

DELMIA

Process Engineer

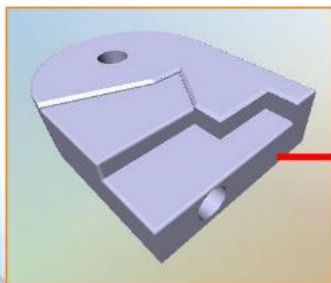
Product Presentation

Pavan Kumar G P

09-05-2005

Target in general

Product



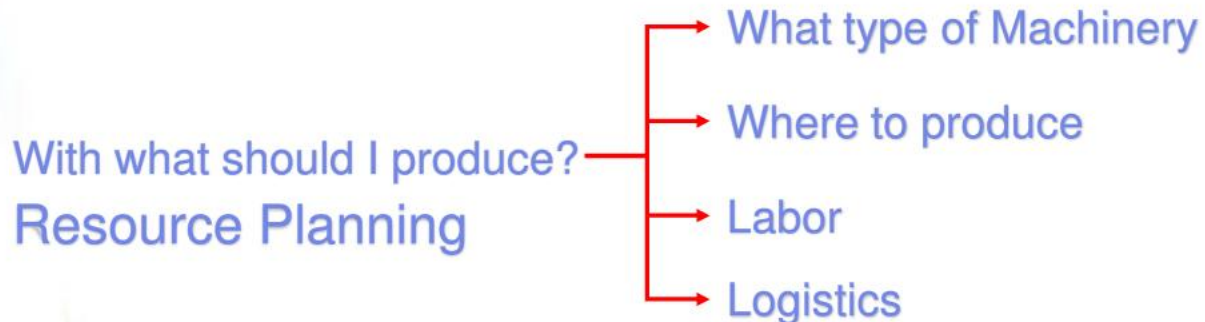
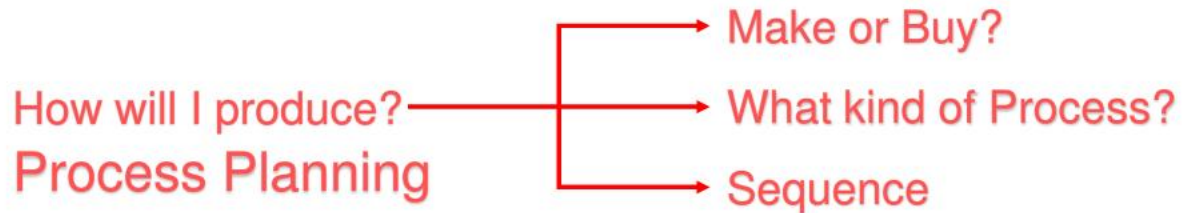
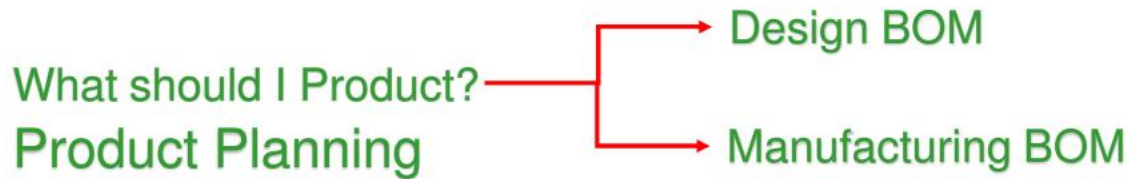
Production



Market



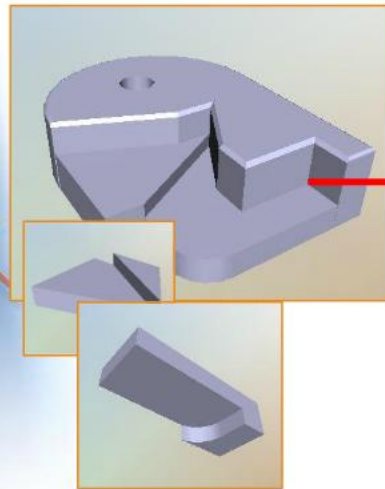
Planning to meet the Market's requirement



