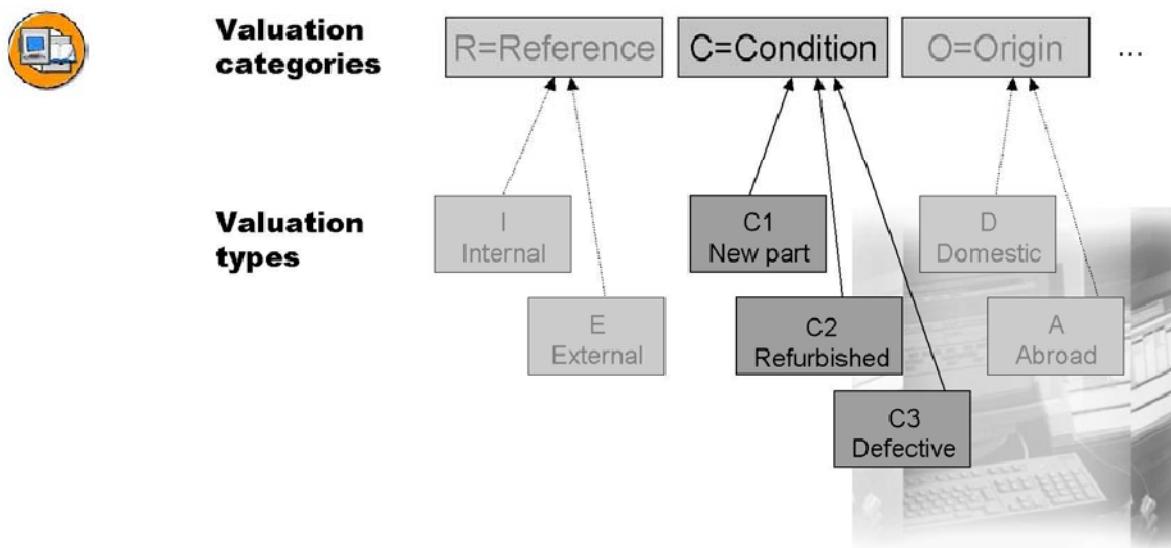


Figure 134: Valuation category and valuation type

In the material master record, a price is defined for the material for each valuation area (= plant or company code). However, in some cases, you need several prices for the same material within one valuation area (**separate material valuation**).

The prerequisite for valuing a material separately is the indicator of the material using the **valuation category** (for example, C for valuation by **condition**) as valued separately. The valuation category is part of the accounting data of the material.

Each material that is intended for separate valuation can be classified in the corresponding **movement types** (for example, new, refurbished, defect). The movement type corresponds to a condition.

Movement types and movement categories are maintained in the Materials Management Customizing.

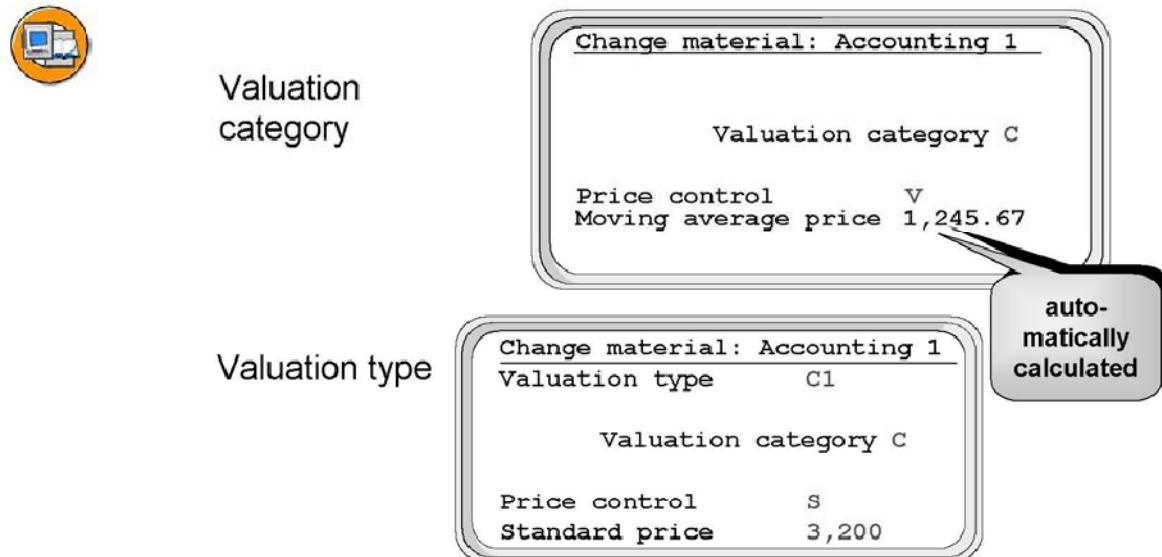


Figure 135: Valuation Category and Type in Material Master

Two types of data are available for a valuation type:

- Valuation data (for example, valuation price, total stock, total stock value) which is defined for each valuation type in the valuation area and applies to all associated storage locations.
- Stock data which is managed per storage location like batch data. If the material valued separately is to be handled in batches, the stock data is not managed per valuation type but per batch. Each batch is assigned to a valuation type.

The stock quantity, stock value and valuation price for all the valuation types are accumulated at valuation area level. The result is the moving average price for the material.

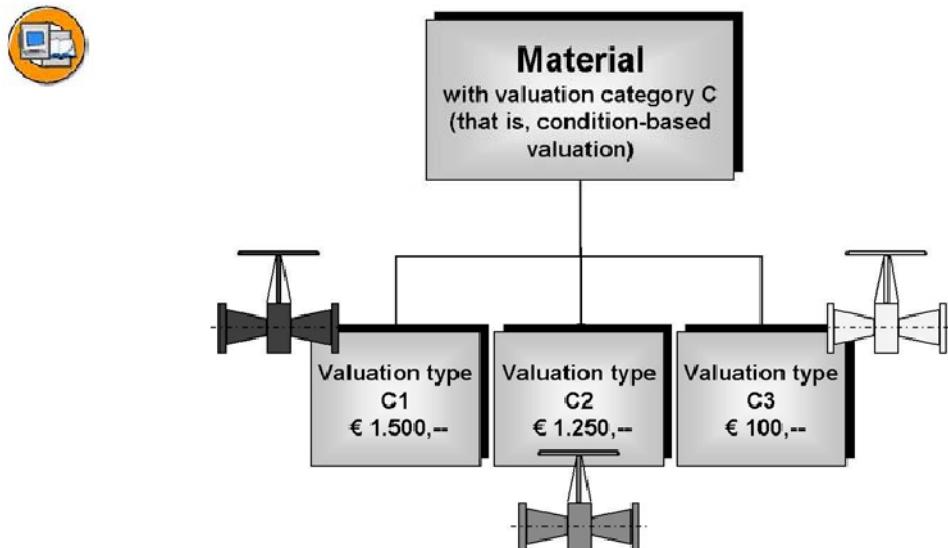


Figure 136: Condition-Based Material Valuation

If a material is valued separately, this material is managed in various partial stocks. Each partial stock is valued separately.

Each valuation-relevant operation, whether it's a goods receipt, goods issue, or inventory, is executed at partial-stock level. When you are processing one of these operations, you must always specify which partial stock is affected. This ensures that only the value of the partial stock concerned can be changed. The other partial stocks remain unaffected.

The overall stock is updated as well as the partial stocks. The value of the overall stock is calculated from the sum of the stock values and the stock quantities of the individual partial stocks.

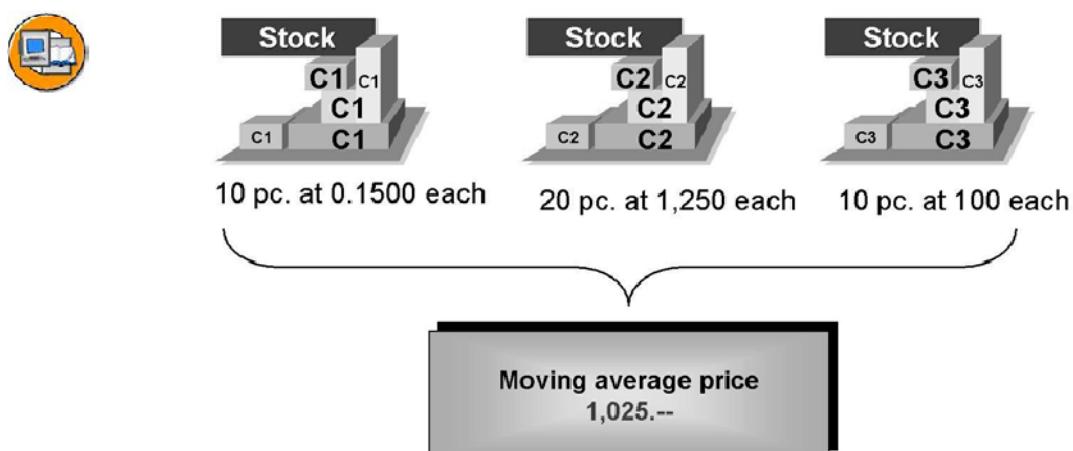


Figure 137: Moving Average Price

The stock quantity, stock value and valuation price for all the valuation types are accumulated at valuation area level. The result is the moving average price for the material.

Refurbishment Order

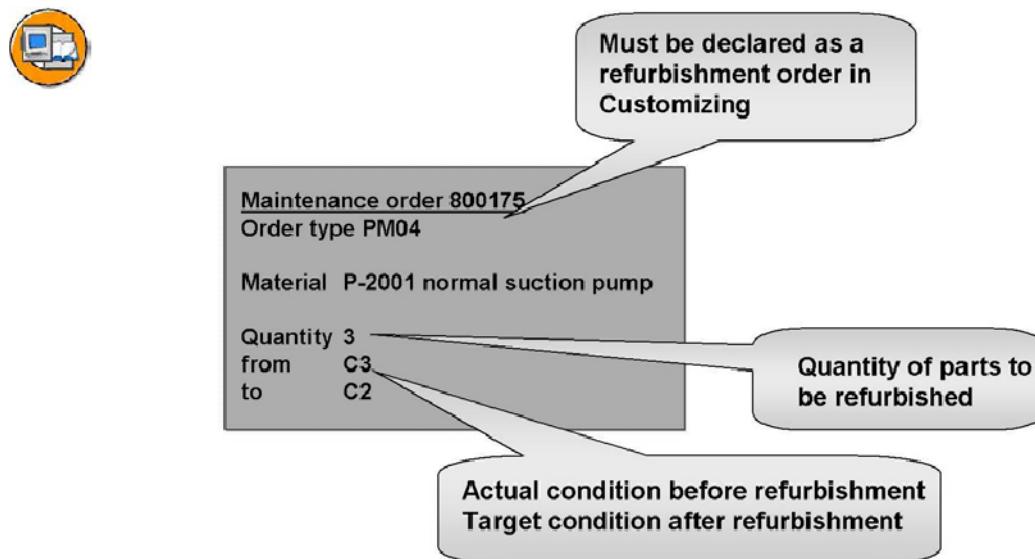


Figure 138: Refurbishment Order

The structure of the refurbishment order essentially corresponds to the structure of the maintenance order.

When creating a refurbishment order, you have to enter at least the following data:

- Material number to be refurbished
- Quantity to be refurbished
- The actual condition which is the basis for refurbishment (for example, C3)
- The target condition which is the aim of refurbishment (for example, C2)

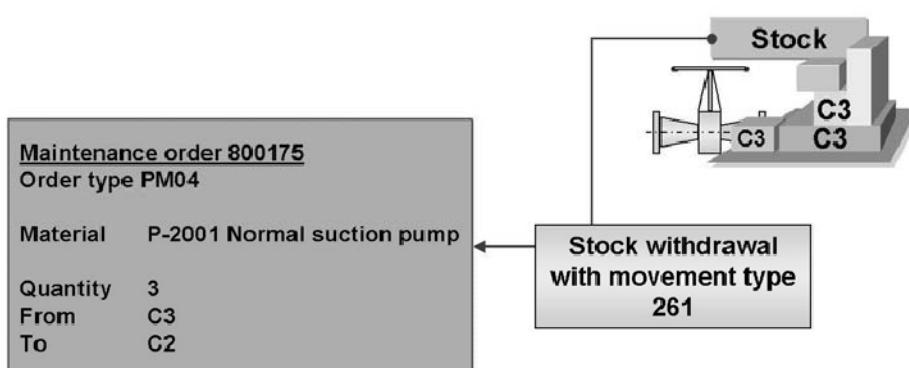


Figure 139: Refurbishment Order - Stock Withdrawal

When a refurbishment order is created, the following planned goods movements of parts to be refurbished are generated in the background:

- Automatic creation of material to be provided ("from" condition) as order component
- Automatic creation of material to be delivered ("to" condition) as material receipt element

The goods issue of the material to be provided ("from" condition) is made as a planned material withdrawal using movement type 261 with reference to the order number.

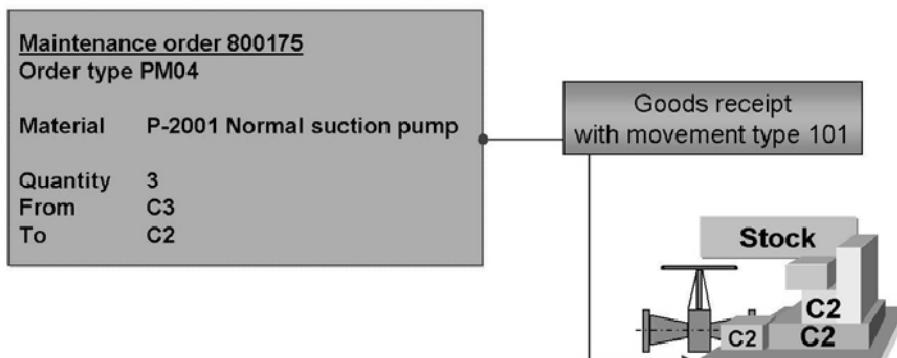


Figure 140: Refurbishment Order - Inward Stock Movement

The goods receipt can be posted either using the usual Materials Management transactions or using a special transaction in the confirmation area of Plant Maintenance (transaction IW8W).

The goods receipt of the material to be delivered ("from" condition) is made as a planned goods receipt using movement type 101 with reference to the order number.

If the valuation types (partial stocks) have a valuation with standard price, the final change of the stock value of the whole material takes place at this time: a C3 part with the standard price, a C2 part with the standard price more in stock. This leads to a new floating average price at the material level. The effective expenditure of the order is not taken into account for this constellation. It is posted to a price difference account for the order settlement.

Inventory Management and Controlling



Stock value before processing

Con-dition	Price	Quantity	Stock value
C1	€1,500.00	10	€15,000.00
C2	€1,200.00	20	€24,000.00
C3	€100.00	10	€1,000.00
Stock value			€40,000.00
Moving average price			€1,000.00



Stock value during processing

Quantity	Stock value
10	€15,000.00
21	€25,200.00
9	€900.00
	€41,100.00
	€1,027.50

Stock value after settlement

Quantity	Stock value
10	€15,000.00
21	€24,350.00
9	€900.00
	€40,250.00
	€1,006.25



Figure 141: Effect of Refurbishment on Stock Value of Material

If the movement types (partial stocks) have a valuation with a floating average price, then the overall stock value of the material rises by the effective expenditure of the order (working time + material; here: 5 hours at a total of €250 + €100 for the residual value of the defect part) after settlement.

This in turn leads to a rise in the floating average price at the overall material level, depending on the expenditure of the order (not on the valuation price of the partial stock).

Exercise 17: The Material Master

Exercise Objectives

After completing this exercise, you will be able to:

- Display the material master
- Determine the valuation category and valuation types
- Determine stocks and valuations

Business Example

Warehouse-based refurbishment is based on the condition-based valuation of the material, for which the different conditions are represented using internal valuation types. In this way, a verification document concerning the value of the change to the material can be maintained for refurbishment.

Task:

Display material master

1. A certain quantity of defective pumps with material number *T-FP1##* has been collected in the warehouse. These should now be refurbished.

However, before the refurbishment starts, you want to obtain an overview of certain core data for this material.

Call up the accounting data of the material master *T-FP1##* for the plant *1000*.

Which menu path do you use?

Determine the following data:

Description	
Price control	
Valuation category	
Moving average price	
Standard price	
Total stock	
Total value	

Continued on next page

2. So that the different conditions (new, refurbished, defective) can be represented, the material has different valuation types.

Which valuation types have been defined for the material *T-FP1##*?

Determine the following data for each valuation type

	Valuation type	Valuation type	Valuation type
Valuation category			
Price control			
Moving average price			
Standard price			
Total stock			
Total value			

3. Stock balance display

Display an overview of the stock.

Which menu path do you use?

How do you limit the selection?

Determine the following stock values

	Unrestricted use	Reserved
Plant 1000		
Storage location 0001		
Batch		
Batch		
Batch		

Solution 17: The Material Master

Task:

Display material master

1. A certain quantity of defective pumps with material number *T-FP1##* has been collected in the warehouse. These should now be refurbished.

However, before the refurbishment starts, you want to obtain an overview of certain core data for this material.

Call up the accounting data of the material master *T-FP1##* for the plant *1000*.

Which menu path do you use?

Determine the following data:

Description	
Price control	
Valuation category	
Moving average price	

Continued on next page

Standard price	
Total stock	
Total value	

- a) Display material master

Choose SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Material → Display.

Field name or data type	Values
Description	Normal suction pump SIHI 200-100
Price control	V
Valuation category	C
Moving average price	1.048,15
Standard price	1.256,19
Total stock	40
Total value	41.926,-

2. So that the different conditions (new, refurbished, defective) can be represented, the material has different valuation types.

Which valuation types have been defined for the material T-FP1##?

Determine the following data for each valuation type

	Valuation type	Valuation type	Valuation type
Valuation category			
Price control			
Moving average price			

Continued on next page

	Valuation type	Valuation type	Valuation type
Standard price			
Total stock			
Total value			

- a) Display movement types

Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Material → Display.*

Enter the material number **T-FP1##** and choose the *Accounting* view.

Call up the F4 help in the *Valuation Type* field.

The following valuation types appear

C1, C2 and C3



Hint: You need the pop-up of the organizational levels to select the valuation type. If the pop-up doesn't appear when you go to the material master, then you can use the pushbutton *Organizational Levels* to determine the organizational levels - and thus also the valuation type - again at any time.

	Valuation type C1	Valuation type C2	Valuation type C3
Valuation category	C	C	C
Price control	S	S	S
Moving average price	1.533,88	1.278,23	102,26
Standard price	1.533,88	1.278,23	102,26
Total stock	10	20	10
Total value	15.338,80	25.564,60	1.022,60

3. Stock balance display

Display an overview of the stock.

Which menu path do you use?

Continued on next page

How do you limit the selection?

Determine the following stock values

	Unrestricted use	Reserved
Plant 1000		
Storage location 0001		
Batch		
Batch		
Batch		

- a) Stock balance display

Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Material → Display.*

In the material:

Environment → Stock Overview

or

Choose *SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Material → Stock Overview.*

Stock values:

	Unrestricted use	Reserved
Plant 1000	40	0
Storage location 0001	40	0
Batch C1	10	0
Batch C2	20	0
Batch C3	10	0

Exercise 18: The Refurbishment Order

Exercise Objectives

After completing this exercise, you will be able to:

- Configure and process a refurbishment order
- Perform a material withdrawal and material receipt

Business Example

Refurbishment processing is performed using an order type configured for this purpose. This enables you to perform refurbishment for material and pieces of equipment linked to a material number.

