WorkShopManager

WORKSHOPMANAGER OFFERS NEW POSSIBILITIES

It is generally thought that automated production is complicated to introduce and that it can only be applied to long runs. The may be true when the robot grips the workpiece directly, but hardly when the workpiece is palletised.

The handling units in System 3R's automation programs are all intended to move pallets between a magazine and predefined chucks in one or more machines. When you work with pallets, the preparations are the same whether you are producing 100 different parts or 100 parts of the same type.

When you have made the preparations for production in WorkShopManager, the operation of lifting the pallet into and out of the machine is not complicated at all.

WorkShopManager has been developed …

… to simplify the preparations for production in automatic cells

… to maximise production capacity

… to create the greatest possible flexibility

… to ensure the security of the process.

WorkShopManager is equally useful for manual loading of pallets in a single machine as for automatic production in a seven-axis linear robot cell, since this software grows with the task. Start with a single machine on the lowest level and then upgrade as your business develops.

WORKSHOPMANAGER SECURES THE PROCESS

The core of the system is a central database. All clients, machines and automation devices are in constant contact with the database.

WorkShopManager links all machining processes together in a controllable and clearly-arranged production system. All machining data is available to the machines and can easily be transferred to the right machine at the right moment.

► User-friendly – necessary data are entered quickly and in a structured manner

► Quick, precise overview of the entire process chain

► Great flexibility – the order of priority can be changed at any time

► Simpler, safer preparation of automatic cells. Information about workpieces, magazine positions, offset values and NC programs is always available.

► The risk of errors due to the human factor is minimised.

► Generates shorter lead times

► Greater process security

► Offers the possibility of automated one-piece production

The user-friendly procedure in WorkShopManager can be summarised in three stages: preparation, execution and monitoring.

PREPARATIONS

All information about the machining is brought together in WorkCenter, which communicates with the database.

In the database, a manufacturing order is created. This may contain:
- an operation list
- an NC program for the operation in question
- documents linked to the operations
- pallet identity
- offset values

WorkCenter does not produce its own data; it compiles information for every machining operation.
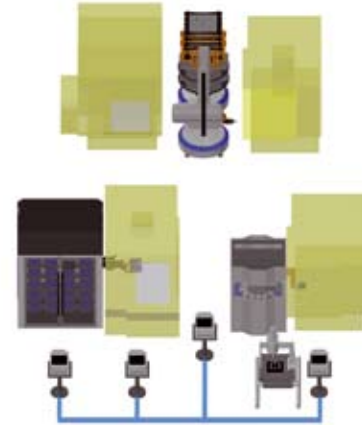
EXECUTION

The necessary information is fetched from the database and transferred to the machines.

How the relevant order is executed depends on the type of cell…

… manual creation of a batch with BatchBuilder, or

… automatic execution with CellManager.

A batch is a complete machining operation, containing several manufacturing orders with their magazine positions. This type of magazine loading can be regarded as static, since machining of the entire batch must be completed before changes can be made in the magazine.

With CellManager, each individual job is started according to a priority list. Here, you can change priorities and magazine content while the machine is working.
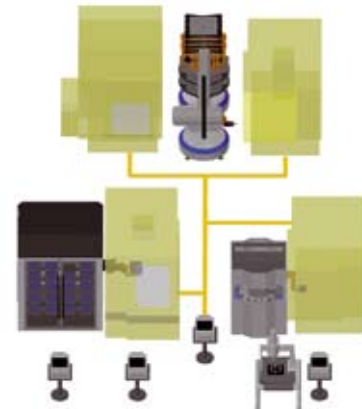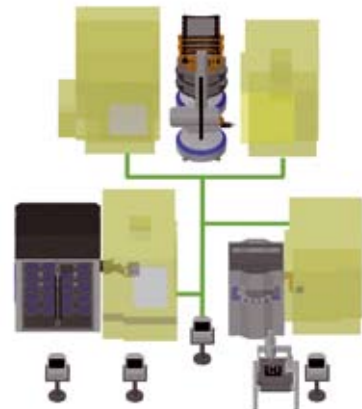
MONITORING

Job status and machining times are recorded and stored in the database.

Reports such as machining time per workpiece can be generated and transferred to a planning system.

Alarm messages from machines and robots can be transferred via e-mail or SMS.

