



White Paper

Enterprise Asset Management for Microsoft Dynamics® AX 2012

Asset Service Management

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Published: November 2013.

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1 Introduction

Enterprise Asset Management is an advanced module for managing assets and service jobs in Microsoft Dynamics® AX 2012. Enterprise Asset Management is developed by Dynaway A/S and integrates seamlessly with several modules in Microsoft Dynamics® AX 2012.

In Figure 1 you will see a graphic illustration of the interfaces to other modules in Microsoft Dynamics® AX 2012.

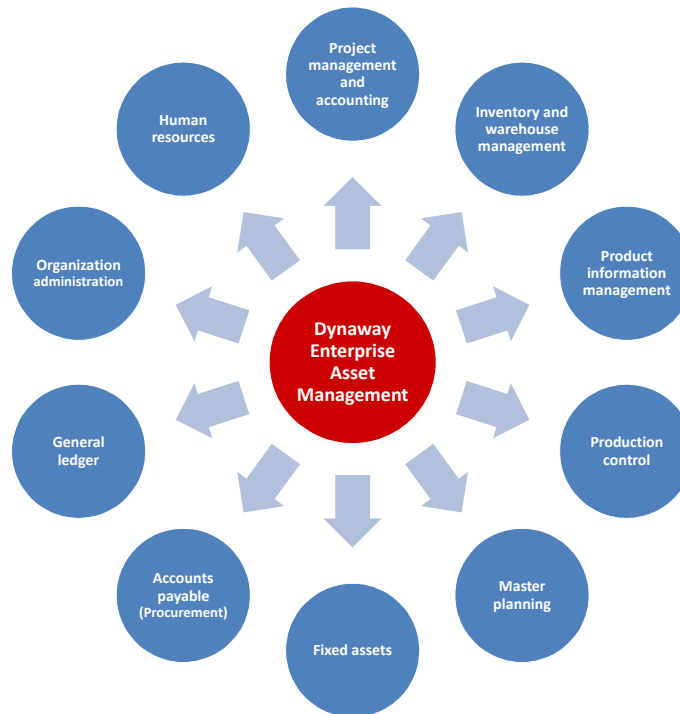


Figure 1

Enterprise Asset Management allows you to efficiently manage and carry out all tasks related to managing and servicing many types of equipment in your company, for example, machines, production equipment, and vehicles. Enterprise Asset Management can also be set up for Asset Service Management with the main focus of servicing customer equipment.

Figure 2 shows an overview of the key functionality covered by Dynaway Enterprise Asset Management.

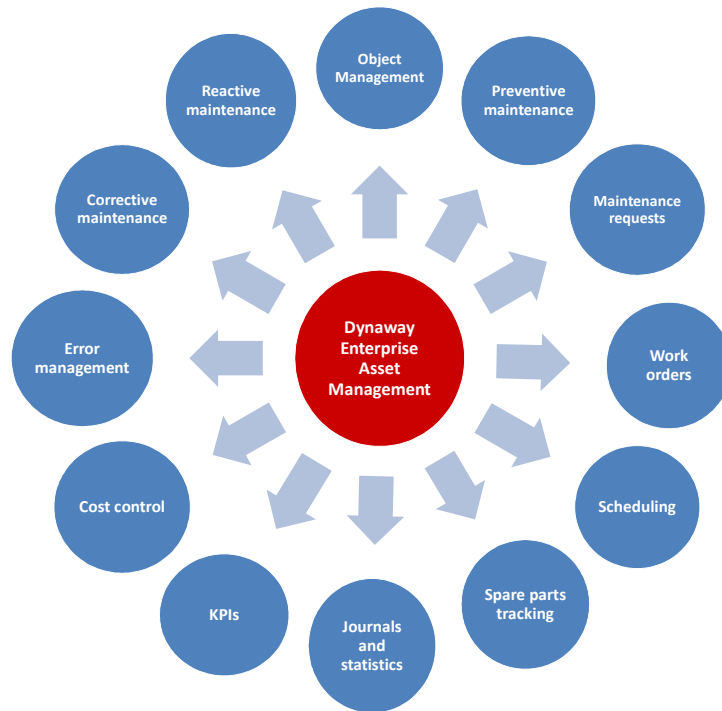


Figure 2

2 Enterprise Asset Management

Dynaway Enterprise Asset Management (EAM) comprises many features that enable your company to keep your machinery running continuously without unnecessary interruptions or breakdowns. In the following sections, we will introduce you to some of the core functionality in our asset management solution.

2.1 Objects and Work Orders

The central parts of Dynaway Enterprise Asset Management (EAM) are objects and work orders. An object is a machine or machine part that requires continuous maintenance and service. Objects can be created in a hierarchical structure. Service jobs can be planned at all levels in the object structure. Various product information data can be set up on an object or a work order.

Here is a list of some of the data that can be created on an object or a work order:

- Jobs
- Product/Model relations
- Location
- Spare parts
- Check lists
- Measuring points
- Condition assessment
- Fault symptom, cause, and remedy
- Maintenance sequences (based on time or counters)
- Production stop
- Technical specifications
- Consumption (items, hours, costs, fees)
- Notes

Objects and related sub objects can be created in a hierarchical structure to display relations and dependencies of objects. Service jobs can be related to all levels in the hierarchical structure.

Copy and Move Objects

In the **All Objects** list page, objects are shown in hierarchical order in the **Object** column. Parent objects are displayed in the **Parent** column. The object hierarchy for a selected object is also shown in a tree view in the **Object tree** FactBox. It is possible to copy an entire object hierarchy. This is useful if your company has several object hierarchies with similar object structures, and you want to quickly create a number of similar object hierarchies.

You can also move objects and related sub objects in an object hierarchy. This is useful if, for

example, your company wants to handle

- moving an object permanently because it has a new location
- moving an object temporarily from an object hierarchy for refurbishment and then re-inserting the refurbished object in the object hierarchy