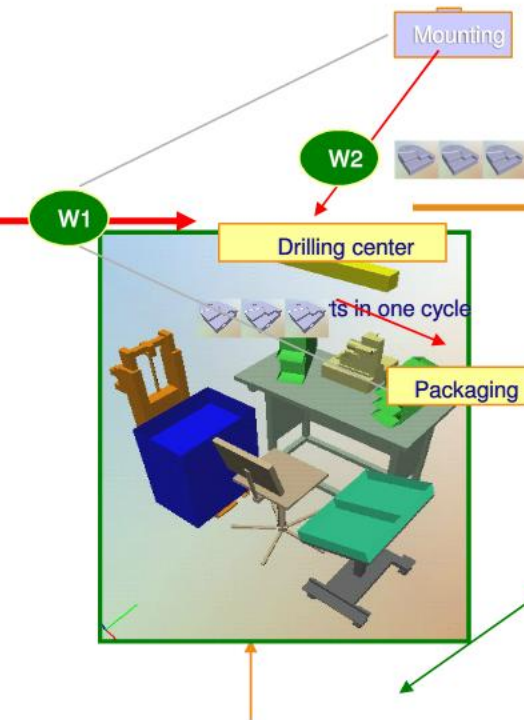
Target in general

Production

Product



Market



Targets (Costs, Output,...)

The Challenge

For a Product with 3 components the time required for planning can be in hours or days

Consider a Scenario

- **4000 components in every car**
- **8 – 10 Models**
- **3 – 5 variants in each Model**
- **2500 operations for each model**

What is the time required to plan and organise



Needs for Digital Manufacturing

Today's Challenges

More car/truck programs in a given time frame

- support the manufacturing engineering teams with computer aided systems

Cost pressure on the vehicle programs

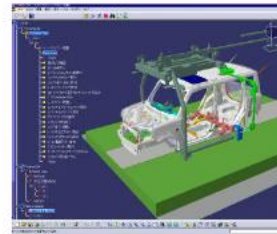
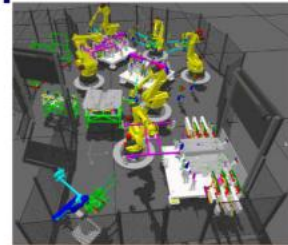
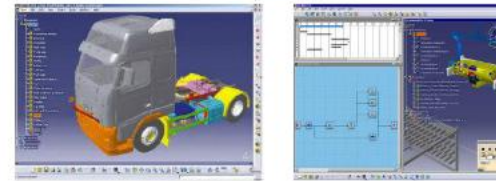
- Visibility of the accurate cost situation during the entire planning phase to make the right decisions