Order creation

In WorkCenter, manufacturing orders can be organised in accordance with the company's standard order structure.

A manufacturing order covers one or more identical parts which may be located on one or more pallets. The same pallet may also be carrying different parts, each with its own manufacturing order. This open structure offers great flexibility when creating a manufacturing order.

Article register

The operation list can be saved as an article for use if the part needs to be produced again. If a new order is created, based on an article, every machining step and NC program will be present in the new production order.

▶ Simpler and quicker

▶ Reduces the risk of data entry errors

Option –planning system integration

When information is imported from ERP/MPS, a manufacturing order is created automatically.

What then remains to be done is to place the workpiece on its pallet, to identify it and to fetch any offset values from the measuring machine.

Up-to-date machining information is fed back to ERP/MPS for evaluation and post-calculation.
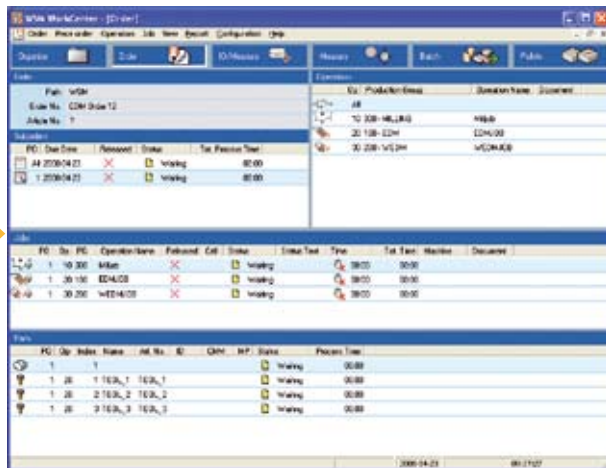
Operation lists

In an operation list, the order of the various machining steps is defined. One operation must be complete before the next operation can start.

Documents

Documents – machining instructions, reports, images, etc. – can be linked to every operation. This allows the operator to make use of the information directly at the machine.
- ► No searching for information
- ► The information is linked to the right machining operation
- ► If the operation has been saved as an article, information from previous occasions will be available.

Linked orders

For an EDM operation, electrodes need to be produced. Linking electrode manufacturing with the EDM operation minimises the risk of mistakes. As soon as the electrode blank has been identified on its holder, the electrode and the EDM operation are linked.
- ► The right electrode for the right EDM operation
- ► High process safety

Status

The status – waiting / machining / ready – of every object in the magazine is recorded in the database.

Identify

The next step is to link the physical objects with their manufacturing orders.

The object is mounted on a pallet with a code carrier which is recorded in the database.
All information held in the database for that object can now be fetched.

CCM integration

If required, a measuring machine can be used before machining to determine offset values (X-Y-Z-C) for the workpiece on its pallet.

The measurements are stored in a neutral format. They are then adapted and transferred to the machine tool.
- ► Reduces the risk of data entry errors

Multi-pallet function

There is no need to measure objects on multi-pallets. Every fixture on the pallet has a known position, and this automatically gives the objects the correct offset values.
- ► With this function, users can create their own multi-pallets
- ► Especially suitable for milling applications