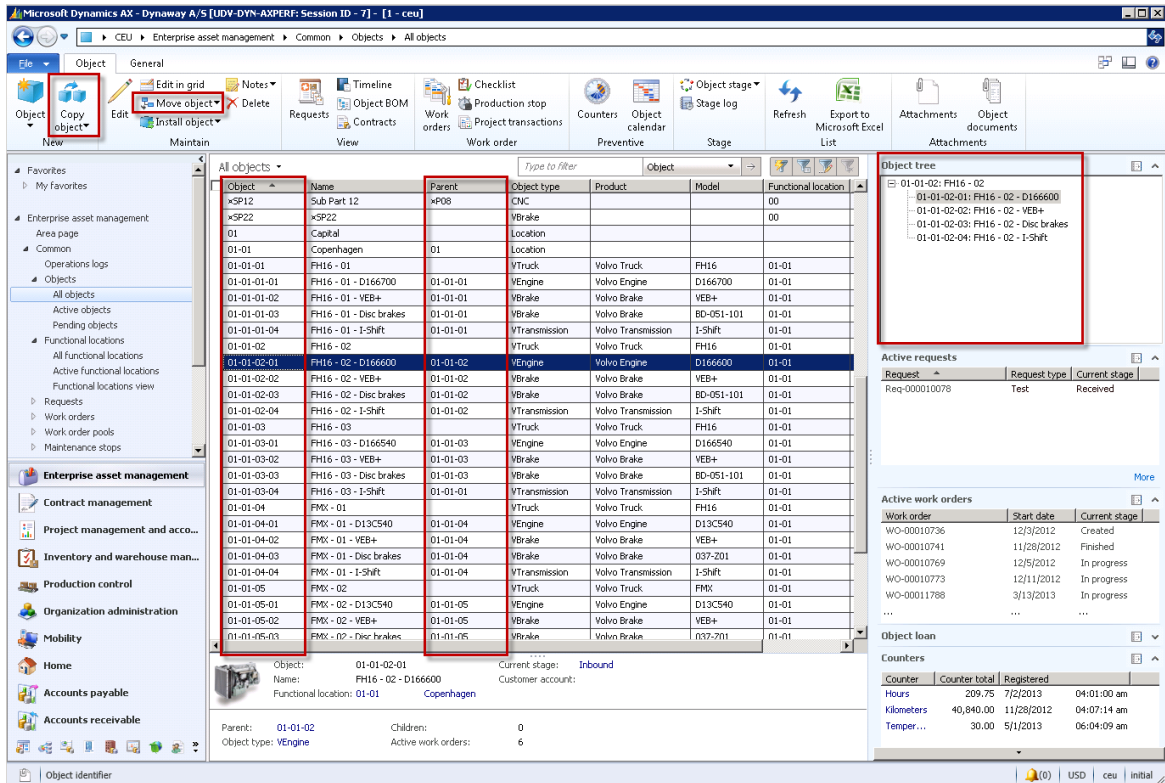


Figure 3

In order to manage service jobs carried out on objects, you create work orders. A work order consists of one or more work order lines. Each work order line contains an object that requires service, and a related job type, for example, 10,000 km, 50,000 km, 1-year overhaul, or safety inspection. In the figure below you will see an overview of the work flow connected to a work order.

Work Order - Flow Diagram

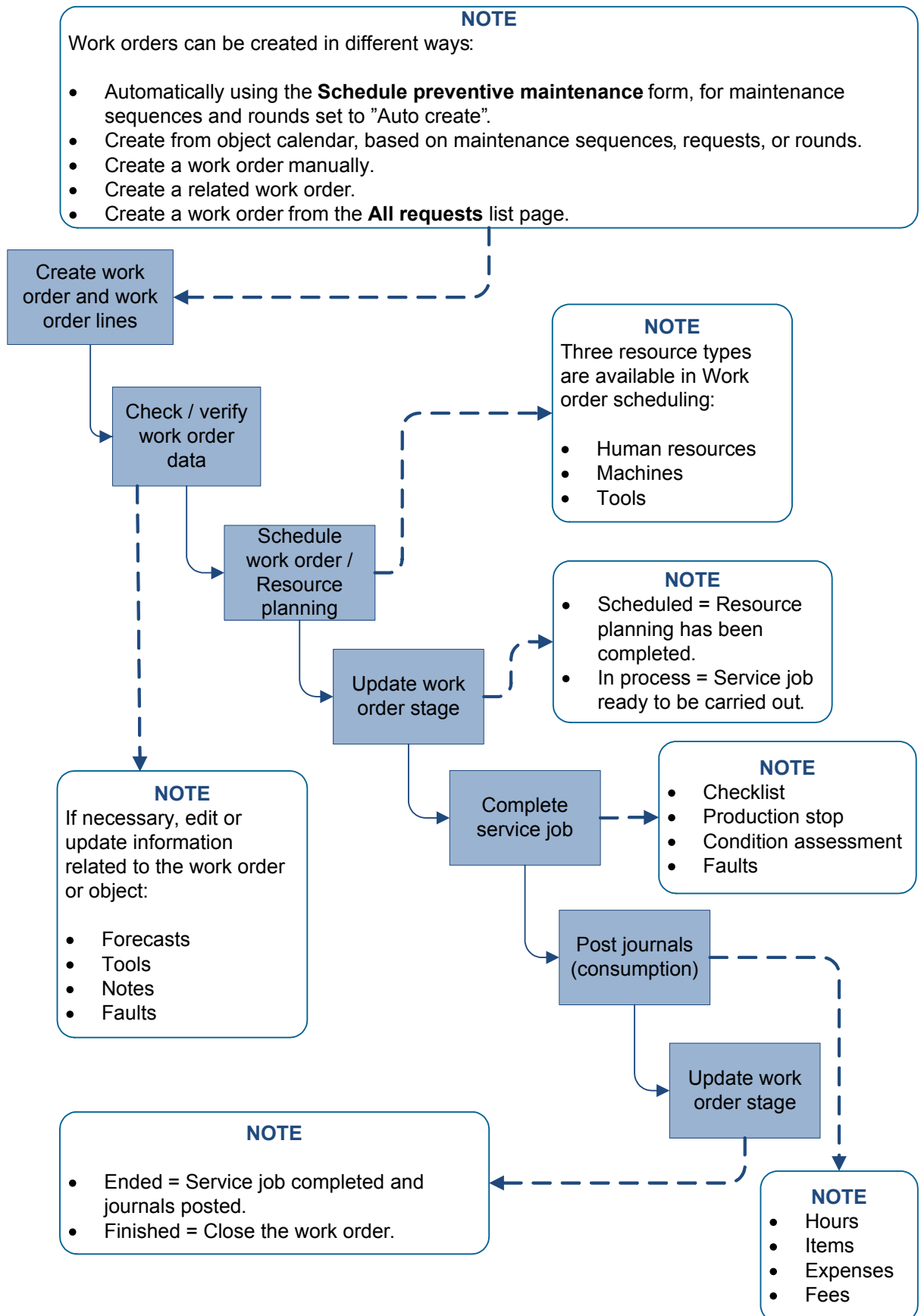


Figure 4

2.2 Functional Locations

Functional locations are used to manage objects on locations, including track object costs on functional locations. Functional locations are structured hierarchically, and locations can have sub locations. The functional location structure is static; locations cannot change place. Objects can be installed on functional locations and, if required, the objects can later be installed on another functional location.

Functional locations are elements of a technical structure, for example, functional units within a system. Here are examples of how you can use functional locations:

- Functional (user-oriented, manage objects with similar behavior)
- Process-related (work flow-oriented)
- Spatial (geographical locations, sites)

Object costs always follow the location of the object meaning that if you install an object on a new functional location, the object automatically uses the financial dimensions related to the functional location. Therefore, object costs are always related to the functional location to which the object was related at any given time. This automatic handling of financial dimensions ensures complete traceability of costs when your company performs project controlling and reporting on functional locations.

How you build your functional location hierarchy is based on your company's requirements for maintaining internal equipment or servicing customer equipment. The two figures below show examples of functional locations - based on geographical locations and customers.

Functional location based on sites

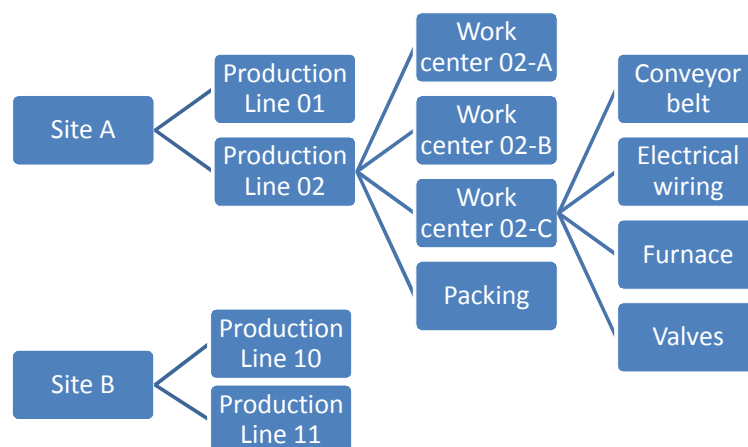


Figure 5

Functional location based on customers

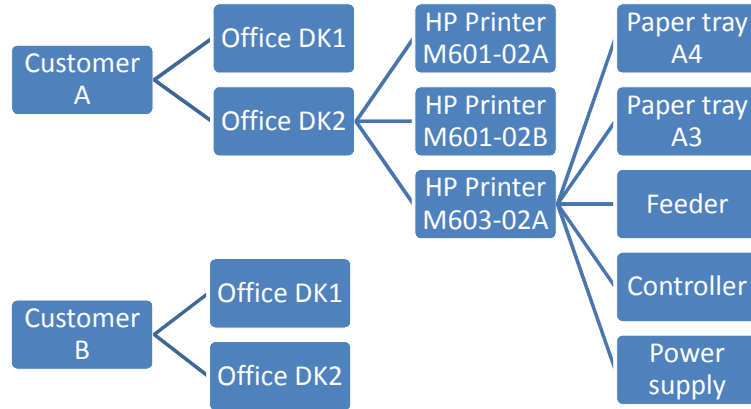


Figure 6

Functional locations provide traceability of objects in relation to requests, work orders, fault registrations, condition assessments, production stop registrations, and object counter registrations.

