Critical manufacturing
an ASM PT company

Maintenance Management

11.1

January 2026

DOCUMENT ACCESS

Public

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Maintenance Management

Estimated time to read: 26 minutes

Maintenance Management is defined as the process of maintaining the assets and resources of a company, with the aim of controlling and reducing costs, times, and resources by regularly monitoring the functioning of machines, equipment, facilities, and tools.

The adequate maintenance of equipment is critical to maintain the health and performance of manufacturing assets to reduce, for example, unplanned downtime due to broken equipment and waste of resources in inefficient maintenance processes.

A maintenance involves the execution of a set of tasks as defined in a checklist, the replacement of spare parts, and the collection of data either for historical or verification purposes.

Critical Manufacturing MES ensures that maintenance plans are followed as defined and keeps track of the maintenance history for every equipment. As a fully integrated module, the usage counters are automatically increased as material is processed and prevents equipment from being used if maintenance is due. The system also checks the certifications of maintenance technicians and updates the inventory of spare parts as they are consumed. Additionally, the Scheduling module is alerted of planned maintenance down times to ensure that equipment is unavailable.

This document will guide you through the required configurations and utilization of the Maintenance Management module.

> **Info**
>
> Maintenance Management is a separately licensed module.

Overview

Maintenance Management provides the functionality required to define and carry-out planned (preventive) and unplanned (corrective) maintenance on Resources, Areas, Containers and Materials. Planned maintenance can be time-based, usage-based or time and usage-based.

Maintenance Management is centered around Maintenance Plans that contain multiple Maintenance Activities. The same Maintenance Plan can be assigned to different objects thus creating Maintenance Plan Instances. A Maintenance Plan Instance contains Maintenance Activity Orders. An object can have multiple Maintenance Plan Instances as long as the Maintenance Plans are not duplicated. A simplified object model is shown in the figure below.

```
graph TD
    A1[Maintenance Plan Instance] === Main[Maintenance Plan]
    Main --- L1[Maintenance Activities]
    A1 --- A6[Maintenance Activity Order]
    L1 --- A6
    A2[Material] --- A1
    A3[Resource] --- A1
    A4[Area] --- A1
    A5[Container] --- A1

classDef mermaid_title color:#000, fill:#fafafa, stroke:#fafafa, stroke-width:0x, font-size:100%,
font-weight:200;
classDef mermaid_start color:#000, fill:#fafafa, stroke:#fafafa, color:#fafafa, stroke-width:0x,
font-size:100%, visibility: hidden;
```

```
classDef mermaid_businessdata color:#000, fill:#65CDE8, stroke:#65CDE8, stroke-width:0px, font-
size:100%;
classDef mermaid_nonbusinessdata color:#000, fill:#B7DEE8, stroke:#B7DEE8, stroke-width:0px, font-
size:100%;
classDef mermaid_entity color:#000, fill:#FB9F53, stroke:#FB9F53, stroke-width:0px, font-size:100%;
classDef mermaid_entitylinked color:#000, fill:#FCD5B5, stroke:#FCD5B5, stroke-width:0px, font-
size:100%;
classDef mermaid_context color:#000, fill:#B9CDE5, stroke:#B9CDE5, stroke-width:0px, font-
size:100%;
classDef mermaid_optional color:#000, fill:#B7DEE8, stroke:#65CDE8, stroke-width:1px, font-
size:100%, stroke-dasharray: 5 5;
class Main mermaid_entity
class A1,A2,A3,A4,A5,A6,A7,A8,A9,A10,A11,A12 mermaid_businessdata
class L1,L2,L3,L4,L5,L6 mermaid_entitylinked
class C1,C2,C3,C4,C5,C6 mermaid_context
class N1,N2,N3,N4,N5,N6 mermaid_nonbusinessdata

click Main "../../userguide/business-data/map"
click A1 "../../userguide/business-data/step"
click A2 "../../userguide/business-data/material"
click A3 "../../userguide/business-data/resource"
click A4 "../../userguide/business-data/map-definition"
```

System States

Maintenance Activity Orders with the exception of Maintenance Activity Order of schedule type *Ad-hoc* follow a schedule state model shown in the figure below.

```
graph LR
    A1[Before Early Due] --> A2[Early Due]
    A2 --> A3[Due]
    A3 --> A4[Late Due]

classDef mermaid_mm_beforeearlydue color:#000, fill:#00aad0, stroke:#000, stroke-width:1px, font-
size:100%;
classDef mermaid_mm_earlydue color:#000, fill:#e5ca82, stroke:#000, stroke-width:1px, font-
size:100%;
classDef mermaid_mm_due color:#000, fill:#33cc99, stroke:#000, stroke-width:1px, font-size:100%;
classDef mermaid_mm_latedue color:#000, fill:#e17572, stroke:#000, stroke-width:1px, font-
size:100%;
class A1 mermaid_mm_beforeearlydue
class A2 mermaid_mm_earlydue
class A3 mermaid_mm_due
class A4 mermaid_mm_latedue
```