Quality control

When the measuring machine has performed a geometrical inspection of the object and sent the status to the database, the object can be barred or released for further operations.
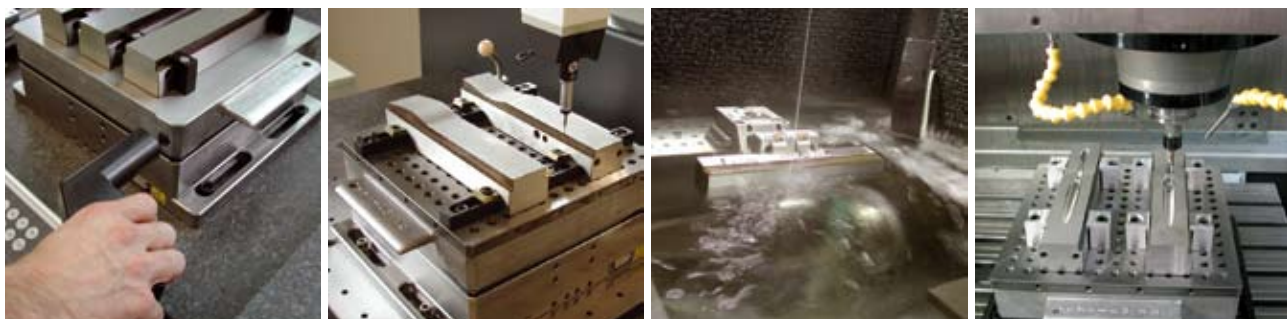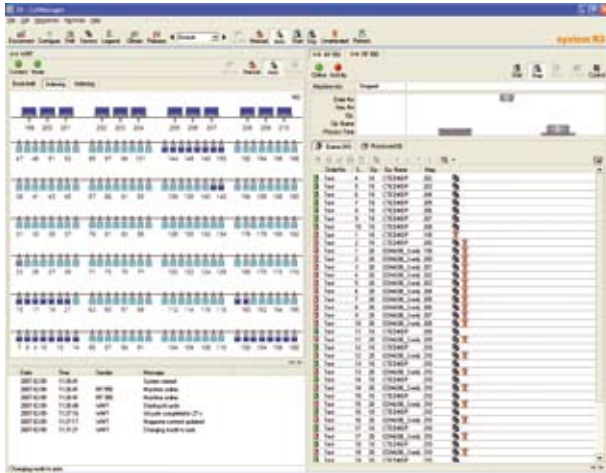
CELLMANAGER

CellManager, which requires the pallets to have an identification system, manages the entire robot cell, handling all necessary data automatically. The cell is controlled entirely from the screen.

- Starts the robot's ID cycle.
- Manages the pallet ID codes and magazine positions.
- Displays the magazine content graphically.
- Creates priority lists.
- Automatically starts available jobs in the order of the priority list.
- Updates the information in the database with the status and machining times of individual orders.

Identification system
Whether you work with visual identification such as labels, or an electronic system with inductive readers and ID transponders, CellManager ensures the security of the process.

Chaotic magazine loading
On loading, the pallet is placed at the first available free magazine position.

CellManager Multi
Manages a robot cell consisting of one robot and more than one machine, regardless of the type and make of the machines.

Easy to change priorities
The order of priority of jobs can be changed while the machine is working.

Easy to insert new jobs
Finished workpieces can be lifted out of the magazine and new ones loaded into it, while the machine is working.

Manually loaded machines

Chaotic loading of a machine table with multiple chucks.
After manual scanning of the machine table, a job list is created in CellManager. The jobs are then done in the sequence in the job list – one program at a time.
- ► The job sequence can be changed
- ► Automatic monitoring

Robot-loaded machines

Chaotic loading of the magazines
After automatic scanning of the magazine, a job list is created in CellManager.
The jobs are then done in the sequence in the job list – one program at a time.
- ► The job sequence can be changed
- ► Automatic monitoring
- ► The magazines can be lifted out and loaded while the machine is working.

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Option – automatic electrode selection (AES)
Automatically chooses the best electrode for the machining operation. Used to limit the number of electrodes when producing identical workpieces. However, for this function it is necessary to make an estimate of the electrode wear with coarse, intermediate and fine machining.

You can, for instance, choose to "downgrade" the electrodes after the first bit. For the second bit you then use the first intermediate electrode for the coarse machining, the first fine electrode for the intermediate machining, and a new electrode for the fine machining.

Option – cutting tool control (CTC)
This function checks that all cutting tools that are needed for the milling operatins are available before machining starts.

Option – RobotManager
Option for cells with industrial robot: CellManager handles communication between the various units of the cell, coordinates all activities, and monitors the status of every operation.
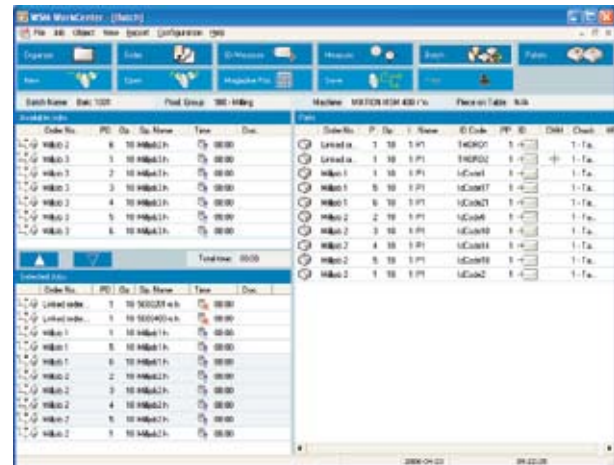
BatchBuilder

BatchBuilder is a WorkCenter function for creating a complete machining operation – en batch – made up of several individual orders. You choose a number of orders and add magazine positions. The function then generates a main program with associated subprograms. The batch is transferred to the right machine and when the machine is started, the individual machining operations are executed – from the beginning to the end.