Functional location	Name	Functional location type	Parent	Children	Objects	Active requests	Active work orders	Stage
01	Capital region	Loc		2				Active
01-01	Copenhagen	TLoc	01		7		12	Active
01-02	Hillerød	TLoc	01		3	1		Active
02	Central region	Loc		3				Active
02-01	Aarhus	TLoc	02		3			Active
02-02	Yiborg	TLoc	02					Active
02-03	Silkeborg	TLoc	02		1	1		Active
03	North region	Loc		1				Active
03-01	Aalborg	TLoc	03					Active
04	Zealand	Loc		2				Active
04-01	Sorø	TLoc	04					Active
04-02	Roskilde	TLoc	04					Active
05	South	Loc		2				Active
05-01	Vejle	TLoc	05					Active
05-02	Odense	TLoc	05					Active
8700	Horsens Production	Loc		2				Active
8700-01	Horsens Production Hall 1	RLoc	8700		1		2	Active
8700-02	Horsens Production Hall 2	RLoc	8700		1			Active
90	Testing area	Loc		5				Active
90-1	90-1	Storage	90		1			Active
90-2	90-2	TLoc	90		3	1		Active
90-3	90-3	TLoc	90		2			Active
90-4	90-4	TLoc	90		2			Active
90-9	90-9	Robot	90		1			Active
99	Scrap - junkyard	Scrap						Scrap

Effective	Object	Name	Object type	Product	Model	Current stage
6/30/2013	11:00:00 pm	01-01-01	FH16 - 01	VTruck	Volvo Truck	FH16 Active
6/30/2013	11:00:00 pm	01-01-02	FH16 - 02	VTruck	Volvo Truck	FH16 Inbound
6/30/2013	11:00:00 pm	01-01-03	FH16 - 03	VTruck	Volvo Truck	FH16 Active
6/30/2013	11:00:00 pm	01-01-04	FMX - 01	VTruck	Volvo Truck	FMX Active
6/30/2013	11:00:00 pm	01-01-05	FMX - 02	VTruck	Volvo Truck	FMX Active
6/30/2013	11:00:00 pm	01-01-06	FH16 - Volvo Truck	VTruck	Volvo Truck	FH16 Active
6/30/2013	11:00:00 pm	01-01-08	FH16 - Volvo Truck	VTruck	Volvo Truck	FH16 Active

Figure 7

2.3 Spare Parts

Spare parts are managed in the **Product information management** module in Microsoft Dynamics AX 2012. Spare part consumption is registered on work orders. Replenishment of stock, including the spare parts ordering process, is done using standard Microsoft Dynamics AX 2012 functionality.

Spare parts are set up on product models, which are related to objects. A spare part list can contain a list of approved spare parts as well as spare part alternatives to be used in case approved spare parts are not available.

The screenshot shows the 'Spare parts (1 - ceu)' window. On the left, a table lists spare parts with columns for Item number, Approved, Model, and Product. Item 10000 is selected. On the right, the 'Product' section shows details for Item number 10000. The 'General' section includes 'Date' (Effective: 4/18/2012, Expiration: empty), 'Approved' (Approved: checked, Approved by: Olivier Fontana, Approved date: 4/18/2012 05:20:41 am), and 'Criticality' (Criticality: 30). The 'Alternative items' section has a table with columns: Item number, Effective, Expiration, Approved, Approved by, and Approved date. Two alternative items are listed:

Item number	Effective	Expiration	Approved	Approved by	Approved date
10001	4/18/2012		<input checked="" type="checkbox"/>	Maurizio Macagno	4/18/2012 05:21:28 am
10001	4/18/2012	4/18/2012	<input checked="" type="checkbox"/>	Maurizio Macagno	4/18/2012 05:23:33 am

Figure 8

When you have created a work order, it is possible to add approved spare parts to the work order, if required.

After you have completed a service job, and item consumption has been registered on a work order, you will be able to track consumption of spare parts and other items used on the object. This functionality allows you to keep a complete item consumption record on all your objects. For example, you can use the record to monitor if a specific spare part is often replaced, or keep track of which spare parts or other items are currently used on an object.

2.4 Checklists

Checklists and measuring points can be created to ensure that service jobs are carried out correctly. For example, you want to ensure that safety precautions or special procedures relating to a particular machine type are observed.

Checklists are set up on job types. When you create a new work order line and select an object, the checklist related to the object is automatically transferred to the work order line. It is possible to define that a worker must attach his or her worker identification to each item in a checklist. This means that a job cannot be completed until the worker has signed off on all checklist items.

Job type setup checklist (1 - ceu) - Object type: VEngine, Service, Job type: Service

File New Delete Copy checklist

Job type setup
Object type: VEngine Product: Model: Object: Job type: Service

Line	Name	M
4.0	Clean interior	
5.0	Shut down machine	
6.0	Change grill	
7.0	Start machine	
8.0	Run test	
18.0	Check it againg bugger	
28.0	Check object tyope	

Identification
Line: 8.0
Name: Run test
Measurements: 1

Mandatory
Worker mandatory:
Date mandatory:

Notes

Measuring points
Add line Remove

Line	Name	Unit	Min value	Max value
1.0	Vibration level		0.00	2.00

Name. Close

Figure 9

2.5 Condition Assessment

Condition assessment is performed at regular intervals. The primary objective is to create and maintain condition data on objects. Seen from a preventive maintenance perspective, it is important to monitor key information such as current condition and remaining life span. Furthermore, if you carry out condition assessment at regular intervals, you will be able to monitor and compare conditions on the machinery in your factory. You can make condition assessment registrations on objects and work orders.

Example: You measure vibrations on your machinery. After you have registered vibration measurements on various types of equipment, you can search for all registered vibration measurements within a particular range, on identical machines, or on all the machines in your factory.

Condition assessment	Date	Object
CA-0000003	3/30/2012	01-01-02
CA-00000025	9/17/2012	01-01-02
CA-00000026	9/17/2012	01-01-02
CA-00000042	6/11/2013	01-01-02

Line	Name	Description	Value	Unit	Comment
1.0	Rust Protection Level	Which level of rust protection 0=none / 5=perfect	0		<input type="checkbox"/>

Figure 10

Condition assessment templates are created and used as the basis for performing condition assessment. This is done to ensure that similar or identical objects are measured in the same way.

2.6 Consumption

When a service job has been completed on a work order, the next step is to make consumption registrations and post journals. You can make registrations on the following consumption types: Hours, items, expenses, and fees. The different consumption types are registered and posted in the **Journal** form. The journal setup is used for creating and posting separate journals for hours, items, expenses, and fees, which is handled in the **Project management and accounting** module.