Task 1:

1. Create a refurbishment order for a piece of your material *T-FP1##* from batch C3, using the following data:

Order type **PM04**

Maintenance planning plant: **1000**

Business area: **1000**

Maintenance planner group: **I##**

Person responsible Work center: **T-ME##**

Overall quantity: **1 piece**

From plant/storage location/valuation type: **1000 / 0001 / C3**

To plant/storage location/valuation type: **1000 / 0001 / C2**

What menu path do you use?

Task 2:

Operations

1. Create the operations you regard as necessary to process the order. Use work center *T-ME##* and control key *PM01* each time.

Continued on next page

Task 3:

Material planning

1. Check the component list for the operation *0010*.

Which entries can you see?

Material number	
Quantity	
Item category	
Plant	
Storage location	
Batch	

Plan further spare parts which you regard as necessary for processing the order.

Which did you plan?

Put the order in process without printing it.

Which order number is assigned?

Task 4:

Material withdrawal

1. Withdraw the material planned for your order.

How do you proceed?

Which document number is assigned?

Task 5:

Time confirmation

1. Enter the actual times for your order using single entry or using collective entry.
Set the final confirmation indicator each time.

How many hours have you confirmed in total?

Continued on next page

Task 6:

Goods receipt

1. Post the return of the refurbished part to the warehouse for your order.

How do you proceed?

Which document number is assigned?

Solution 18: The Refurbishment Order

Task 1:

1. Create a refurbishment order for a piece of your material **T-FP1##** from batch C3, using the following data:

Order type **PM04**

Maintenance planning plant: **1000**

Business area: **1000**

Maintenance planner group: **I##**

Person responsible Work center: **T-ME##**

Overall quantity: **1 piece**

From plant/storage location/valuation type: **1000 / 0001 / C3**

To plant/storage location/valuation type: **1000 / 0001 / C2**

What menu path do you use?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (Special) → Refurbishment Order.*

Field name or data type	Values
Order type	PM04
Material	T-FP1##
Planning plant	1000
Business area	1000
Maintenance planner group	I##
Person responsible Work center	T-ME##
Total quantity	1
From plant/storage location/valuation type	1000 / 0001 / C3
To plant/storage location/valuation type	1000 / 0001 / C2

Continued on next page

Task 2:

Operations

1. Create the operations you regard as necessary to process the order. Use work center *T-ME##* and control key *PM01* each time.

a) In the order, choose *Operations*;

Enter useful operations for performing refurbishment.

Task 3:

Material planning

1. Check the component list for the operation *0010*.

Which entries can you see?

Material number	
Quantity	
Item category	
Plant	
Storage location	
Batch	

Plan further spare parts which you regard as necessary for processing the order.

Which did you plan?

Put the order in process without printing it.

Continued on next page

Which order number is assigned?

- a) Double-click from the operation list on the operation number *0010*:

Component *T-FP1##* is scheduled automatically with the following data:

Field name or data type	Values
Material number	T-FP1##
Quantity	1
Item category	L
Plant	1000
Storage location	0001
Batch	C3

Plan additional materials using free material assignment (execute the F4 help in the field *Components* and search, for example, for a material short text);

Possible materials: 100-100, 100-400, 100-431, 100-600 and so on..

Choose *In Process*.

Task 4:

Material withdrawal

1. Withdraw the material planned for your order.

How do you proceed?

Continued on next page

Which document number is assigned?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Movement.*

Transaction MB11

Field name or data type	Values
Movement type	261
Plant	1000
Storage location	0001
Material	T-FP1##

Choose *For Order* and enter the order number. Save the entry.

Alternatively you can use transaction MIGO here.

Task 5:

Time confirmation

1. Enter the actual times for your order using single entry or using collective entry.
Set the final confirmation indicator each time.

How many hours have you confirmed in total?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Overall Completion Confirmation.*

or

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Individual Time Confirmation.*

Task 6:

Goods receipt

1. Post the return of the refurbished part to the warehouse for your order.

How do you proceed?

Continued on next page

Which document number is assigned?

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Movement → Refurbishment goods receipt.*

Enter the order number of your refurbishment order and choose **Enter**.

Check posting and document dates.

Check quantity, movement type, plant, and storage location

Save

Exercise 19: Inventory Management and Controlling

Exercise Objectives

After completing this exercise, you will be able to:

- Perform a cost analysis for the order
- Check stocks
- Describe the effects of the settlement

Business Example

The refurbishment order is settled directly to the material. Depending on the price control of the condition batches (valuation types), values are assigned based on the standard price of the valuation type or the actual resources required. The check can also be made using the cost report in the order.

Task 1:

Cost Analysis of the Order

1. Call up the planned/actual cost report and check which credits and debits the order has before settlement.

How do you proceed?

Personnel/Material cost types	Actual costs
Factory output cost type	

Task 2:

1. Which settlement rule is used for the order?

Continued on next page

Task 3:

1. When is the stock value changed for material *T-FP1##* and why?

Are the actual working time and spare parts required considered when the stock value is changed?

Solution 19: Inventory Management and Controlling

Task 1:

Cost Analysis of the Order

1. Call up the planned/actual cost report and check which credits and debits the order has before settlement.

How do you proceed?

Personnel/Material cost types	Actual costs

Continued on next page

Factory output cost type	

- a) Choose SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.

Choose Extras → Cost Reports → Planned/Actual Comparison.

Personnel/Material cost types	Actual costs
404000 Spare parts	For example: 200
615000 Direct activity allocation	For example: 129, 53
655901 Overhead rates	None, since these cannot be calculated automatically
Factory output cost types	
895000 Factory production	For example: 1,278.23-



Hint: The service provided by the refurbishment is posted to the order as credit in the form of negative costs.

The value results from the values assigned to the C2 batch of material T-FP1## (standard price valuation).

Task 2:

1. Which settlement rule is used for the order?
- a) Choose SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change.

Choose GoTo → Settlement rule.

MAT T-FP1## 100% GES

The settlement rule is created automatically. The settlement is made directly to the material.

Continued on next page

Task 3:

1. When is the stock value changed for material *T-FP1##* and why?

Are the actual working time and spare parts required considered when the stock value is changed?

- a) Since the material *T-FP1##* has a standard price valuation at the level of valuation type (= batch), the stock value is changed for the return of the refurbished part to the warehouse (in batch C2).

As a result of the standard price valuation, an item received in the C2 batch is always assigned the standard price (here €1,278.23) and thereby leads to an increase in the stock value at overall material level.

The actual working time and spare parts required are not considered for the standard price valuation of batches.

The resources required can only be considered if a moving average price has been agreed at movement type level. The actual resources required are then settled to the material when the order is settled (not when it reaches the warehouse).



Lesson Summary

You should now be able to:

- Describe the refurbishment processing
- Describe the prerequisites for the refurbishment in the material master
- Describe the concept of the separate evaluation
- Execute a refurbishment order
- Describe and check the effects of the refurbishment on the stock value



Unit Summary

You should now be able to:

- Describe the refurbishment processing
- Describe the prerequisites for the refurbishment in the material master
- Describe the concept of the separate evaluation
- Execute a refurbishment order
- Describe and check the effects of the refurbishment on the stock value

Unit 7

Preventive Maintenance

Unit Overview

This lesson gives an overview of preventive maintenance, consisting of the areas of work and maintenance planning.



Unit Objectives

After completing this unit, you will be able to:

- Describe the concept of preventive maintenance
- Describe the process of preventive maintenance
- Describe the concept of the maintenance task list.
- Describe the structure of the maintenance task list
- Describe and create a single cycle plan (time-based)
- Describe and create a strategy plan (time-based)
- Describe the concept of scheduling
- Schedule Maintenance Plans

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Lesson: Overview of Preventive Maintenance

Lesson Overview

This lesson covers the process of preventive maintenance.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the concept of preventive maintenance
- Describe the process of preventive maintenance

Business Example

To keep downtimes and maintenance costs to a minimum, the technical systems in a company are inspected and maintained regularly.

Preventive maintenance is performed based on time, the condition or the performance of the technical object.

Preventive Maintenance: Basics

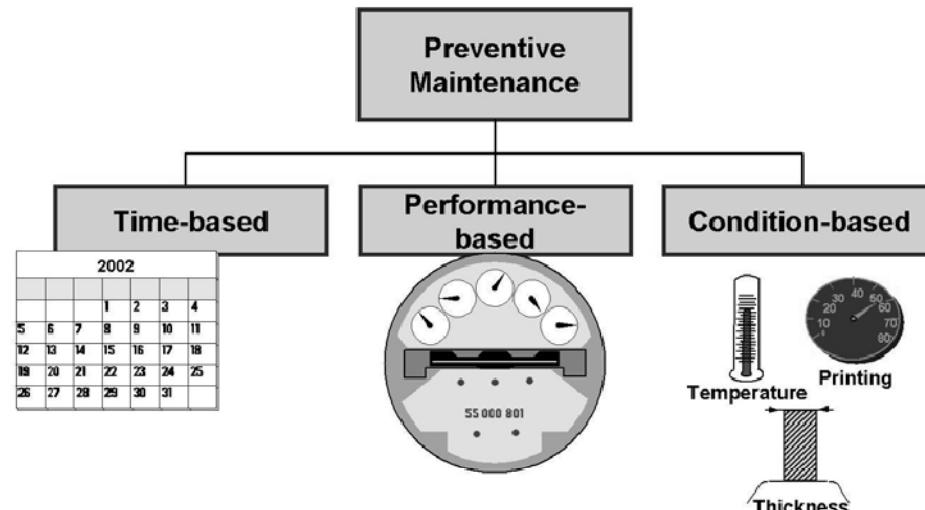


Figure 142: Types of Preventive Maintenance

Preventive maintenance is divided into three areas:

- **Time-based**, that is preventive maintenance tasks are triggered after a specific period of time has elapsed (for example, every six months).
- **Performance-related**, that is preventive maintenance tasks are triggered after a specific performance level has been reached (for example, every 10,000 kms).
- **Condition-based**, that is preventive maintenance tasks are due when a condition is outside of a specific value range (for example, thread depth below 15 mm or temperature higher than 85° C).

Preventive Maintenance: Process

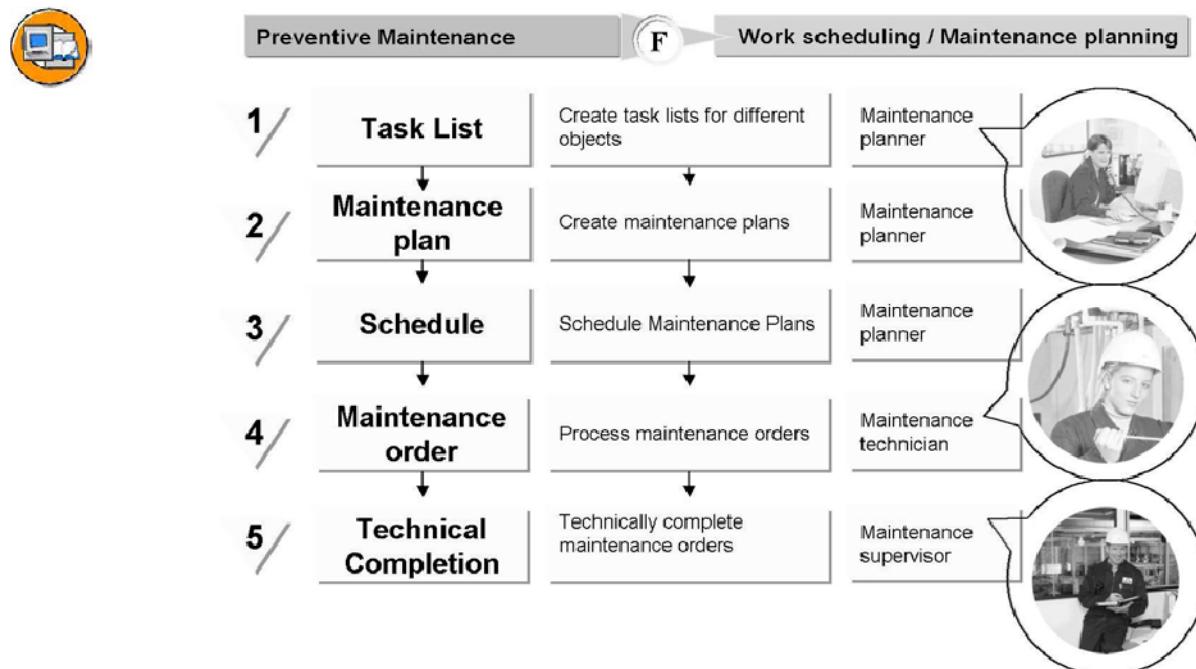


Figure 143: Preventive Maintenance

The process of preventive maintenance contains steps for the planning and execution of regularly recurring inspection and maintenance activities.

Step 1: The task list defines object-dependent or object-independent process steps to be performed.

Step 2: The maintenance plan is created for the object and serves to automatically generate orders (also: notifications, service entry sheets) in accordance with particular guidelines.

Step 3: Scheduling is responsible for the regular call up of orders (notifications, service entry sheets) as well as for recalculating planned dates.

Step 4: The maintenance order is automatically generated by the maintenance order and entered in the order list, from where it is processed like other orders.

Step 5: The technical completion marks the order and the corresponding planned date in the maintenance plan as finished. The date of the technical completion is used in the maintenance plan for calculating the next planned date.



Lesson Summary

You should now be able to:

- Describe the concept of preventive maintenance
- Describe the process of preventive maintenance

Lesson: Work Scheduling

Lesson Overview

This lesson introduces the concept of the maintenance task list.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the concept of the maintenance task list.
- Describe the structure of the maintenance task list

Business Example

In the company, all the inspection and maintenance tasks that must be performed at regular intervals are defined in maintenance task lists.

The task lists are then automatically integrated into maintenance orders within the maintenance planning or can be manually used in unscheduled maintenance orders.

Concept of the Task List

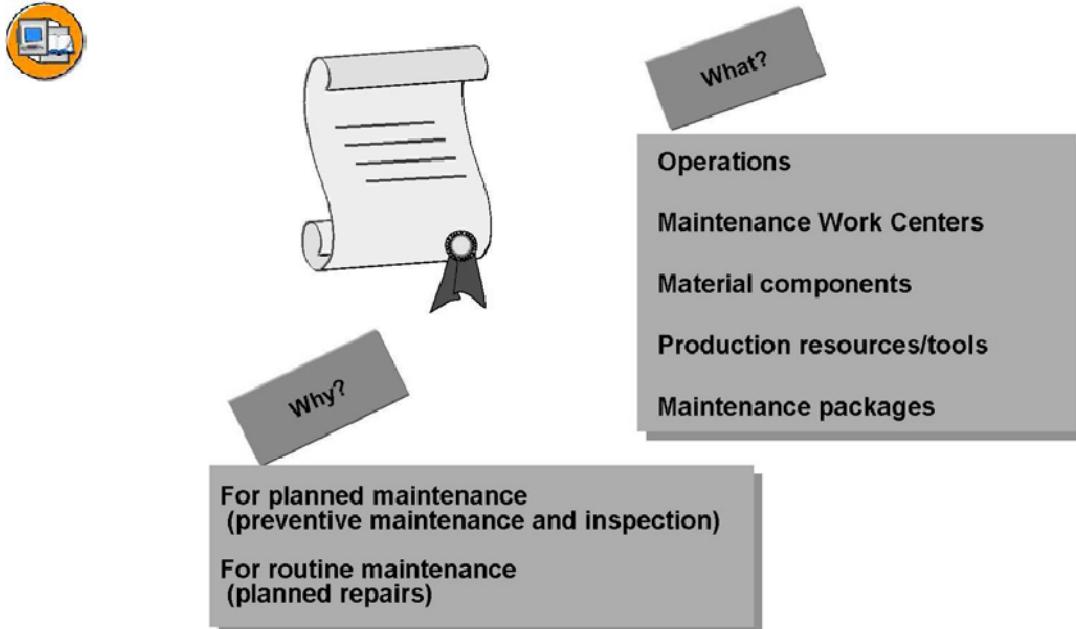


Figure 144: Task list

Maintenance task lists describe a series of individual maintenance activities. You can use them to standardize recurring activities, plan them more effectively, and to save time when creating maintenance orders and maintenance plans.

Task lists can be object-independent (categories: equipment plan, plan for the functional location) and, in this case, refer to exactly one technical object.

Object-independent task lists (category: general maintenance task list) can be used for multiple objects of the same type.

General maintenance task lists can be used for routine and for planned maintenance tasks. Task lists also specify which spare parts and tools are required for operations and the time needed to perform the work.

If you have created maintenance task lists, you can create maintenance orders and maintenance plans with a minimum of effort, since you refer to the operations and processes that were already created in the maintenance task list. For example, if you create a maintenance order for a task, for which all the individual operations have already been described in a maintenance task list, you only need to specify this task list and the required times in the maintenance order; you do not need to enter the individual operations because they are copied from the maintenance task list. If the same task is required again shortly afterwards, you can again create the maintenance order with reference to the maintenance task list.

Structure of the Task List

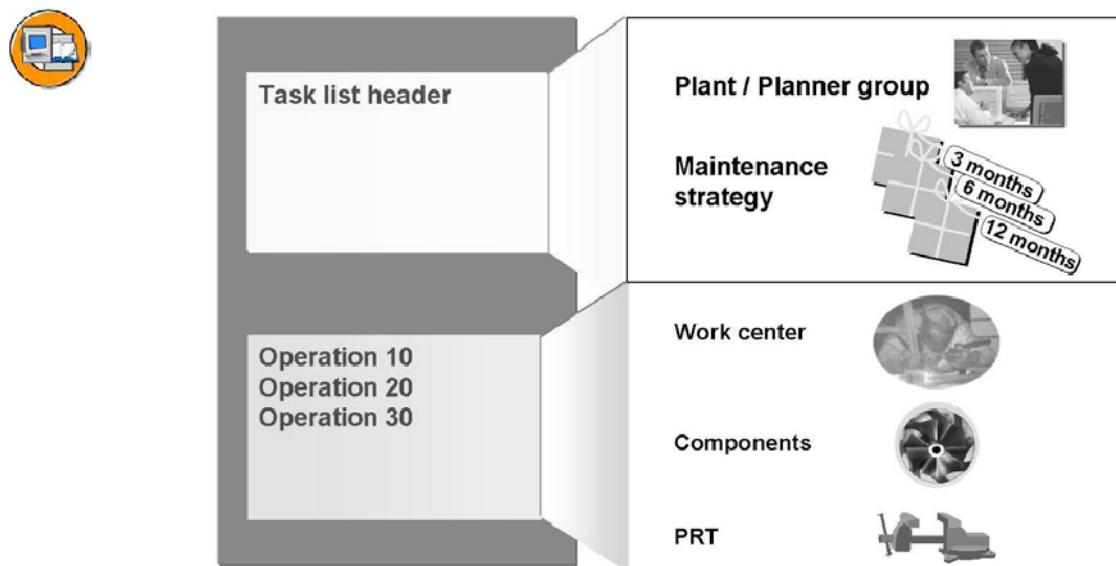


Figure 145: Maintenance Task Lists: Structure

The following assignments are made in the **task list header**:

- Maintenance planning plant
- Planner Group
- Maintenance strategy
- Some additional parameters

The following assignments are possible for **operations**:

- Work center
- Time
- Components (Material)
- Additional parameters

Exercise 20: The Task List

Exercise Objectives

After completing this exercise, you will be able to:

- Display task list details

Business Example

You can use task lists to store the recurring sequence of operations as a master record. These operations can then be included either in a maintenance plan or in order planning.

