



# Line Verification

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## DOCUMENT ACCESS

Public

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# Line Verification

The Line Verification feature addresses the need for systematic verification activities while a **Material** is being processed. These verifications are particularly relevant in high-sensitivity production environments, where any changes in conditions, such as operator shifts, can impact product quality.

## Info

- Maintenance Management is a separately licensed module required to access this feature.
- This feature is part one of a two-part process that pairs seamlessly with the Setup and Line Clearance feature. Check out the [Setup and Line Clearance](#) tutorial.

## Overview

In this tutorial, we will explore expand the following sections:

- Feature Overview – explaining how Line Verification works
- Scenario – presenting a simplified example to understand the logic
- Configuration – showing a step-by-step guide to trigger verifications on in-process **Materials**, after shift breaks and shift changes
- Execution – triggering in-process **Material** verification using the feature
- Final Notes – pointing out some additional insights and considerations

## Feature Overview

This feature is event-based and is triggered after a **Material** is tracked, ensuring that critical verification occurs while the **Material** is in-process.

The feature is implemented within the Maintenance Management module and is driven by a **Maintenance Plan** assigned dynamically through a context resolution of the Smart Table `MaterialInProcessVerificationContext`, creating a **Maintenance Plan** Instance when a **Material** is tracked in. This plan outlines the specific verification activities required for each **Material** during processing. In this tutorial, we will explore the time based activities, triggered on shift change events.

Once a **Material** is tracked in, a **Maintenance Plan** Instance is created and remains active throughout the time the **Material** is in-process, until it is tracked out. During this window, there is the need to execute verification activities, such as inspecting equipment, recalibrating scales, and checking environmental conditions (for example, temperature or humidity).

## Scenario

To assess how this industry and production requirement is addressed by Critical Manufacturing MES, let's consider a simplified model:

- **Shift Definition:** 6 shifts covering 24 hours.
- **Facility:** General Facility
- **Area:** Area 1
- **Flow and Step:** General Flow with Step 1

- **Products:** Product A
- **Resources:** Resource 1
- **Service:** Service A, required by Step 1 and Provided by Resource 1
- Role

Suppose that the process at Step 1 requires the operator with the Process Verification Role to monitor the temperature and humidity of the environment whenever a **Material** is in-process, at two specific moments: when the next shift employees return from their mid-shift break, and after a shift change. There is a scheduled and automatically triggered verification requested for the material that was left in-process.

Additionally, during shift changes, the new operators are required to:

- Confirm that all necessary durables are in the correct position
- Acknowledge the materials that are currently in line for processing at Step 1.

## Configuration

Basic entities like **Facility**, **Area**, **Services**, **Products**, **Parameters**, **Resources** and **Roles** won't be detailed.

### Useful Documentation



There are some entities whose configurations require closer attention:

- **Calendar** and **Shift Definition**
- **Step**
- **Data Collection** and **Checklist**
- **Maintenance Plan**

### Calendar and Shift Definition

This scenario assumes the existence of a **Calendar** with a **Shift Definition** that includes six shifts, covering the full 24-hour day.

Keep in mind the correct sequence when setting this up:

- First, create the Calendar.
- Then, define the Shift Definition.
- Finally, associate the Shift Definition with the Calendar.

The following images display the general configuration settings of the **Calendar** and **Shift Definition**:



Standard Calendar (Active)

DETAILS

General Actions

Information

Name: Standard Calendar  
Description: Standard Calendar  
Universal State: Active  
Data Group:

Time Zone: (UTC+00:00) Dublin, Edinburgh, Lisbon, London  
Clock-In Early Start (Minutes): 0  
Enterprise Wide Reporting: No  
Dimension:  
Fiscal Start Day: 1  
Fiscal Start Month: January  
Week Start Day: Monday  
Day Start Time: 02:00 AM - Current Day

WEEK DEFINITION

Week Days (7)

DAY	SHIFT DEFINITION	COST OVERTIME FACTOR
Monday	Standard Shift	1
Tuesday	Standard Shift	1
Wednesday	Standard Shift	1
Thursday	Standard Shift	1
Friday	Standard Shift	1
Saturday	Non-Working Day	
Sunday	Non-Working Day	

## Shift Definition

Standard Shift (Active)