All Maintenance Activity Orders follow an execution state model shown in the figure below.

```
graph TD
    Start -->|Request| A1
    A1[Requested] ==>|Approve| A2[Approved]
    A1 -.->|Skip if AutoApproval| A2
    A2 ==>|Release| A3[Released]
    A2 -.->|Skip if AutoRelease| A3
    A3 ==>|Begin| A4[In Progress]
    A4 -.->|Skip if AutoAccept| A6
    A4 ==>|Complete| A5[Waiting For Acceptance]
    A5 ==>|Accept| A6[Closed]
    A5 -->|Rework| A7[Reworked]
    A1 -->|Skip| A8[Skipped]
    A2 -->|Skip| A8[Skipped]
    A3 -->|Skip| A8[Skipped]
    A1 ---->|Reject| A9[Rejected]
    A1 ---->|Join| A10[ClosedAsJoined]
    A1 ---->|Cancel| A11[Canceled]

classDef mermaid_title color:#000, fill:#fafafa, stroke:#fafafa, stroke-width:0x, font-size:100%,
font-weight:200;
classDef mermaid_start color:#000, fill:#fafafa, stroke:#fafafa, color:#fafafa, stroke-width:0x,
font-size:100%, visibility: hidden;
```

```
classDef mermaid_mao_requested color:#000, fill:#fff, stroke:#00318a, color:#000, stroke-width:6px,
stroke-dasharray: 5 5, font-size:100%;
classDef mermaid_mao_approved color:#000, fill:#fff, stroke:#ffc000, color:#000, stroke-width:3px,
font-size:100%;
classDef mermaid_mao_released color:#000, fill:#fff, stroke:#92d050, color:#000, stroke-width:3px,
font-size:100%;
classDef mermaid_mao_inprogress color:#000, fill:#fff, stroke:#00b0f0, color:#000, stroke-
width:3px, font-size:100%;
classDef mermaid_mao_waiting color:#000, fill:#fff, stroke:#ff5800, color:#000, stroke-width:3px,
font-size:100%;
classDef mermaid_mao_closed color:#000, fill:#fff, stroke:#ff0000, color:#000, stroke-width:3px,
font-size:100%;
class Title mermaid_title
class Start mermaid_start
class A1 mermaid_mao_requested
class A2 mermaid_mao_approved
class A3 mermaid_mao_released
class A4 mermaid_mao_inprogress
class A5 mermaid_mao_waiting
class A6,A7,A8,A9,A10,A11 mermaid_mao_closed
```

Note

The left line of the Maintenance Activity represents the Schedule State.

Maintenance Activity Details

Each Maintenance Activity defines several scheduling and execution relevant properties as listed in the tables below:

Property	Description	Type
Schedule Type	The type of the Maintenance Activity that triggers the execution: *- Ad-hoc* *- Time based* *- Usage based* *- Time and Usage based*	**Mandatory**
Maintenance Type	The type of the Maintenance Activity: *- Inspection* *- Calibration* *- Corrective* *- Preventive*	**Mandatory**
Duration	The expected duration of the Maintenance Activity in hours.	**Mandatory**
Ignore in Scheduling	In case that the Scheduling module is being used, whether the Maintenance Activity must be considered working time or not. If the option is checked, the Maintenance Activity time is considered working time.	**Mandatory**
Enable Concurrent Instances	Whether a Maintenance Activity of schedule type Ad-hoc can be requested and performed multiple times concurrently.	**Optional**
Request Approval Mode	If the Maintenance Activity needs to be explicitly approved or if it's automatically approved by the system.	**Mandatory**

Property	Description	Type
Order Release Mode	If the Maintenance Activity needs to be explicitly released or if it's automatically released by the system.	**Mandatory**
Acceptance Mode	If the Maintenance Activity needs to be explicitly accepted or if it's automatically accepted by the system. ℹ️ **Only Maintenance Activities that are configured for manual acceptance can be sent for rework.**	**Mandatory**
Request Role	The Role that can request the Maintenance Activity, only for Maintenance Activities of Schedule Type Ad-hoc.	**Optional**
Root Cause Source	A lookup table that defines the possible list of root causes for Maintenance Activities of Schedule Type Ad-hoc.	**Optional**
Role	The role that can perform the Maintenance Activity.	**Mandatory**
Schedule	For Maintenance Activities that are time-based, usage-based or time and usage-based: - The recurrence frequency time interval or usage count - The early due and late due intervals or usage values - The counter type and counter event for usage-based maintenance activities - For time-based Maintenance Activities, the schedule mode: - *Any Day* - *Next Working Day* -- schedules for the next working day in the calendar in case the scheduled day is a non-working day - *Previous Working Day* -- schedules for the previous working day in the calendar in case the scheduled day is a non-working day ℹ️ The Resource Calendar is the Calendar of the Resource Area. ℹ️ The Area Calendar is the Calendar of the Area. ℹ️ The Material Calendar is the default Calendar of the Material Facility. ℹ️ The Container Calendar is the default Calendar of the Container Facility. - The *Schedule Next* mode: - *Fixed* -- uses a fixed interval regardless of when the maintenance activity is performed - *Dependant* -- takes into account when the maintenance activity was performed to re-schedule the next occurrence ℹ️ When using the Fixed schedule next mode, it's possible to configure the behavior of the counters when re-scheduling the maintenance activity using the configuration entry /Cmf/System/Configuration/MaintenanceManagement/UsageFixedNextMode. If this configuration entry value is set to *ResetCounters* the counters are set to zero and the target counter values are adjusted. If set to any other value, the target counter values remain the same, but the counter values are adjusted accordingly and may become negative.	**Mandatory**
Contains	A list of Maintenance Activities that are contained by the Maintenance Activity. For example, a Maintenance Activity that is performed once per year may include a Maintenance Activity that is performed every month.	**Optional**
Rules	A list of Rules of scope *Maintenance Management Action* to be triggered whenever a certain Schedule State is reached.	**Optional**