Magazine positions
The NC programs that were linked to the respective operation do not include the magazine positions. This information therefore must therefore be added when the batch is created. This can be done manually or the information can be generated automatically.
► Simplified NC-programming.

Loading list
When the batch has been created, you can print out a loading list which describes the magazine positions of the objects.
► Less risk of loading at the wrong magazine position

Transfer of NC programs
When creating the batch, you choose the machine or the cell that you want to perform the machining operation. The complete information is then transferred via the network. The magazines are loaded according to the loading list and the machining operation can start.
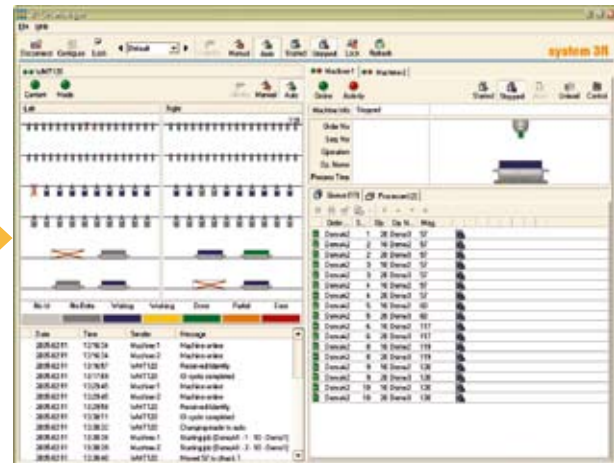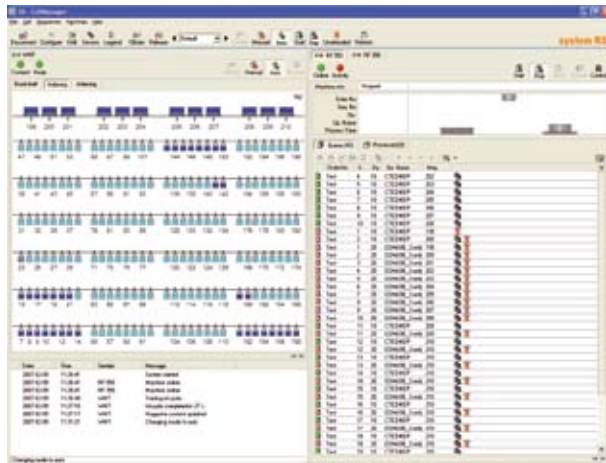
CellManager

CellManager maintains constant contact with the machines and monitors what is happening in the cell.

- When a machining operation starts and ends
- What operation is being done
- What object is in the machine
- Messages coming from the maskin

Option – AlarmServer

Alarm messages from the machine and the robot can be transferred via e-mail or SMS.

WorkCenter

All information about the various operations is saved in the database. WorkCenter makes it possible to use this information wherever you happen to be.

Reporting

Reports such as machining time per part can be created and transferred to a production planning system (PPS).

Status

WorkCenter keeps track of what is to be machined, and on which machine, as well as monitoring the status of jobs.

Option –planning system integration

Up-to-date machining information can be automatically fed back to ERP/MPS for evaluation and post-calculation.

