

Consulting Solution

# „Lean Manufacturing – Planning & Control“

Georg Saiko

SAP Deutschland SE & Co. KG



**SAP**

# Agenda

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**1. Content & Targets of Consulting Solution**

**2. Comprised Functions and Enhancements**

**3. Summary**

# Content of Consulting Solution

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- Consulting Solution “Lean Manufacturing – Planning & Control” is an Add-on in SAP ERP
  - No interfaces necessary
  - Direct access to data needed
  - Optimized locking of orders handled
  - Separate Customizing to adjust solution
  - Separate name space /LMPC
- Comprised enhancements and features use only /LMPC transactions
- Delivery to customer via development transport



# Targets of Consulting Solution

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- Centralization and integration of functions belonging together (cockpit solution)
- Support of classic planning approach (manufacturing planning & control) as well as heijunka
- Solution supports all kind of production order types: production orders, process orders, repetitive mfg. orders and plant maintenance / project system
- More transparency through visualization
- Easy to handle (ergonomic), e.g. via user specific profiles in customizing
- Flexible and easy to enhance with customer-specific function modules

# Agenda

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# Solution Content LMPC

## Lean Manufacturing

- Levelling (Heijunka) with own transaction
- Production Schedule (Rhythm Wheel)
- Integration of detailed scheduling and Kanban



## Detailed Scheduling

- Enhancement of graphical planning table via ALV grid, with access to all relevant data
- Chart to visualize capacity usage and inventory over time
- Full control for all types of mfg. orders:
  - Sequencing, Scheduling & Rescheduling
  - Capacity & component availability
  - Alerts and visualization of conflicts

**The Consulting Solution LMPC can be used for Lean AND Classic Manufacturing. Therefore it combines the best of two worlds – Push & Pull.**

# Features in detail - Levelling (Heijunka)

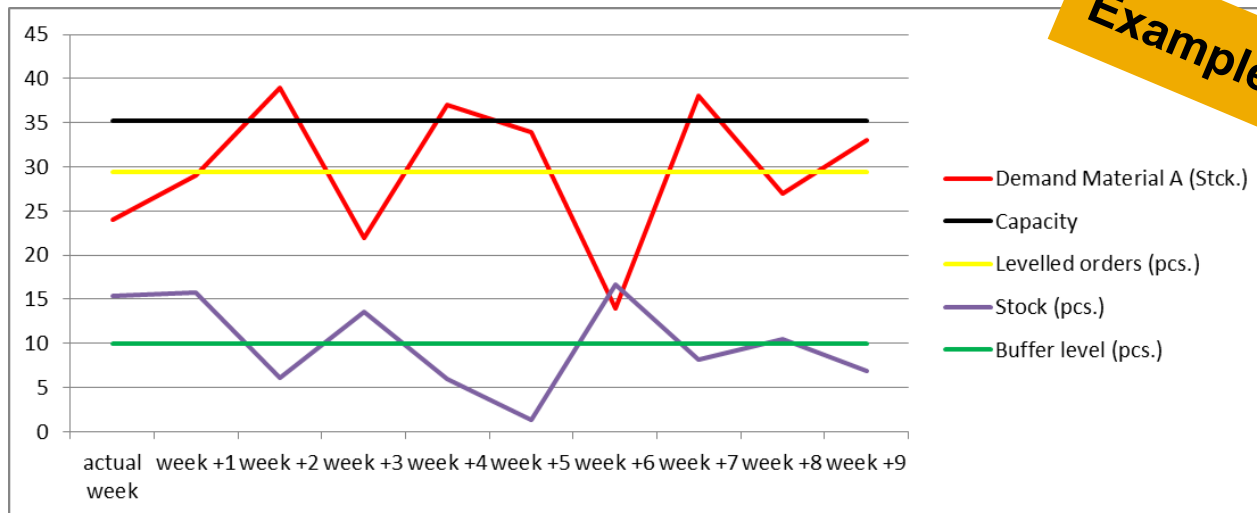
## Challenge:

Demands of manufacturing goods vary over time and result in inefficiencies:

- Bull-Whip Effect
- Fluctuations on lower levels of BOM
- Efficient use of capacities is not possible → causes short term ad-hoc reaction instead of long term optimization

## Solution:

- Levelling of replenishment items enables production to be more smooth and efficient
- Fluctuations on lower levels of BOM are levelled as well
- Minimization of Bull-Whip-Effect and inventory levels



# Levelling – how does it look & feel?

**LEAN - Levelling of planned orders**

Plant

**Material selection by material**  
Material  to

**Material selection by prod. version**  
Production line  to

**Material selection by routing usage**  
work center  to   
Routing type  to

**Material selection by sales document**  
Document number  to

**Material selection by time table usage**  
 Determine timetable automat.  
Work Center  to   
Timetable  to

**Selection/Regeneration of planned orders**  
Period  to   
Prod./basic dates   
Scheduling strategy

MRP Area

**Single steps**

- 1. Delete fixed pl. orders
- 2. MRP single level
- 3. Levelling
- 4. Create planned orders
- 5. MRP
- multi level
- single level