3 Asset Service Management

Dynaway Enterprise Asset Management provides functionality for Asset Service Management (ASM), allowing you to effectively manage service of customer equipment. You use the customer information already created in Microsoft Dynamics AX and create a list of the customers related to your service organization. From the **Customers** list page, you have quick access to information about the objects, work orders, and requests related to a customer.

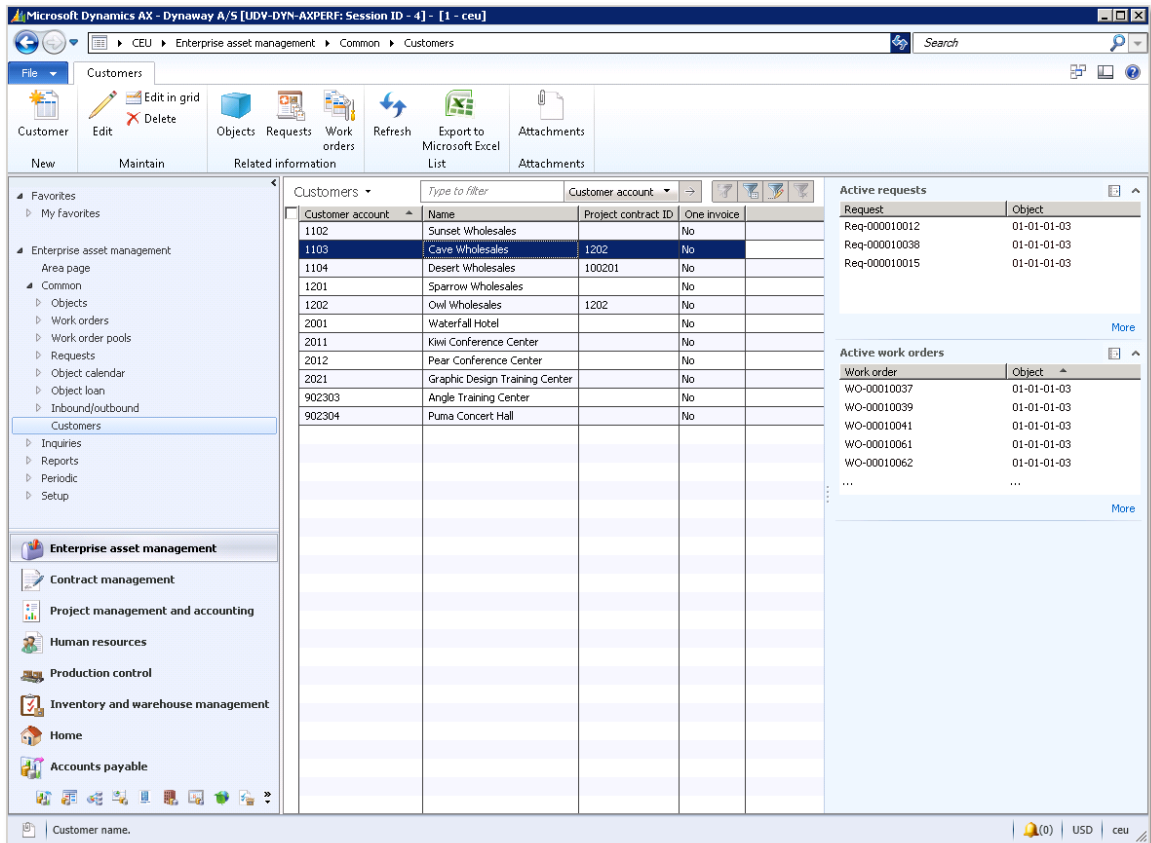


Figure 11

3.1 Quotations

Quotations can be created from a work order. For example, a customer requests a quote for a service job, which is not covered by a service contract. In that case, you first create a work order and subsequently create a quotation, which is sent to the customer. Asset Service Management uses the project quotation functionality in the **Project management and accounting** module to create project quotations. The work order for which you want to create a quotation must contain forecasts. You create a quotation based on the work order, and when you get approval from the customer, you confirm the quotation.

3.2 Warranty

Enterprise Asset Management allows you to set up warranty terms that can be connected to an object or an object type. Warranty terms are created for a specific period. Warranty can be set up to provide full or partial coverage, and you can set up terms to relate to hours, expenses, and items. Furthermore, you can also define specific items that are not covered by the warranty.

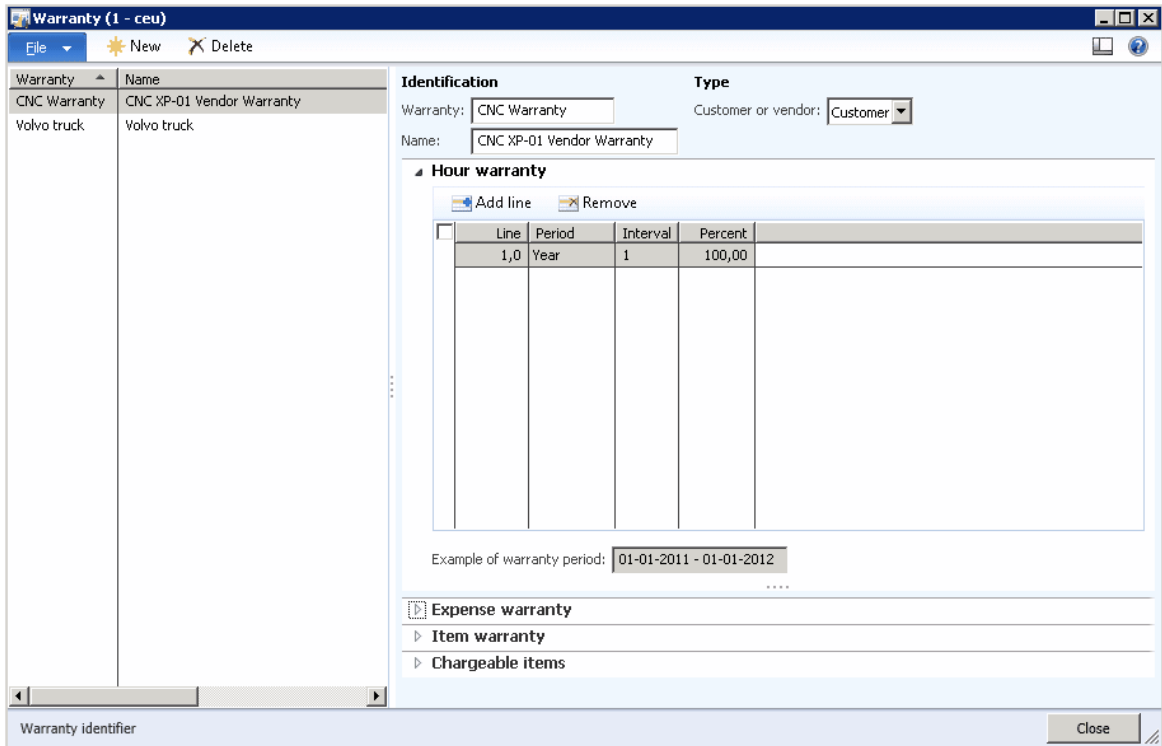


Figure 12

4 Contract Management

In the **Contract management** module, you can manage customer contracts regarding service agreements on various types of equipment. Contracts can be set up in a number of ways, accommodating special requirements relating to, for example, coverage, payment terms, termination, and identification of items not covered by the contract.

