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Introduction

- Drehen can be considered as bottleneck of the process.
- Routings are using a generic work center called T1DREH (existing) which is replaced by a line as T1.1, etc. at the moment of capacity planning of the planned orders.
- It is considered that the conversion of planned orders into production orders (released) proceeds without further changes in work centers.
- At the moment of change over the External system will assign the Actual Machine to the order and this will be used for the confirmation process but it is no longer relevant for capacity planning.
- For CNC there are three groups of machines:
 - Standard
 - New Production Line
 - OKUMA
- Each group is composed by several Lines (not defined yet in SAP)
- Each Line has several specific equipment (which are not required for capacity planning but only for production execution)
- Different Groups of machines will require different production versions.

Master Data

GENERIC WORK CENTER

Creation of Generic Drehen Work center (this is not required as already exists)

Transaction CR01

Change Work Center: Basic Data

Plant: 0100
Work center: T1DREH
General Drehen WC

Basic Data | Default Values | Capacities | Scheduling | Costing | Technology

General Data

Work Center Category: 0001 Machine
Person responsible: 001 Responsible Taller Motores Planta I
Location:
QDR system:
Supply Area:
Usage: 009 All task list types
 Backflush

Standard Value Maintenance

Standard value key: SAP1 Normal production

Standard Values Overview

Key Word	Rule for Maint.	K...	Description
Setup	no checking		
Machine	no checking		
Labor	no checking		

Generic Bohren Work Center

Change Work Center: Basic Data

Plant: 0100
Work center: T1B0HR
General Bohren WC

Basic Data | Default Values | Capacities | Scheduling | Costing | Technology

General Data

Work Center Category: 0001 Machine
Person responsible: 001 Responsible Taller Motores Planta I
Location:
QDR system:
Supply Area:
Usage: 009 All task list types
 Backflush

Standard Value Maintenance

Standard value key: SAP1 Normal production

Standard Values Overview

Key Word	Rule for Maint.	K...	Description
Setup	no checking		
Machine	no checking		
Labor	no checking		

ROUTING FOR STANDARD GROUP OF MACHINES

Both Work centers are used in the routing (i.e. a production version for this group of machines)

Change Routing: Operation Overview

Material 30002423 Grp.Count6
Sequence 0

Op...	SOp	Work ce...	Plnt	Co...	Standar...	Description	L...	P...	Cl...	O...	P...	C...	S...	Base Quantity	U...	StdValuTxt1	U...	Activit...	Machine
0020		T1DREH	0100	PP01		Drehen Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	PCE		H		2,000
0030		T1B0HR	0100	PP01		Bohren Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	PCE		H		1,000

In the details of Operation 0020 we have 2 hours per piece for Drehen (bottleneck)

Change Routing: Operation Details

Material 30002423 Grp.Count6

Operation

Operation/Activity: 0020 Suboperation:

Work center / P1nt: T1DREH / 0100 General Drehen WC

Control key: PP01 Routing/Ref. op. set - internal proc.

Standard text key: Drehen Operation

Long text exists

Standard Values

Base Quantity: 1 Conversion of Units of Measure

Act./Operation UoM: PCE Header Unit Operat. UoM

1	PCE	<=>	1	PCE
---	-----	-----	---	-----

Break:

	Std Value	Un	Act. Type	Efficiency
Setup	<input type="text"/>	H		<input type="checkbox"/>
Machine	2,000	H		<input type="checkbox"/>
Labor	<input type="text"/>	H		<input type="checkbox"/>

Business Process:

For operation 0030, it is required only 1 hour per piece.

Change Routing: Operation Details

Material 30002423 Grp.Count6

Operation

Operation/Activity: 0030 Suboperation:

Work center / P1nt: T1B0HR / 0100 General Bohren WC

Control key: PP01 Routing/Ref. op. set - internal proc.

Standard text key: Bohren Operation

Long text exists

Standard Values

Base Quantity: 1 Conversion of Units of Measure

Act./Operation UoM: PCE Header Unit Operat. UoM

1	PCE	<=>	1	PCE
---	-----	-----	---	-----

Break:

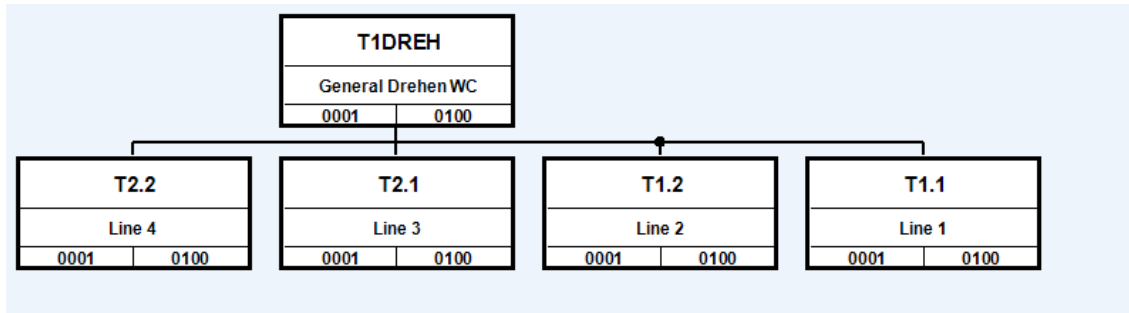
	Std Value	Un	Act. Type	Efficiency
Setup	<input type="text"/>	H		<input type="checkbox"/>
Machine	1,000	H		<input type="checkbox"/>
Labor	<input type="text"/>	H		<input type="checkbox"/>

Business Process:

HIERARCHY

Transaction CR21 - Creation

Previously are created all lines of this group using CR01 and then they are assigned, together with T1DREH, to a hierarchy called Plant. Using the hierarchy, one can summarize capacity requirements for all lines in the generic Work Center.



This relationship can also be seen in the Work Center for each line (CR02)

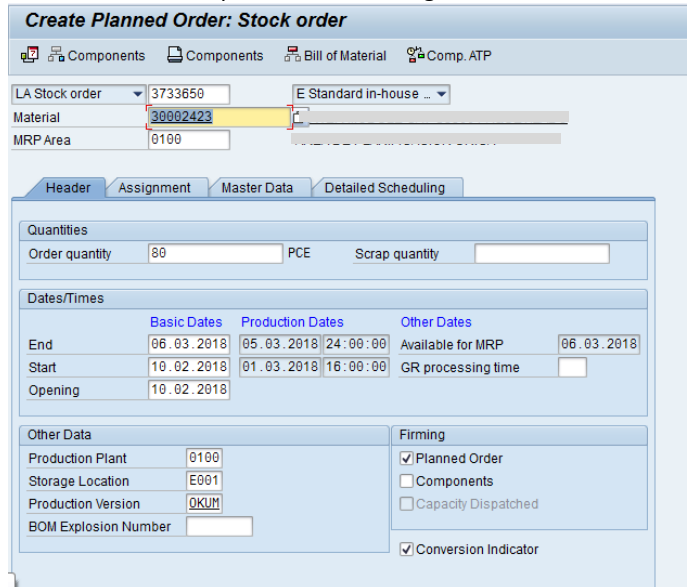
OKUMA LINE

This is an example of an alternative group of machines that can be used also for the production. We create a generic Work Center for Okuma:

Key Word	Rule for Maint.	K...	Description
Setup	no checking		
Machine	no checking		
Labor	no checking		

Planned Order Creation

For this example, Planned order are created manually using the transaction MD11: Several orders for the standard Line (T1DREH) and one order for Okuma, to show how this order can be assigned to the standard (T1DREH) when we are still on planned orders stage.



Create Planned Order: Stock order

Components Components Bill of Material Comp. ATP

LA Stock order 3733650 E Standard in-house ...

Material 30002423

MRP Area 0100

Header Assignment Master Data Detailed Scheduling

Quantities

Order quantity 80 PCE Scrap quantity

Dates/Times

	Basic Dates	Production Dates	Other Dates
End	06.03.2018	05.03.2018 24:00:00	Available for MRP 06.03.2018
Start	10.02.2018	01.03.2018 16:00:00	GR processing time
Opening	10.02.2018		

Other Data

Production Plant 0100

Storage Location E001

Production Version OKUM

BOM Explosion Number

Firming

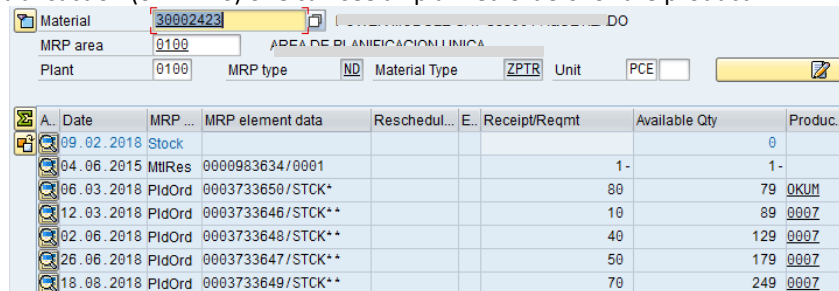
Planned Order

Components

Capacity Dispatched

Conversion Indicator

In the MD04 transaction (or MD16) one can see all planned orders for the product:



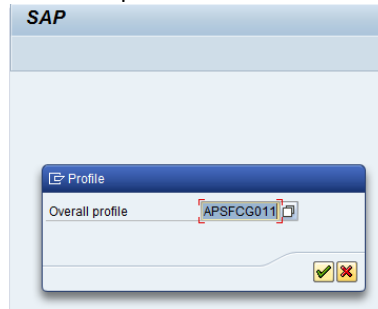
A.	Date	MRP ...	MRP element data	Reschedul...	E.	Receipt/Reqmt	Available Qty	Produc...
	09.02.2018	Stock					0	
	04.06.2015	MIRes	0000983634/0001			1-	1-	
	06.03.2018	PldOrd	0003733650/STCK*			80	79	OKUM
	12.03.2018	PldOrd	0003733646/STCK**			10	89	0007
	02.06.2018	PldOrd	0003733648/STCK**			40	129	0007
	26.06.2018	PldOrd	0003733647/STCK**			50	179	0007
	18.08.2018	PldOrd	0003733649/STCK**			70	249	0007

Capacity Planning

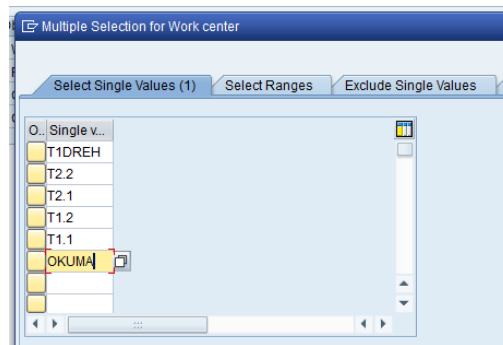
This is done using transaction CM21 or CM25 (more flexible as one can select the profile). The Planning will be executed using the planned orders.

We use transaction CM25 and select the profile SAPFCG011, because this profile has three charts:

- Upper chart: work center view of planning
- Mid chart: dispatched (planned) orders view as a Gantt chart
- Lower chart: pool of orders to be dispatched.



We have also created a Variant with all relevant work centers for this step of the production process (drehen and bohren)



The Capacity planning table is displayed, initially with all planned orders in the pool and using the generic work center (T1DREH or OKUMA)

Planning Table: SAPFCG011 Finite scheduling forw./all functs.activ

GrafObj.
 Capacity
 Order
 Operation
 Strategy
 Plan.log.

Work Centers						February'18			
Work ctr	Cap.cat	Wk.cnt.description	Cap.description	Num.ind.c		CW 07	CW 08	CW 09	CW 10
OKUMA	001	General Drehen &		4					
T1.1	001	Line 1		4					
T1.2	001	Line 2		4					
T1DREH	001	General Drehen W		4					
T2.1	001	Line 3		4					
T2.2	001	Line 4		4					

Orders (dispatched)								February'18				
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu		CW 07	CW 08	CW 09	CW 10

Orders (pool)								February'18				
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu		CW 07	CW 08	CW 09	CW 10
D	30002423		3733646	0020	T1DREH	001	10,000					
D	30002423		3733647	0020	T1DREH	001	50,000					
D	30002423		3733648	0020	T1DREH	001	40,000		3733648			
D	30002423		3733649	0020	T1DREH	001	70,000		3733649			
D	30002423		3733650	0010	OKUMA	001	80,000					3733650

Using drag & drop one can dispatch the desired operation to the line where it should be executed. We still keep the Okuma order without dispatching.

Planning Table: SAPSFCG011 Finite scheduling forw./all functs.activ

GrafObj. Capacity Order Operation Strategy Plan.log.

Work Centers					February'18		
Work ctr	Cap.cat	Wk.cnt.description	Cap.description	Num.ind.c	CW 07	CW 08	CW 09
OKUMA	001	General Drehen &		4			
T1.1	001	Line 1		4	3733648	3733649	
T1.2	001	Line 2		4	3733647		
T1DREH	001	General Drehen W		4			
T2.1	001	Line 3		4	37		
T2.2	001	Line 4		4			

Orders (dispatched)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 07	CW 08	CW 09	CW 10
0	30002423		3733648	0020	T1.1	001	40,000	3733648			
0	30002423		3733649	0020	T1.1	001	70,000		3733649		
0	30002423		3733647	0020	T1.2	001	50,000		3733647		
0	30002423		3733646	0020	T2.1	001	10,000		37		

Orders (pool)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 07	CW 08	CW 09	CW 10
0	30002423		3733650	0010	OKUMA	001	80,000				3733650

Using the sorting process by date in the mid chart, we have the orders in a sequence based on initial date, just like a Gantt chart of activities.