Property	Description	Type
Auto Disable After Late Due	**Create Maintenance Activity Order** - Auto Disable After Late Due (defaults to `false`) ℹ Only if Maintenance Plan Activity Schedule Type is not Ad-hoc. - All Maintenance Activity Rules associated with the Event Time Late Due are executed by the system in the order that they are defined. The following apply should the MAO have the Auto Disable After Late Due be set to `true`: 1. If the MAO refers to a Maintenance Plan Instance Type as Resource, then the Resource is put on hold. 2. If the MAO refers to a Maintenance Plan Instance Type as Container, then the Container is put on hold. 3. If the MAO refers to a Maintenance Plan Instance Type as Area, then the Area is put on hold. - All Maintenance Activity Rules associated with the event Usage Late Due are executed by the system in the order that they are defined. The following apply should the MAO have the Auto Disable After Late Due flag set to `true`: 1. If the MAO refers to a Maintenance Plan Instance Type as Resource, then the Resource is put on hold. 2. If the MAO refers to a Maintenance Plan Instance Type as Container, then the Container is put on hold. 3. If the MAO refers to a Maintenance Plan Instance Type as Area, then the Area is put on hold. - For **Usage Based**, when associating the Maintenance Plan with an Entity, the system creates only one instance, and then when that instance is completed (Closed/Skipped) the system ends the current one and creates a new one right after it. - For **Time Based** ℹ Schedule Next Mode can be Fixed or Dependent, and is conditioned by whether the re-schedule of the activity takes into account the last performed activity or if it forces the usage of fixed (absolute) counters. 1. If the Schedule Mode is Fixed when associating the Maintenance Plan with an Entity, the system creates only one instance in the resolved date/time (Schedule Date depends on Schedule Next Mode), and when the instance is completed (Closed/Skipped) the system ends the current one and creates a new one in the next Schedule Date. 2. If Schedule Mode is Dependent when associating the Maintenance Plan with an Entity, the system creates the number (#N) of instances defined in the activity with the first activity to be placed in the resolved date/time (Schedule Date depends on Schedule Next Mode), and when an instance is completed (Closed/Skipped) the system ends the current one and creates a new one in the first slot in the future so that there are always #N active instances in it. **Terminate Maintenance Activity Order** - If the MAO belongs to a Maintenance Plan Instance that is associated with a Resource or Container, and if the MAO has the property Auto Disable After Late Due set to `true` and if the MAO Schedule State is Late Due, then the Resource or Container or Area is released from Hold. **Rework Maintenance Activity Order** - If Terminate Maintenance Activity Order is called for the current MAO, but with the exception that the MAO has the property Auto Disable After Late Due set to `true`, no release (of Container or Resource or Area) takes place.	**Optional**

Table: Maintenance Activity scheduling relevant properties

When determining the **Calendar** to be used, the system executes a specific DEE action (`EvaluateCalendarForEntity`) that retrieves the **Calendar** to use depending on the Entity type used. If a

custom entity is to be used for the Maintenance Plan, this rule should be altered to accommodate it.

Property	Description	Type
Begin and Complete Mode	There are two possible values for the *Begin and Complete Mode*:	**Mandatory**
	- *Manual Begin and Complete* -- there must be an explicit Begin and Complete transaction for the Maintenance Activity	
	- *Auto Begin and Complete* -- it's only necessary to do a Perform transaction since the Begin and Complete will be assumed implicitly. In this mode it's required to specify a Checklist as the state of the Checklist will drive the state of the Maintenance Activity.	
Checklist	A long-running checklist (of scope *Maintenance Management*) that must be executed when performing the Maintenance Activity.	**Optional**
Data Collection	A Data Collection that must be filled-in when performing the Maintenance Activity.	**Optional**
Data Collection Limit Set	A Data Collection Limit Set that belongs to the selected Data Collection that will be applied when performing Maintenance Activity.	**Optional**
	A Data Collection Limit Set can only be defined if a Data Collections is specified.	
Charts	A list of SPC Charts to send data from the Data Collection. It's also possible to specify if the SPC data must be displayed -Never, Always, Only on Violation; and acknowledged -- Always or Only on Violation.	**Optional**
Parts	A BOM of scope *Parts* that defines the spare parts to be used in the Maintenance Activity. Also, it's possible to specify whether the parts to be used in the Maintenance Activity are restricted to the pre-defined BOM of *Parts* or not.	**Optional**
Personnel	A list of personnel requirements for the Maintenance Activity as well as the Labor Tracking options:	**Optional**
	- Check-in configuration	
	- Whether labor can be manually reported	
	- The personnel requirements	

Table: Maintenance Activity execution relevant properties

Info

When the Costing module is licensed, the system will calculate the cost of every Maintenance Activity Order by adding the Labor and Parts cost.