The screenshot shows the 'Contracts (1 - ceu) - Contract: C000064, Test contract' window. The interface includes a menu bar with options like 'File', 'Contract', 'Delete', 'Start contract', 'Terminate contract', 'Installments', 'Fee', 'Contract stage', 'Stage log', 'Refresh', 'Export to Microsoft Excel List', and 'Attachments'. Below the menu, the contract details are organized into sections:

- General**: Contract ID (C000064), Name (Service contract), Contract type (Std. Con.), Project ID (CM-0048), Stage (Created), Active (checkbox), Contract dates (Start, Terminated, End), Termination (Termination notice: 3 Month, No termination period: 1 month, Termination cause), Customer (Customer account: 1202, Name: Owl Wholesales), and Price (Index: 2013).
- Coverage**: A table with columns 'Line', 'Period', 'Interval', and 'Percent'. One line is visible: Line 1.0, Period Year, Interval 1, Percent 100.00.
- Chargeable items**, **Payment**, and **Objects**: These sections are currently empty or collapsed.

The bottom of the window shows a status bar with navigation icons, a search field, and a 'Close' button.

Figure 13

5 Preventive and Reactive Maintenance

Preventive maintenance is a discipline involving planned maintenance jobs, for example, regular service, calibration, and inspections. You can create maintenance sequences and set them up on objects or functional locations. Also, you can read counter registrations (production hours or quantity produced) on your equipment and subsequently create counter registration records on the objects. The counter registrations are used in preventive and reactive maintenance scheduling.

Maintenance sequences can be set up on objects or functional locations. Instead of setting up maintenance sequences on objects, you can create rounds that include multiple objects on which you need to perform related types of maintenance jobs in the same work routine. Maintenance sequences are used for preventive and reactive maintenance on individual objects. Rounds are used for preventive maintenance on a group or a set of objects.

A maintenance sequence defines when a pre-planned preventive maintenance job is to be carried out on an object. Maintenance sequences can be related to objects, object types, functional locations, or functional location types. There are two types of maintenance sequences:

- Counter
- Time

Examples of preventive maintenance sequences of type "Time" are "Repeated from start date", "Repeated from last work order", and "Linked from last work order" (repeated after every completed work order).

Examples of reactive maintenance sequences of type "Counter" are "Once reached above" (validating against an upper limit) and "Once reached below" (validating against a lower limit).

The figure below provides an overview of the work flow from creating maintenance sequences to creating work orders for objects based on those sequences.

Flow Diagram: Schedule Preventive Maintenance Work Orders

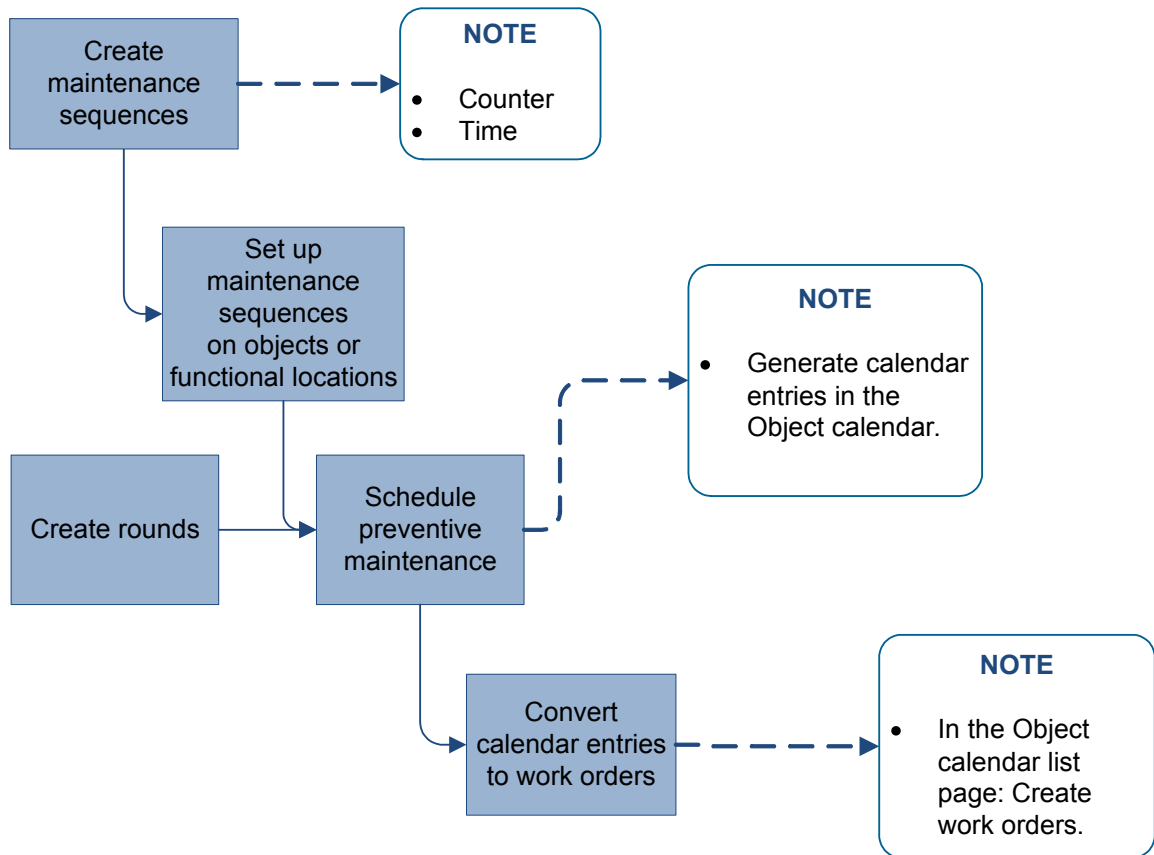


Figure 14

Requests and Notes

Workers can create requests and notes in the system, for example, if they discover the need for further maintenance or repair when they are performing a preventive maintenance job.

Object Calendar

The object calendar is used for scheduling all the expected preventive maintenance jobs to be carried out. The object calendar provides an overview of the following job types: Preventive maintenance jobs, rounds, and requests. When the calendar entries have been converted to work orders, you will be able to see the work order ID related to each job.

6 Work Order Scheduling

When a work order has been created and planned, the next step is to allocate the required resources to complete the maintenance or service job. Resources are used in work order scheduling to make capacity reservations. Three resource types are available in Microsoft Dynamics AX 2012:

- Human resources
- Machines
- Tools

Work order scheduling can be carried out on two levels - advanced work order scheduling or exclusive work order scheduling - depending on your requirements for resources for the service job. The "Schedule exclusively" option is useful if, for example, a worker has called in sick, and you need to quickly reschedule jobs from one worker to another. The scheduling process in the **Enterprise Asset Management** module is done by including different factors in the scheduling calculation:

- Calculating scores for work orders and workers. The scores are set up in the **Enterprise asset management parameters** form.
- Checking for matching competencies, meaning skills and certificates, required to perform the job. Skills and certificates are set up on workers in the **Human resources** module in Microsoft Dynamics AX 2012.

Work Order Calendar

The work order calendar is used to get an overview of the work orders allocated to a resource. Work orders using resource types "Human resources", "Tools", and "Machines" are displayed in the list. The list can be used to get an overview of work orders allocated to a specific resource. You can also use it to find a work order allocated to a worker who, for example, called in sick this morning, and then quickly allocate another worker to the job.