DETAILS

General Actions

Information

Name: Standard Shift  
Description: Standard Shift  
Universal State: Active  
Data Group:

Shift Definition

Calendar: Standard Calendar  
Start Time: 02:00 AM

SHIFTS

Shifts (6)

NAME	START TIME	END TIME	COST OVERTIME FACTOR	TEAM PATTERN	CODE AND COLORS
Shift 1	02:00	06:00	1		1>
Shift 2	06:00	10:00	1		1>
Shift 3	10:00	14:00	1		1>
Shift 4	14:00	18:00	1		1>
Shift 5	18:00	22:00	1		1>
Shift 6	22:00	02:00	1		1>

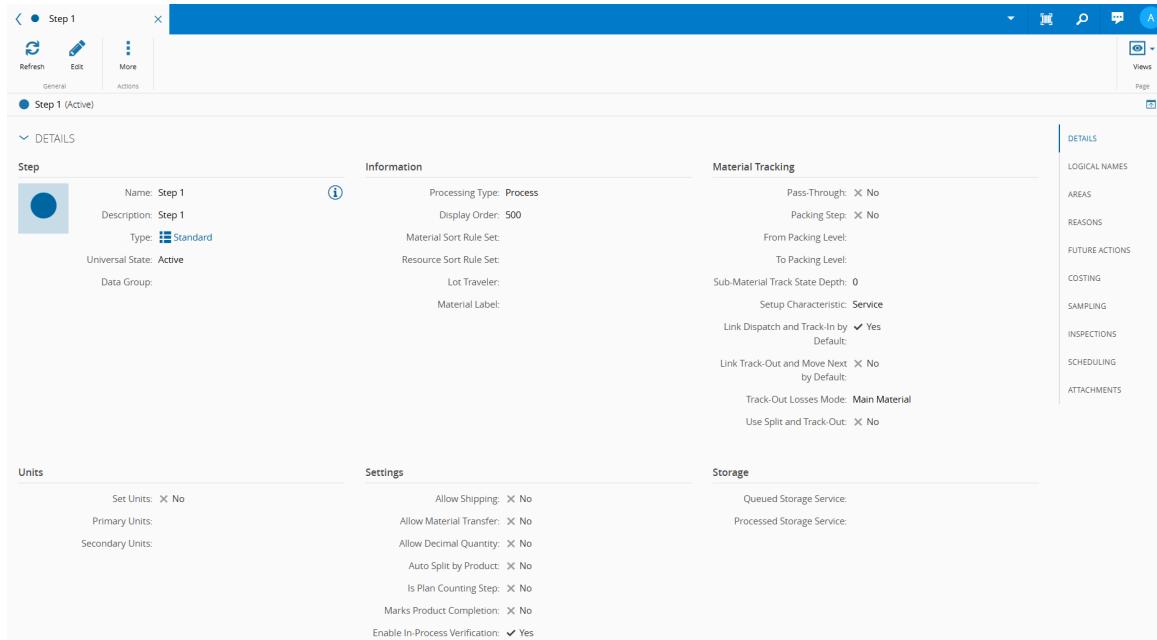
### Useful Documentation

- [Create Calendar](#)
- [How to: Create a Calendar](#)
- [Create Shift Definition](#)
- [How to: Create a Shift Definition](#)

## Step

For a **Step** to support in-process verification, the property `Enable In-Process Verification` must be set to true under the **Settings** section in the details of the **Step**.

The following images display the general configuration of the **Step**.



### Useful Documentation

- [Create Step](#)
- [How to: Create a Step](#)

## Data Collection and Checklist

The Data Collection consists of gathering a sample and recording two key **Parameters**: Temperature and Humidity.

The following image displays the general configuration of the **Data Collection**.

The **Checklist** is scoped under Maintenance Management and incorporates the **Data Collection**. Since the requirements differ for each scenario, there are two distinct **Checklists**.

The Shift Break **Checklist** includes two items, each corresponding to the collection of one **Parameter**: temperature and humidity.

The following images display the configuration of the Shift Break **Checklist**.

### Shift Break

### Item 1 - General Data

### Item 1 - Data Collection

## Item 2 - General Data

## Item 2 - Data Collection

The Shift Change **Checklist** contains four items:

- The first two are the same as in the shift break case, capturing Temperature and Humidity data.
- The remaining two require the operator to verify:
  - That Durables are in the correct position.
  - The status and acknowledgment of Work In Progress materials queued at the step.