Roles

There are two primary roles involved in Maintenance Management with different privileges and responsibilities as shown in the table below.

Role	Description	Privileges / Responsibilities
Maintenance Plan Instance Owner (Management)	Persons that belong to this role can manage all the maintenance activity orders of a particular maintenance plan instance.	**Approve a requested Maintenance Activity Order** **Reject a requested Maintenance Activity Order** **Release a Maintenance Activity Order** **Accept a Maintenance Activity Order** **Rework a Maintenance Activity Order** **Skip a Maintenance Activity Order** **Join two or more Maintenance Activity Orders** **Separate two or more Maintenance Activity Orders** **Can re-assign a Maintenance Activity Order to a particular User or Role** **Change the scheduled dates and/or usage counters of a Maintenance Activity Order** **Change the duration of a Maintenance Activity Order** **Set the Schedule Date for a Maintenance Activity Order** **Add a note to a Maintenance Activity Order**
Maintenance Activity Owner (Execution)	Persons that belong to this role can perform a particular maintenance activity order.	**Begin a Maintenance Activity Order** **Perform a Maintenance Activity Order** **Complete a Maintenance Activity Order** **Change the duration of a Maintenance Activity Order** **Set the Schedule Date for a Maintenance Activity Order** **Add a note to a Maintenance Activity Order** **Check-In at a Maintenance Activity Order** **Check-Out from a Maintenance Activity Order**

Table: Maintenance Management Roles

Planned (Preventive) Maintenance

Planned maintenance can be time-based, usage-based or time and usage-based - whatever comes first. Planned maintenance activities include a grace-period defined by an early-due and a late-due time interval or value.

Info

Planned maintenance activities are always scheduled automatically by the system.

Info

It's possible to specify that the object for which the maintenance plan applies must be disable if the late due is reached by checking the option *Auto disable after late due*.

Time-Based Maintenance

When using time-based maintenance, it's possible to define recurring maintenance activities based on month, week, day or hour intervals as shown in the following table:

Interval Base	Time Due	Early Due and Late Due Interval
Month	Day of Month and Time	**Days**
Week	Day of the Week and Time	**Days**
Day	Number of Days and Time	**Hours**
Hour	Number of Hours	**Hours**

Table: Time-based possible time intervals

Info

For time-based activities for which the schedule mode is fixed, it's possible to specify a certain number of maintenance activities to schedule using the option *Number of instances to schedule*.

Info

The schedule state of time-based activities is updated by system timers. The two configuration entries below provide some configuration options for these timers:

- `/Cmf/System/Configuration/MaintenanceManagement/Timers/ErrorDistributionList` - a distribution list where an email will be sent in case that a Maintenance Management timer execution fails
- `/Cmf/System/Configuration/MaintenanceManagement/Timers/RetryCount` - the number of retries for Maintenance Management timer executions

Usage-Based Maintenance

When using usage-based maintenance, the system can increase the maintenance counters automatically on certain events, such as track-in or track-out. It's possible to increase the maintenance counters by four different methods as listed in this table:

Method	Description
CountOne	The maintenance counter is increased by one.
CountQuantityOne	The maintenance counter is increased by the quantity one of a certain event, for example, the primary quantity on a track-in or a track-out.
CountQuantityTwo	The maintenance counter is increased by the quantity two of a certain event, for example, the secondary quantity on a track-in or a track-out.
CountExpression	The maintenance counter is increased by the quantity as returned by a flexible expression, such as `$Resource.IncreaseAmount` or `$Material.Product.ExposureIntensity`