Scheduled start	Week	Scheduled end	Hours	Worker	Resource	Job type	Inspection	Object	Functional location	Line number
3/13/2013 06:27:38 am	11	3/14/2013 12:27:38 am	3.00	Makoto Yamagishi	00202	Service	Inspection	01-01-02-01		10
3/14/2013 12:27:38 am	11	3/14/2013 03:27:38 am	6.00	Makoto Yamagishi	00202	Service	Inspection	01-01-05-01		20
3/26/2013 05:00:00 am	13	3/27/2013 04:00:00 am	6.00	Samantha Woogerd	00101	Service	20K	01-01-08		10
3/27/2013 01:04:31 am	13	3/28/2013 01:04:31 am	6.00	Tony Madigan		Service	Service	01-01-02		30
4/3/2013 05:25:48 am	14	4/3/2013 11:25:48 pm	3.00	Steve Kastner	00102	Service-05	65K	38-01		10
4/3/2013 11:25:48 pm	14	4/4/2013 05:25:48 am	5.00	Steve Kastner	00102	Service-05	65K	38-02		20
4/21/2013 11:00:00 pm	17	4/22/2013 06:00:00 am	6.00	Chris Meyer		Misc	Ad hoc	CNC-001234		10
4/22/2013 06:00:00 am	17	4/22/2013 08:00:00 am	2.00	Chris Meyer		Misc	Wash truck	01-01-08		10
6/19/2013 11:00:00 pm	25	6/20/2013 06:00:00 am	6.00	Samantha Woogerd	00101	Misc	Overhaul	Obj-000000636		10
6/20/2013 06:00:00 am	25	6/21/2013 03:00:00 am	6.00	Samantha Woogerd	00101	Misc	Overhaul	Obj-000000644		10

Schedule type	Reference number	Name	Resource	Hours	Scheduled start	Scheduled end
Worker	000458	Makoto Yamagishi	00202	3.00	3/13/2013 06:27:38 am	3/14/2013 12:27:38 am
Object	01-01-02-01	FH16 - 02 - D166500	WO101201	3.00	3/13/2013 06:27:38 am	3/14/2013 12:27:38 am

Figure 15

Capacity Planning

In Enterprise Asset Management it is possible to calculate capacity load and item forecasts. You can make capacity load and item forecast calculations on

- Object calendar lines
- Work orders that have not yet been scheduled
- Scheduled work orders

This is useful if you want to get an overview of expected capacity load or expected item consumption (spare parts and other items required for completing work orders) for a specific period. Calculation of capacity load and item forecast can be done on all objects or selected objects. You can also make a calculation on a maintenance stop, or on a work order pool.

Date	Year	Object	Product	Model	Functional lo...	Job group	Job type	Work order	Work order type	Hours
7/6/2013	2013	PCs Object	Computer			DEL	Job2	WO-00010554	Service	2.00
7/10/2013	2013	01-01-05-01	Volvo Engine	D13C540		Misc	Ad hoc	WO-00012265	Quick	2.00
7/11/2013	2013	Obj-000000635	Honda	ASIMO		Service	20K	WO-00012274	Service	8.00
8/26/2013	2013	01-01-01	Volvo Truck	FH16	01-01	Service	Service	WO-00012292	Maintenance validate	1.00
9/2/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	20.00
9/3/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	20.00
9/3/2013	2013	R-4711	Honda	NASIMO	8700-01	Misc	Overhaul	WO-00012303	Service	6.00
9/4/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	20.00
9/5/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	20.00
9/10/2013	2013	01-01-08	Volvo Truck	FH16	01-01	Misc	Ad hoc	WO-00012339	Service	2.00
9/10/2013	2013	01-01-11	Volvo Truck	VHD	00	Misc	Ad hoc	WO-00012335	Service	2.00
9/10/2013	2013	01-01-11	Volvo Truck	VHD	00	Misc	Overhaul	WO-00012333-01	Service	0.00
9/10/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Service	WO-00012333	Service	1.00
9/12/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	40K	WO-00012346	Service	20.00
9/12/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Inspection	WO-00012346	Service	2.00
9/12/2013	2013	01-01-12	Volvo Truck	VHD	00	Service	SK	WO-00012346	Service	4.00
9/12/2013	2013	BQ-Blower			00	Service	Service	WO-00012342	Service	1.00
9/12/2013	2013	T08	Volvo Truck	FL	90-4	Misc	Overhaul	WO-00012346-01	Service	5.00
9/16/2013	2013	COMP-0001-A			8710-01	Service	Inspection	WO-00012351	Preventive Maint.	2.00
9/17/2013	2013	01-01-12	Volvo Truck	VHD	00	Misc	Ad hoc	WO-00012373-01	Quick	2.00
9/17/2013	2013	01-01-12	Volvo Truck	VHD	00	Service	Service	WO-00012373	Service	1.00
9/17/2013	2013	Obj-000000657			00	Misc	Ad hoc	WO-00012376	Service	2.00

Figure 16

Item forecast (1 - ceu)

File Calculate item forecast Inventory Export to Microsoft Excel

Group by

Date: Date: Month: Year: Week: Quarter:

Object: Object: Product: Object type: Model:

Location: Functional location: Functional location type:

Reference: Reference type: Reference ID:

Job: Job group: Job type: Maintenance stop: Criticality:

Responsible: Responsible group: Responsible worker:

Date	Year	Object	Product	Model	Functional location	Job group	Job type	Work order	Work order type	Item number	Product name	Quantity
7/16/2013	2013	PCs Object	Computer			DEL	Job2	WO-00010554	Service	5002	Grill screws	5.00
7/11/2013	2013	Obj-000000635	Honda	ASIMO		Service	20K	WO-00012274	Service	5001	Grill	2.00
7/11/2013	2013	Obj-000000635	Honda	ASIMO		Service	20K	WO-00012274	Service	5002	Grill screws	25.00
8/26/2013	2013	01-01-01	Volvo Truck	FH16	01-01	Service	Service	WO-00012292	Maintenance validate	5001	Grill	7.00
8/26/2013	2013	01-01-01	Volvo Truck	FH16	01-01	Service	Service	WO-00012292	Maintenance validate	5002	Grill screws	10.00
9/2/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	5001	Grill	2.00
9/2/2013	2013	01-01-02-01	Volvo Engine	D166600	01-01	Service	20K	WO-00012312	Service	5002	Grill screws	25.00
9/10/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Service	WO-00012333	Service	5001	Grill	1.00
9/10/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Service	WO-00012333	Service	5002	Grill screws	10.00
9/12/2013	2013	BQ-Blower			00	Service	Service	WO-00012342	Service	5001	Grill	1.00
9/12/2013	2013	BQ-Blower			00	Service	Service	WO-00012342	Service	5002	Grill screws	10.00
9/13/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	40K	WO-00012346	Service	5001	Grill	2.00
9/13/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	40K	WO-00012346	Service	5002	Grill screws	25.00
9/13/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Inspection	WO-00012346	Service	5001	Grill	2.00
9/13/2013	2013	01-01-11	Volvo Truck	VHD	00	Service	Inspection	WO-00012346	Service	5002	Grill screws	25.00
9/17/2013	2013	01-01-12	Volvo Truck	VHD	00	Service	Service	WO-00012373	Service	5001	Grill	1.00
9/17/2013	2013	01-01-12	Volvo Truck	VHD	00	Service	Service	WO-00012373	Service	5002	Grill screws	10.00
9/17/2013	2013	Obj-000000657			00	Misc	Ad hoc	WO-00012377	Service	5002	Grill screws	10.00
9/17/2013	2013	Obj-000000658			00	Misc	Ad hoc	WO-00012378	Service	5002	Grill screws	1.00
9/17/2013	2013	Obj-000000659			00	Misc	Ad hoc	WO-00012379	Service	5002	Grill screws	1.00
9/17/2013	2013	Obj-000000659			00	Misc	Ad hoc	WO-00012379	Service	5003	Binding posts	1.00
9/17/2013	2013	Obj-000000659			00	Misc	Ad hoc	WO-00012380	Service	5001	Grill	1.00

Transaction date Close

Figure 17

7 Cost Control

In Enterprise Asset Management, you can calculate costs to get a complete overview of actual costs compared to budget costs on

- Objects
- Functional locations
- Work orders
- Fault registrations

Actual costs are based on posted transactions. The date is the transaction date when the registration was recorded.