The following images display the configuration of the Shift Change **Checklist**.

### Shift Change



Shift Change Verification Checklist ...

New Refresh Edit Lock Preview More

General Actions

Shift Change Verification Checklist [A.1] A (Default) 1 (Effective)

DETAILS

Checklist

Name: Shift Change Verification Checklist

Description:

Type: Standard

Universal State: Effective

Information

Scope: MaintenanceManagement

Execution Mode: Long Running

BOM:

Data Collection: Verification Data Collection [A]

Data Collection Limit Set:

Documentation URL:

Define Standard Times: X No

Track Execution Times: X No

DETAILS

INSTANCES

ATTACHMENTS

## Item 1 - General Data

Shift Change Verification Checklist ...

New Refresh Lock Preview More

General Actions

Shift Change Verification Checklist [A.1] A (Default) 1 (Effective)

Checklist Items (4)

Temperature Verification	No Instructions	IF *
Humidity Verification	No Instructions	IF *
Check durables position	No Instructions	IF *
Check incoming WIP	No Instructions	IF *

GENERAL DATA

Name: Temperature Verification

Type:

Documentation URL:

Activity Type: Manual Task

Tracking Type: End

Optional: X No

Floating: X No

Execute Out of Order: X No

## Item 1 - Data Collection

Shift Change Verification Checklist ...

New Refresh Lock Preview More

General Actions

Shift Change Verification Checklist [A.1] A (Default) 1 (Effective)

Checklist Items (4)

Temperature Verification	No Instructions	IF *
Humidity Verification	No Instructions	IF *
Check durables position	No Instructions	IF *
Check incoming WIP	No Instructions	IF *

GENERAL DATA

DATA COLLECTION

CONDITION

Data Collection Parameters (1)

PARAMETERS	FROM SAMPLE	TO SAMPLE
Temperature V	1	1

## Item 2 - General Data

Checklist Items (4)

Temperature Verification	IF *
No Instructions	
Humidity Verification	IF *
No Instructions	
Check durables position	IF *
No Instructions	
Check incoming WIP	IF *
No Instructions	

GENERAL DATA

Name: Humidity Verification
Type:
Documentation URL:
Activity Type: Manual Task
Tracking Type: End
Optional: X No
Floating: X No
Execute Out of Order: X No

## Item 2 - Data Collection

Checklist Items (4)

Temperature Verification	IF *
No Instructions	
Humidity Verification	IF *
No Instructions	
Check durables position	IF *
No Instructions	
Check incoming WIP	IF *
No Instructions	

GENERAL DATA

PARAMETERS	FROM SAMPLE	TO SAMPLE
Humidity V	1	1

DATA COLLECTION

## Item 3 - General Data

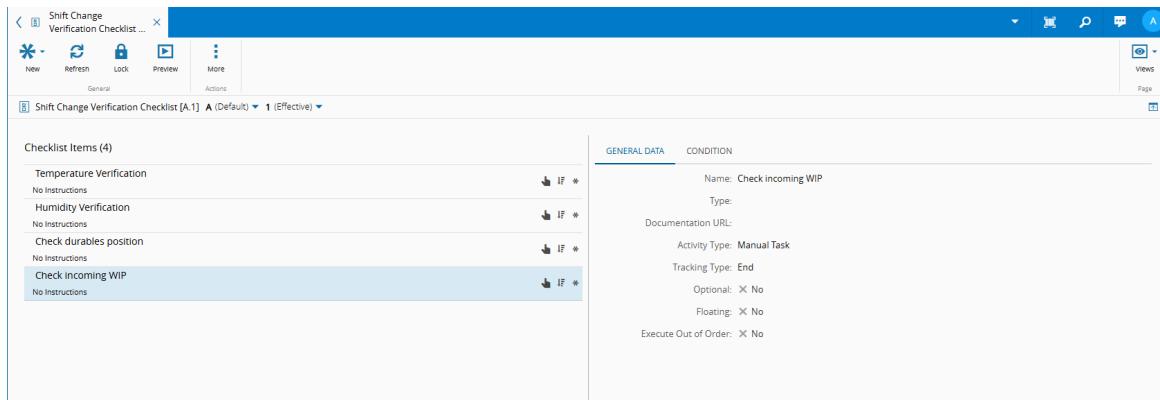
Checklist Items (4)

