Infor LN Service User Guide for Work Order Control (RMA & Depot Repair)

Important Notices

Trademark Acknowledgements

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About this document

This guide provides information about the various concepts and processes such as work order control, subcontracting and material allocation, available in Work Order Control.

Objectives

This document is a User's Guide that is designed to meet the following objectives:

Understand the following concepts

- Work order control
- Subcontracting
- Material allocations, delivery types, and work order (activity) status
- Disassembly/assembly process

To perform the following tasks

- To create a work order
- To process a work order
- To close a work order
- To handle subassembly
- To use reference activities

In this document, you are assumed to already have an understanding of LN Service.

Document summary

This User's Guide describes the various concepts and processes available in the Work Order Control module.

How to read this document

This document is assembled from Online Help topics. As a result, references to other sections in the manual are presented as shown in the following example:

For details, refer to the LN Service Online Help.

To locate a section referenced in this document, refer to the table of contents.

Underlined terms indicate a link to a glossary definition. If you view this document online, you click on underlined text to jump to the glossary definition at the end of this document.

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Chapter 1
Introduction

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This chapter provides a brief introduction of the Work Order Control functionality available in the RMA & Depot Repair module.

Work Order Control (WCS)

In the Work Control System module, the work order preparation, planning, and execution in a maintenance shop or repair shop is handled.

Work Control System for internal maintenance and for maintenance on customer owned parts. For maintenance on customer owned parts, Work Control System is fully integrated with the Maintenance Sales Control module.

In addition, Work Control System is related to the following LN packages and modules:

- People for labor resources, hours registration, and to transfer all labor hours to maintenance sales order coverage lines.
- Purchase Control Purchasing to create a purchase order for required materials or items.
- Tools Requirement Planning Tooling to allocate tool requirements to a work order or a work order activity.
- Warehousing to create a warehousing order, for transactions on economic stock or to increase or decrease the actual stock, to create inventory commitment, and to check economic stock.
- General Ledger to book WIP costs in Financials.
- Maintenance Sales Control to transfer the costs incurred during repair on the work order.
- Activity Management to select and create reference activities. To create work order activities, you can select routing options.

Chapter 2
Work Order Control Concepts

2

This chapter provides a brief description of the concepts available in work orders.

Subcontracting - Work Order

A single company may not deliver the entire range of services. In which case, the company may subcontract the entire service of a product to a subcontractor.

In LN, you can enter into a subcontracting agreement with the supplier to carry out the required services as specified in the work order.

You must define a **Cost** or **Service** item and a **Subcontractor** on the work order to identify that the work order is subcontracted.

When you release the work order a purchase order is generated for the subcontractor. A subcontracting cost line is created in the Work Order Other Resources (tswcs4130m000) session with the cost type set to **Subcontracting** to register the cost and sales related to the subcontracted work.

When the purchase order generated is received, it indicates the delivery of the required services.

Note

You must subcontract the entire work order.

Material allocations, delivery types, and work order (activity) status

The work order material resource lines are created when the work order or work order activity can have the following status:

- **Free**
- **Planned**

- **Released**
- **Completed**

For the **To Warehouse** delivery type, an available-to-promise check is carried out during the **Planned** status of the work order or the work order activity. If commitment is required during the planning phase, a warehouse order is created after the work order is planned, and the material resources are then allocated. If commitment is required if the work order status is **Released**, the warehousing procedure starts after the work order or the work order activity is released.

For the **Via Purchase** delivery type, a purchase order is created when the work order status or the work order activity status is **Planned**. If you release the work order or the work order activity, the warehousing procedure is started to issue the materials.

For the following delivery types, the materials are allocated manually to the work order or to the work order activity after the work order or work order activity is released:

- **From Service Inventory**
- **From Kit**
- **To Warehouse**

Processing Subassembly

When a work order receives an item, that requires maintenance, the item is disassembled into various components and you can decide upon a follow-up action for each disassembled component. These disassembled components are called subassemblies.

Business Example

A car is received from a customer on a maintenance sales order and a work order is created for the same. The engine, gearbox, wheels and the tyres are disassembled.

Action Outgoing Subassembly:

An outgoing subassembly can be linked to a work order activity or to a work order directly and can be registered manually. For each disassembled component, an outgoing subassembly is created in the Work Order Outgoing Subassemblies (tswcs4150m000) session. You can specify the action that must be performed on each subassembly.

Note

For more information, refer to Actions Performed on Outgoing Subassemblies.