MODULES IN WORKSHOPMANAGER

| WorkCenter	Description
Basic client/server package	SQL-server, 1 client, 1 machine licence
Multi-cell licence	When additional WorkCenter installation is needed
BatchBuilder multi-machine licence	When integrating an additional machine into WorkShopManager
Option: identification	
BatchBuilding software for manual scanning	
BatchBuilding software for automatic scanning	
ERP/MPS interface	

CellManager	Description
CellManager 3	
Manual CellManager 3	Manual applications
Automatic electrode selection (AES)	
Cutting tool control (CTC)	
Machine processors for robot cells	
Machine processors for manual cells	

AlarmServer	Description
AlarmServer	Sends alarm messages from an automatic cell as an e-mail or SMS (text) messsage. One AlarmServer covers the entire workshop.
Alarm client for WorkCenter	One alarm client per cell is needed for additional cells
Alarm client for CellManager	For advanced robot alarm function
GSM alarm transmitter	bla, bla, bla

Code carrier	Description
ID reader 665 with pistol-grip antenna	
ID reader 665 with simple antenna	
Universal reader	Reads both Trovan and EM-Marin chips
Add On Scanner Kit	
Automatic Scanner Kit	
Hand scanner (HS)	Manual scanning
Fixed scanner (AOS)	Fixed scanner
Robot scanner (RS)	The robot scans the magazines
Magazine scanner (MS)	Fixed scanner at every magazine position

EXAMPLES OF APPLICATIONS

Die-sinking EDM with CMM	ID-system	Function
Electrode changer + table chuck	–	BatchBuilder
Electrode changer + table chuck	HS	BatchBuilder
Electrode changer + pallet changer	–	BatchBuilder
Electrode changer + pallet changer	AOS	BatchBuilder
Electrode changer + WorkPal	–	BatchBuilder
Electrode changer + WorkPal	RS	BatchBuilder
Electrode and pallet changer	–	BatchBuilder
Electrode and pallet changer	AOS	BatchBuilder
WorkPartner/WorkMaster	–	BatchBuilder
WorkPartner/WorkMaster	RS	BatchBuilder
WorkPartner/WorkMaster	RS	CellManager
WorkMaster/WorkMaster Linear	LS+QS	CellManager
Six-axis industrial robot	LS	CellManager
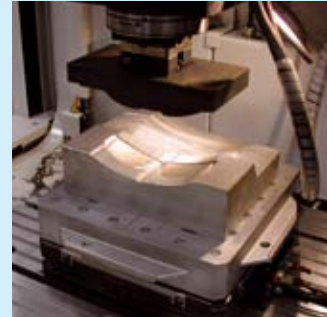
Wire EDM with CMM	ID-system	Function
Table chucks	–	BatchBuilder
Table chucks	HS	CellManager Light
Pallet changer	–	BatchBuilder
Pallet changer	HS/AOS	BatchBuilder
WorkPal	–	BatchBuilder
WorkPal	RS	BatchBuilder
WorkPal	RS	CellManager
WorkPartner/WorkMaster	–	BatchBuilder
WorkPartner/WorkMaster	RS	BatchBuilder
WorkPartner/WorkMaster	RS	CellManager
WorkMaster/WorkMaster Linear	LS+QS	CellManager
Six-axis industrial robot	LS	CellManager

Milling and grinding	ID-system	Function
Manual loading	–	BatchBuilder
Manual loading	HS	BatchBuilder
Pallet changer	–	BatchBuilder
Pallet changer	HS/AOS	BatchBuilder
WorkPal/WorkPartner/WorkMaster	–	BatchBuilder
WorkPal/WorkPartner/WorkMaster	RS	BatchBuilder
WorkPal/WorkPartner/WorkMaster	RS	CellManager
WorkMaster/WorkMaster Linear	LS+QS	CellManager
Six-axis industrial robot	LS	CellManager

BASIC CONFIGURATIONS

WorkShopManager is equally useful for manual loading of pallets in a single machine as for automatic production in a seven-axis linear robot cell, since it grows with the task. Start with a single machine on the lowest level and then upgrade as your business develops.

	WorkCenter	CellManager	ID system
BatchBuilder	X		
Batch ID			
CellManger			
AlarmServer			
Option ERP/MPS	X	X	
Option CTC			
Option AES			

Level 1

Batch management
- One or more machines
- A new licence is needed for every new machine

	WorkCenter	CellManager	ID system
BatchBuilder			
Batch ID	X		X
CellManger			
AlarmServer			
Option ERP/MPS	X	X	
Option CTC			
Option AES			

Level 2

Batch management with ID system
- One or more machines
- A new licence is needed for every new machine

	WorkCenter	CellManager	ID system
BatchBuilder			
Batch ID			
CellManger	X	X	X
AlarmServer		X	
Option ERP/MPS	X	X	
Option CTC		X	
Option AES		X	

Level 3

Management of a complete cell
- One or more machines

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