Temperature Verification	IF *
No Instructions	
Humidity Verification	IF *
No Instructions	
Check durables position	IF *
No Instructions	
Check incoming WIP	IF *
No Instructions	

GENERAL DATA

Name: Check durables position
Type:
Documentation URL:
Activity Type: Manual Task
Tracking Type: End
Optional: X No
Floating: X No
Execute Out of Order: X No

## Item 4 - General Data



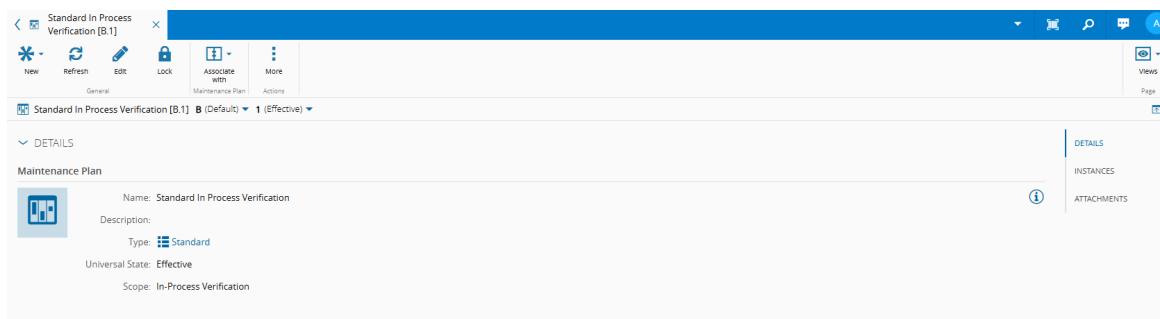
### Useful Documentation

- [Create Data Collection](#)
- [How to: Create a Data Collection](#)
- [Create Checklist](#)
- [How to: Create a Checklist](#)

## Maintenance Plan

For this scenario, we will define a single **Maintenance Plan** of scope In-Process Verification. The associated maintenance activities must use a time based schedule type, allowing us to leverage the "On Shift Change" time due scale to implement the intended logic.

The following image displays the configuration of the **Maintenance Plan**.



## Maintenance Activities Overview:

Maintenance Activity Order	Trigger	Duration	Due Window	Tolerance	Activity

Maintenance Activity Order	Trigger	Duration	Due Window	Tolerance	Activity
Shift Break Verification	Halfway through the shift (offset of 50%)	3 minutes (0.05 hours)	Must be completed 15 minutes (0.25 hours) after the mid-shift break	Cannot be performed before the halfway point of the shift, but can be completed anytime within the 15-minute window	Perform Shift Break Checklist and Data Collection
Shift Change Verification	When the shift changes	6 minutes (0.1 hours)	Must be completed 15 minutes (0.25 hours) after the shift change	Early or late completion allowed within a 15-minute window	Perform Shift Change Checklist and Data Collection

The following image displays the configuration of the Shift Break Verification maintenance activity.

### General

Standard In Process Verification [B.1]

Activities (2)

Shift Break Verification	No Description
Shift Change Verification	No Description

GENERAL DATA

Name: Shift Break Verification  
Description:  
Type: Standard  
Schedule Type: Time Based  
Expected Duration (Hours): 0.05  
Execution Role: Process Verification  
Request Approval Mode: Auto Approval  
Maintenance Type: In-Process Verification  
Material Type Restriction: Allow All Mode  
Order Release Mode: Auto Release  
Acceptance Mode: Manual Acceptance  
Ignore in Scheduling: Yes  
Auto Disable After Late Due: Yes

### Schedule

Standard In Process Verification [D.3]

Activities (2)

Shift Break Verification	No Description
Shift Change Verification	No Description

SCHEDULE

Time Based Scheduling

Time Due: On Shift Change  
Offset Type: Duration  
Duration (%): 50  
Time Early Due (Hours): 0  
Time Late Due (Hours): 0.25

### Execution



Standard In Process Verification [B.1] B (Default) 1 (Effective)

Activities (2)

Shift Break Verification  
No Description

Shift Change Verification  
No Description

GENERAL DATA SCHEDULE EXECUTION PARTS PERSONNEL DOCUMENTS RULES CONTAINS

Begin and Complete Mode: Manual Begin And Complete

Checklist: Shift Break Verification Checklist [A]

Data Collection: Verification Data Collection [A]

Data Collection Limit Set:

Perform

Rework

CHARTS (0)

CHART DISPLAY MODE

No data to show.