With reference to the business example, the following outgoing subassemblies are registered. You can process these subassemblies using the **Process** option in the Work Order Outgoing Subassemblies (tswcs4150m000) session:

- The Wheels: Outgoing subassembly is created with the **Action Outgoing Subassembly** field set to **To Location**. The subassembly is transferred to the **Location** selected manually. The subassembly is received from this location by the **Assembly Activity**.
- The Gearbox: Outgoing subassembly is created with the **Action Outgoing Subassembly** field set to **To Warehouse**. The subassembly is transferred to the **Warehouse** selected manually. The subassembly is received from this warehouse by the **Assembly Activity**. When processed, a warehouse order is created to handle the inbound.

Note

The subassembly is stored as company owned inventory or customer owned inventory. In case of company owned, the ownership is changed from customer to the service organization.

If the subassembly is stored as company owned inventory and is replaced by a new part from inventory, a material resource line is created in the Work Order Material Resources (tswcs4110m000) session.

- The Tyres: Outgoing subassembly is created with the **Action Outgoing Subassembly** field set to **To Scrap**. The subassembly is scrapped. If the subassembly is replaced by a new part from inventory, a material resource line is created in the Work Order Material Resources (tswcs4110m000) session. The new part can be owned by the customer or by the service organization. When processed, the ownership, actual location, and status data is modified in the Physical Breakdowns (tscfg2110m000) and Serialized Items (tscfg2100m000) sessions.
- The Engine: Outgoing subassembly is created with the **Action Outgoing Subassembly** field set to **To Location for Work**. The subassembly is transferred to the **Location** selected manually and a related work order is generated that is used for further repair work on the subassembly. The relation between the initiating work order and the related work order is saved in the Related Orders (tsmdm4500m000) session. The engine is repaired at the location and the actual costs for material, labor and other costs are booked on the related work order.

Action Incoming Subassembly:

LN generates the incoming subassembly based on the **Action Incoming Subassembly** specified in the Work Order Outgoing Subassemblies (tswcs4150m000) session. You can view the incoming subassemblies in the Work Order Incoming Subassemblies (tswcs4151m000) satellite session in the Work Order (tswcs2100m100) session.

Note

For more information, refer to Actions Performed on Incoming Subassemblies.

With reference to the business example, following incoming subassemblies are registered, when the outgoing subassemblies are processed. You can process these subassemblies using the **Process** option in the Work Order Incoming Subassemblies (tswcs4151m000) session.

- The Wheels: Incoming subassembly is created with the **Action Incoming Subassembly** field set to **From Location**. The **Assembly Activity** receives the subassembly from the **Location**. The **Received on Shop Floor** check box is selected in the Work Order Incoming Subassemblies (tswcs4151m000) session, if the subassembly is received on shop floor.
- The Gearbox: Incoming subassembly is created with the **Action Incoming Subassembly** field set to **From Warehouse**. The **Assembly Activity** receives the subassembly from the **Warehouse**. A warehouse order is created when incoming subassembly is created. You must select the **Received on Shop Floor** check box in the Work Order Incoming Subassemblies (tswcs4151m000) session, if the shipment for the subassembly is received on shop floor.
- The Tyres: The subassembly is scrapped and a replacement part is procured from the warehouse. A material resource line is created in the Work Order Material Resources (tswcs4110m000) session.
- The Engine: Incoming subassembly is created with the **Action Incoming Subassembly** field set to **From Location for Work**. The incoming subassembly is processed only after the related work order is **Completed** and **Signed-Off**.

Alternative Item

Alternative items serve as a substitute for the standard item when the standard item cannot be delivered or is being replaced. If several items can be substituted for a standard item, you can assign a priority code to each alternative item.

You can specify alternative items for the components in an item breakdown under different parent items. You can select the correct alternative item based on the parent item

When you delete an item breakdown relation then the corresponding alternative items are also deleted. When there is a change in the item breakdown then the corresponding item in the alternative items must be updated.

ATP

An item master plan contains ATP (ATP) information. You can use the ATP information to determine the quantity available and to support order acceptance.

You can use the information to :

- Determine the availability of the stock of the spare part.
- Identify warehouse in which it is available

- Determine the date when the spare part can be promised to determine the service execution dates and service delivery dates.

Impact of ATP Date

When an ATP check is performed successfully there is an impact of the ATP date on Earliest Start Time(EST), Planned Start Time(PST) , Planned Finish Time(PFT), Latest Finish Time (LFT) and Planned Delivery Date(PDD).