Table: Usage-based maintenance counter increase methods

Info

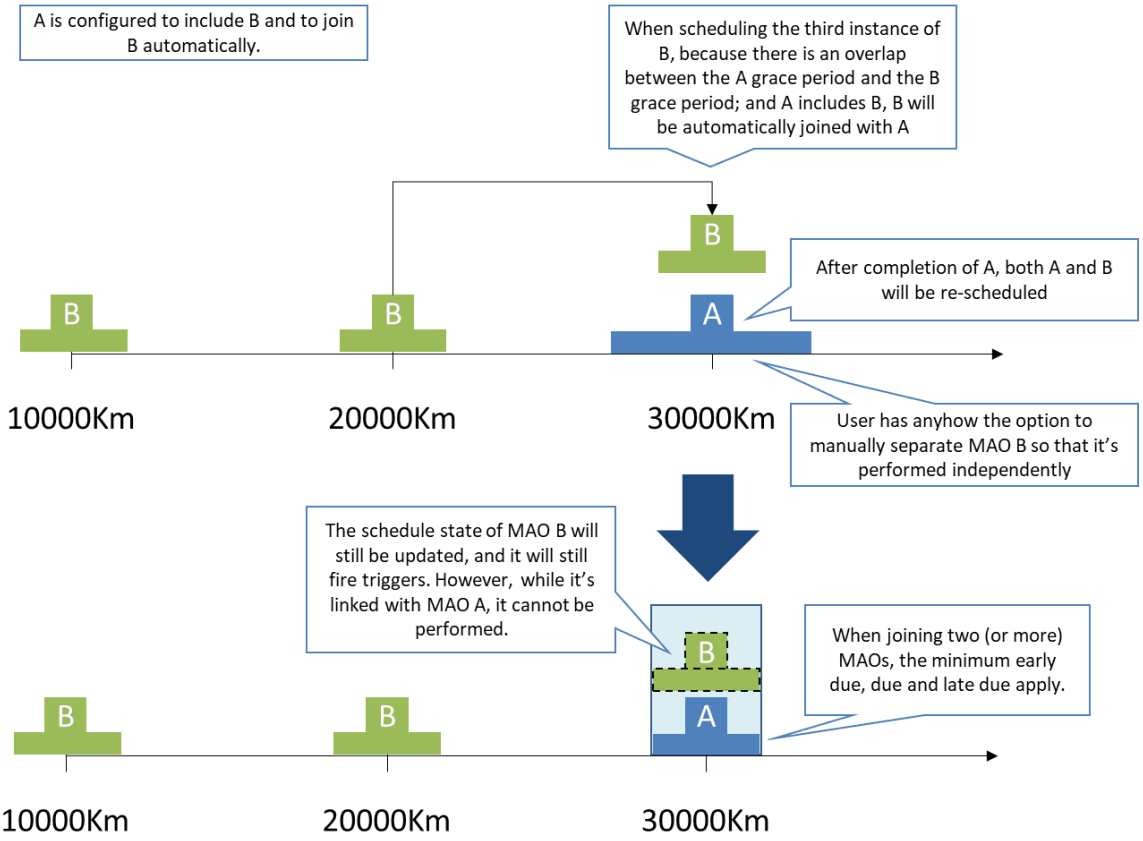
The list of possible events for increasing the usage-based counters is defined in the lookup table *MaintenanceManagementEvent*.

Info

Counters for an object can be increased manually by calling the *Increase Maintenance Counters* transaction for that particular object.

Activities That Include Other Activities

Planned maintenance activities can be configured to include other activities of the same schedule type. A good example is a yearly maintenance activity that includes a monthly maintenance activity. Each activity that is contained in another can be configured to be joined together automatically if there's an overlap between the grace periods as shown in the figure below.



A joined activity is considered to be completed when the parent activity is completed, and it will be re-scheduled at that time. An activity which has been joined to another can be separated manually as long as the parent activity is not in progress.

Info

When modeling joined activities, it's important to consider the design of checklists, parts and data collection to consider the possible combinations.

Unplanned (Corrective) Maintenance

Unplanned (corrective) maintenance activities have the schedule type Ad-hoc. These type of maintenance activities are not scheduled automatically by the system and need to be requested explicitly. Note that if the ad-hoc maintenance activity has a *Request Role* defined, only users that belong to this role will be able to request it.

Info

It's possible to enable that the same ad-hoc is requested multiple times within the same maintenance plan instance by checking the option *Enable Concurrent Instances* in the maintenance activity configuration in the maintenance plan..

Info

It's possible to allow an ad-hoc maintenance activity to be requested when the state of a Resource is changed to *Unscheduled Down* (as given by the state model state SEMI-E10 attribute value). This is enabled at a Resource level by checking the option *Enable MAO Request on State Change*.

Info

The two following configuration entries determine the request time of the maintenance activity:

- `/Cmf/System/Configuration/MaintenanceManagement/RequestMAO/DefaultFutureHours` - when requesting a maintenance for a day in the future the system sets the *DefaultFutureHours* value as the default time (in hours).
- `/Cmf/System/Configuration/MaintenanceManagement/RequestMAO/DefaultTodayMinutes` - when requesting a maintenance for today, the system rounds up the default time until a time with the *DefaultTodayMinutes* minutes.

Setting Up Maintenance Management

In order to setup Maintenance Management it's necessary to follow the steps as described in the following table:

Step	Title	Description
1	**Create the Necessary Products**	Optionally, create the necessary Products for the different Spare Parts. There are two important Maintenance Management properties: - Enabled for Maintenance Management - allows the product to be used as a Part in Maintenance Management - Consume Quantity - specifies if inventory is consumed for the product or not in Maintenance Management
2	**Create the Necessary BOMs**	Optionally, create the necessary BOMs of scope *Parts* to define the bill-of-parts to be used in a Maintenance Activity.
3	**Create the Necessary Data Collection and Data Collection Limit Sets**	Optionally, create the necessary Data Collections and Data Collection Limit Sets that are intended to be used in Maintenance Management.
4	**Create the Necessary SPC Charts**	Optionally, create the necessary SPC Charts that are intended to be used in Maintenance Management.
5	**Create the Necessary Checklists**	Optionally, create the necessary Checklists of scope Maintenance Management that are intended to be used in Maintenance Management.
6	**Create the Necessary Certifications**	Optionally, create the necessary technician Certifications that will be used as personnel requirements in Maintenance Management.

Step	Title	Description
7	**Create the Necessary Rules**	Optionally, create the necessary Rules of scope *Maintenance Management Action* to be triggered when the scheduled state changes.
8	**Create a Maintenance Plan**	Create the Maintenance Plan, optionally referencing all the objects that have been created previously.
9	**Create a Maintenance Plan Instance**	Associate the Maintenance Plan with one or more objects of type Resource, Area, Container or Material by creating a Material Plan Instance.