Page 1 of 1 (0 Records)

Rows per Page: 10

The following image displays the configuration of the Shift Change Verification maintenance activity.

### General

Standard In Process Verification [D.3] D (Default) 3 (Effective)

Activities (2)

Shift Break Verification  
No Description

Shift Change Verification  
No Description

GENERAL DATA SCHEDULE EXECUTION PARTS PERSONNEL DOCUMENTS RULES CONTAINS

Name: Shift Change Verification

Description:

Type: Standard

Schedule Type: Time Based

Expected Duration (Hours): 0.1

Execution Role: Process Verification

Request Approval Mode: Auto Approval

Maintenance Type: In-Process Verification

Material Type Restriction: Allow All

Order Release Mode: Auto Release

Acceptance Mode: Manual Acceptance

Ignore In Scheduling: Yes

Auto Disable After Late Due: Yes

### Schedule

Standard In Process Verification [B.1] B (Default) 1 (Effective)

Activities (2)

Shift Break Verification  
No Description

Shift Change Verification  
No Description

GENERAL DATA SCHEDULE EXECUTION PARTS PERSONNEL DOCUMENTS RULES CONTAINS

Time Based Scheduling

Time Due: On Shift Change

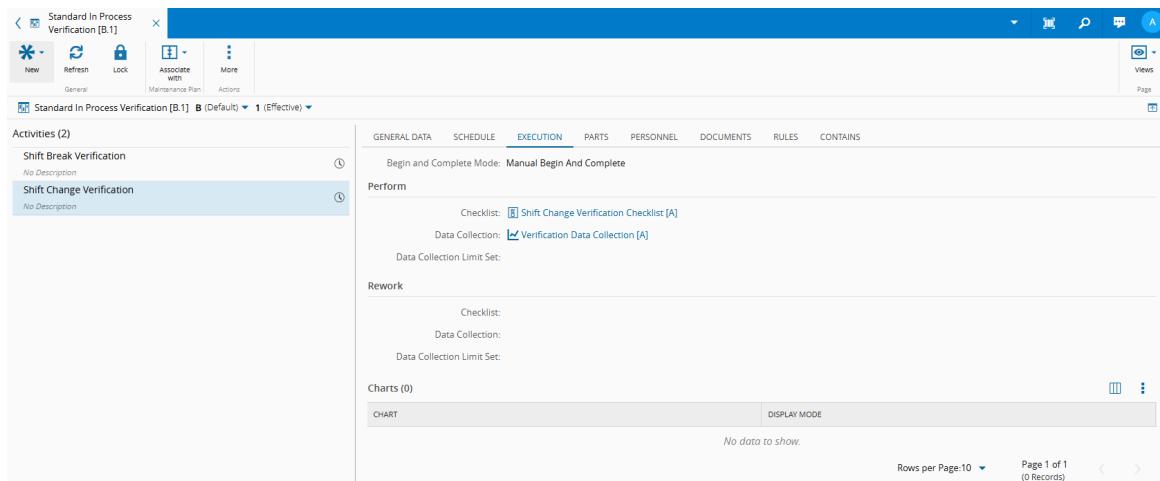
Offset Type: Hours

Hours: 0.25

Time Early Due (Hours): 0.25

Time Late Due (Hours): 0.25

### Execution



To connect all elements of the configuration, the system uses the Smart Table [MaterialInProcessVerificationContext](#). In this table, it is defined:

- The **Step** (which must have In-Process Verification enabled)
- Optional context variables to refine applicability
- The corresponding **Maintenance Plan** to be triggered when the **Material** is tracked-in at that **Step**

The following table displays the Smart Table configuration.