Planning Table: SAPSFCG011 Finite scheduling forw./all functs.activ

GrafObj. Capacity Order Operation Strategy Plan.log.

Work Centers					February'18			
Work ctr	Cap.cat	Wk.cnt.description	Cap.description	Num.ind.c	CW 07	CW 08	CW 09	CW 10
OKUMA	001	General Drehen &		4				
T1.1	001	Line 1		4	3733648	3733649		
T1.2	001	Line 2		4	3733647			
T1DREH	001	General Drehen W		4				
T2.1	001	Line 3		4	37			
T2.2	001	Line 4		4				

Orders (dispatched)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 07	CW 08	CW 09	CW 10
0	30002423		3733648	0020	T1.1	001	40,000	3733648			
0	30002423		3733647	0020	T1.2	001	50,000		3733647		
0	30002423		3733646	0020	T2.1	001	10,000		37		
0	30002423		3733649	0020	T1.1	001	70,000		3733649		

Orders (pool)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 07	CW 08	CW 09	CW 10
0	30002423		3733650	0010	OKUMA	001	80,000				3733650

CHANGING THE GROUP OF MACHINES

Let assume that there is some issue on OKUMA (Technical or capacity) and we need to transfer this order from OKUMA to the standard group. We select the order on CM25 and then click on Order . Here, we can change the production version and pick the 0007 (Standard)

Ver.	Text	LSzeFrom	LotSize	Valid from	Valid to
0001	Vers. 0001	0,000	0,000	01.01.2009	30.06.2010
0002	Vers. 0002	0,000	0,000	01.07.2010	31.01.2011
0003	Vers. 0003	0,000	0,000	01.02.2011	30.06.2011
0004	Vers. 0004	0,000	0,000	01.07.2011	30.11.2013
0005	Vers. 0005	0,000	0,000	01.12.2013	31.12.2014
0006	Vers. 0006	0,000	0,000	01.01.2015	31.08.2015
0007	Vers. 0007	0,000	0,000	01.09.2015	31.12.9999
OKUM	Okuma Version	0,000	0,000	09.02.2018	31.12.9999

After saving, we go back to the CM25 screen; the planned order has now the T1DREH as generic work center and can be dispatched to any of the Lines (T1.1, T1.2 etc.) of this Group.

Work ctr	Cap.cat	Wk.cntnr.description	Cap.description	Num.ind.ca	February'18			
					CW 06	CW 07	CW 08	CW 09
OKUMA	001	General Drehen &		4				
T1.1	001	Line 1		4		3733648	3733649	
T1.2	001	Line 2		4		3733647		
T1DREH	001	General Drehen W		4				
T2.1	001	Line 3		4		37		
T2.2	001	Line 4		4				

Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	February'18			
								CW 06	CW 07	CW 08	CW 09
0	30002423		3733648	0020	T1.1	001	40,000		3733648		
0	30002423		3733647	0020	T1.2	001	50,000		3733647		
0	30002423		3733646	0020	T2.1	001	10,000		37		
0	30002423		3733649	0020	T1.1	001	70,000		3733649		

Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	February'18			
								CW 06	CW 07	CW 08	CW 09
0	30002423		3733650	0020	T1DREH	001	80,000		37 33650		

Let assume that we dispatch the order to Line 4 (T2.2)

Planning Table: SAPSFCG011 Finite scheduling forw./all functs.activ

Graf.Obj. Capacity Order Operation Strategy Plan.log

Work Centers					February'18			
Work ctr	Cap.cat	Wk.cnt.description	Cap.description	Num.ind.ca	CW 06	CW 07	CW 08	CW 09
OKUMA	001	General Drehen &		4				
T1.1	001	Line 1		4		3733648	3733649	
T1.2	001	Line 2		4		3733647		
T1DREH	001	General Drehen W		4				
T2.1	001	Line 3		4		37		
T2.2	001	Line 4		4		3733650		

Orders (dispatched)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 06	CW 07	CW 08	CW 09
0	30002423		3733648	0020	T1.1	001	40,000		3733648		
0	30002423		3733647	0020	T1.2	001	50,000		3733647		
0	30002423		3733646	0020	T2.1	001	10,000		37		
0	30002423		3733649	0020	T1.1	001	70,000		3733649		
0	30002423		3733650	0020	T2.2	001	80,000		3733650		

Orders (pool)								February'18			
Spl	Material	Prio	Order	Op.	Work ctr	Ca	Operation qu	CW 06	CW 07	CW 08	CW 09

Capacity Evaluation

Using the capacity evaluation tool (CM01), one can revise the capacity load at line level or even at a hierarchy level. We can select the generic Work Center

Capacity Planning: Selection

Standard overview Detailed cap. list Variable overview

Operator

Work center: T1DREH

Capacity planner group: []

Plant: 0100

In the menu we select Setting → General

Capacity Planning: Selection

Standard overview Detailed cap. list Variable overview

Operator

Work center: T1DREH

Capacity planner group: []

Plant: 0100

Settings menu: General..., Graphics, Evaluations, EXCEL interface...