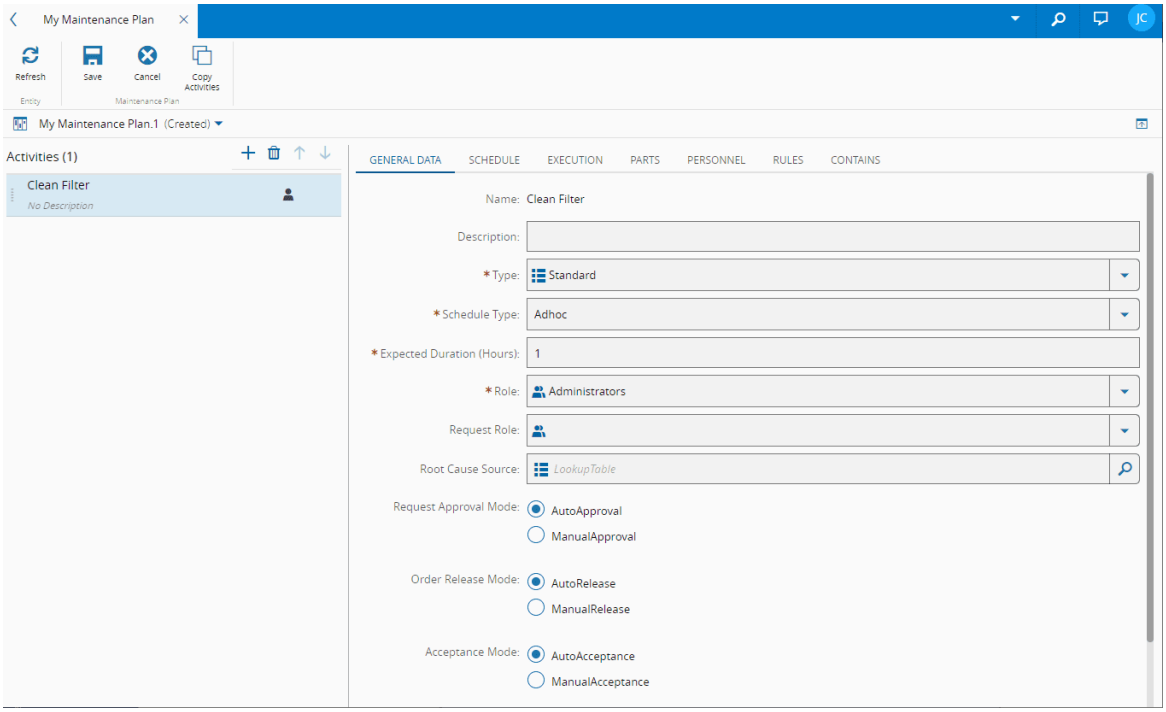
Table: Maintenance Management Setup steps

Steps **8** and **9** which are specific to Maintenance Management are described below in more detail.

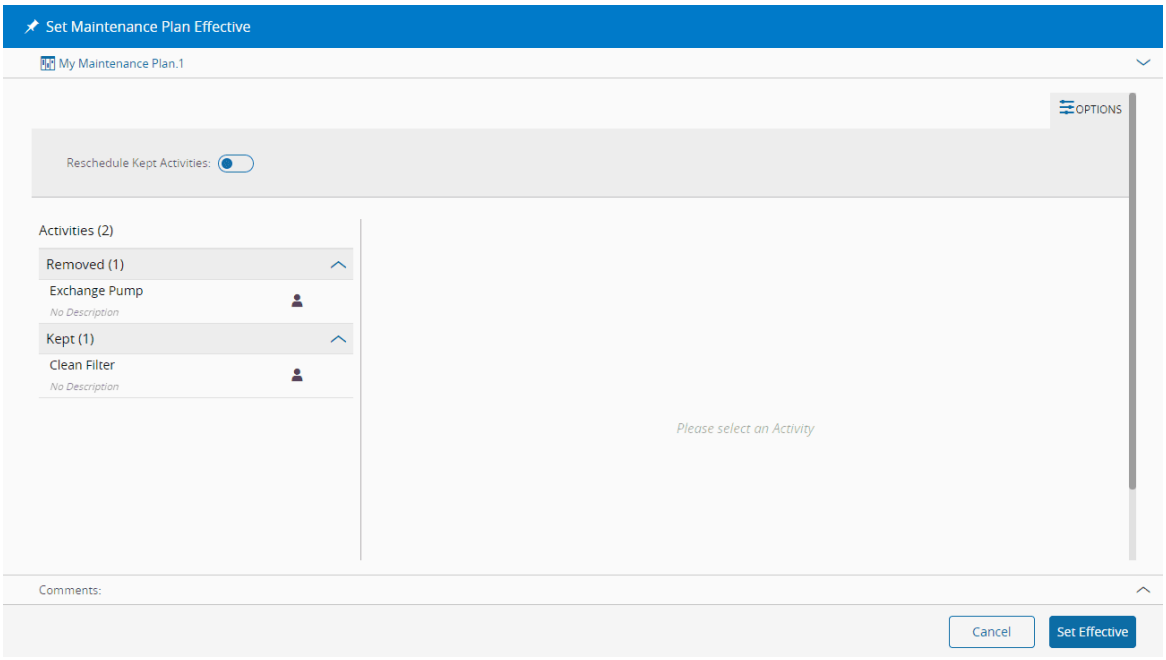
Create a Maintenance Plan

The Maintenance Plan consists of a set of Maintenance Activities that will then be assigned to one or more Resources, Areas, Containers and Materials.