Step	Maintenance Plan	Owner Role
Step 1	Standard In Process Verification	Process Verification

#### Useful Documentation

- [How to: Assign Roles to a User](#)
- [How to: Add Value to Smart Table for assigning a Maintenance Plan to a Step on the MaterialInProcessVerificationContext Smart Table](#)
- [Create Maintenance Plan](#)

This is the [Master Data file](#) used to create this model.

## Execution

After all configurations are completed, the operation that sets everything in motion is the Track-In of a **Material** at a **Step** where in-process verification is enabled.

Once the **Material** is tracked in, navigating to the Material Maintenance View will display its Maintenance Plan Instances, as illustrated in the image below.

### Shift Change



Material P1.3

General Transaction Material Exceptions Data Collection Printing Documents Maintenance Actions

Refresh Edit View Reports Reports Track-Out Abort Change Merge Split Hold Record Loss/Bonus Process Open Instance Exceptions Data Collection Printing Documents Change Begin Skip Update Schedule... More

Views Page

Material P1.3 (Active)

2025 < JULY > Mon Tue Wed Thu Fri Sat

DISPLAY: NAME TYPE: ALL Pending Terminated

Activities

USAGE BASED (0)  
No usage based activities

AD-HOC (0)  
No ad-hoc activities

Day	1	2	3	4	5
Sun	29	30	1	2	3
Mon	6	7	8	9	10
Tue	13	14	15	16	17
Wed	20	21	22	23	24
Thu	27	28	29	30	31
Fri	3	4	5	6	7
Sat	10	11	12	13	14

6:15p 09/07-Shift Change ... 8p 09/07-Shift Break Verif...

Activity: Shift Change Verification

Name: 09/07-Shift Change Verification.0004

Owner Role: Process Verification

Execution Role: Process Verification

Schedule Type: TimeBased

Schedule Date: 07/09/2025 06:15 PM

Schedule State: BeforeEarlyDue

Duration: 6m

Start Date: 07/09/2025 06:15 PM

Execution State: Released

End Date: 07/09/2025 06:30 PM

Material: Material P1.3

Maintenance Type: InProcessVerification

Due: 07/09/2025 06:15 PM

Late Due: 07/09/2025 06:30 PM

## Shift Break

Material P1.3

General Transaction Material Exceptions Data Collection Printing Documents Maintenance Actions

Refresh Edit View Reports Reports Track-Out Abort Change Merge Split Hold Record Loss/Bonus Process Open Instance Exceptions Data Collection Printing Documents Change Begin Skip Update Schedule... More

Views Page

Material P1.3 (Active)

2025 < JULY > Mon Tue Wed Thu Fri Sat

DISPLAY: NAME TYPE: ALL Pending Terminated

Activities

USAGE BASED (0)  
No usage based activities

AD-HOC (0)  
No ad-hoc activities

Day	1	2	3	4	5
Sun	29	30	1	2	3
Mon	6	7	8	9	10
Tue	13	14	15	16	17
Wed	20	21	22	23	24
Thu	27	28	29	30	31
Fri	3	4	5	6	7
Sat	10	11	12	13	14

6:15p 09/07-Shift Change ... 8p 09/07-Shift Break Verif...

Activity: Shift Break Verification

Name: 09/07-Shift Break Verification.0004

Owner Role: Process Verification

Execution Role: Process Verification

Schedule Type: TimeBased

Schedule Date: 07/09/2025 08:00 PM

Schedule State: BeforeEarlyDue

Duration: 3m

Start Date: 07/09/2025 08:00 PM

Execution State: Released

End Date: 07/09/2025 08:00 PM

Material: Material P1.3

Maintenance Type: InProcessVerification

Due: 07/09/2025 08:00 PM

Late Due: 07/09/2025 08:15 PM

In the example, the **Material** was tracked in at 04:55 PM.