Here the Accumulation or Reqmts and Capacity are selected, under Hierarchy.

Finally, the capacity load is displayed for the Generic Work Center, summarizing up the load at the different lines.

Capacity Planning: Standard Overview

Cap. details/period

Work center: T1DREH General Drehen WC Plant: 0100
Capacity cat.: 001 Machine

Week	Requirements	AvailCap.	CapLoad	RemAvailCap	Unit
06.2018	0,00	768,00	0 %	768,00	H
07.2018	381,22	2.304,00	17 %	1.922,78	H
08.2018	118,78	2.304,00	5 %	2.185,22	H
09.2018	0,00	2.304,00	0 %	2.304,00	H
10.2018	0,00	2.304,00	0 %	2.304,00	H
11.2018	0,00	2.304,00	0 %	2.304,00	H
12.2018	0,00	2.304,00	0 %	2.304,00	H
13.2018	0,00	1.920,00	0 %	1.920,00	H
14.2018	0,00	2.304,00	0 %	2.304,00	H
15.2018	0,00	2.304,00	0 %	2.304,00	H
Total >>>	500,00	21.120,00	2 %	20.620,00	H

Conversion into Production Orders

A very important step is converting the dispatched planned orders into production orders; we know that some operations in the planned orders have been changed (by dispatching them to work centers different from the generic work center) so it is important to know if the production order inherits these changes:

The screenshot shows the 'Display Planned Order: Stock order' interface. It includes fields for 'LA Stock order' (3733648), 'Material' (30002423), and 'MRP Area' (0100). The 'Detailed Scheduling' tab is active, showing 'Dates/Times' and 'Parameters'. The 'Scheduling Result Planned Order' table is as follows:

Seq.	Op.	Su...	Work Ce...	Start Date	Time	End Date	Time	C...	Description	C...
0	0020		T1_1	12.02.18	00:00	15.02.18	08:00	001	Machine	80
0	0030		T1BOHR	15.02.18	08:00	16.02.18	24:00	001	Machine	40

We want to know if this change remains after the planned order is converted.

Using the transaction MD16, for material or MRP controller, we get the list of orders:

The screenshot shows the 'Display Planned Orders' transaction. It includes fields for 'Material' (30002423), 'Plant' (0100), and 'MRP ctrl' (004). Below the fields is a table with columns: Plnd open., OrderStart, Ord.finish, Order quantity, Fi..., P S, Planned or..., Or..., A, Sales Order, Item, Sc... The table contains the following data:

Plnd open.	OrderStart	Ord.finish	Order quantity	Fi...	P S	Planned or...	Or...	A	Sales Order	Item	Sc...
15.02.2018	15.02.2018	14.03.2018	10	✓	E E	3733646	LA			0	0
12.02.2018	12.02.2018	28.05.2018	40	✓	E E	3733648	LA			0	0
13.02.2018	13.02.2018	26.06.2018	50	✓	E E	3733647	LA			0	0
16.02.2018	16.02.2018	21.08.2018	70	✓	E E	3733649	LA			0	0
12.02.2018	12.02.2018	12.09.2018	80	✓	E E	3733650	LA			0	0

We select one (or several) production orders and click on **Convert to Production Order**.

The system shows the production order, when we can verify that the selection of the line (T1.1 in this case), made during the capacity planning, remains after the conversion.

The screenshot shows the 'Production Order Create: Operation Overview' interface. It includes fields for 'Order' (%0000000001), 'Material' (30002423), 'Plant' (0100), and 'Sequence' (0). The 'Operation Overv.' table is as follows:

Op.	SOp	Start	Start	Work Ce...	Plant	Co...	StdText	Operation short text	Text	SysStatus	User Stat
0020		12.02.2018	00:00:00	T1_1	0100	PP01		Drehen Operation		CRTD_DSPT	
0030		15.02.2018	08:00:00	T1BOHR	0100	PP01		Bohren Operation		CRTD	