Shorter time-to-market cycles

- Reuse of best practices (BOP) instead of starting from scratch

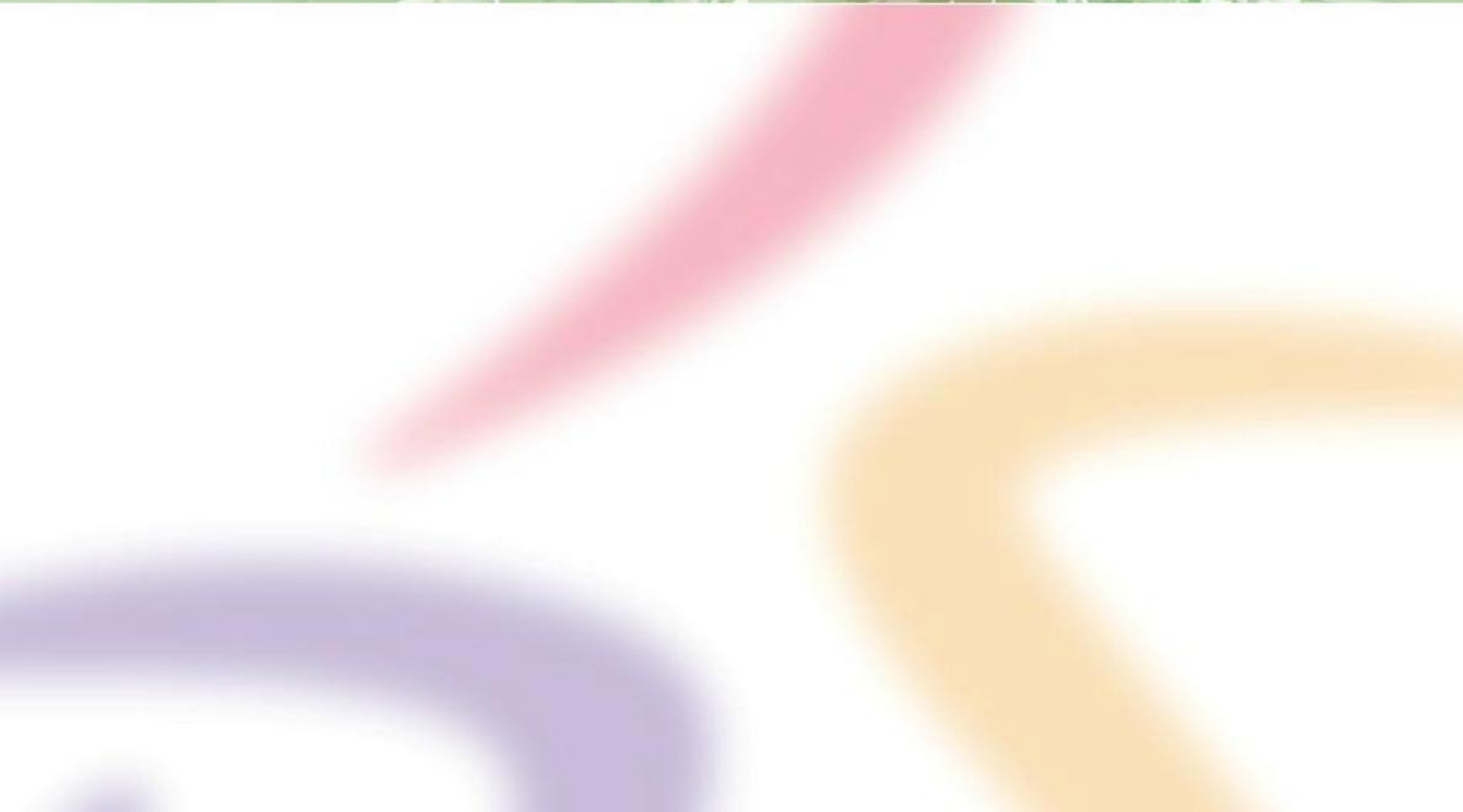
Higher efficiency of the production line

- Line balancing to optimize utilization degree



DELMIA Global Solutions



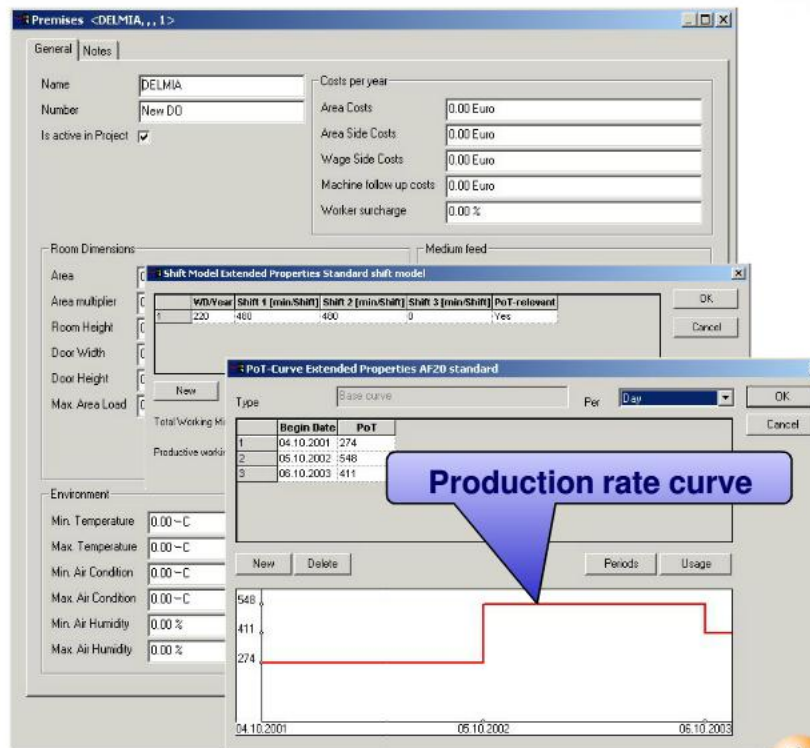


Planning Premises

... Define the boundary conditions for production planning when starting a new project

Premises properties

- quality requirements
- location requirements
- Shift models
- Cost targets
- cost rates
- Production rate
- Planning targets
- Project-Milestones
- ...