The below table displays the Earliest Start Time(EST), Planned Start Time(PST) , Planned Finish Time(PFT), Latest Finish Time (LFT) and Planned Delivery Date(PDD), when the ATP check is not performed:

EST	PST	PDD	PFT	LFT
5-Apr-07	7-Apr-07	7-Apr-07	10-Apr-07	11-Apr-07

When the ATP check is performed and in case the ATP Date is greater than the Planned Delivery Date then following is the impact of the ATP date:

- The EST date is reset to the ATP date.
- The LFT date increases by the same number of days as the difference between the EST and the new EST as shown in the table below:

ATP Date	EST	New EST	PST	New PST	PDD	New PDD	PFT	New PFT	LFT	New LFT
8-Apr-07	5-Apr-07	8-Apr-07	7-Apr-07	8- Apr-07	7-Apr-07	8-Apr-07	10-Apr-07	9-Apr-07	11-Apr-07	14-Apr-07

When the ATP check is performed and ATP is greater than PDD and the new EST is greater than PST date then following is the impact :

- The EST date is reset to the ATP date.
- The PST date is reset to the ATP date.
- The PDD also reset to the ATP date.
- The PFT date increases by the same number of days as the difference between the PST and the new PST.

- The LFT date increases by the same number of days as the difference between the EST and the new EST as shown in the table below:

ATP Date	EST	New EST	PST	New PST	PDD	New PDD	PFT	New PFT	LFT	New LFT
8-Apr-07	5-Apr-07	8-Apr-07	7-Apr-07	8- Apr-07	7-Apr-07	8-Apr-07	10-Apr-07	11-Apr-07	11-Apr-07	14-Apr-07

Note

The delivery date on the Maintenance Sales Order line is updated with the ATP date when an ATP check is performed successfully.

Chapter 3
Master Data Setup

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This chapter describes the steps you must follow to set up master data for the Work Order Control module.

Work order control master data

Before you can define or process work orders, you must set up the Work Order Control master data. In addition to company level parameters, you must define details such as work locations and master routing.

The process to create master data for work order control includes the following activities:

- Set up work order control parameters.
- Define work locations.
- Define reference activities for depot repair.
- Define master routing.

To set up master data for work order control

Step 1: Set up work order control parameters

Before you begin to define or use work orders, you must review and set up the related parameters in the Work Order Parameters (tswcs0100m000) session. These parameters affect the way in which LN processes work orders .

Step 2: Define work locations

In the Locations (tswcs0125m000) session, you can define work locations.

Work locations are generic locations or locations specific to your service department. You can use locations to store incoming parts and repaired parts until they are shipped back to the customer. You can receive an item either in the warehouse or in the service department location. When you use a warehouse, a receipt warehouse order is created. If you use a location, no warehouse order is created. You can use the item receipt to identify that the item was received in the specific location.

Step 3: Define reference activities for depot repair

In the Reference Activities (tsacm1101m000) session, you can define reference activities for work orders. The Work Control System module uses reference activity to plan and carry out maintenance on items.

Step 4: Define master routing

In the Master Routings (tsacm1101m100) session, you can define master routings.

You can define generic master routings and master routings that are specific for a service department or an item. You can link master routing options to a master routing to determine the type of service to be carried out while implementing work orders. You can also link master routing operations to a master routing to define a set of reference activities for the master routing.

Use the Operations (tsacm2100m100) session to define operations for the selected master routing. Use the Routing Options (tsacm1101m200) session to define routing options. Next, you can select the defined operations for the routing options in the Routing Matrix (tsacm2800m000) session.

Chapter 4
Work Order Control Procedures

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This chapter describes the Work Order Control procedures.

To create a work order

A work order represents the work carried out on one or more products or component in the repair depots.

Work orders are derived from the following resources:

- Maintenance sales order lines
- Entered directly

The process to create a work order entry consists of the following activities:

- Create a work order
- Create work order activities
- Add material resource lines to the work order or work order activities
- Add other resource lines to the work order or work order activities

To create a work order

To create a work order, take the following steps:

Step 1: Create the work order

Use the Work Orders (tswcs2100m000) session to create or modify work order details.

Work orders are used for planning, execution, and control of all possible activities to maintain items. A work order consists of multiple activities required to perform the maintenance work. You can release a work order without related activities, which is useful if no work preparation can be carried out with the aid of reference activities.

Step 2: Create work order activities

In the Work Order Activities (tswcs2110m000) session, you can maintain work order activities.

An activity is maintenance work that must be performed. For shop maintenance, a work order activity line is an operation to be carried out. You can add activities to a work order during the work order's planning phase, during the work orders preparation phase, and during the execution phase. The work order status must be **Free**, **Planned**, or **Released**. You cannot add activities to subcontracted work orders in **Released** status.

Step 3: Add material resource lines to the work order or work order activities

In the Work Order Material Resources (tswcs4110m000) session, you can define the expected and actual consumption of materials, as well as the disassembled components.

The work order material resource lines are created when the work order or work order activity status is **Free**.

You can add work order material resources to:

- Work orders.
- Work order activities. If you link material resources to a work order activity, the resource requirements that you defined in the Resource Requirements (tsacm2120m000) session, are copied to the Work Control System module.