Task:

1. What are task list groups and group counters used for?
2. Display the task list header of the general maintenance task list PUMP_WTG with group counter 1.

How do you proceed?

Which parameters indicate that this task list has been defined for strategy-based maintenance planning? What is the value?

3. Display the operation list.

How do you proceed?

Which maintenance packages have been assigned to which operations?

Solution 20: The Task List

Task:

1. What are task list groups and group counters used for?
 - a) The task list group combines task lists with similar topics from logical and data-related perspectives. The group counter is the sequence number of a task list within the task list group.
2. Display the task list header of the general maintenance task list PUMP_WTG with group counter 1.

How do you proceed?

Which parameters indicate that this task list has been defined for strategy-based maintenance planning? What is the value?

- a) Display the task list header

Choose *SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Work Scheduling → Task Lists → Maintenance Task Lists → Display*.

Task list group: PUMP_WTG

Task list group counter: 1

Header pushbutton

The value A is entered in the “Maintenance strategy” field (calendar-based scheduling). This shows that the general task list should be used for time-based strategic maintenance. Strategy A provides the maintenance packages (cycles) which are available for the operations.

3. Display the operation list.

How do you proceed?

Which maintenance packages have been assigned to which operations?

- a) Display the operation list:

Choose *Operation* from the plan header.

Choose *Maintenance Packages* and show the maintenance packages for all the operations.



Lesson Summary

You should now be able to:

- Describe the concept of the maintenance task list.
- Describe the structure of the maintenance task list

Lesson: Maintenance Planning

Lesson Overview

This lesson introduces maintenance plans with a single cycle or with a maintenance strategy.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe and create a single cycle plan (time-based)
- Describe and create a strategy plan (time-based)

Business Example

To keep downtimes and maintenance costs to a minimum, the technical systems in a company are inspected and maintained regularly.

Time-based maintenance planning is particularly used for this.

Single cycle plans are to be used to manage the maintenance of machines and operational systems, which are always inspected in the same way at fixed intervals.

Strategy plans are used when activities that are due at different intervals are graded.

Single Cycle Plan

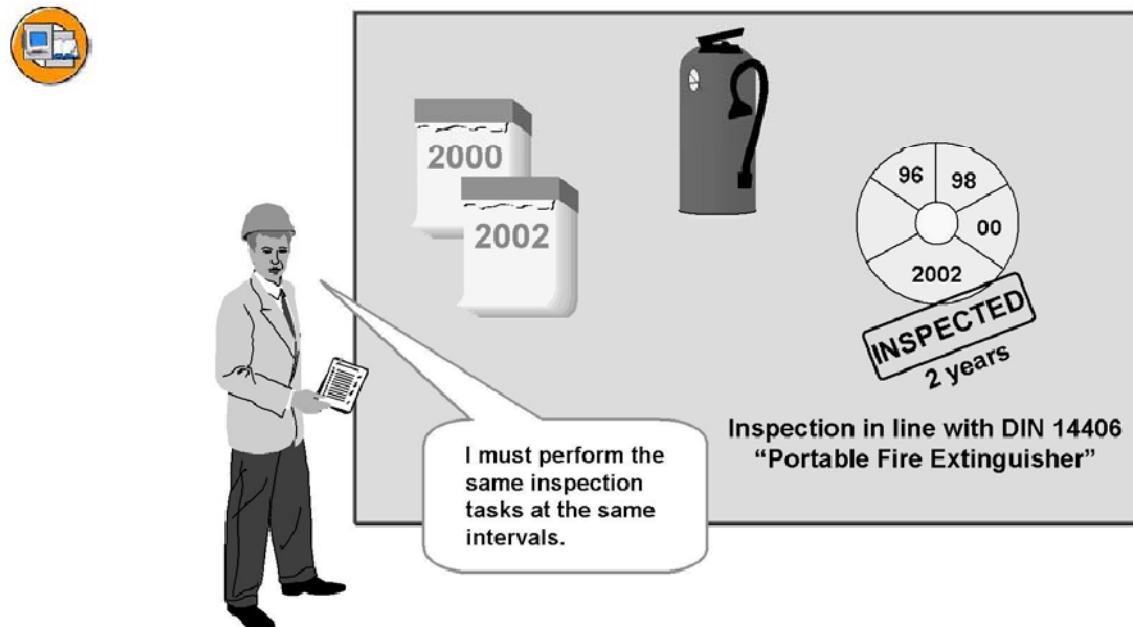


Figure 146: Single Cycle Plan: Business Process

Business process: The same activity must be executed at regular intervals.

Examples:

- Annual inspection of fire extinguishers
- Acceptance test every two years
- Inspection of boilers every six years, as per pressure vessel regulations.

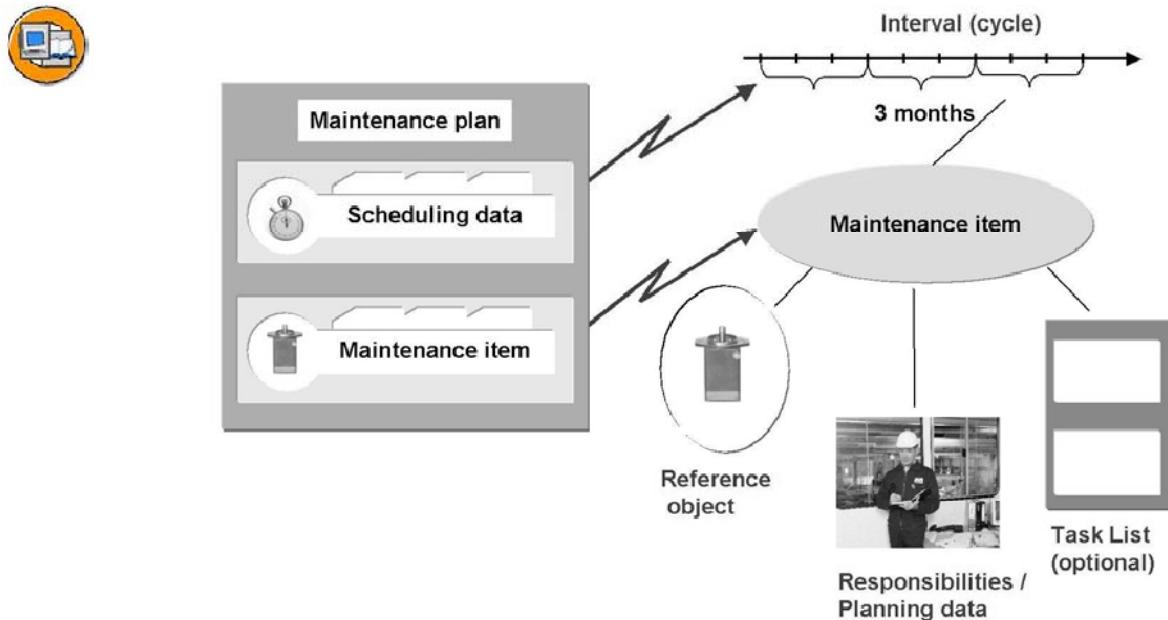


Figure 147: Maintenance Item and Scheduling Data

The maintenance plan is composed of **maintenance items** and **scheduling dates** and is used for automatically generating **maintenance call objects** (order, notification, service entry sheet).

The maintenance item contains the following data:

- Planning data (for example, maintenance planning plant, maintenance planner group, order type and so on)
- Reference object
- Task list (optional)

The scheduling data contains the following:

- Cycle or maintenance intervals
- Scheduling parameters for fine-tuning scheduling
- List of planned dates and call dates

A maintenance plan can have one or more maintenance items (For example, pump maintenance: one maintenance item for the pump transmission with corresponding task list, one maintenance item for the pump motor with corresponding task list).

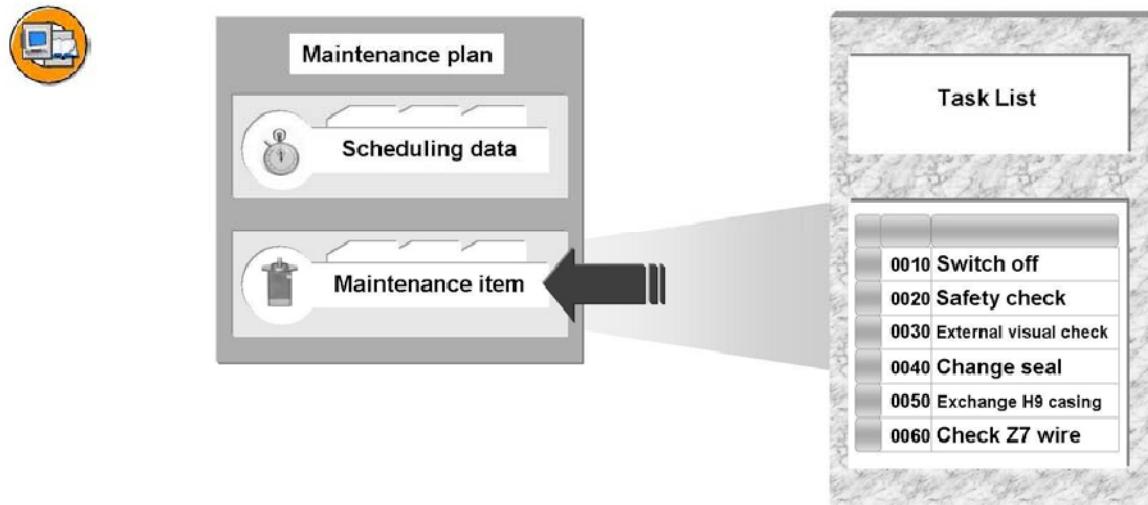


Figure 148: Using a Task List to Include an Operation List

A task list is assigned within the maintenance item.

The operations are executed at the times calculated by the system when scheduling the maintenance plan.

In the case of a single cycle plan, the complete task list is always due.

Maintenance planning: Strategy plan

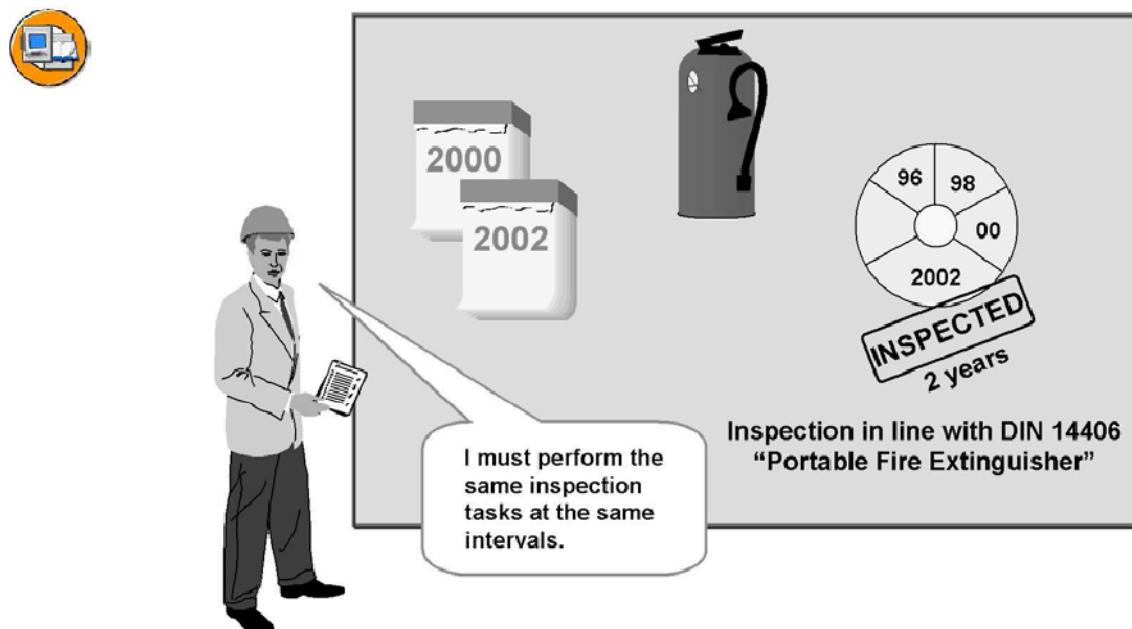


Figure 149: Strategy Plan: Business Process

Business process: Maintenance work and inspections are performed in different cycles.

Example: Service record for a car (excerpt):

- Check fan belt: every 12 months
- Change fan belt: every 24 months
- Check air filter: every 6 months
- Change air filter: every 12 months

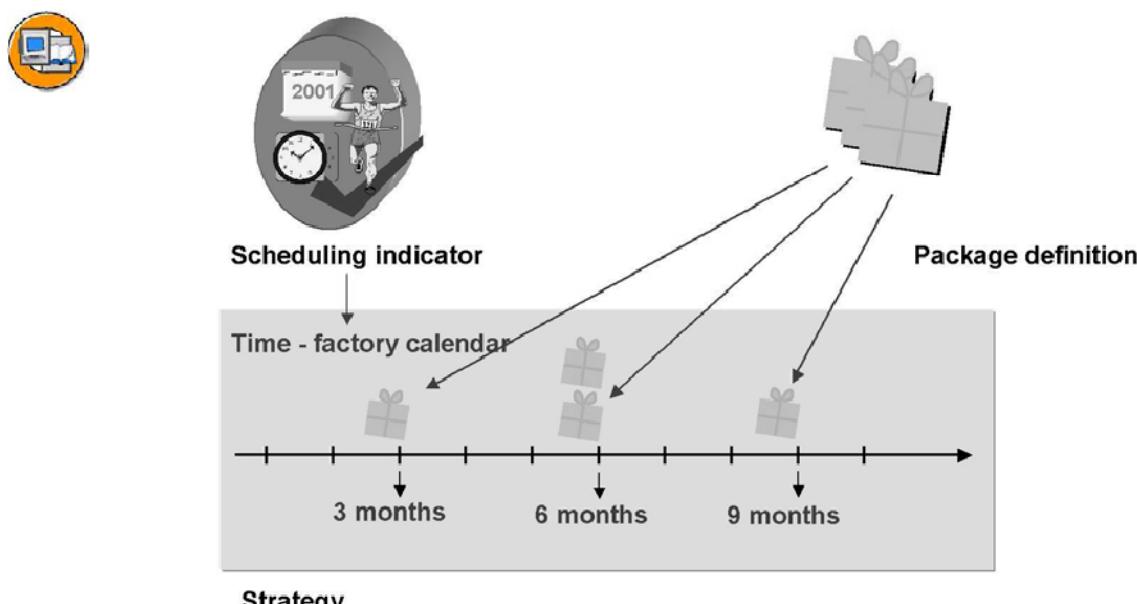


Figure 150: Maintenance strategy

The **maintenance strategy** consists of several maintenance packages and represents the scheduling rule for preventive maintenance. You can assign **task lists** to maintenance strategies.

The **scheduling indicator** determines the scheduling type.

Examples:

- Time-based
- Time-based using key date
- Time-based according to factory calendar
- Performance-based

You can assign **maintenance packages** to a maintenance strategy. The packages for a strategy can have different cycle units (for example, month, year), but they must **always have the same dimension** (for example, time).

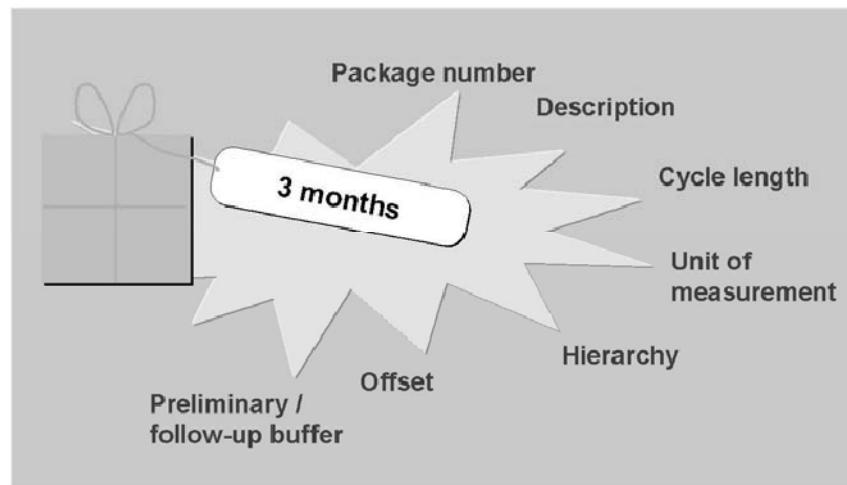


Figure 151: maintenance package

Maintenance packages define the frequency at which specific operations are executed. You can assign maintenance packages to the operations in a task list.

Maintenance packages are part of a maintenance strategy.

Important parameters for a maintenance package are:

- Package number
- Description
- Cycle length
- Unit of measurement
- Hierarchy

If two packages are due on the same date, the hierarchy determines which package is performed.

- Offset

The offset determines the first due date for a package.

- Preliminary or follow-up buffer

The preliminary or follow-up buffer specifies to what extent intended start and end dates for a package can vary.

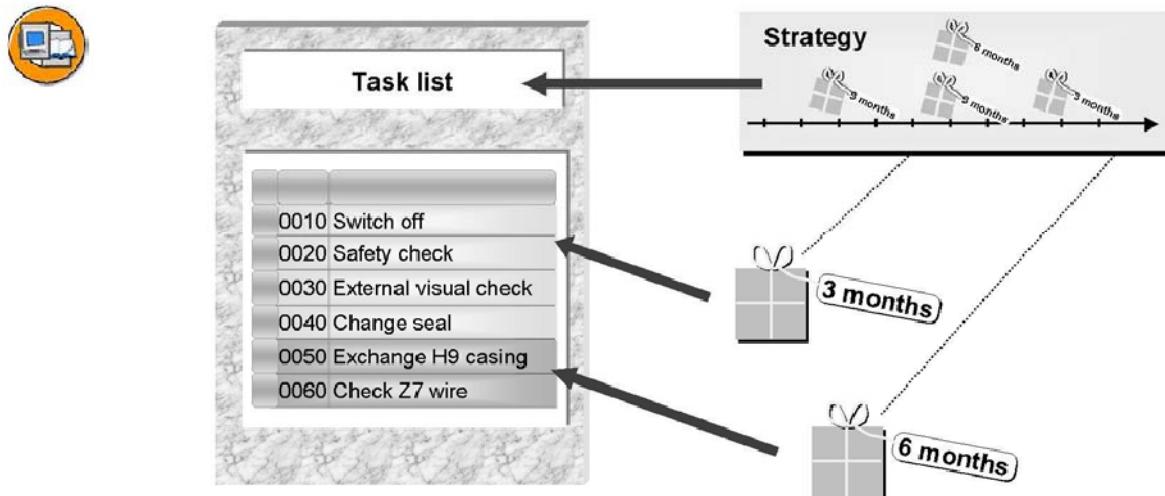


Figure 152: Task List and Maintenance Strategy

Task lists can be created for use in preventive maintenance. To prepare task lists for use in **strategy plans**, the following steps are required:

A **strategy** is defined in the task list header.

Packages can then be assigned to different **operations** in the task list. This defines the frequency with which the operations should be executed.