Refer to the figure below. Each Maintenance Activity consists of up to seven sub-sections depending on its schedule type: Details, Execution, Schedule, Parts, Rules, Personnel and Contains. Refer to the tables above as well as to the User Guide for more information on the details of these sections.



When setting a new version of a Maintenance Plan effective, because there may be already scheduled Maintenance Activity Orders, the user must decide whether the Maintenance Activities are retained must be re-scheduled or not as shown below.

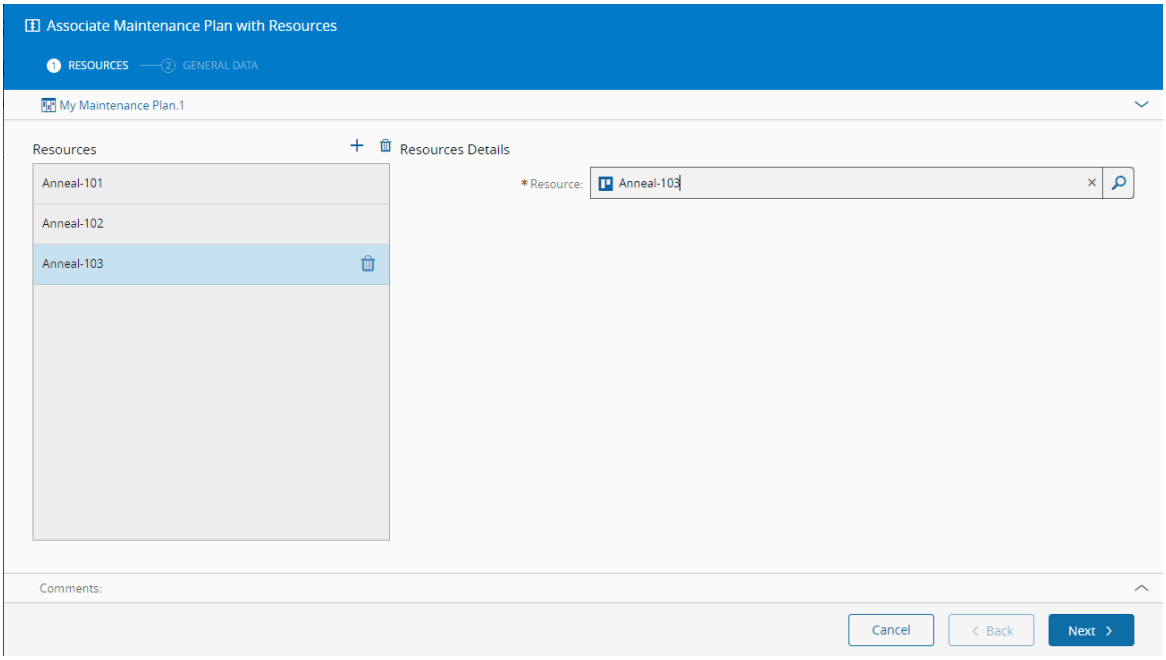


Info

When setting a new version of a Maintenance Plan effective, Maintenance Activity Orders that are either *In Progress* or *Waiting for Acceptance* are not modified.

Create a Maintenance Plan Instance

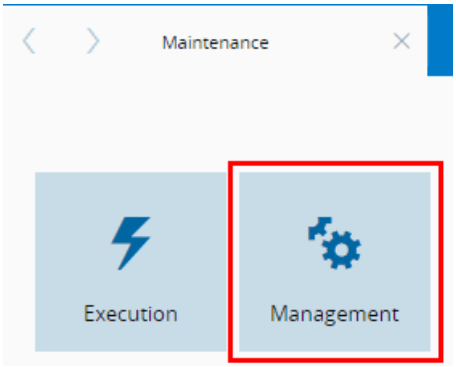
As described earlier, a Maintenance Plan can be assigned to one or more Resources, Areas, Containers and Materials. Each Resource, Area, Container or Material can also have multiple Maintenance Plan Instances. When a Maintenance Plan is assigned, a Maintenance Plan Instance is created. The Maintenance Plan Instance defines the Owner role and optionally a distribution list. If the distribution list is not defined, the system will use the distribution list associated with that Role if one is defined, and if one is not defined, it will construct a distribution list based on the individual users that are part of that Role.



> **Info**
>
> When a Maintenance Plan Instance is created, all planned (preventive) maintenance activity orders are scheduled automatically by the system.