Step 4: Add other resource lines to the work order or work order activities

In the Work Order Other Resources (tswcs4130m000) session, you can define other resources required for the **Work Order Activity**. Other resources are, for example, tools, subcontracting costs, other costs, and so on.

To process work orders

Orders that are used to plan, carry out, and control all maintenance on items in a maintenance shop or in a repair shop. A work order consists of at least one work order header, and can have a number of activities that must be carried out on a repairable service item.

The items are received in either the locations or warehouses and then the items are issued to the service depot for executing the repairs, you can process the work order to complete the repair.

To process work orders

Take the following steps to process the work orders:

Step 1: Plan the work order

Use the Work Order Planning/Releasing (tswcs3200m000) session to plan or release the work order.

You can plan the work orders if the following conditions are fulfilled:

- The work order is accepted in the work load of a shop or a depot.
- The work order activities for the work order are defined.

Step 2: Release the work order

After you define a work order, the work order status is **Free** or **Planned**. You can release work orders that have the **Free** or the **Planned** status.

Work orders can be released one by one. On the Work Orders (tswcs2100m000) session, select the work order and on the Specific menu, click **Release...**. LN starts the Work Order Planning/Releasing (tswcs3200m000) session.

Step 3: Process the work order hours

Work order tasks are accounted based on the registered and processed hours accounting lines. Employees executing the work order can register the hours spent on the work orders. The work order hours contribute to the labor-related charges to the linked maintenance sales order lines. You can enter or process the hours registered on the work order in the Work Order Hours (bptmm1140m000) session. The hours can be registered and processed when the work order has the following status:

- Released
- Completed.

Step 4: Complete the work order

Work orders can be completed with the completion of all the underlying activities. If no activities are defined for a work order, then the work order can be directly set to **Completed**.

On the Work Orders (tswcs2100m000) session, select the work order and on the Specific menu, click **Complete Order**. LN sets the work order status to **Completed**.

Step 5: Sign Off

Step 6: Close the work order.

To close a work order

Work-order closure is the signing-off and closing of work orders, and copying the finished work orders to history.

The process to close a work order includes the following activities, each of which are described in detail in the following section:

- Sign-off the work order activities.

- Close the work orders.
- Copy closed or cancelled work orders to history.
- Delete closed work orders.

To close a work order

Step 1: Sign-off the work order activities

Sign-off can be critical for the repair of products, where safety is an important concern, such as with ships or aircraft. The sign-off step can ensure a satisfactory completion of the related activities.

To sign-off work order activities, start the Work Order Activities (tswcs2110m000) session, select an activity and, on the Specific menu, click **Sign-Off**. LN changes the work order activity status to **Signed-Off**. You can only sign off work order activities that have the **Released** or the **Completed** status.

Step 2: Close work orders

You can close work orders that have the **Signed-Off** or **Completed** status. If work order activities are not created for the work order, the work orders with the **Completed** status can be set to **Closed**. If work order activities are created for the work order, each activity must be signed off before you can close the work order.

Use the Close Work Orders (tswcs2265m000) session to change the work order status to **Closed**.

Step 3: Copy closed or cancelled work orders to history

The closed or cancelled work orders can be copied to history, which you can use for analytical purposes later. Copying work orders to history does not delete the work orders from the active sessions.

Run the Copy Work Orders to History (tswcs2280m000) session to copy work orders with **Closed** or **Canceled** status to history.

Step 4: Delete closed work orders

After you close work orders, and if required copy the work orders to history, you can then delete the work orders. Because the work orders can exist in a structure with multiple follow-up work orders, you must delete the entire work order structure. You can delete such structures, or individual work orders within the selection range.

In the Delete Work Order Structures (tswcs2202m000) session, you can delete work orders with **Closed** or **Canceled** status.

To use reference activities

In the Activity Management module, you can maintain the definitions of all the work that can be carried out for maintenance reasons. You can create a repository of reference activities that contains various types of static information.

The Work Control System module uses reference activities to plan and carry out maintenance on items.

You can create reference activities for the following:

- All items
- Specific items
- Functional elements. Note that you must select the **Functional Elements Active** check box on the **Control** tab of the General Service Parameters (tsmdm0100m000) session.

Note

Reference activities are the smallest units of work that can be planned and controlled in Service.

Project pegging in depot repair

Overview

In Service, you can implement project pegging in the Depot Repair module. You can peg the service cost to a project, element, and/or an activity.

To peg a project, specify the project, element, and/or activity information for the call, the contract, the maintenance sales quotation, maintenance sales orders or work orders. You must select the **Mandatory Project Peg** check box in the Items - General (tcibd0501m000) session if defining the PCA ID is mandatory to peg the cost of the item to the project.

Initiation of the pegged transaction

The peg is initiated only when a business process is started for transactions that register actual costs. For Example Calls and Maintenance Sales orders.