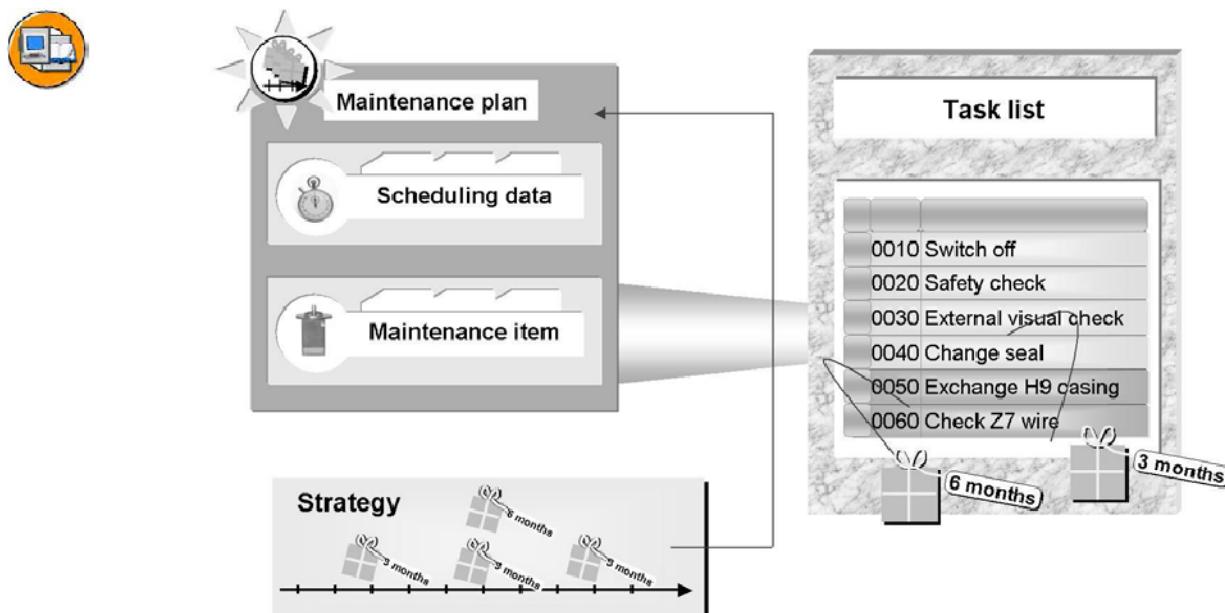


Figure 153: Creating a Time-Based Strategy Plan

You assign a maintenance strategy to a strategy-based maintenance plan.

Only a task list, which has the same maintenance strategy as the maintenance plan, can be assigned to a strategy-based maintenance plan.

Exercise 21: Single Cycle Plans

Exercise Objectives

After completing this exercise, you will be able to:

- Configure a single cycle plan
- Use a pre-defined task list

Business Example

You can use a single cycle plan to display similar tasks that are always due at the same intervals.

Task 1:

Creating a Single Cycle Plan

A mechanical inspection should be performed every three months for your piece of equipment *TEQ-##*. When this inspection takes place, all the operations in the general maintenance task list PUMP_REP with group counter 2 should be executed.

1. Which menu path do you use?

Use maintenance plan category *Maintenance Plan Order*.

2. After you have entered your equipment number, the system displays various default values.

Which default values are shown? Where do they come from?

Maintenance planning plant		
Maintenance planner group		
Order type		
Maintenance activity type		
Main work center		
Business area		

Task 2:

Task List

1. What options do you have for defining operations in the maintenance plan?

Continued on next page

2. Include the task list in your maintenance plan.

How do you proceed?



Hint: When you save the maintenance plan, the current date is proposed as the start date. Confirm this start date and copy it to the maintenance plan.

Save your maintenance plan.

Which number is assigned to it?

Solution 21: Single Cycle Plans

Task 1:

Creating a Single Cycle Plan

A mechanical inspection should be performed every three months for your piece of equipment *TEQ-##*. When this inspection takes place, all the operations in the general maintenance task list PUMP_REP with group counter 2 should be executed.

1. Which menu path do you use?

Use maintenance plan category *Maintenance Plan Order*.

- a) Choose *SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Create → Single Cycle Plan*.

Field name or data type	Values
Maintenance plan number	Do not specify (internal number assignment)
Maintenance plan category	Maintenance plan order
Short text / description	Enter as required
Cycle	3 MON
Equipment	TEQ-##

2. After you have entered your equipment number, the system displays various default values.

Which default values are shown? Where do they come from?

Maintenance planning plant		
Maintenance planner group		
Order type		

Continued on next page

Maintenance activity type		
Main work center		
Business area		

- a) Default values

Field name or data type	Values	Origin
Maintenance planning plant	1000	Equipment
Maintenance planner group	I##	Equipment
Order type	PM02	Customizing
Maintenance activity type	102	Customizing
Main work center	T-ME##	Equipment
Business area	9900	Equipment

Task 2:

Task List

1. What options do you have for defining operations in the maintenance plan?
 - a)
 1. Choose *Select Task List* (binoculars icon) and set a selection condition.
 2. Choose *Create Task List* (white page icon) and create a new general maintenance task list.
 3. Do not specify a task list; a standard operation (short order) is then generated in the subsequent maintenance order using the short text from the maintenance item.
 2. Include the task list in your maintenance plan.

How do you proceed?



Hint: When you save the maintenance plan, the current date is proposed as the start date. Confirm this start date and copy it to the maintenance plan.

Save your maintenance plan.

Continued on next page

Which number is assigned to it?

a) Including a Task List:

- Choose the binoculars pushbutton (select task list)
- Activate task list category *General Task List*.
- Enter the selection criterion Pump*, for example, in the *Task List Group* field.
- - Make a selection and choose the required general task list from the following list (task list type A, task list group PUMP_REP, task list group counter 2)

b) The number is sequential and is assigned by the system.

Exercise 22: Strategy Plan

Exercise Objectives

After completing this exercise, you will be able to:

- Display a maintenance strategy
- Configure a strategy plan
- Use a pre-defined task list

Business Example

If different tasks are due according to different cycles, this can be represented using a strategy-based maintenance plan.

Task 1:

Displaying a Maintenance Strategy

1. Display the maintenance strategy A and determine the following data:

From *Detail View* the strategy:

Maintenance strategy header	
Scheduling indicator	
Strategy unit	
Shift factor for late completion	
Shift factor for early completion	

From the *Package* view the strategy:

Maintenance packages	Short text	Description	Cycle length	Unit	Hierarchy

Continued on next page

Task 2:

Creating a Strategy Plan

Preventive electrical maintenance tasks are to be performed at your piece of equipment TEQ-##. However, the tasks have different cycles.

1. Create a strategy plan with maintenance plan type *Maintenance Plan Order* for maintenance strategy A for your piece of equipment TEQ-##.

How do you proceed?

2. Include the general maintenance task list PUMP_WTG with group counter 2 in the strategy plan. Which maintenance packages are used?
3. Determine the maintenance cycles in which the individual operations are due.
How do you proceed?

Operation	Maintenance package(s)

Save your maintenance plan. Which number is assigned to it?

Solution 22: Strategy Plan

Task 1:

Displaying a Maintenance Strategy

1. Display the maintenance strategy A and determine the following data:

From *Detail View* the strategy:

Maintenance strategy header	
Scheduling indicator	
Strategy unit	
Shift factor for late completion	
Shift factor for early completion	

From the *Package* view the strategy:

Continued on next page

Maintenance packages	Short text	Description	Cycle length	Unit	Hierarchy

- a) Maintenance strategy

SAP Menu → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance Strategies → Display

Detail View the strategy:

Field name or data type	Values
Scheduling indicator	Time
Strategy unit	MON
Shift factor for late completion	100%
Shift factor for early completion	100%

Package view the strategy:

Maintenance packages	Short text	Description	Cycle length	Unit	Hierarchy
1	1M	Monthly	1	MON	H1
2	3M	3 monthly	3	MON	H1
3	1Y	Yearly	12	MON	H2

Task 2:

Creating a Strategy Plan

Preventive electrical maintenance tasks are to be performed at your piece of equipment TEQ-##. However, the tasks have different cycles.

1. Create a strategy plan with maintenance plan type *Maintenance Plan Order* for maintenance strategy A for your piece of equipment TEQ-##.

Continued on next page

How do you proceed?

- a) SAP Menu → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Create → Strategy plan

Field name or data type	Values
Maintenance plan number	Do not specify (internal number assignment)
Maintenance plan category	Maintenance plan order
Maintenance strategy	A
Short text / description	Enter as required
Equipment	TEQ-##

2. Include the general maintenance task list PUMP_WTG with group counter 2 in the strategy plan. Which maintenance packages are used?

- a) Including a General Task List:

Choose the *binoculars* pushbutton (select general task list)

The strategy (here: A) is also now used automatically as a selection parameter, that is, only general task lists with this maintenance strategy are selected

Perform selection.

Maintenance packages used:

1M, 3M and 1Y

3. Determine the maintenance cycles in which the individual operations are due. How do you proceed?

Operation	Maintenance package(s)

Continued on next page

Save your maintenance plan. Which number is assigned to it?

- a) Maintenance packages in task list:

Choose the *Display Task List* pushbutton.

In the operation overview, choose *MntP* (you do not need to select the operations).

Operation	Maintenance package(s)
0010	1M, 1Y
0020	1M, 1Y
0030	1M, 1Y
0040	1M, 1Y
0050	3M, 1Y
0060	1M, 3M



Lesson Summary

You should now be able to:

- Describe and create a single cycle plan (time-based)
- Describe and create a strategy plan (time-based)

Lesson: Maintenance Plan Scheduling

Lesson Overview

This lesson shows the scheduling of maintenance plans.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the concept of scheduling
- Schedule Maintenance Plans

Business Example

The system has to monitor continuously the inspection tasks and maintenance tasks that the planner schedules in the form of maintenance plans. This is to ensure that the system generates maintenance call objects by the due date (as a rule, a maintenance order).

Schedule Maintenance Plans

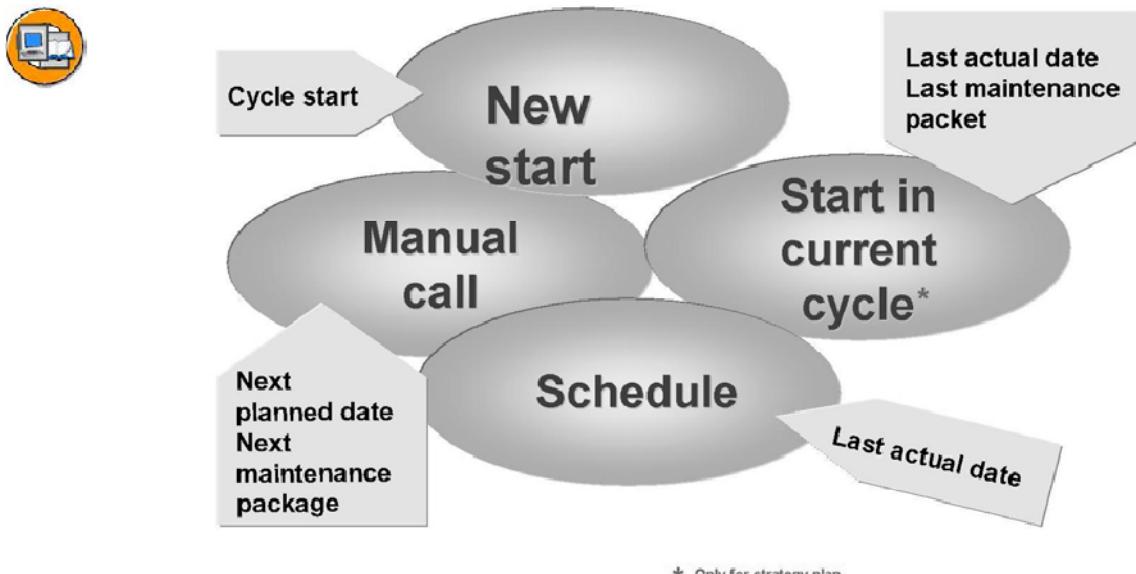


Figure 154: Schedule Maintenance Plans

Scheduling allows you to define start dates for maintenance orders and always keep them updated. Without regular scheduling, call objects (maintenance orders, notifications, service entry sheets) cannot be created. Scheduling is normally performed automatically and at regular intervals (for example, daily, once a week) in a background job.

New start is the function normally used to start a maintenance plan for an object, which has just been put into operation, or for which preventive maintenance work is required.

Scheduling is the function used to call up the next maintenance order after the last maintenance order has been completed. It is not usually performed manually, but triggered by the technical completion of the order and the deadline monitoring program.

Start in current cycle: You can restart scheduling for your strategy plan in the current cycle. This function is useful if you have previously been using a different EDP-system, or no EDP-system at all, to manage your maintenance work. The maintenance strategy that you have assigned to your maintenance plan, has, for example, 3 packages monthly, every 4 months and every 6 months. Instead of starting the scheduling with the monthly package, you specify that scheduling starts with the 6-month-package. You must then enter the date when the last preventive maintenance work (in this case, the fifth monthly package) was performed.

Manual call: If you also want to schedule a maintenance task for a particular date, you can schedule this date manually.

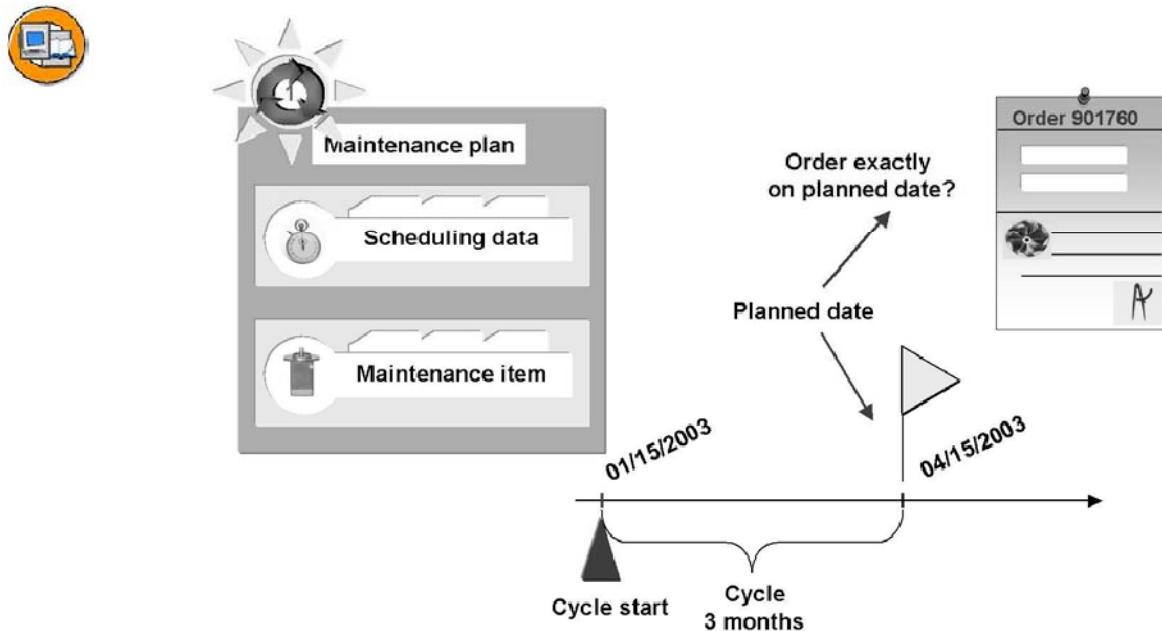


Figure 155: Cycle Start and Planned Date

When you create a single cycle plan, the **cycle** is assigned first, that is, the time period up to the relevant **planned date**, that is, the **due date of the task**. Orders are generated based on the planned date.

The **call date**, that is, the **date the order was created** is usually before the planned date so that there is a certain pre-processing phase (for example, for material procurement).

The **cycle start** defines the date from which the calculation of the planned dates should begin.

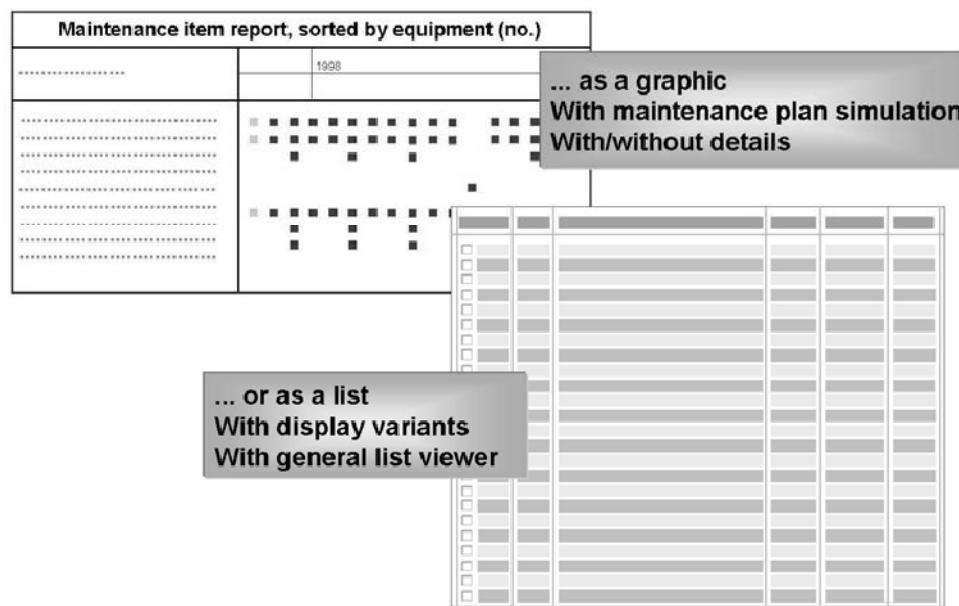


Figure 156: Maintenance Scheduling Overview

Maintenance dates can be displayed using a graphic schedule overview or a schedule list.

The graphic schedule overview uses colored symbols to display upcoming or completed tasks and has a variety of processing functions (maintenance plan simulation, capacity planning).

You can use the scheduling list to display all the maintenance dates for the conditions you have defined, for example, for a piece of equipment, or for a maintenance plan. The ABAP List Viewer is used for the display, allowing you to define user-specific display variants.

Exercise 23: Maintenance Plan Scheduling

Exercise Objectives

After completing this exercise, you will be able to:

- Restart a maintenance plan
- Start a maintenance plan in the cycle
- Display the scheduling overview
- Display your maintenance orders

Business Example

Using maintenance plan scheduling, maintenance dates due regularly in the maintenance plans are converted into maintenance orders, and dates that are on hold are recalculated if the scheduling parameters are changed.

Task 1:

Restarting a Single Cycle Plan

1. Start your single cycle plan for the 1st of the current month.
Which is the first due date?
Save the maintenance plan.

Task 2:

Starting a Strategy Plan in the Current Cycle

1. Starting a Strategy Plan in the Current Cycle
Start your strategy plan so that the first 3-month-package was performed on the 28th of the previous month.
How should you proceed?
Which is the next due date? Which package is due then?
Save the maintenance plan.

Task 3:

Displaying Maintenance Orders

1. How do find the maintenance orders you have generated?

Continued on next page

Which order numbers have been generated?

Task 4:

Scheduling Overview

1. Display an overview of the due maintenance dates in list form for your maintenance plans.

Which menu path do you use?

Solution 23: Maintenance Plan Scheduling

Task 1:

Restarting a Single Cycle Plan

1. Start your single cycle plan for the 1st of the current month.

Which is the first due date?

Save the maintenance plan.

- a) Restarting a Single Cycle Plan

Choose *SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling*.

Choose *Processing → Start*.

If a start date was transferred to the maintenance plan when the strategy plan was created, this is now proposed (here: the 1st of the current month);

If no start date has yet been entered in the maintenance plan, one must now be set (for example, current date).



Hint: The start and ongoing scheduling of all maintenance plans is not usually executed manually, but using deadline monitoring which is controlled by a system job.