**MRP-Settings**

Create MRP list	1
Create purchase req.	2
Schedule lines	3
Planning mode	3
Scheduling	2

Plant	Work ctr	Material	Class	Func. type	Parameter	Para
				Leveling only		
1000	*	*	/LMPC/CL_NIVEL_FUNCTION_LIGHT	Leveling only		
1000	*	LMPC_FERT_01	ZQU_CL_NIVEL_FUNCTION	Leveling only		
1000	*	LMPC_FERT_02	ZQU_CL_NIVEL_FUNCTION	Leveling only		
1000	*	LMPC_TAA_F01	ZQU_CL_NIVEL_FUNCTION	Leveling only		
1000	*	LMPC_TAA_F02	ZQU_CL_NIVEL_FUNCTION	Leveling only		

**selection of levelling-relevant materials**

**definition of steps to be performed**

**selection of levelling period**

**parametrisation of levelling algorithm via user interface**



# Production schedule – rhythm wheel

- New master data: production schedule assigned to production line and production groups (blocks), comprising 1-n materials
- Assembly groups can be assigned per plant and production line, entering start / end time per day
- Changeover times can be minimized in advance, using the ideal sequence of materials

Definition of Production Schedule								
line	time	monday	tuesday	wednesday	thursday	friday	saturday	sunday
production line 1	06:00							
	07:00							
	08:00							
	09:00	material A	Free capacity (for orders with date)	material A	Free capacity (for orders with date)	material E		
	10:00							
	11:00							
	12:00	material B		material B		material F		
	13:00					material G		
	14:00							
	15:00	material C & D		material C & D		Planned Maintenance		
	16:00							
	17:00							
	18:00							
	19:00							
20:00								
21:00								
22:00								

production group for 1-n materials

definition start - end per production group (block)

# Creation of production schedules

## 1: Creation of assembly groups

LMPC_01 (LMPC_01)								
Ass. Group	IdentN...	SeqNo	Plant	Cl...	Char.	Char.Value	Material	F
LMPC_01	1	1	1000				LMPC_1	
LMPC_01	2	2	1000				LMPC_2	
LMPC_01	3	3	1000				LMPC_3	

## 2: Definition of blocks – assignment of production groups per weekday

Monday				
Bl...	P...	Assembly group	ID	
1	1	LMPC_F01		<input checked="" type="checkbox"/>

## 3: Definition of start / end-times and planning restrictions

Block time assignment

Start time	08:00:00
End time	24:00:00
Max. iteration	1

Change restrictions

Block Id	LMPC_F01#0001#1
Plant	1000
Assembly group	LMPC_F01
Planning type	C
min.	1
max.	3
Critical	<input checked="" type="checkbox"/>

# Creation of production schedules

## 3: Complete view of production schedule:

**Time table administration LMPC\_F01**

Create Timetable    Create prod. group

▼ Schedule information    Plant 1000 W.Cent.

- Configuration
  - Planning res    Default: planning res
  - Block time p    Default: block time p
- Validities
  - Maintain    Schedule mapping
- Time tables
  - ASDASFSA    asfasfaf
  - CLASS\_TEST
  - LMPC\_F01**    LMPC\_F01
  - TEST\_FPL
- Assembly groups
  - A1    Assembly group
  - A2    Assembly group A2
  - A3    Assembly group A3
  - BLOCK1    optimization with set
  - CLASS\_TEST
  - DEMO\_01
  - DEMO\_02
  - DEMO\_03
  - DEMO\_04
  - FBL1    Assembly block 1
  - FERT\_01
  - FERT\_02
  - FERT\_03
  - FERT\_04
  - JB001    JB001
  - JB002
  - JB003

**Monday**

Bl...	P...	Assembly group	ID
1	1	LMPC_F01	■

**Tuesday**

Bl...	P...	Assembly group	ID
1	1	LMPC_F02	■

**Wednesday**

Bl...	P...	Assembly group	ID
1	1	LMPC_F01	■

**Thursday**

Bl...	P...	Assembly group	ID
2	1	LMPC_F02	■

**Friday**

Bl...	P...	Assembly group	ID
2	1	LMPC_F01	■

**Saturday**

Bl...	P...	Assembly group	ID
2	1	LMPC_F02	■

**Sunday**

Bl...	P...	Assembly group	ID
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## The enhanced planning table – functions and features in a nutshell:

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- Enhancement of graphical planning table through ALV grid, with access to all relevant data (> 900 data columns, extendable according to customer's needs)
- Additional chart to visualize capacity usage and stock over time
- Many ways to sequence and reschedule orders
- Refresh und Save planning table without having to leave the transaction
- Menus and buttons to call other transactions and functions (can be adapted flexibly & and extended according to customer's needs)
- Production schedule for subdaily partition of available capacity
- Visualization of alerts and conflicts , e.g. if delivery date is exceeded etc.
- Solution can be adapted very flexible via customer specific functions and enhancements

# Look & Feel of the enhanced planning table:

The screenshot displays the SAP Planning Table interface for the date 25.01.2013 at 09:22:19. The main window shows a Gantt chart for Work Centers (LMPC\_F02\_001) and Orders (dispatched - GANTT chart). A secondary window titled 'Capacity load chart' shows a bar chart of capacity load percentage over a calendar week, with categories for FERT and PLAF, both scheduled and unscheduled. The bottom section shows a detailed table with columns for L.A., Action, Status, Lock, Seq. no., Work ctr, Order, Material, A, Cap. rem., Open yield, StckDS, Exc., Plant, Earliest start, Earl.start, Earliest finish, Erl.finish, Block Id, Timetabl., Ass. Group, and Bord.

**Capacity view**

**Stock level view**

**Visualization of order sequence**

**Alerts, e.g. for buffer level, constraints not met, etc.**

**flexible & adjustable menus and buttons**

**Sequencing according to different criteria (e.g. setup matrix)**

**Alle relevant data available (> 900 columns in ALV-Grid)**

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# Summary

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**This consulting solution extends the standard features in many ways:**

- Concept is **based on long term practical experience**
- Solution **supports planned orders, production orders, process orders and plant maintenance orders**
- Concept supports Push and Pull, as well as Heijunka
- Integration of **extended lean and planning table functions** within the cockpit-solution
- **Customer-specific enhancements possible** via BADIs
- **Combination of benefits from Push & Pull**

Thank you very much for your attention!

## Contact Data

**Georg Saiko**

SAP Deutschland AG & Co. KG  
Hasso-Plattner-Ring 7  
69190 Walldorf, Germany

M +49 151 16810047

E [Georg.Saiko@sap.com](mailto:Georg.Saiko@sap.com)

[www.sap.com](http://www.sap.com)





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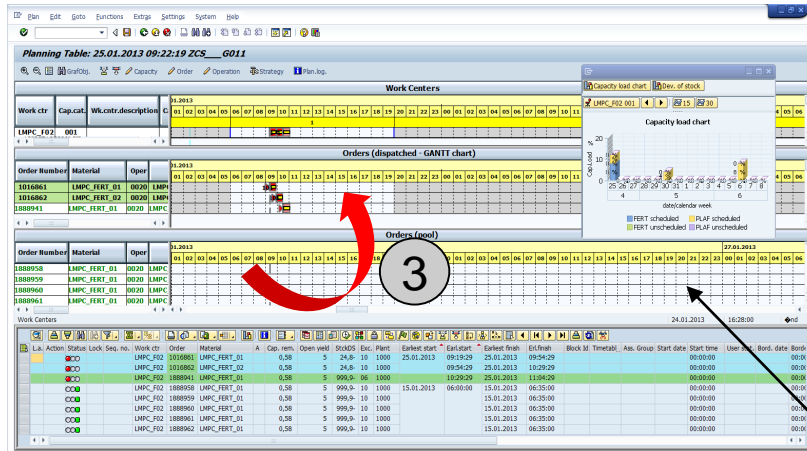
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# LMPC Heijunka Process Example: Levelling - Production Control & Scheduling with Kanban

3. Scheduling:  
Orders are sequenced in LMPC planning table according to defined rhythm wheel or other sequence



2



2. SAP LMPC shows kanban orders in overflow box (= order pool) after shipping (low & high runner)

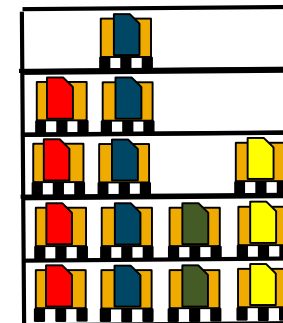
1

1. Customer call off, shipping (Kanban set empty)



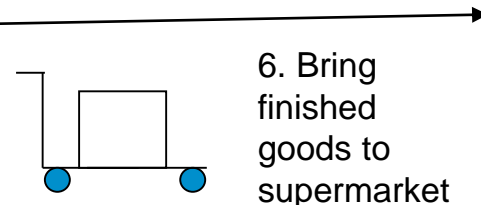
Dispatch

FG Supermarket



6. Bring finished goods to supermarket or dispatch

6



4. Bring Kanban to production pace maker process (e.g. printout of Kanban card)

4



5

5. Produce parts and add kanban cards