Project Cost Account is an account where the cost is pegged. Costs are pegged through Project Cost Account ID. You can populate the PCA ID:

- By entering the PCA ID when you create a new call, contract, maintenance sales quotation, maintenance sales order, or an external work order.
- By specifying the PCA ID on the service contract. You can also enter the PCA ID manually.

Propagation of the peg in the depot repair process

The PCA ID is propagated to the resulting transaction (Example, from call to MSO to Work order). You can change the PCA ID until the status of the call / contract / maintenance sales quotation / maintenance sales order / work order changes.

Propagation of the peg to service contract and configuration lines

In Service, the service contract can determine whether the call / contract / maintenance sales quotation / maintenance sales order / work order, linked to the service contract, retrieves the PCA ID from the contract. By default, the configuration lines retrieve the PCA ID from the service contract header. These PCA IDs on the configuration line are propagated to the maintenance sales quotation lines, maintenance sales order part lines, and work orders.

Note

You can define the PCA ID for service contracts that have the status 'Free' or 'Active'.

Propagation of the peg to a call

The PCA ID of the call is retrieved from the service contract header by default, if the call is related to a service contract. You can specify or modify the PCA ID if the call status is ‘Free’. You must specify the reason for the modification.

If the call is solved without being transferred (Example to a maintenance sales order or service order), the call can be invoiced. The costs are booked to the corresponding PCAs. The cost component is used to identify the appropriate project cost type using cost mapping in the Cost Mappings (tcmcs0149m000) session.

Propagation of the peg to the maintenance sales quotations

LN defaults the PCA ID of the quotation header line either from a service call, or a maintenance sales order part line, or a work order. If the PCA ID is not defaulted from these origins, LN defaults the ID from the service contract configuration line if the serialized item is linked to a service contract. You can specify or change the PCA ID, if the maintenance sales quotation status is ‘Free’.

Propagation of the peg to the maintenance sales order

LN defaults the PCA ID of the maintenance sales order from the originating call or maintenance sales quotation. The PCA ID of the order part line is defaulted from a service call or maintenance sales order part line. If the PCA ID is not defaulted from these origins, LN defaults the ID from the service contract configuration line in case the serialized item is linked to a service contract. You can enter or change the PCA ID, if the maintenance sales quotation status is ‘Free’.

Propagation of the peg to the work order for MSO part line

By default, the PCA ID is retrieved from the maintenance sales order. If the installation group or the item is linked to a service contract, the PCA ID is retrieved from the service contract configuration line. If the PCA ID is not defaulted from these origins, LN defaults the ID from the service contract configuration line in case the serialized item is linked to a service contract. You can specify or change the PCA ID, if the maintenance sales quotation status is ‘Free’.

Propagation of the peg to the work order linked /originating from a maintenance sales order

LN defaults the PCA ID of the work order (linked/originating from maintenance sales order) from the service contract configuration line, if the serialized item is linked to a service contract. If the PCA ID is not defaulted from these origins, LN defaults the ID from the service contract configuration line in case the serialized item is linked to a service contracts. You can specify or change the PCA ID, if the maintenance sales quotation status is ‘Free’.

Propagation of the peg to the follow-up work order

By default, the PCA ID is retrieved from the initiating work order. If the installation group or the item is linked to a service contract the PCA ID is retrieved from the service contract configuration line. If the PCA ID is not defaulted from these origins, LN defaults the ID from the service contract configuration line in case the serialized item is linked to a service contract. The user can specify or change the PCA ID, if the work order status is ‘Free’.

Propagation of a material request to LN Warehousing from depot repair

When warehouse orders are generated from Service, in order to request material from a warehouse, the PCA ID is propagated to Warehousing only if the **Inherit Project Peg** check box in the Items - General (tcibd0501m000) session is selected. Warehousing uses the PCA ID for financial bookings to LN Project. Warehousing handles the potential peg transfers:

Example

Service needs materials B and material C to be used in the repair of item A. For item B, LN Service requests inventory with a peg. For item C, Service requests material with a peg, because the cost for B and C have to be reported to the project.

Warehousing checks if there is inventory of item B with the corresponding PCA. In the case of an inventory shortage, Warehousing checks whether transfer rules apply to meet the LN Service request. Warehousing handles the potential peg transfers in the background.

For item C, the process is the same. Service requests the material with a PCA, though there is inventory for item C without a peg.

For Example, a demand transaction for item A has a peg123 that requires material B and C. When the **Inherit Project Peg** check box in the Items - General (tcibd0501m000) session for Material B is set to Yes and for Material C is set to No:

	Inherit Peg	Cost Pegged To	Request to Warehouse
Material B	Yes	P1E10A10	Financially peg costs to: P1E10A10 Inventory from: P1E10A10
Material C	No	P1E10A10	Financially peg costs to: P1E10A10 Inventory from: <empty peg >

Since material C is without a peg in inventory, the costs are not yet pegged to the project. However, since material B is already cost pegged to the project, the cost do not have to be booked again to the project when the actual outbound process is executed.