Task 2:

Starting a Strategy Plan in the Current Cycle

1. Starting a Strategy Plan in the Current Cycle

Start your strategy plan so that the first 3-month-package was performed on the 28th of the previous month.

How should you proceed?

Which is the next due date? Which package is due then?

Continued on next page

Save the maintenance plan.

a) Starting a Strategy Plan in the Current Cycle

Choose *SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling*.

- Choose *Start in Cycle*.
- Enter a confirmation date, for example, the 28th of the previous month. Choose *Select Package*.
- Position the cursor on the first package *3M* and choose *Start offset*, use the F3 function to navigate back.
- The next due planned date is displayed in the list of scheduled calls according to the entry.
- Due packages: 1M

Task 3:

Displaying Maintenance Orders

1. How do find the maintenance orders you have generated?

Continued on next page

Which order numbers have been generated?

a) Displaying Maintenance Orders

1. Using list editing for orders

Choose *SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change.*



Hint: In the order list, select the *Period* in such a way that the basic start date of your maintenance order lies within this time period. Otherwise, the system will not find any orders.

The basic start date for your maintenance order as resulting from the single cycle plan is as follows:

Basic start date of the order = planned date in the maintenance plan

The basic start date for your maintenance order as resulting from the strategy plan is as follows:

Basic start date of order = (planned date in the maintenance plan minus the preliminary buffer of the maintenance package) - for package 1M: 2 days.

Order type PM02

2. Maintenance plan scheduling:

Choose *SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling.*

Choose *Scheduled Calls*.

Select a line with the status *Called*.

Choose *Display Orders* (glasses icon)

Task 4:

Scheduling Overview

1. Display an overview of the due maintenance dates in list form for your maintenance plans.

Continued on next page

Which menu path do you use?

- a) SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling Overview → List
- Enter maintenance plan numbers
 - Execute



Hint: By using *Settings* → *Display Variants* → *Current*, additional fields along the same lines as the notification and order lists can be shown.



Lesson Summary

You should now be able to:

- Describe the concept of scheduling
- Schedule Maintenance Plans



Unit Summary

You should now be able to:

- Describe the concept of preventive maintenance
- Describe the process of preventive maintenance
- Describe the concept of the maintenance task list.
- Describe the structure of the maintenance task list
- Describe and create a single cycle plan (time-based)
- Describe and create a strategy plan (time-based)
- Describe the concept of scheduling
- Schedule Maintenance Plans

Unit 8

Project-Oriented Maintenance

Unit Overview

This lesson gives an overview of project-oriented maintenance and describes the relationship between the Enterprise Asset Management and Program & Project Management components.



Unit Objectives

After completing this unit, you will be able to:

- Describe the potential applications of project-oriented maintenance
- Describe the basic processes of project-oriented maintenance

Unit Contents

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Lesson: Project-Oriented Maintenance

Lesson Overview

This lesson introduces large-scale Plant Maintenance tasks in the framework of project-oriented Plant Maintenance.

The interaction of the components *Enterprise Asset Management* and *Program & Project Management* is also covered.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the potential applications of project-oriented maintenance
- Describe the basic processes of project-oriented maintenance

Business Example

In the company, inspections and repair work requiring a shutdown of the entire asset is performed at regular intervals.

These tasks should be planned and monitored in the form of projects.

Investment measures should be represented in the same way.

Project-Oriented Maintenance

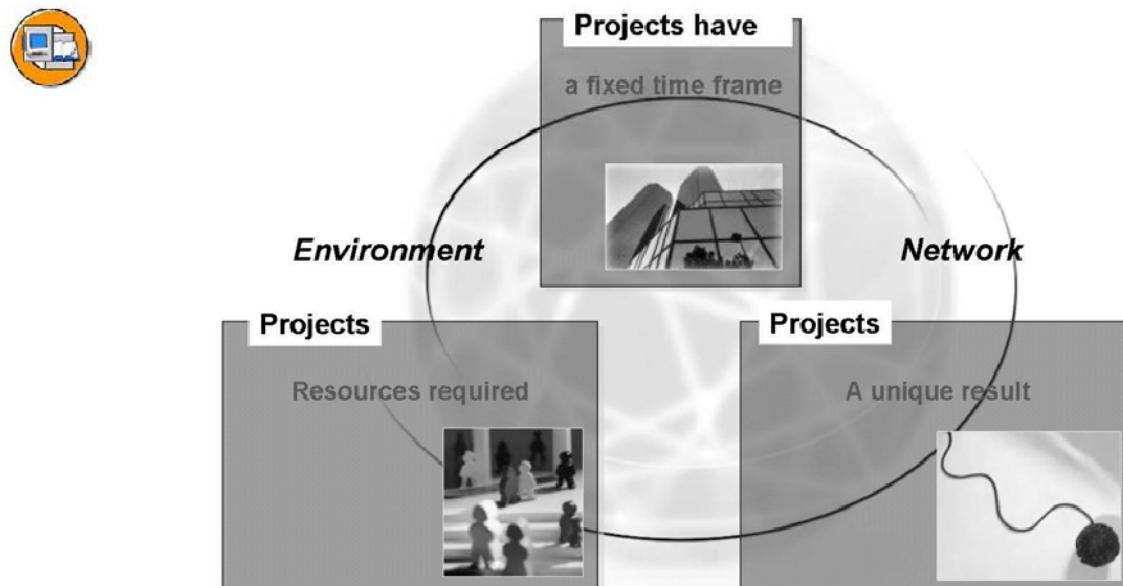


Figure 157: What is a project?

Projects are tasks with particular characteristics:

- They are, as a rule, complex, unique, and can be high-risk.
- You have precise objectives that were agreed between the sold-to party and the contractor.
- They are fixed in time, and cost- and capacity-intensive.
- Several departments contribute to the project development.
- They are subject to certain quality requirements.
- They are often of strategic importance to the company responsible for them.

Projects are usually integrated into the business flow of a company. To control all the tasks that arise when realizing a project, you need a project-specific organization that should reside between the two departments involved.

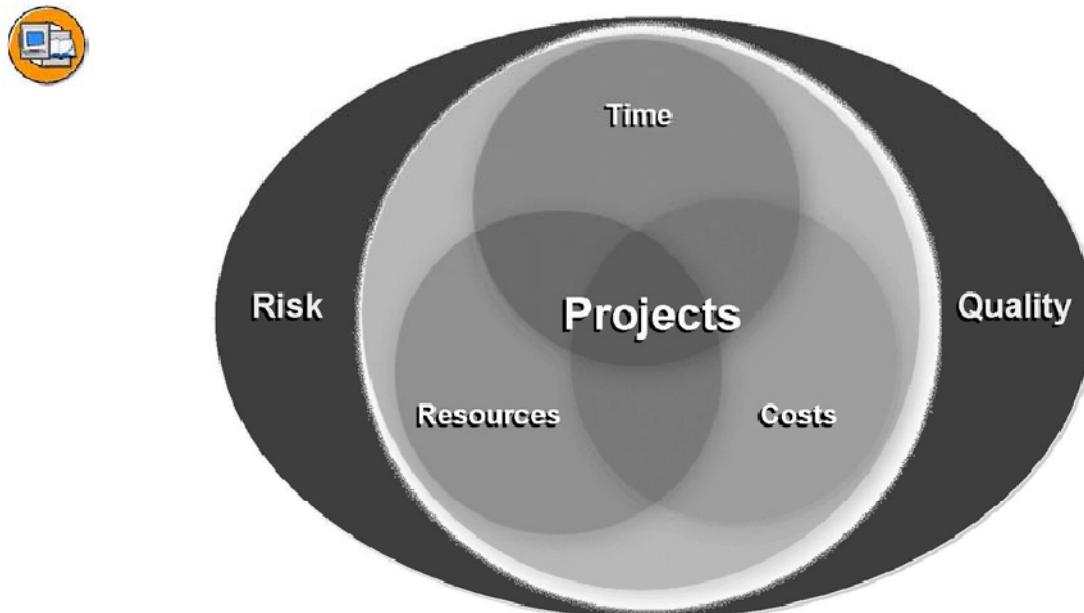


Figure 158: Conditions for the project work

Projects are often subject to conflicts between varying requirements and restrictions. For example, only limited resources are available or there is a preset cost limit. Projects can pose a high risk for a company, as costs are often high and there is no guarantee that the projects will be completed.

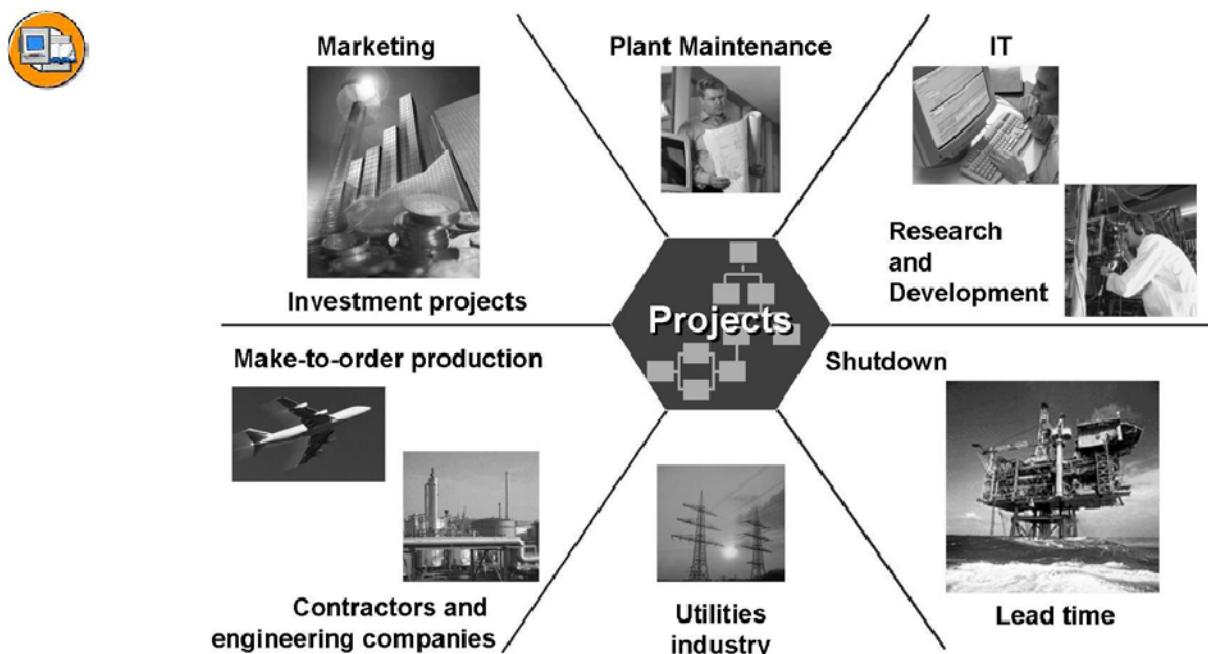


Figure 159: Use of Program & Project Management

Program & Project Management (part of the solutions *mySAP ERP* and *mySAP PLM*) can be used in a variety of areas. Typical areas are:

- Investment projects
- Projects for make-to-order production
- IT projects
- Projects in the utilities industry
- Maintenance projects

Structure of a Maintenance Project

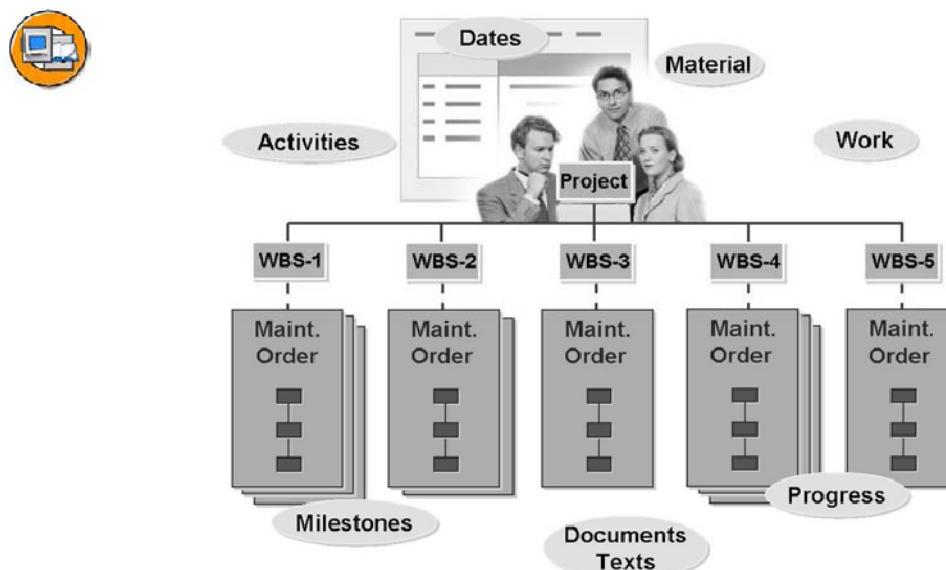


Figure 160: Structure of a Maintenance Project

A project is a plan with a fixed theme and a fixed time, that is executed on a cross-departmental level, represents an innovation and carries a certain risk. You can use projects to plan, control, monitor, and evaluate very comprehensive plans. The functions range from the logistics area (scheduling, materials, work centers, and so on) to the accounting area (budgeting, assigning cost centers, updating G/L accounts, and so on).

In the Plant Maintenance area, this plan usually has the following form:

Shutdowns, overhauls, modifications, major repairs, investments

Projects are set out by a **project definition** and a **work breakdown structure (WBS)**. The individual sub steps are depicted as elements of the work breakdown structure (**WBS elements**).

Maintenance orders can be manually or automatically assigned to each WBS element. The WBS element then controls the orders with regard to the basic dates and the budget.

The project-oriented maintenance is mainly based on the combined use of the two PLM application components *Program & Project Management* and *Enterprise Asset Management*.

There is also an interface to external project planning tools (such as Primavera), which can also be used in conjunction with *Enterprise Asset Management* for project-orientated maintenance.

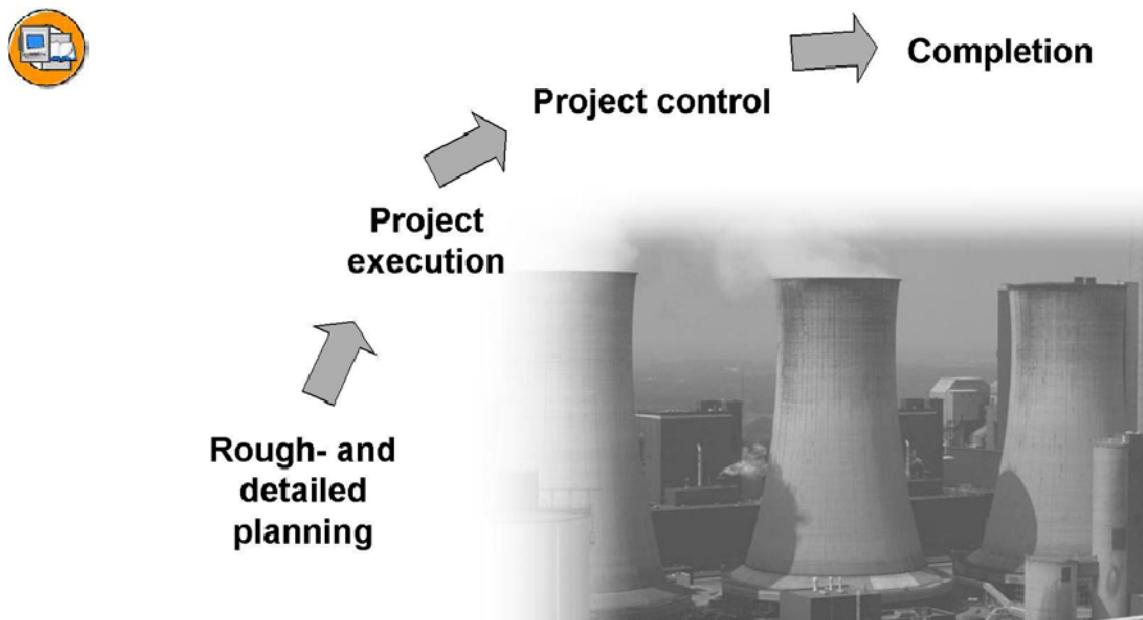


Figure 161: Shutdown Project

You can use Project Management to map a shutdown project. The life cycle of a project consists of the following phases:

- Rough- and detailed planning
- Project execution
- Project control
- Completion

The main goal is to ensure that working conditions are safe, whilst reducing time- and cost expenditure. Shutdown is characterized by the following:

- Shutdown signifies a significant loss of production for the plant.
- The main part of a plant's maintenance costs are incurred during a shutdown.
- The production losses during a shutdown are the most significant losses during the plant's production plans.
- Shutdown tasks must be inspected, monitored, and documented.

The result of this: Increased resources for planning, preparing, and performing a shutdown.

Project-Oriented Maintenance: Process

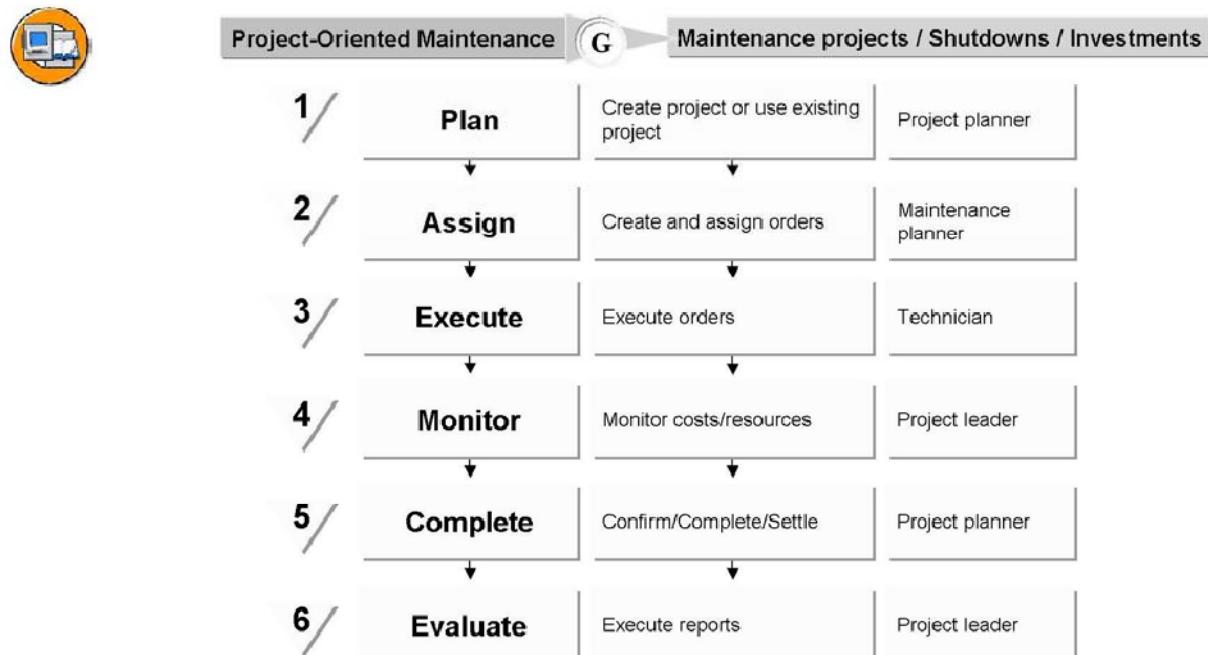


Figure 162: Project-Oriented Maintenance: Process

Step 1: A project definition and a work breakdown structure, composed of WBS elements, are created for the project to be executed.