Managing Maintenance Activity Orders

For persons that belong to the Maintenance Plan Instance owner role, they will be able to visualize the Maintenance Activity Orders that they can manage by accessing the **Maintenance > Management** page as shown below:



Accessing the Maintenance Activity Orders management page, the user has access to transactions described in the table below:

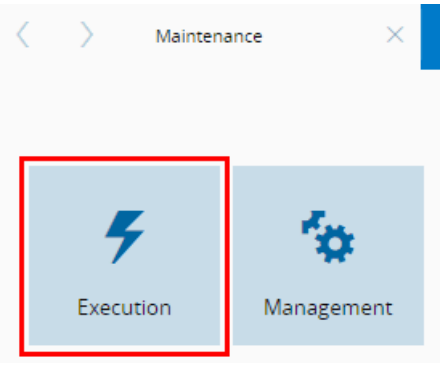
Transaction	Description
Accept Maintenance Activity Order	In case a Maintenance Activity Order has been configured for *Manual Acceptance*, this transaction is used to release it explicitly. A special version of this transaction called Special Accept Maintenance Activity Order exists. The transaction is the same, but it can be called by persons that do not belong to the Maintenance Plan Instance Owner Role.
Add Note to Maintenance Activity Order	This transaction is used to add a note to a Maintenance Activity Order.
Approve Maintenance Activity Order	In case a Maintenance Activity Order has been configured for *Manual Approval*, this transaction is used to approve it explicitly.
Cancel Maintenance Activity Order	This transaction is used to cancel a Maintenance Activity Order explicitly.
Edit Maintenance Activity Order	This general edit transaction, is used to modify the following properties: - Execution Owner Role or Employee - Duration - Schedule Date This transaction can also be used to append a note.
Join Maintenance Activity Orders	In case a Maintenance Activity Order can contain other Maintenance Activity Orders, this transaction is used to manually join them.

Transaction	Description
Reject Maintenance Activity Order	In case a Maintenance Activity Order has been configured for *Manual Approval*, this transaction is used to reject it.
Release Maintenance Activity Order	In case a Maintenance Activity Order has been configured for *Manual Release*, this transaction is used to release it explicitly.
Request Maintenance Activity Order	This transaction allows the user to request an ad-hoc maintenance activity. ℹ If a Request Role is defined for the Maintenance Activity, the user can only request it if it belongs to that role.
Rework Maintenance Activity Order	In case a Maintenance Activity Order has been configured for *Manual Acceptance*, this transaction is used to send a Maintenance Activity Order for rework. ℹ A Maintenance Activity Order can be sent for rework multiple times. ℹ A special version of this transaction called Special Rework Maintenance Activity Order exists. The transaction is the same, but it can be called by persons that do not belong to the Maintenance Plan Instance Owner Role.
Separate Maintenance Activity Orders	In case a Maintenance Activity Order contains other Maintenance Activity Orders, this transaction is used to separate them.
Skip Maintenance Activity Order	In case a Maintenance Activity Order is not *In Progress* or *Waiting for Acceptance*, this transaction is used to skip it.
Update Maintenance Activity Order Schedule / Counters	This transaction is used to update the scheduled dates and/or usage counters. ℹ A special version of this transaction called Special Update Maintenance Activity Order Schedule / Counters. The transaction is the same but it can be called by persons that do not belong to the Maintenance Plan Instance Owner Role.

Table: Maintenance Activity Order management transactions

Executing Maintenance Activity Orders

For persons that belong to the Maintenance Activity Order owner role or have been assigned to a particular Maintenance Activity Order, they will be able to visualize the Maintenance Activity Orders that they can perform by accessing the **Maintenance > Execution** page as shown in the figure below:



Accessing the Maintenance Activity Orders management page, the user has access to transactions described in the table below.

> **Info**
>
> The user must have an Employee object associated with his/her user in order to able to perform most of the Maintenance Management transactions.

Transaction	Description
Add Note to Maintenance Activity Order	This transaction is used to add a note to a Maintenance Activity Order.
Begin Maintenance Activity Order	In case a Maintenance Activity Order *Begin and Complete Mode* is set to *Manual Begin and Complete,* this transaction is used to begin work on a Maintenance Activity Order.
Check-In at a Maintenance Activity Order	Depending on the Personnel configuration for the Maintenance Activity Order, the user may have the option to Check-In manually. ℹ A special version of this transaction called Special Check-In at Maintenance Activity Order. The transaction is the same, but it can it be called to check-in other Employees.
Check-Out from a Maintenance Activity Order	Depending on the Personnel configuration for the Maintenance Activity Order, the user may have the option to Check-Out manually. ℹ A special version of this transaction called Special Check-Out at Maintenance Activity Order. The transaction is the same, but it can it be called to check-out other Employees.
Complete Maintenance Activity Order	In case a Maintenance Activity Order *Begin and Complete Mode* is set to *Manual Begin and Complete,* this transaction is used to mark the work on a Maintenance Activity Order as complete.
Edit Maintenance Activity Order	This general edit transaction, is used to modify the following properties: - Duration - Schedule Date This transaction can also be used to append a note.
Perform Maintenance Activity Order	This transaction is used to carry out work on a Maintenance Activity Order. A Maintenance Activity Order has up to four sections: - Checklist - Parts - Data Collection - Personnel ℹ A Maintenance Activity Order is a long running transaction. It can be stopped and resumed multiple times.
Request Maintenance Activity Order	This transaction allows the user to request an ad-hoc maintenance activity. ℹ If a Request Role is defined for the Maintenance Activity, the user can only request it if it belongs to that role.

Table: Maintenance Activity Order execution transactions

Legal Information

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