The screenshot shows the 'Object cost control (1 - ceu)' window. The 'Group by' section is set to 'Object'. The table displays the following data:

Date	Work order	Object	Product	Model	Functional location	Job type	Original budget	Actual cost	Preventive cost	Corrective cost	Committed cost
7/6/2013	WO-00010554	PCs Object	Computer			Job2	66.25	0.00	0.00	0.00	0.00
7/10/2013	WO-00374	01-01-02	Volvo Truck	FH16		Overhaul	0.00	0.00	0.00	0.00	2,214.35
7/10/2013	WO-00375	01-01-02	Volvo Truck	FH16		10K	0.00	0.00	0.00	0.00	1.25
7/11/2013	WO-00012274	Obj-000000635	Honda	ASIMO		20K	422.03	0.00	0.00	0.00	17.03
7/16/2013	WO-00012239	Obj-000000656	Honda	NASIMO		Overhaul	0.00	3,840.00	0.00	3,840.00	0.00
7/17/2013	WO-00012143	CNC-001234				Service	0.00	0.00	0.00	0.00	7.89
8/20/2013	WO-00012112	CNC-001234				Ad hoc	0.00	270.00	0.00	270.00	0.00
8/21/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.00	0.00	0.00	8.39
8/22/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.50	0.00	0.00	0.00
8/23/2013	WO-00012285	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.00	0.00	0.00	8.39
8/23/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	3,704.23	3,704.23	0.00	8.39
8/26/2013	WO-00012285	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	7.88	0.00	7.88	0.00
8/26/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	989.58	989.58	0.00	-8.39

Figure 18

The screenshot shows the 'Functional location cost control (1 - ceu)' window. The 'Group by' section is set to 'Functional location'. The table displays the following data:

Date	Work order	Object	Product	Model	Functional location	Job type	Original budget	Actual cost	Preventive cost	Corrective cost	Committed cost
8/21/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.00	0.00	0.00	8.39
8/22/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.50	0.50	0.00	0.00
8/23/2013	WO-00012285	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.00	0.00	0.00	8.39
8/23/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	3,704.23	3,704.23	0.00	8.39
8/26/2013	WO-00012285	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	7.88	0.00	7.88	0.00
8/26/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	989.58	989.58	0.00	-8.39
8/26/2013	WO-00012292	01-01-01	Volvo Truck	FH16	01-01	Service	91.97	0.00	0.00	0.00	56.97
8/27/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	494.79	494.79	0.00	8.39
9/2/2013	WO-00012312	01-01-02-01	Volvo Engine	D166600	01-01	20K	2,942.03	0.00	0.00	0.00	0.00
9/4/2013	WO-00012285	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	26.50	0.00	26.50	0.00
9/4/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	18.76	18.76	0.00	0.00
9/5/2013	WO-00012310	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	15.48	0.00	15.48	0.00
9/5/2013	WO-00012312	01-01-02-01	Volvo Engine	D166600	01-01	20K	0.00	30.97	0.00	30.97	0.00

Figure 19

Work order cost control (1 - ceu)

File Calculate cost Export to Microsoft Excel

Group by

Date: Date: Quarter: Week: Year: Month:

Work order: Work order stage: Work order type:

Object: Product: Object type: Model:

Location: Functional location: Functional location type:

Job: Job group: Job type: Posting: Transaction: Category:

Date	Work order	Object	Product	Model	Functional location	Job type	Original budget	Actual cost	Preventive cost	Corrective cost	Committed cost
7/11/2013	WO-00012274	Obj-000000635	Honda	ASIMO		20K	422.03	0.00	0.00	0.00	17.03
7/16/2013	WO-00012239	Obj-000000656	Honda	NASIMO		Overhaul	0.00	3,840.00	0.00	3,840.00	0.00
8/21/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.00	0.00	0.00	8.39
8/22/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	0.50	0.50	0.00	0.00
8/23/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	3,704.23	3,704.23	0.00	8.39
8/26/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	989.58	989.58	0.00	-8.39
8/27/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	494.79	494.79	0.00	8.39
9/3/2013	WO-00012239	Obj-000000656	Honda	NASIMO		Overhaul	0.00	0.04	0.00	0.04	0.00
9/4/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	18.76	18.76	0.00	0.00
9/18/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	0.00	43.32	43.32	0.00	0.00
9/19/2013	WO-00012286	01-01-01	Volvo Truck	FH16	01-01	Service	883.39	90.00	90.00	0.00	0.00

Transaction date Close

Figure 20

Object fault cost control (1 - ceu)

File Calculate cost Export to Microsoft Excel

Group by

Date: Date: Quarter: Week: Year: Month:

Object: Product: Object type: Model:

Location: Functional location: Functional location type:

Fault: Fault area: Fault cause: Fault symptom: Fault type:

Posting: Transaction type: Dimension: Category:

Fault date	Object	Product	Model	Fault	Fault symptom	Fault cause	Original budget	Actual cost	Corrective cost	Preventive cost	Committed cost
4/30/2012	01-01-01	Volvo Truck	FH16	F00000070	Light on dash		281.25	456.25	456.25	0.00	1.25
3/19/2013	01-01-01	Volvo Truck	FH16	F00000087	Change noise	Malfunction	328.79	120.57	120.57	0.00	187.69
4/29/2013	01-01-01	Volvo Truck	FH16	F00000118	Change noise	Broken	6.22	0.00	0.00	0.00	6.22
4/29/2013	01-01-01	Volvo Truck	FH16	F00000119	Light on dash		7.77	0.00	0.00	0.00	7.77
4/29/2013	01-01-01	Volvo Truck	FH16	F00000120	No accel. in second range		7.77	0.00	0.00	0.00	7.77
4/29/2013	01-01-01	Volvo Truck	FH16	F00000121	Poor fuel economy		7.77	0.00	0.00	0.00	7.77

Calculate cost based on object faults Close

Figure 21

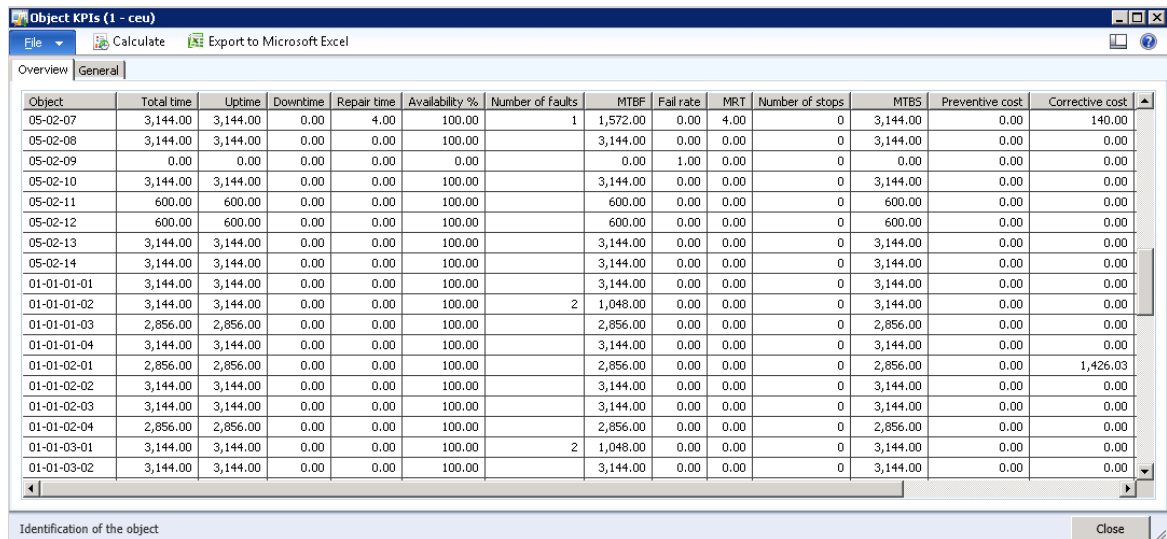
Note

The **Original budget** field shows budget costs from the work order forecast. The **Actual cost** field shows posted costs on work orders. The **Committed cost** field shows costs that your company is committed to in relation to work orders, but these costs have not yet been posted.