Step 2: To structure the WBS elements, maintenance orders are created and manually or automatically assigned to the WBS elements. This means that the order planning data (for example, planned costs) can be condensed to the WBS elements even for the overall project planning (for example, assigning a budget on the basis of the total planned costs). For scheduling purposes, maintenance orders can also be assigned as sub networks of networks. The networks are, in turn, assigned to the WBS element.

Step 3: The orders are performed within the framework of the project specifications (for example, cross-checking the planned and actual costs of an order against the budget of the WBS element).

Step 4: While the order is being performed, you can monitor the current situation (adherence to schedule, consumption of budget, and so on) using reports from the project information systems.

Step 5: After the tasks have been completed, the orders receive their time confirmations, are completed technically and, if necessary, settled to the WBS element.

Step 6: The central key figures (overall costs, materials consumed, times, and so on) can also be evaluated using reports from the project information system.



Lesson Summary

You should now be able to:

- Describe the potential applications of project-oriented maintenance
- Describe the basic processes of project-oriented maintenance



Unit Summary

You should now be able to:

- Describe the potential applications of project-oriented maintenance
- Describe the basic processes of project-oriented maintenance

Unit 9

Work Clearance Management

Unit Overview

At the end of the lesson you can explain the basic idea of Work Clearance Management and its integration in Plant Maintenance.



Unit Objectives

After completing this unit, you will be able to:

- Explain the Work Clearance Management concept

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Lesson: Work Clearance Management (WCM)

Lesson Overview

This lesson introduces Work Clearance Management as a component of maintenance processing.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the Work Clearance Management concept

Business Example

In the company, a well-defined process must be used to ensure work safety before any maintenance measures are carried out.

This process must be easily understandable and available at all times to employees involved in the maintenance process.

Work Clearance Management makes this possible.

Work Clearance Management



- Maintenance workers operate in a dangerous environment (for example, high voltage, radioactivity, and so on.)
- Maintenance measures need to be carried out during production
- Operation of an asset or technical system must not be impaired under any circumstances
- Some occupational illnesses require specific health protection measures

You can only carry out maintenance measures for technical objects (for example, inspection, repairs, preventive maintenance work) after all measures to protect occupational health and safety have been implemented. These safety measures might include tagout/lockout, fire protection, radiation protection.

The **Work Clearance Management** (PM-WCM) component helps you to control and monitor these safety measures. It helps you to ensure safe and secure working conditions for your plant maintenance employees, helps you to adhere to environmental protection requirements, and guarantees reliability for your assets and technical systems.

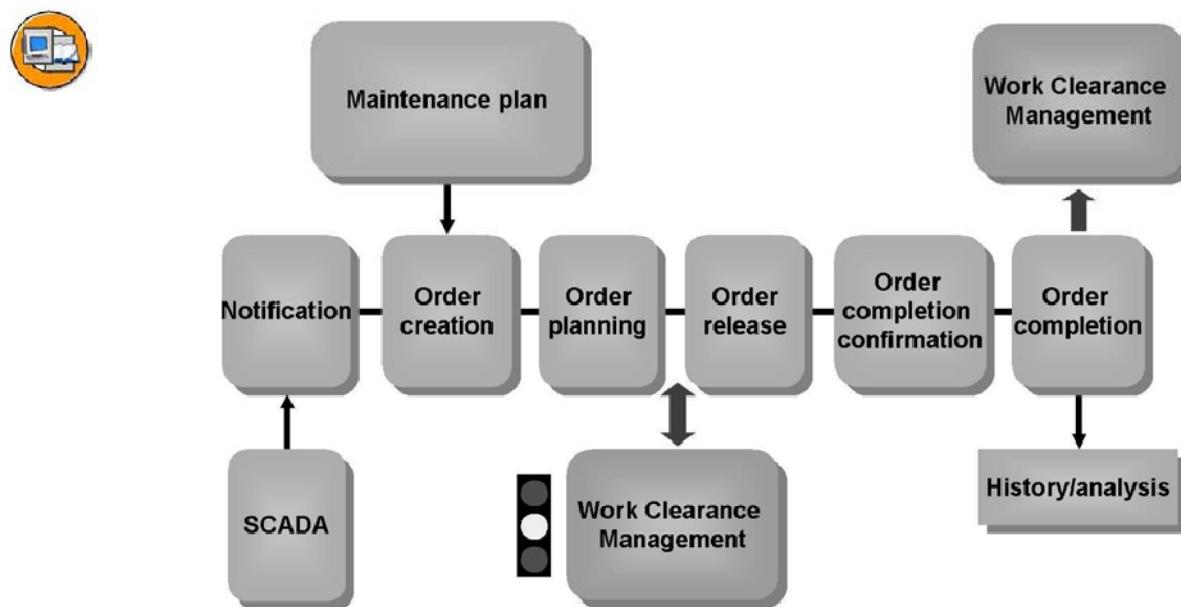


Figure 163: Maintenance order processing with Work Clearance Management

Orders are connected to Work Clearance Management in the **order header**.

You can only perform maintenance work for WCM-relevant orders when you have issued the status **Released for Execution (EXEC)**. The *Release for Execution* is dependent on the architecture of the Work Clearance Management.

Connecting an order to WCM is not absolutely essential - some measures may require WCM, some may not. WCM allows you to implement a safety measure without carrying out a corresponding order. This is the case if, for example, each change within the technical structure should or must be documented, but the order is needed as a planning tool or as a cost collector.

Work Clearance Management: Process

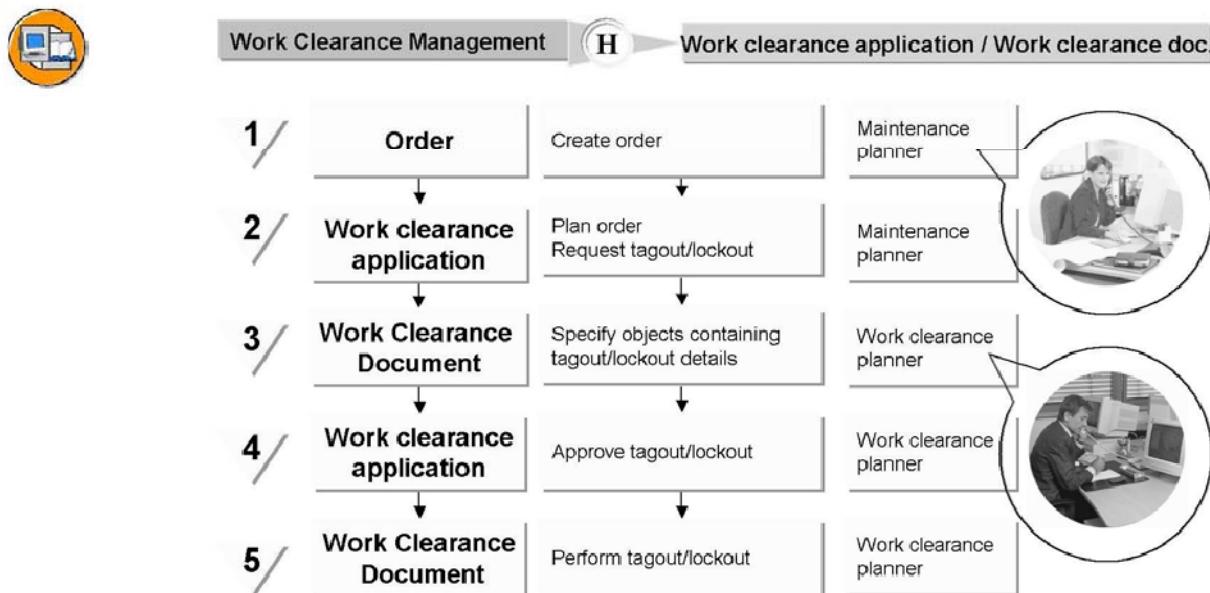


Figure 164: Work Clearance Management: Process (1)

Example:

A leakage in a feed-water pump at the biological purification pumping plant must be dealt with. The pump must be opened. The following steps may arise for a maintenance order containing a work clearance management element:

- Step 1: A maintenance planner creates the maintenance order.
- Step 2: By creating a work clearance application for the order, the maintenance planner requests tagout/lockout for the pump (that is, the pump must be isolated so that work can be carried out safely).
- Step 3: In the work clearance document, the work clearance planner (safety engineer) records valves 1 and 2 (located in the pipe in front of and behind the pump) as having the tagging condition “closed”.
- Step 4: The work clearance planner (safety engineer) approves the tagging.
- Step 5: The tagging is performed on site: Valves 1 and 2 are closed and are given tags.

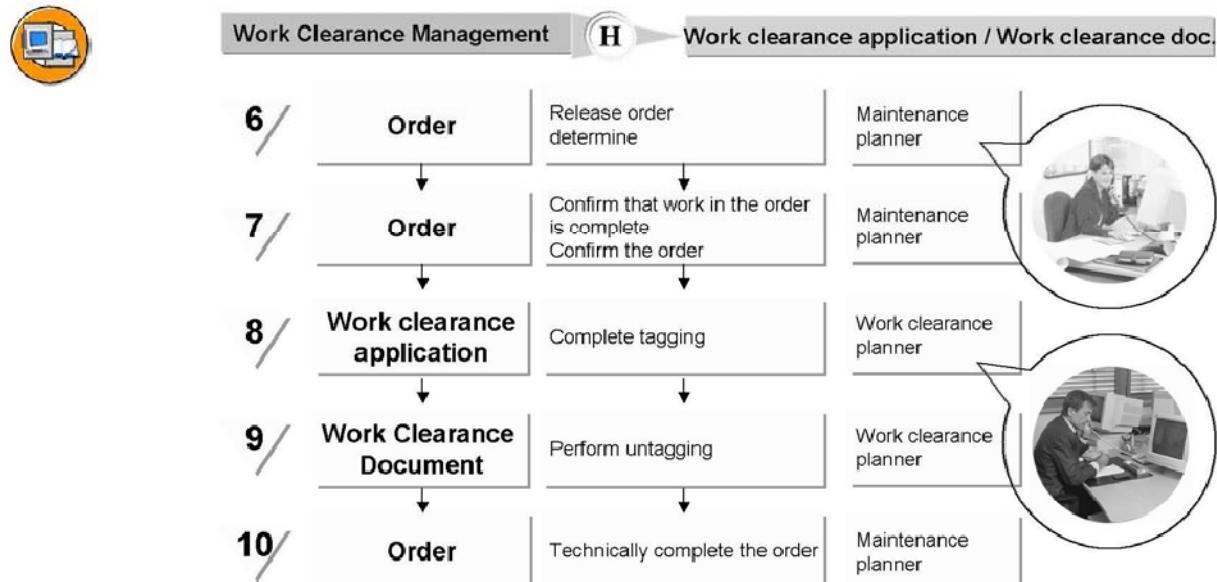


Figure 165: Work Clearance Management: Process (2)

Step 6: When tagging has been performed, the maintenance planner can release the order (from a safety perspective). Business order release takes place independently of this.

Step 7: After the work has been carried out and tagout/lockout is no longer required, the maintenance planner sets the status *Work Complete* for the order. Technical completion is independent of this.

Step 8: The work clearance application is completed and untagging approved.

Step 9: Untagging is carried out on site: Valves 1 and 2 are re-opened and the tags are removed.

Step 10: The maintenance planner technically completes the order.

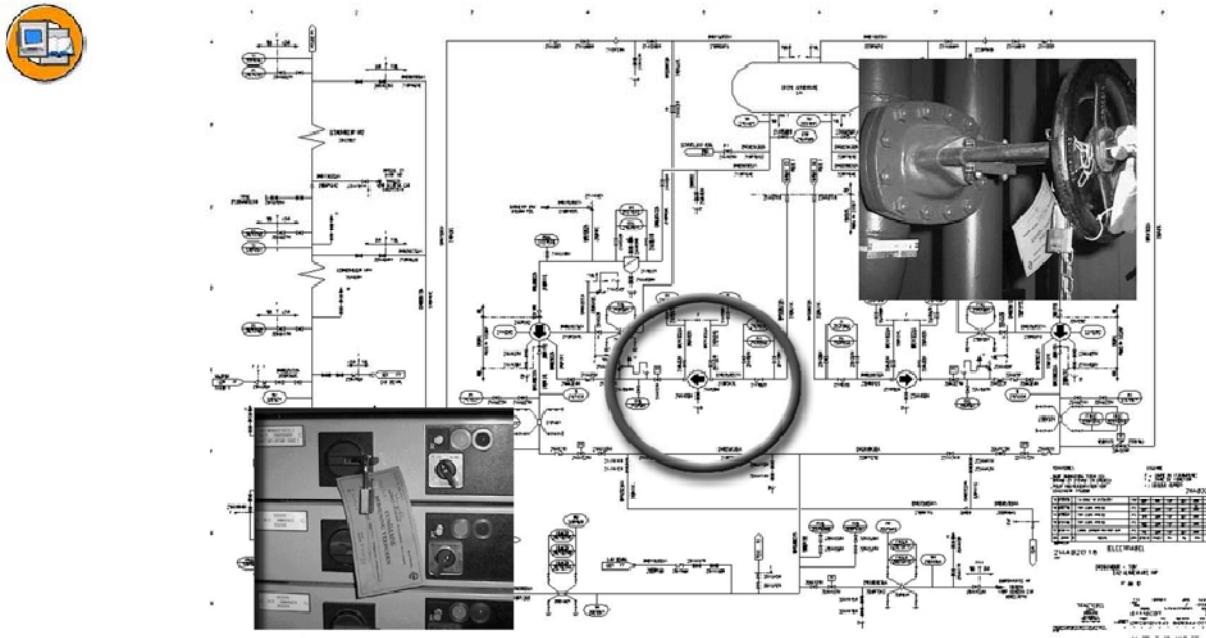


Figure 166: Work Clearance Document

The work clearance document contains a detailed description of lockout/tagout.

The work clearance document is the only WCM object that has items as well as header data. As items you enter all the technical objects that should be processed in conjunction with a lockout/tagout. The work clearance document can contain equipment, functional locations, and technical objects that are not listed in the technical structure. It may also contain commentaries.



Lesson Summary

You should now be able to:

- Explain the Work Clearance Management concept



Unit Summary

You should now be able to:

- Explain the Work Clearance Management concept

Unit 10

Reporting and Analysis

Unit Overview

This lesson gives you an overview of the options for performing analyses and evaluations in the SAP system.

This includes an introduction to the areas of history and standard analyses.

A short view of analyses in the *SAP BW* should also be given.



Unit Objectives

After completing this unit, you will be able to:

- Describe the basic steps for reports and evaluations.
- Describe the sections of the maintenance history
- Check the usage list for a piece of equipment
- Explain the structure of the Logistics Information System (LIS)
- Perform standard analyses
- Give an outlook on analyses in *SAP BW*

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Lesson: Maintenance History

Lesson Overview

This lesson introduces the basics of reporting with regard to plant maintenance.

This includes the introduction of maintenance history as the basis for analyses and reports in the Plant Maintenance Information System.



Lesson Objectives

After completing this lesson, you will be able to:

- Describe the basic steps for reports and evaluations.
- Describe the sections of the maintenance history
- Check the usage list for a piece of equipment

Business Example

Evaluations of technical and cost-oriented details should be object-related or area-based.

The maintenance history contains the basic data, together with the notification history, order history, equipment usage list, and the material where-used list.

Maintenance History

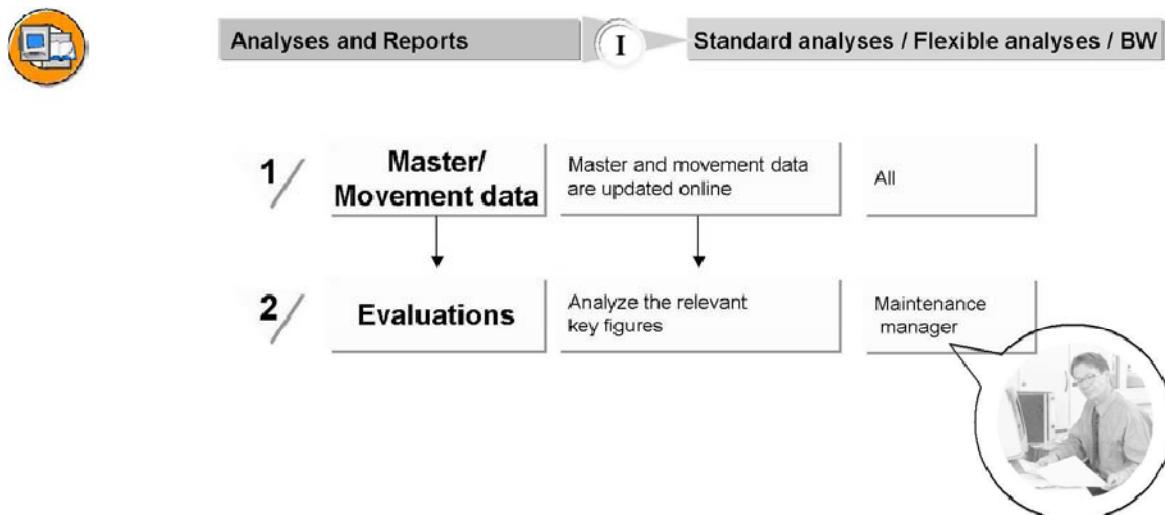


Figure 167: Evaluations - Steps

Step 1: Master data and movement data are created.

Step 2: The maintenance manager performs cost-based and technical evaluations using pre-defined standard analyses or user-defined flexible analyses in the Plant Maintenance Information System (PMIS):

The PMIS is part of the Logistics Information System (LIS) in SAP R/3 or mySAP ERP.

Alternatively, the maintenance manager can also use the *Business Information Warehouse (BW)* to perform system-wide evaluations. *BW* is an independent system, independent of other SAP systems, which can compile data from diverse source systems for evaluations.

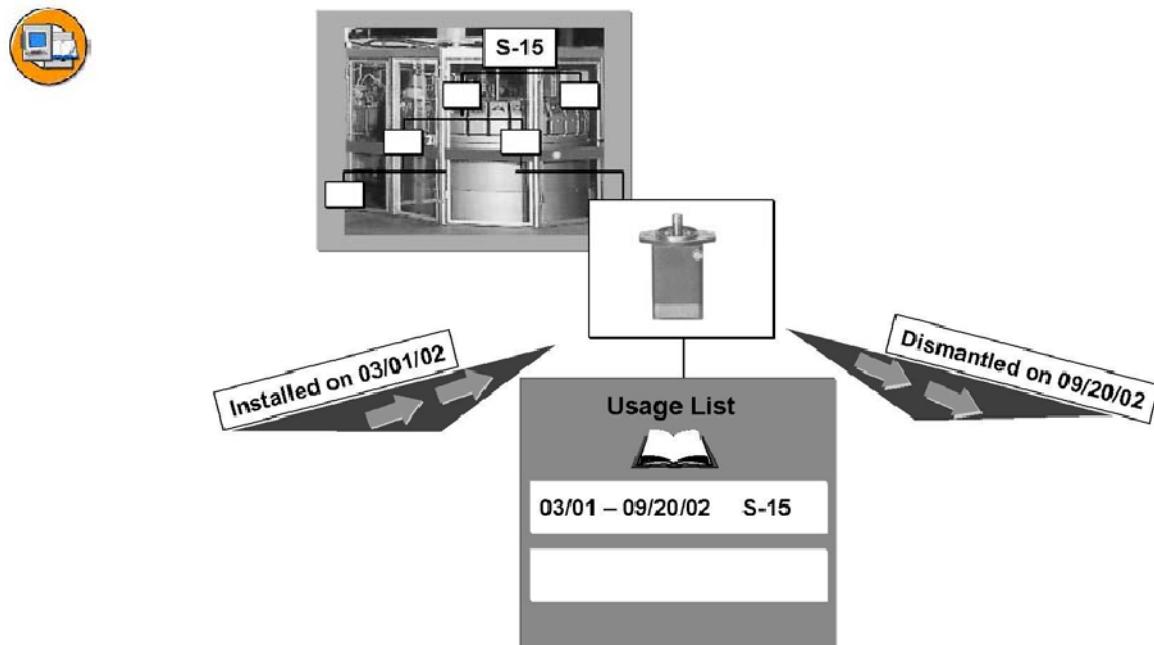


Figure 168: Usage List

The usage list provides both object-related and location-based information about equipment usage.