Propagation of the Peg to generate purchase order

For project pegged items when purchase orders are generated, the PCA ID from Service (Example Subcontracting), is propagated to LN Order Management to generate the purchase order with the corresponding peg. For material request of type Via Purchase, the PCA ID is propagated only if the **Inherit Project Peg** check box in the Items - General (tcibd0501m000) session is selected.

Propagation of the peg to book hours

When hours are booked in Service, the PCA is processed to LN People to book hours on the work order.

Book other costs or bench stock material costs

When actual other costs or Bench stock material costs are defined in Service, the costs are logged in the PCL. If the item is defined for the maintenance sales coverage line, the item is used to identify the appropriate project cost type. In case the item is not defined, the cost component is used to identify the appropriate project cost type using cost mapping in the Cost Mappings (tcmcs0149m000) session.

Propagation of the peg to a maintenance sales order coverage line

When the maintenance sales order coverage lines are costed, the invoice is created in LN Invoicing. The revenues and costs are booked to the corresponding PCAs. If the item is defined for the maintenance sales coverage line, the item is used to identify the appropriate project cost type. In case the item is not defined, the cost component is used to identify the appropriate project cost type using cost mapping in

the Cost Mappings (tcmcs0149m000) session. LN Invoicing receives the related PCA IDs for the actual costs.

Internal subcontracting for depot repair

Overview

When a defect occurs in a product, the customer requests for a repair and sends the product to the service department. The service department repairs the product, but a part of the repair is subcontracted to another repair center that belongs to another legal entity. Therefore an internal invoice is based on the actual material used, the actual hours booked, and the actual other costs such as transportation costs, is required to cover the repair costs incurred by the subcontracting repair center..

Creation of the Maintenance Sales Order

If a customer sends the product to a service department for repair, the service department creates a maintenance sales order using the Maintenance Sales Orders (tsmsc1100m000) session. Example The service department (in The Netherlands) receives an order from the customer to repair a defective product. The service department creates a maintenance sales order.

Creation of the Work Order

The service department must generate a work order for the repair center using the Work Orders (tswcs2100m000) session. The repair center must plan the repair activities and acquire the required material and/or tools. Example The service center generates a work order and assigns this work order to a repair center located at its own site.

Shipment of the Goods

The customer sends the defective product to the repair center. Example The customer sends the product to a repair center in Netherlands.

Receipt of the Product

The defective product is received at the repair center.

Repair Activity

The repair center repairs the product.If the product cannot be repaired at the current repair center, the repair work can be subcontracted to another repair center. A new repair order must be created for the

product at the new repair center. Example At the repair center in the Netherlands, the first repair activity takes place. If the product cannot be repaired on this site, the repair order is created for another repair site in the United Kingdom and the product is send to this repair site for repair.

Transfer of the Product

The product is transferred to the next repair center. Example The product is transferred from repair center, in Netherlands, and received at repair centre in United Kingdom.

Repair at the Repair Center

The product must be repaired and all cost such as materials used, and hours spent must be captured in the work order. If Internal Invoicing is implemented, the cost must be available on the work order. Example The repair center in United Kingdom repairs the product and includes all the cost on the work order.

Customer Invoicing

The service department invoices the customer, unless the product is repaired under the warranty or contract.

Internal Invoicing

The internal invoicing can be based on the actual repair costs or a fixed repair price. For internal invoicing, the repair center must invoice the service department where the product is initially received. The internal invoice must be based on the Follow-up work order. The internal invoice must be created before the work order is closed using the Close Work Orders (tswcs2265m000) session. When the invoice is created, additional costs cannot be booked to the work order. The internal invoice is required for legal reporting and to support internal pricing. Example: The repair center in the United Kingdom invoices the service department (of the maintenance sales order) on time and material, based on the actual costs or based on a fixed repair rate. This internal invoice is created when all the costs (material, time and other costs) are booked on the work order and no changes are allowed resulting in all costs invoiced internally. For Internal Invoicing, thesePrice Methods can be used:

- Fixed Price : A fixed internal price is specified. This price does not depend on the type of repair or the actual costs but depends on the item to be repaired and on Enterprise Units, therefore, LN uses Price Books (tdpcg0111m000) logic. All cost lines must be passed to Invoicing with an invoice amount of zero, and the cost amount specified. When fixed repair price for the repair of this product is specified, the rate is independent for the actual cost. This price can be used when items are repaired on a regular basis. In this case, the internal price is known and the fixed repair price is set to reflect the average repair costs.
- Time and Material : The internal price is based on the actual costs, therefore, on the material used, the hours spent, and on other costs. All the actuals are priced and invoiced separately. The types of cost are:

Material Pricing with Price Origins supported

- Actual cost: The total cost amount specified in the Work Order Material Resources (tswcs4110m000) session is used. Surcharges are applicable.
- Commercial Price: When the price origin is Commercial Price, for the materials issued on the work order, the commercial rate is used to determine the price on the internal invoice. The Price Books (tdpcg0111m000) functionality can be used along with the **Internal Price Search Method** defined in the General Service Parameters (tsmdm0100m000) session. **Note**: The internal business partners linked to the enterprise units are used to search the price. For more Information please refer to *Internal commercial rates (p. 28)*.
- Zero pricing : For Price Origin Zero Pricing, LN creates invoicing lines with zero costs.

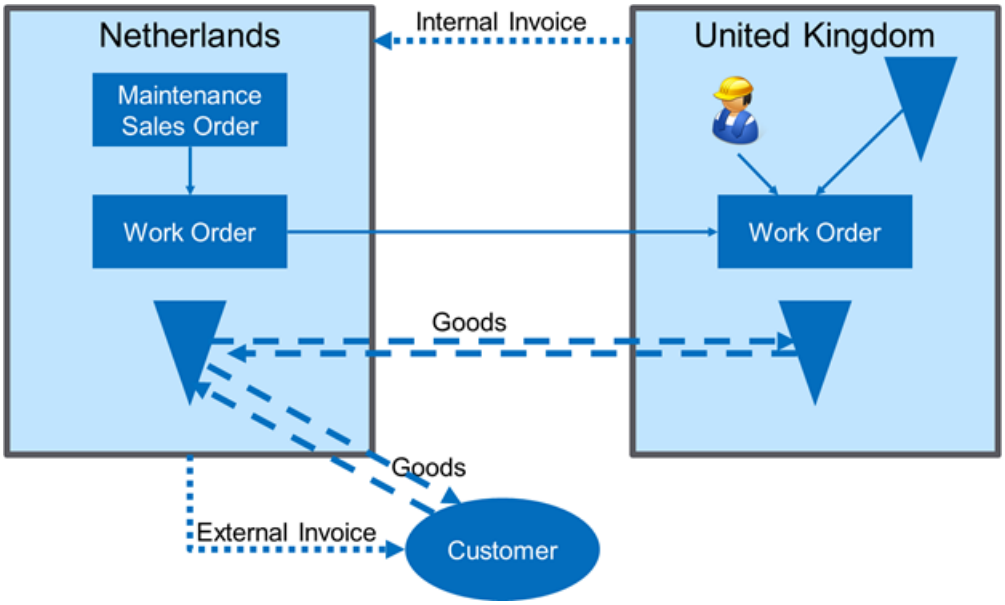
Labor Pricing with Price Origins supported

- Actual cost: The actual cost amount specified in the Work Order Labor Resources (tswcs4120m000) session is used. Additionally, Surcharges are applicable.
- Commercial Price: To determine a commercial price for labor, the **Internal Sales Labor Rate** defined in the Service Departments (tsmdm1100m000) session is used. This labor rate specifies the sales labor rate when this service department performs a task for another service department using the specific **Labor Rate** defined in Service Departments (tsmdm1100m000) session. Labor rates for internal business partner can be specified. **Note**: The internal business partners linked to the enterprise units are used to search the price. For more Information please refer to *Internal commercial rates (p. 28)*.
- Zero pricing: LN creates invoicing lines with zero costs for Price Origin Zero Pricing.

Pricing Other Cost

For the other costs such as tooling, travelling, and freight, a price based on the actual costs (with or without surcharge) is applicable. For Other Cost Pricing, these Price Origins are supported:

- Actual cost: The actual cost amount specified in the Work Order Other Resources (tswcs4130m000) session is used. Surcharges are applicable.
- Zero pricing: LN creates invoicing lines with zero costs for Price Origin Zero Pricing.



Internal commercial rates

Overview

For internal pricing, commercial prices can be used for material and labor. Additionally, a single fixed price can be specified. This is a fixed repair rate that must be paid, on the actual material used and hours spent.

Commercial Material Costs

When the price origin on the relationship detail for material is Commercial Price, for the materials issued for the work order, the commercial rate is used to determine the price on the internal invoice. You can use the **Internal Price Search Method** field in the General Service Parameters (tsmdm0100m000) session to retrieve the price. These are the possible options:

- Price Book Service/Sales : The **Default Service Price Book** is used. This price cannot be specific to one Business Partner. If this price book is not defined, the **Default Sales Price Book** is used.
- Price Book Transfer : Using the Sales price book with **Matrix Type** field set to **Transfer Price** on the Matrix Definitions (tdpcg0110m000) session, an internal sales price between two internal business partners can be specified. **Note**: LN considers the internal business partners linked to the enterprise units to search for the sales price.