8 KPIs

In Enterprise Asset Management, you can calculate various Key Performance Indicators (KPIs) for objects and object types. KPIs are used to get an overview of performance on objects in relation to, for example

- Uptime
- Downtime
- Repair time
- Mean Time Between Failure (MTBF)
- Mean Time Between Stops (MTBS)
- Mean Repair Time (MRT)



The screenshot shows a software window titled 'Object KPIs (1 - ceu)' with a menu bar containing 'File', 'Calculate', and 'Export to Microsoft Excel'. The window displays a table with the following columns: Object, Total time, Uptime, Downtime, Repair time, Availability %, Number of faults, MTBF, Fail rate, MRT, Number of stops, MTBS, Preventive cost, and Corrective cost. The table contains 20 rows of data for different object IDs, such as 05-02-07, 05-02-08, etc., up to 01-01-03-02. The 'Number of faults' column shows values of 1, 2, and 2 for different groups of objects. The 'Corrective cost' column shows a value of 1,426.03 for object 01-01-02-01.

Object	Total time	Uptime	Downtime	Repair time	Availability %	Number of faults	MTBF	Fail rate	MRT	Number of stops	MTBS	Preventive cost	Corrective cost
05-02-07	3,144.00	3,144.00	0.00	4.00	100.00	1	1,572.00	0.00	4.00	0	3,144.00	0.00	140.00
05-02-08	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
05-02-09	0.00	0.00	0.00	0.00	0.00		0.00	1.00	0.00	0	0.00	0.00	0.00
05-02-10	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
05-02-11	600.00	600.00	0.00	0.00	100.00		600.00	0.00	0.00	0	600.00	0.00	0.00
05-02-12	600.00	600.00	0.00	0.00	100.00		600.00	0.00	0.00	0	600.00	0.00	0.00
05-02-13	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
05-02-14	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-01-01	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-01-02	3,144.00	3,144.00	0.00	0.00	100.00	2	1,048.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-01-03	2,856.00	2,856.00	0.00	0.00	100.00		2,856.00	0.00	0.00	0	2,856.00	0.00	0.00
01-01-01-04	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-02-01	2,856.00	2,856.00	0.00	0.00	100.00		2,856.00	0.00	0.00	0	2,856.00	0.00	1,426.03
01-01-02-02	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-02-03	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-02-04	2,856.00	2,856.00	0.00	0.00	100.00		2,856.00	0.00	0.00	0	2,856.00	0.00	0.00
01-01-03-01	3,144.00	3,144.00	0.00	0.00	100.00	2	1,048.00	0.00	0.00	0	3,144.00	0.00	0.00
01-01-03-02	3,144.00	3,144.00	0.00	0.00	100.00		3,144.00	0.00	0.00	0	3,144.00	0.00	0.00

Figure 22

9 Security Roles

In Microsoft Dynamics AX 2012, security roles are used to grant access rights to a user, allowing the user to access certain menu items and perform specific tasks. Security roles relate to Client Access Licenses (CAL) in Microsoft Dynamics AX 2012. You can read more about this topic in the white paper "Microsoft Dynamics AX 2012 Security Roles and Licensing" published by Microsoft®.

Below, you will see the roles and related tasks defined for Dynaway Enterprise Asset Management.

Enterprise Asset Management

Role	Related tasks	CAL level in Microsoft Dynamics AX 2012
Maintenance Manager	Maintain base data and perform all maintenance-related tasks	Functional
Maintenance Clerk	Schedule work orders, register consumption, post journals, maintain work orders, create purchase orders	Functional
Maintenance Worker	Print work order report, register consumption, change work order stage	Task

Contract Management

Role	Related tasks	CAL level in Microsoft Dynamics AX 2012
Contract Manager	Maintain base data and perform all contract-related tasks	Functional
Contract Clerk	Manage contracts, carry out invoicing, update contract payments	Functional

10 Industries

Dynaway Enterprise Asset Management (EAM) is designed for maintenance management across various industries. Companies in the manufacturing, distributing, and servicing sectors will benefit from our EAM solution through powerful asset data management. Dynaway EAM helps maximize the reliability and availability of your assets.

The Dynaway EAM solution is a strong partner whether your primary focus is maintenance of buildings, machines, vehicles, facilities, or any other object that requires regular inspection or overhaul.

Here are a few examples of industries that currently profit from the Dynaway Enterprise Asset Management solution:

- Discrete manufacturing
- Process manufacturing
- Project manufacturing
- Chemical processing
- Metal processing
- Pharmaceuticals
- Food / Beverage
- Energy supply
- Bio diesel
- Mining

For more information, take a look at our case stories on www.dynaway.com.

11 About Dynaway

Dynaway A/S is a privately held independent software vendor with an exclusive focus on providing valuable solutions for the Microsoft Dynamics AX platform.

Dynaway A/S was founded in 2001 as a spin-off from one of the largest Microsoft Dynamics AX Value Added Resellers (VAR) in Denmark. The intention of the spin-off was to create a software development powerhouse, capable of absorbing trends, ideas and partial solutions from the mother company and its end customers, and transform these into fully-fledged, high-quality software packages for the entire Microsoft Dynamics AX partner channel. Today, Dynaway A/S is owned by the EG group, a Microsoft Gold Certified Partner.

Dynaway designed and developed the Shop Floor Control module for Microsoft Dynamics AX, which has been divided into two separate modules, Manufacturing execution and Time and attendance, in Microsoft Dynamics AX 2012. Those modules are now owned by Microsoft. Production management has been a core focus area for Dynaway for more than 10 years.

Following our success with Shop Floor Control, we have developed Dynaway BLUE, which is a Manufacturing Execution System (MES) built directly into your Microsoft Dynamics AX solution, making costly integration to stand-alone MES systems and data integrity issues things of the past. The Dynaway BLUE solution is your real-time link to the factory floor; the perfect manufacturing execution companion for Microsoft Dynamics AX that will empower your shop floor for continuous improvement. Dynaway BLUE has achieved the Certified for Microsoft Dynamics (CfMD) accreditation, the highest possible Microsoft accreditation for Microsoft Dynamics ISV solutions.

Another focus area for Dynaway is Enterprise Asset Management (EAM). Today, our solution sets the de facto standard for maintenance, service, and contract management in Microsoft Dynamics AX. The Enterprise Asset Management solution is sold through Microsoft Dynamics AX partners world-wide, and the solution is Certified for Microsoft Dynamics (CfMD).

In addition to the horizontal solutions for the shop floor and the asset management organization, Dynaway has developed VinCAD, an industry solution for door and window manufacturers, built into Microsoft Dynamics AX. VinCAD supports the very special make-to-order requirements set by the door and window industry and has proven its value among Europe's largest manufacturers.

Dynaway has also developed mobile solutions to provide optimum flexibility for mobile workers to handle various kinds of job registrations. The mobile solutions are based on HTML5 technology and integrate seamlessly with several modules in Microsoft Dynamics AX 2012. The Mobile Time Client is an advanced client to be used for project registrations regarding time consumption and item consumption. The Mobile EAM Client is customized for maintenance workers and service technicians to provide quick and easy access to information and registrations related to objects and work orders.

For more information on Dynaway and our products, visit our website on www.dynaway.com, or email to info@dynaway.com.

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