It displays phases, during which the equipment was installed at a functional location, assigned directly to a usage site (for example, a cost center), stored in a warehouse, and so on.

The usage list displays all the equipment usage periods in chronological order, that is, all the validity periods for a definite assignment (functional location, cost center, and so on).

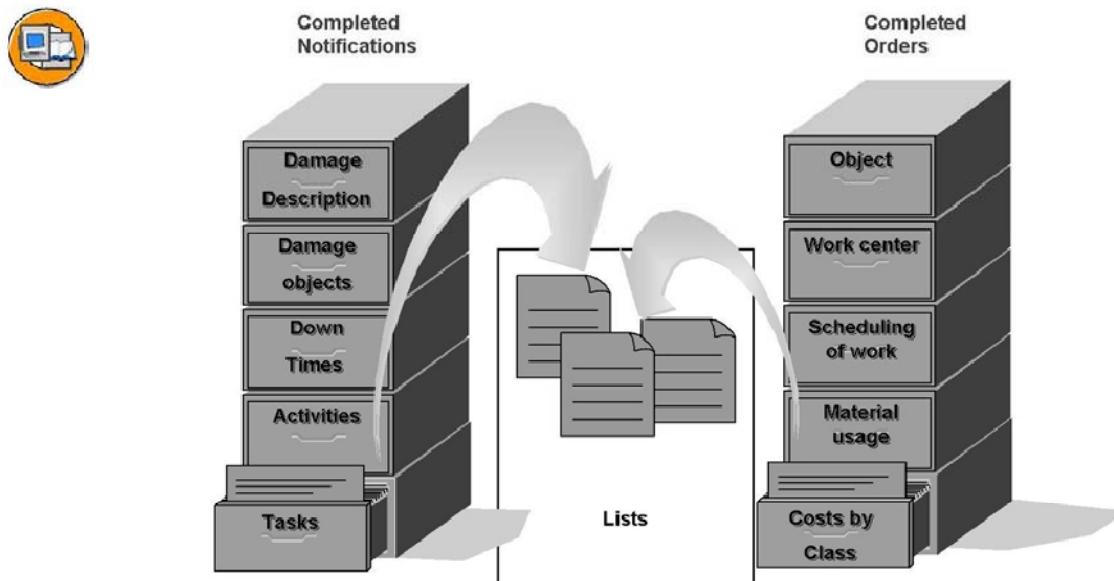


Figure 169: Maintenance History

Analyses in maintenance processing are based on completed notifications or orders and historical orders.

Completed notifications and orders: You can use completed notifications and orders for medium-term evaluations. A notification is transferred to the **notification history** when completed, whereas an order is transferred to the **section for completed orders**. The data for completed notifications and orders can be analyzed in full.

Evaluations can be performed in the corresponding list editing function, where the status *Completed* must be set each time.

Historical orders are generated when completed orders are archived and they form the basis for long-term analyses. They are transferred to the **order history**. Historical orders contain the most important order data in condensed form. You can perform analyses in the list editing function for the orders, where the status *Historical* must be set.



Example: Use of material 100-100
from 01.01.01 to 01.01.02

Material	Order	Notifictn	F. Loc.	Equipment	Work Center	Reserved	Unit	Res. Ref.	Unit
100-100	901021			1000253	MECHMNT	2	PC	2	PC
	901021			1000255	MECHMNT	1	PC	1	PC
	901118			1000255	MECHMNT	2	PC	2	PC
	901234	1000056		1000253	MECHMNT	1	PC	1	PC
	901256			1000255	MECHMNT	2	PC	2	PC
100-100	904051	1000083		1000258	MECHMNT	18	PC	18	PC
						18	PC	18	PC

Figure 170: Material Usage

You can use the "Material where-used list" function to verify the use of materials in maintenance orders within a specific period of time.

Orders can be chosen according to different selection criteria, for example, by order number, order type, equipment and so on.

The material where-used list also indicates which materials were planned withdrawals, for example, with reference to a reservation, and which were unplanned (without reference to a reservation).

Exercise 24: Maintenance History

Exercise Objectives

After completing this exercise, you will be able to:

- List the different parts of the maintenance history
- Display notification and order list

Business Example

When monitoring activities in Plant Maintenance, it is important for you to be able to perform evaluations and analyses of costs, damage, usage times and so on, quickly and easily.

Task:

1. What are the components of the maintenance history?

Solution 24: Maintenance History

Task:

1. What are the components of the maintenance history?
 - a) The components of the maintenance history are:
 - Completed notifications
 - Completed and historical orders
 - Usage lists
 - Material consumption



Lesson Summary

You should now be able to:

- Describe the basic steps for reports and evaluations.
- Describe the sections of the maintenance history
- Check the usage list for a piece of equipment

Lesson: Evaluations in the Logistics Information System (LIS)

Lesson Overview

This lesson covers the evaluations that can be performed using the Plant Maintenance Information System as part of the Logistics Information System.

The participant will execute basic standard analyses from a technical and cost accounting viewpoint.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the structure of the Logistics Information System (LIS)
- Perform standard analyses

Business Example

Evaluations of technical and cost-oriented details should be object-related or area-based. Online updating of data guarantees quick, optimized access to the required characteristics and key figures.

Logistics Information System

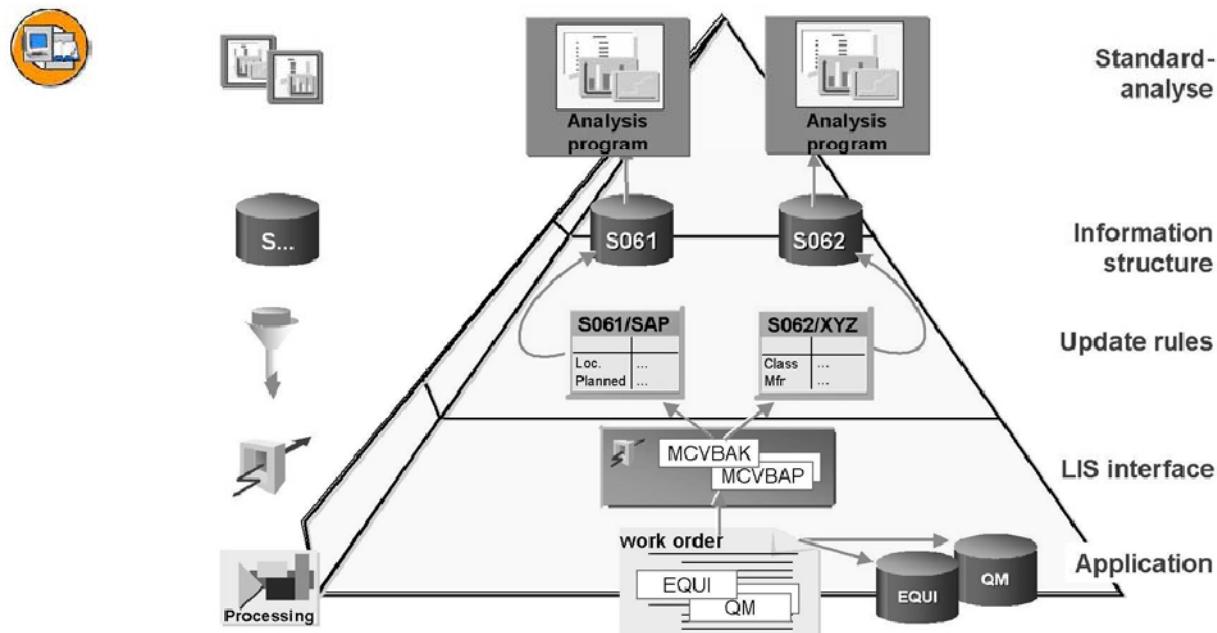


Figure 171: Data Flow in LIS

The **Logistics Information Systems (LIS)** have a modular structure and have a number of different analysis techniques. The **Plant Maintenance Information System (PMIS)** is part of the LIS.

The maintenance application data is updated online to the PMIS during its creation.

The aim of the update is to condense the amount of data generated in the application into informative, meaningful characteristics and key figures.

This concentration of the application data takes place in the information structures (info structures).

Various analyses can be based on the info structures. There is a variety of standard analyses (for example, location analysis, damage analysis, cost analysis, and so on) that are also based on the info structures delivered in the standard system.

You also have the option of creating your own info structures and your own analyses (flexible analyses).



Examples:							
Characteristics		Time	key figures				
From Sales & Distribution							
Customer	Material	Month	Order quantity	Order value	No. of Orders
From Plant Maintenance							
Planner group	Equipment	Month	No. of PM Orders	PM costs	Duration	...	
Logistics in general							
Material	Plant	Month	Order quantity	Number of PM Orders	Maintenance costs	...	

Figure 172: Information Structures in Logistics

The PMIS contains the following standard information structures:

- S061 = Location and Planning
- S062 = Object Class and Manufacturer
- S063 = Damage Analysis
- S065 = Object Statistics
- S115 = Cost Evaluation

You can use the relevant standard analyses to evaluate data, without having to make additional settings in Customizing.

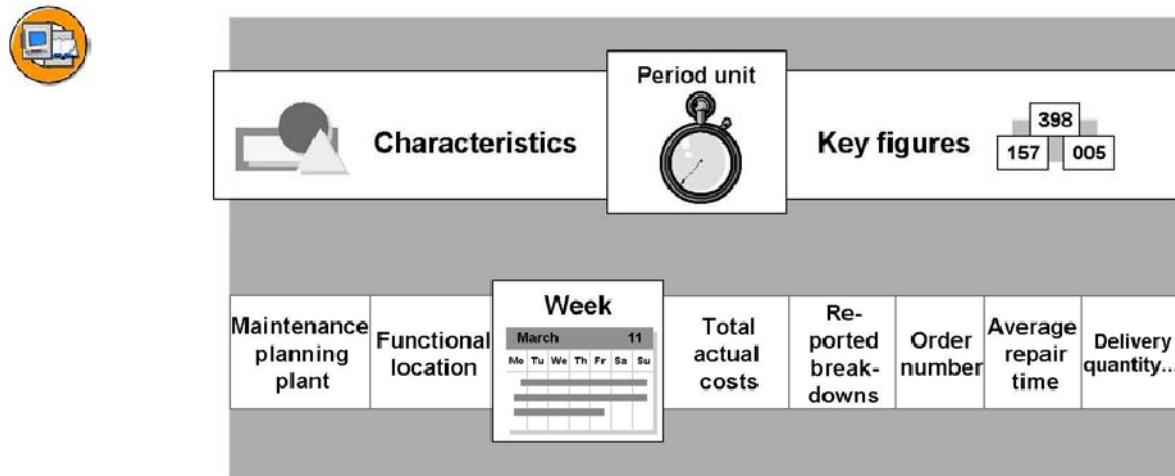


Figure 173: Structure of information structures

Information structures are special statistical tables that contain basic data from different applications. This data is constantly collected and updated by the system.

Information structures contain three basic elements:

Characteristics are criteria which you specify to collect information about a particular subject. For example, in Controlling, you normally require information about workshops and materials.

A **period unit** (periodicity) makes the time reference. Dates are set with reference to this unit (year, month, week, day).

Key figures are measurements of performance which provide important business information about a characteristic.

Analyses and Reports

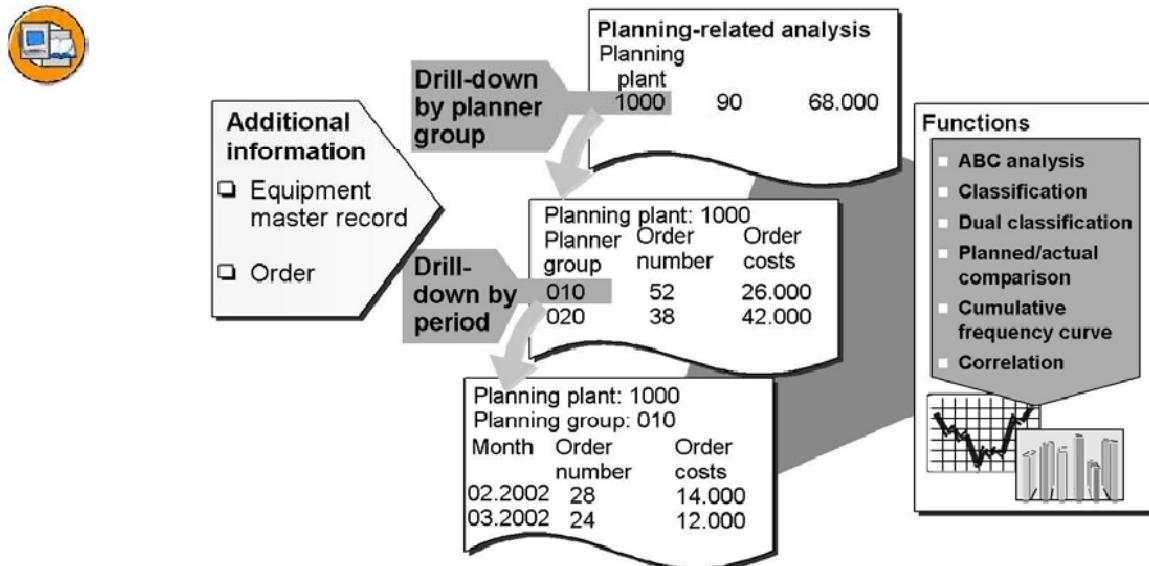


Figure 174: Standard Analysis Options

Standard analyses provide many functions that enable you to find specific information for detailed evaluations.

The information structures provide the database for standard analyses.

You can specify the range of data to be evaluated.

You can define the key figures or choose them online during the analysis itself.

The drill-down function allows you to vary the detail of information.

You can specify the sequence in which levels of information are displayed or you can follow the standard drill-down sequence.

Different functions are available at each level, for example, cumulative frequency curves, ABC analyses, correlation, classification, dual classification, and ranking lists.

All the results can also be displayed graphically.

Selections restricted by theme and time can be retained in selection versions.

You can access summary information in the information structure and branch to the display of master data and movement data.

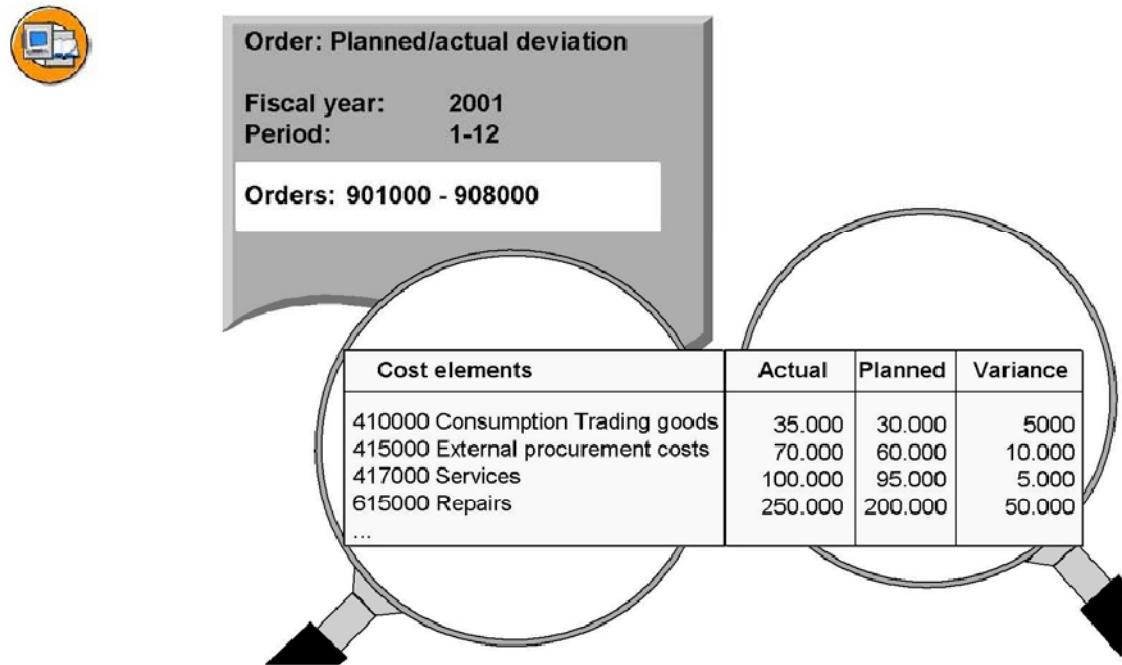


Figure 175: Standard Report in CO



Lesson Summary

You should now be able to:

- Explain the structure of the Logistics Information System (LIS)
- Perform standard analyses

Lesson: Evaluations in the Business Information Warehouse (BW)

Lesson Overview

This lesson gives a short overview of the *SAP Business Information Warehouse (SAP BW)* as well as the business content in the standard system for the Plant Maintenance area.



Lesson Objectives

After completing this lesson, you will be able to:

- Give an outlook on analyses in *SAP BW*

Business Example

System-wide analyses are performed with the *SAP Business Information Warehouse (SAP BW)*.

Business Information Warehouse (BW): Architecture



Figure 176: Business Information Warehouse (BW) - Architecture

The **Business Information Warehouse (BW)** is a system independent of other SAP systems, for extracting data from diverse source systems (both SAP and non-SAP systems), restructuring this data and compiling it into analyses and presenting these accordingly.

The heart of this is the SAP BW server pre-configured with the **business content** for the various core areas of the company.

Business content refers to pre-configured role- and task-based information models based on consistent meta data. The business content provides a range of information for selected roles in a company which these roles need to perform their tasks.

The **Business Explorer** provides companies with flexible reporting and analysis tools for strategic analysis and to support the decision-making processes (for example, **queries** = enquiries/analysis).