- Item Service Price : The sales price defined on the Items - Service (tsmdm2100m000) session is used. This price can also be used for the internal invoice. Item Service Price is used if Service Price Book and Price Book Transfer is not defined.

Commercial Labor Rates

To define a commercial labor rate when the **Price Origin** for labor pricing is set to **Commercial Price** in the Internal Trade Details (tcemm2151m000) session, the **Internal Sales Labor Rate** field in the Service Departments (tsmdm1100m000) session is used. This labor rate specifies the sales labor rate when a service department performs the work for another service department. **Labor Rate** for internal business partner can be specified using commercial labour rates.

Note: Only the sales rates of the labor rate codes are used. The cost rates are not applicable, because actual costs of the work order are used.

Note: LN considers the internal business partners linked to the enterprise units to search for the price.

Appendix A
Glossary

A

ATP

See: *available-to-promise (p. 31)*

ATP

The item quantity that is available to be promised for a customer either immediately, or at a specific time in the future.

ATP check

A check on the quantity that can be promised to a customer based on the allowed demand. The main purpose of the ATP check is to reserve a certain quantity of the spare part or item.

available-to-promise

The item quantity that is still available to be promised to a customer.

In LN, available-to-promise (ATP) is part of a more extended framework of order promising techniques called capable-to-promise (CTP). If an item's ATP is insufficient, CTP goes beyond ATP in that it also considers the possibility of producing more than was initially planned.

In addition to the standard ATP functionality, LN also uses channel ATP. This term refers to the availability of an item for a certain sales channel, taking into account the sales limits for that channel.

For all other types of order promising functionality used in LN, the term CTP is used.

Acronym:

Abbreviation: ATP

coverage lines

Lines that store the information on the costs incurred, amounts to be invoiced, and the amounts covered by the applicable contract and/or warranty. Most coverage lines are added through the maintenance sales order process, but can also be manually entered.

delivery type

Indicates how the material that is required to carry out the activities, must be delivered, or what will happen to the defective item.

economic stock

The inventory that is available to be sold.

functional element

A grouping of exchangeable items with identical functions. Functional elements can be used in item breakdowns, physical breakdowns, and reference activities.

Example

When a maintenance activity is defined for a configuration, a functional element can be specified. This way, the activity applies to all items covered by that functional element, and multiple, identical reference activities for similar items are avoided.

inventory commitment

The reservation of inventory for an order without taking into account the physical storage of the goods within the warehouse. Previously referred to as hard allocation.

labor rate

The labor rate code, defined in the Labor Rate Codes (tcppl0190m000) session in People. A sales rate and cost rate can be specified in this labor rate code.

You can assign labor rates on a wider scale to, for example,

- A service department, for all work done by the service department.
- An Installation group, for all work carried out on the Installation group.

In the Service Order Parameters (tssoc0100m000) session, default labor rate search paths can be set for the following:

- Estimated sales rate
- Estimated cost rate
- Actual sales rate
- Actual cost rate

maintenance sales order lines

Lines that store all details of the items that must be maintained, loaned, replaced, delivered, or received.

master routing

A set of operations that can be carried out. The reference activities based on which operations are added to a master routing, must have the same characteristics, such as item, functional element, and service department.

Example

All the inspections, tests, cleaning activities, assembly activities, disassembly activities, and repair activities that you can carry out on an engine.

price book

An entity in which you can store price information that is valid for a given period of time.

A price book includes the following elements:

- A price book header, which contains the code, type, and use of the price book.
- One or more price book lines, which contain the items.

A quantity or value break discount schedule can be linked to a price book.

reference activity

The smallest unit of work that is required to carry out maintenance.

routing option

A subset of master routing. A predefined set of operations that can be carried out. Each operation is identified by a unique sequence number.

warehouse order

See: *warehousing order (p. 34)*

warehousing order

An order for handling goods in the warehouse.

A warehouse order can be of the following inventory-transaction types:

- **Receipt**
- **Issue**
- **Transfer**
- **WIP Transfer**

Each order has an origin and contains all the information required for warehouse handling. Depending on the item (lot or non-lot) and warehouse (with or without locations), lots and/or locations can be assigned. The order follows a predefined warehousing procedure.

Note
In Manufacturing a warehousing order is often called a warehouse order.

Synonym: warehouse order

work order

Orders that are used to plan, carry out, and control all maintenance on items in a maintenance shop or in a repair shop. A work order consists of at least one work order header, and can have a number of activities that must be carried out on a repairable service item.

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