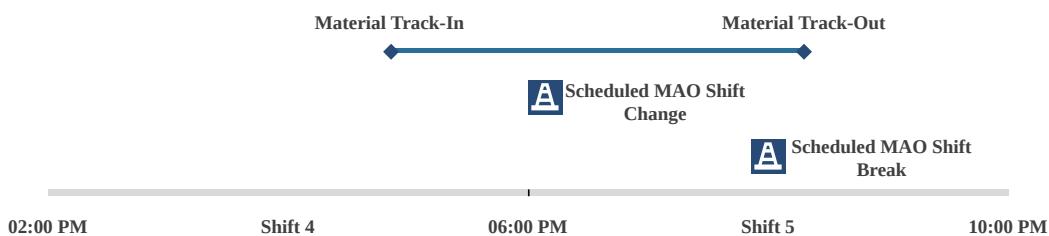
The next shift begins at 06:00 PM, so two Maintenance Activity Orders are created:

- One with a due date at 06:15 PM PM, for the Shift Change Verification
- Another with a due date at 08:00 PM, for the Shift Break Verification

If the due time arrives and the **Material** is still in process, the verification must be performed.

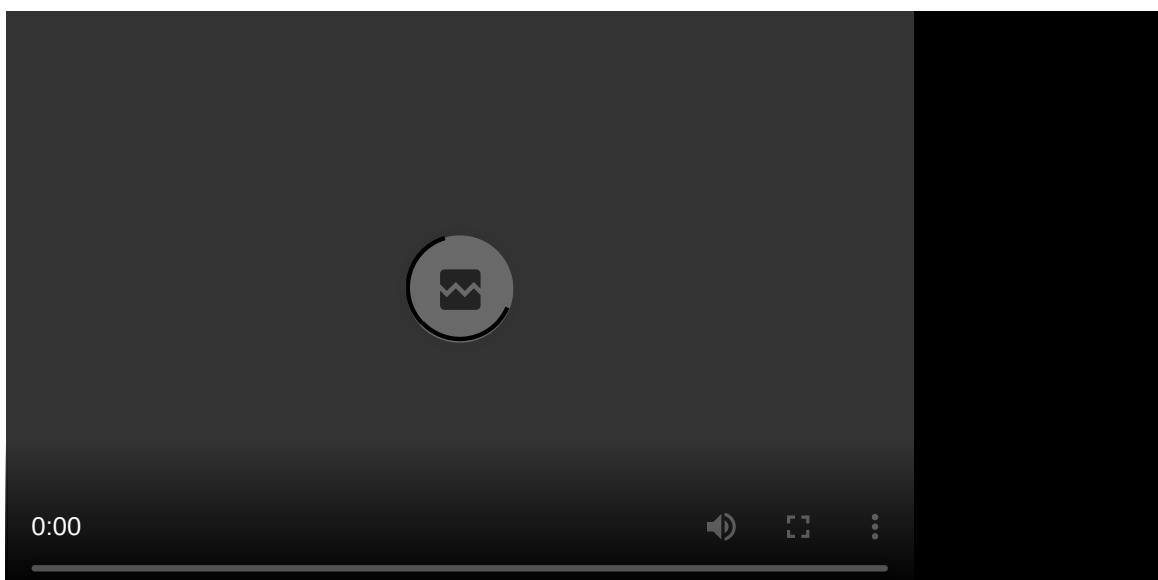
If a user attempts to Track-Out the **Material** without completing the required verification, the system will notify them about the pending In-Process Verification Maintenance Plan Instance.

Refer to the diagram below for a clear, visual timeline of these events.



The operations required to carry out these verifications follow the standard Maintenance Activity Order flow: Begin, Perform, and Complete.

The video below illustrates the execution of this scenario.





#### Useful Documentation

- For a more in-depth understanding of this module, please refer to the [[tutorials-maintenancemanagement]] tutorial.

#### Note

- The Material Traceability View includes a dedicated section to accommodate In-Process Verifications.
- The **Material** In-Process Verification Maintenance Plan Instance the reference to the associated instance.

## Final Considerations

Keep in mind the following behaviors and consequences related to the In-Process Verification Maintenance Plan Instance:

- Terminate / Abort **Material** - Terminates the instance and clears the associated property
- Split / Expand **Material** - Resets the instance in the resulting child materials
- Merge **Material** - Merge is blocked if any of the Materials involved have an active instance
- Track-In **Material** - Creates a new Maintenance Plan Instance based on the resolved **Maintenance Plan** from the In-Process Verification context of the **Material**; sets the In Process Verification Maintenance Plan Instance accordingly
- Track-Out **Material** - Validates the Maintenance Activity Orders associated with the instance; if validation passes, terminates the instance and clears the property



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