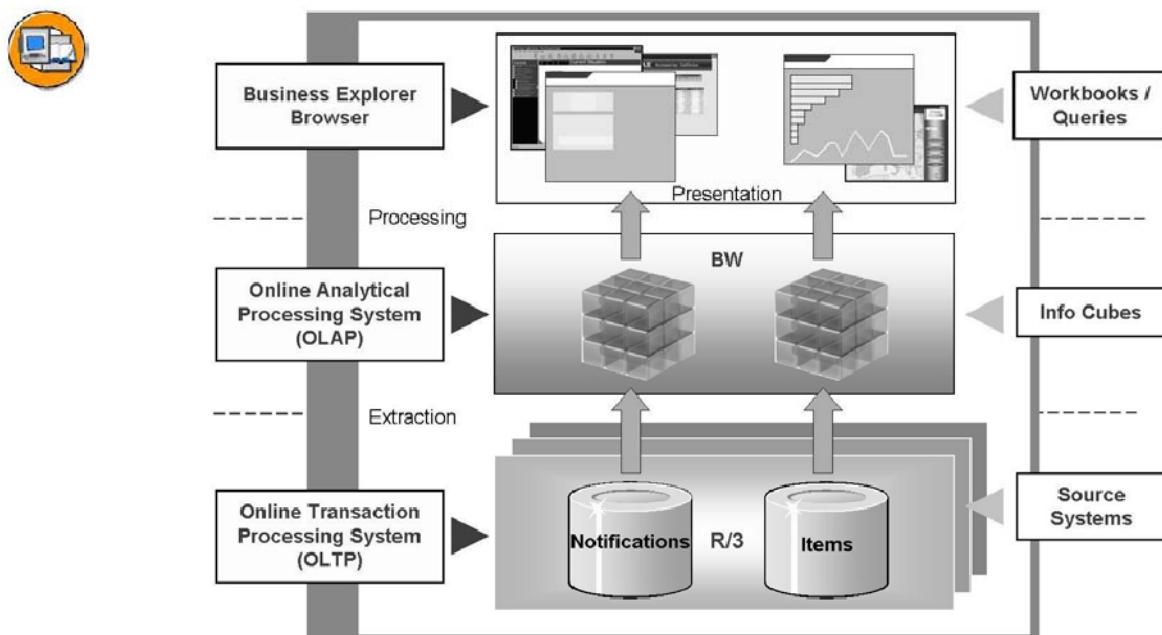


Figure 177: SAP BW at a glance

In the first step, data is prepared in various **source systems** and **extracted**.

In the second step, this data is compiled into **info cubes** in *SAP BW*. Info cubes are structures that describe a self-contained dataset of a business area from a reporting perspective.

In the third step, queries (enquiries, analysis) are defined on the basis of the info cubes in the *Business Explorer*.

Plant Maintenance Business Content

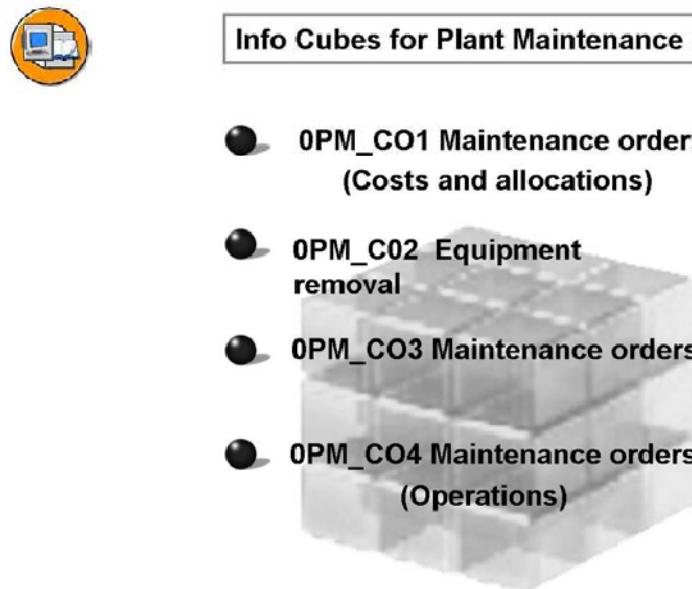


Figure 178: Plant Maintenance Business Content

The following info cubes are available for **Plant Maintenance**:

- Maintenance orders - costs and allocations
- Equipment removal
- Maintenance orders
- Maintenance orders - Operations



Lesson Summary

You should now be able to:

- Give an outlook on analyses in *SAP BW*



Unit Summary

You should now be able to:

- Describe the basic steps for reports and evaluations.
- Describe the sections of the maintenance history
- Check the usage list for a piece of equipment
- Explain the structure of the Logistics Information System (LIS)
- Perform standard analyses
- Give an outlook on analyses in *SAP BW*



Course Summary

You should now be able to:

- Name the most important business processes in Plant Maintenance and how they are mapped with SAP
- Describe some of the most important ways that Plant Maintenance is integrated with other SAP applications

Appendix 1

Solution Manager: Menu Paths and Transaction Codes

Solution Manager: Implementation and Monitoring

The Solution Manager



- is SAP's new infrastructure for controlling and managing your solution landscape
- is a free-of-charge additional component
- is connected with all systems and components of the solution landscape
- should be installed on an SAP Web AS 6.10 release or higher

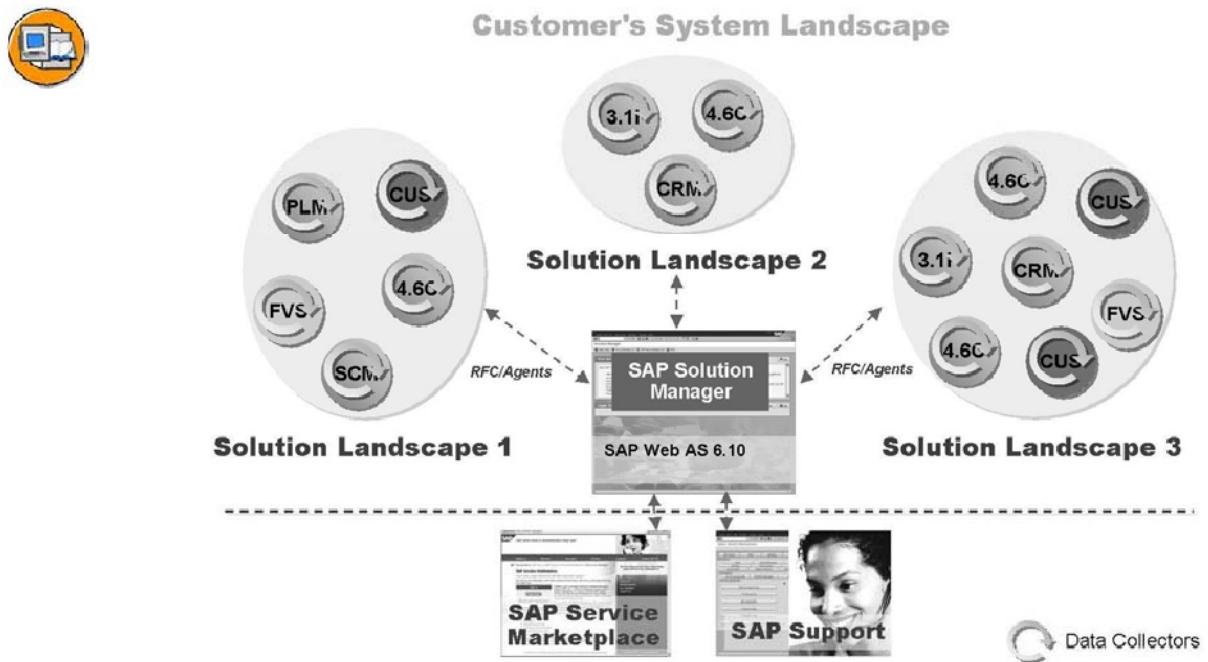


Figure 179: SAP Solution Manager – Architecture

- “Live” Documentation
 - Graphic display
- Framework and technical infrastructure for the service
 - On-Site (Consulting), Remote, Self Services
- Central monitoring
 - Service-level management, system monitoring, business process monitoring, central system administration
- Central platform for accessing all SAP information
 - SAP Service Marketplace
- Central integration of service and support tools
 - SAP Note Assistant, Microsoft NetMeeting, Support Desk, ...

Menu Paths and Transaction Codes



Work centers

Step	Transac-tion	Menu Path
Display work center	IR03	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Environment → Work Centers → Display Work Center</i>



Technical Objects

Step	Transac-tion	Menu Path
Change equipment	IE02	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Change</i>
Create equipment	IE01	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Create</i>
Display equipment	IE03	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → Display</i>
Equipment List Processing	IE05	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Equipment → List editing → Change → Display</i>
	IE08	
Display catalog	QS42	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Environment → Display Catalog</i>
Display material BOM	CS03	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Bill of material → Material BOM → Display</i>
Change functional location	IL02	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Change</i>
Create functional location	IL01	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Create</i>

Step	Transac-tion	Menu Path
Display functional location	IL03	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Display</i>
Functional Location List Processing	IL05 IL06	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → List Editing → Change → Display</i>
Functional Location Structure Display	IH01	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Functional Location → Structure Display</i>

Orders



Step	Transac-tion	Menu Path
Create order	IW31	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General)</i>
Change order	IW32	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Change</i>
Display order	IW33	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Display</i>
Order List Processing	IW38 IW39 IW40	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Order List → Change → Display → Display (Multi-Level)</i>
Time confirmation single entry	IW41	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Individual Time Confirmation</i>

Step	Transac-tion	Menu Path
Time confirmation collective entry with selection	IW48	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Collective time confirmation → With Selection</i>
Time confirmation collective entry without selection	IW44	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Collective time confirmation → Without Selection</i>
Overall completion confirmation	IW42	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Entry → Overall Completion Confirmation</i>



Notifications

Step	Transac-tion	Menu Path
Create malfunction report	IW24	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Create (Special) → Malfunction Report</i>
Create maintenance request	IW26	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Create (Special) → Maintenance Request</i>
Create activity report	IW25	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Create (Special) → Activity report</i>
Change notification	IW22	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Change</i>
Display notification	IW23	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → Display</i>

Step	Transac-tion	Menu Path
Notifica-tion List Processing	IW28	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List Editing → Change → Display → Display (Multi-Level)</i>
	IW29	
	IW30	
Notifica-tion - list of activities	IW64	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List of Actions → Change</i>
Notifica-tion - list of items	IW68	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Notification → List of Items → Change</i>

Materials Management / Purchasing



Step	Transac-tion	Menu Path
Create purchase order	ME21 / ME21N	<i>Logistics → Materials Management → Purchasing → Purchase Order → Create → Vendor known</i>
Enter services	ML81	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Services</i>
Display material	MM03	<i>SAP Menu → Logistics → Plant Maintenance → Managing Technical Objects → Material → Display</i>
Goods Movement	MB11 or MIGO	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Movement</i>
Goods Receipt	MB31 or MIGO	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Goods Receipt</i>



Refurbishment

Step	Transac-tion	Menu Path
Create re-furbishment order	IW81	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Order → Create (General)</i>
Goods Re-ceipt Refur-bishment	IW8W	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → Completion Confirmation → Refurbishment Goods Receipt</i>



Preventive Maintenance (Work/Maintenance Planning)

Step	Transac-tion	Menu Path
Display equipment task list	IA03	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Work Scheduling → Task Lists → For Equipment → Display</i>
Display general maintenance task list	IA07	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Work Scheduling → General Maintenance Task Lists → Display</i>
FunctLoca-tion-Dispaly Task List	IA13	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Work Scheduling → Task Lists For Functional Location → Display</i>
Create single cycle plan	IP41	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Create → Single Cycle Plan</i>
Create strategy plan	IP42	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Create → Strategy plan</i>
Change mainte-nance plan	IP02	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Change</i>
Display mainte-nance plan	IP03	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance plans → Display</i>

Maintenance Plan Scheduling

Schedule maintenance plan	IP10	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling</i>
Maintenance Plan Schedule Monitoring	IP30	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Schedule monitoring</i>
Change Maintenance Strategy	IP11	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance Strategies → Change</i>
Display Maintenance Strategy	IP12	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Maintenance Strategies → Display</i>
Maintenance Schedule Overview - Graphic	IP19	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling Overview → Graphical</i>
Maintenance Schedule Overview - List	IP24	<i>SAP Menu → Logistics → Plant Maintenance → Preventive Maintenance → Maintenance Planning → Scheduling for Maintenance Plans → Scheduling Overview → List</i>

Project-Oriented Maintenance

Step	Transac-tion	Menu Path
Display Work Breakdown Structure	CJ03	<i>SAP Menu → Logistics → ? Project System → Project → Special Maintenance Functions → Work breakdown structure → Display</i>
Structure Overview of Project	CN41	<i>SAP Menu → Logistics → Project System → Info System → Structures → Structure Overview</i>



Work Clearance Management

Step	Transac-tion	Menu Path
Work Clearance Management		<i>SAP Menu → Logistics → Plant Maintenance → Work Clearance Management</i>



History / Plant Maintenance Information System

Step	Transac-tion	Menu Path
Material Usage	IW13	<i>SAP Menu → Logistics → Plant Maintenance → Maintenance Processing → History → Material where-used list</i>
Standard analyses	MCI1 MCI2 MCI3 MCI4 MCI5 MCI6 MCI7 MCI8 MCIZ	<i>SAP Menu → Logistics → Plant Maintenance → Information System → Standard Analyses → Object Class → Manufacturer → Location → Planner Group → Damage Analysis → Object Statistics → Breakdown Analysis → Cost Analysis → Vehicle Consumption Analysis</i>

Data Sheet for Exercises

Description	Training system	IDES system
	General data	
Controlling area	1000	1000
Company code	1000	1000
Plant / Planning plant	1000	1000

Description	Training system	IDES system
Storage location	0001	0001
Purchasing organization	1000	1000
G/L account external service	417000	417000
Vendors	1000, 1101, 1102 SRV-1	1000
	Technical Objects	
Equipment	TEQ-##	P-1000-N001
Equipment with synchronous equipment/serial number	TEX-##	-
Test equipment (PM/QM link)	10003540, 10003541	10003540, 10003541
Equipment with equipment BOM (Plant 1200)	T-SM0100 T-SM0120	
Configurable equipment	P-6000-N001	P-6000-N001
Functional location	C1 ## (*) SERV-PRO-RZ-##	C1 SERV-PRO-RZ-##
Status profile equipment	PMSTAT	
	Materials and Bills of Material	
Materials: Pump without serial number - standard price for batch	T-FP1##	P-2001
Pump with serial number - standard price for batch	T-FP2##	P-2002

Description	Training system	IDES system
Pump with serial number - moving average price for batch	T-FP3##	P-2003
Pump with serial profile PM2 (equipment/serial number synchronous)	T-FP400	-
Pump without serial number - moving average price for batch	T-FP9##	P-2009
Serial number profile (stock check = 1 > warning)	PM1	PM1
Serial number profile - equipment/Serial number synchronous	PM2	-
Configurable material	P-6000	P-6000
Bill of material for material P-6000	P-6000	P-6000
Materials for material BOM P-1000 (plant 1000, usage 4)	100-00 100-400 DG-1000 100-600 100-431 KR117185 WL-1000 G-1000 M-1000	100-100 100-400 DG-1000 100-600 100-431 KR117185 WL-1000 G-1000 M-1000

Description	Training system	IDES system
Materials for equipment BOM T-SM0100 – T-SM0120 (Plant 1200, Usage. 4)	DPC9021 C-1112 R-1120 R-1131 R-1160	DPC9021 C-1112 R-1120 R-1131 R-1160
Configurable material (service)	INSPECTION_SERVICE	
	Work centers	
Work centers	T-ME## T-EL## T-EX##	Mechanics Electrics
	Task lists and maintenance planning	
Task lists	PUMP_WTG PUMP_REP MM-CALIB	PUMP_WTG PUMP_REP MM-CALIB
Profile	0000001	0000001
Maintenance task lists service procurement PM/QM link	50 600000000000 51, 52	50 600000000000 51, 52
Display maintenance strategy, service-based	DFL	DFL
Cycle set	ZS	ZS
Configurable general task list for WPL in connection with configurable equipment	PUMP_WTG 6	PUMP_WTG 6

Description	Training system	IDES system
Maintenance plan with configurable equipment and configurable general task list	80	
	Notifications / orders	
Service masters	100131, 100132	100131, 100132
Order type for generating inspection lot	PM06	PM06
Control key for internal processing of service	PM05	PM05
Standard text keys	PM00001 - PM00008	PM00001 - PM00008
Settlement profile for refurbishment (for order type PM04)	PM_AWA	
Order type investment orders	PM07	
Service masters for internal service processing (control key PM05)	100020, 100021	
	Cost centers and activity types	
Maintenance cost centers technical assets external company	4300 4110 4350	4300 4110 4350
Activity types	1410 (rep. hrs) 1610 (external hrs)	1410 (rep. hrs) 1610 (external hrs)
Settlement cost element for activity type 1610	615000	615000

Description	Training system	IDES system
	Outline agreements / framework orders	
Outline agreement pipe-laying work (vendor 1101)	4600000024	4600000024
Framework order for services	4500006496	4500006496

	Service	
Maintenance contract		
Configurable material (service)	INSPECTION_SERVICE	
Sold-to party	1171	
	Classes	
Variant class (used in configurable equipment and configurable general maintenance task list)	CL_P600	CL_P600
	Project and investment program	
project	I/5000	I/5000
Plant Maintenance project profile	PM00001	PM00001
Investment program	IDES1000	IDES1000

Glossary

Benutzerstammsatz

Der Benutzerstammsatz enthält die Definition eines Benutzers im Mandanten. Einige Felder sind z. B.: Name, Vorname, Initialkennwort, Telefonnummer etc. Der Benutzerstammsatz wird verwendet, um bei der Anmeldung eines Benutzers am System den sogenannten Benutzerkontext (siehe dort) aufzubauen.

Kommandofeld (Befehlsfeld)

Im Kommandofeld (Befehlsfeld) können Sie Anwendungen direkt über die Eingabe des Transaktionscodes starten.

Mandant

Ein Mandant entspricht in der Regel der Abbildung eines Unternehmens in einem SAP-System. Das heißt in einem SAP-System mit mehreren Mandanten können mehrere Unternehmen abgebildet und parallel tätig sein. Der Mandant hat eine Entsprechung als Schlüsselfeld in den Tabellen der zum SAP-System gehörenden Datenbank. Von einem Mandanten aus kann nur auf Daten genau dieses Mandanten zugegriffen werden. Somit entsprechen Mandanten betriebswirtschaftlich eigenständigen Entitäten.

SAP Easy Access

SAP Easy Access stellt das Standard-Einstiegsbild in SAP Systeme dar. Im linken Bildbereich sehen Sie eine Baumdarstellung der Ihnen zur Verfügung stehenden Menüs des SAP-Systems, im rechten Bildbereich können Sie sich ein eigenes Logo anzeigen lassen.

SAP Logon

Das Programm *SAP Logon* bietet nach seinem Aufruf eine Liste von SAP-Systemen an, für welche der Anmeldeprozess gestartet werden kann. Diese Liste entstammt den Angaben einer Datei auf dem Frontend: *saplogon.ini*. Diese Datei wird typischerweise für Endanwender vorkonfiguriert von zentraler Stelle zur Verfügung gestellt. Das Programm *SAP Logon* ermöglicht zudem bei der Anmeldung an ein System eine Logon-Lastverteilung über die vom gewählten System zur Verfügung gestellten Ressourcen.

SAP-Hinweis

Ein SAP-Hinweis ist eine Textinformation zu einer bestimmten Frage, Problemsituation oder Systemmeldung, die im Zusammenhang mit Ihrer Arbeit am System auftauchen kann. Alle SAP-Hinweise sind in einer online verfügbaren

Datenbank bei SAP hinterlegt, und für Kunden von dort abrufbar. Ein mögliche Frage könnte z. B. lauten: "Welche Datenbankversionen der Datenbank XY sind im Zusammenhang mit meinem SAP-Systemrelease von SAP freigegeben? "

SAP-System

Ein SAP-System kann z. B. ein SAP R/3-, ein SAP BW- oder ein SAP CRM-System sein. SAP-Systeme bilden die zentralen Komponenten der mySAP Solutions im Rahmen von mySAP.com.

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Feedback

SAP AG has made every effort in the preparation of this course to ensure the accuracy and completeness of the materials. If you have any corrections or suggestions for improvement, please record them in the appropriate place in the course evaluation.