Product Evaluation

Import/Update E-BOM from external source

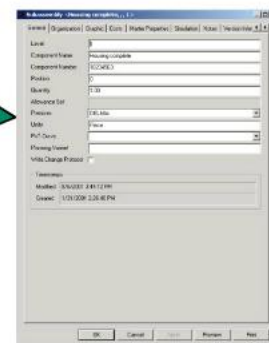
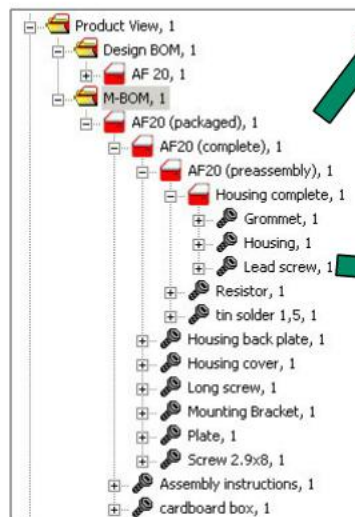
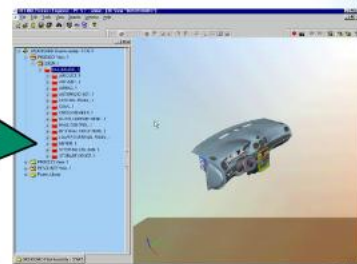
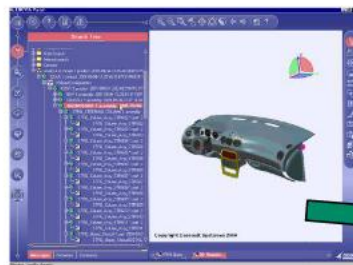
E.g : From VPM or PDM or Excel File

Generate M-BOM

Manage product variants

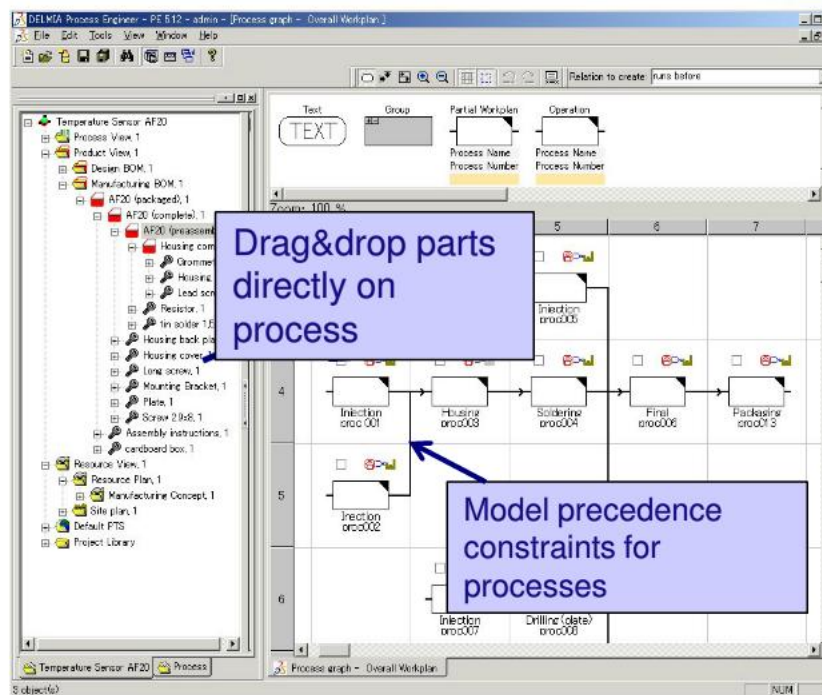
By use of variant codes and mathematically logical expressions

Assign Part Bins

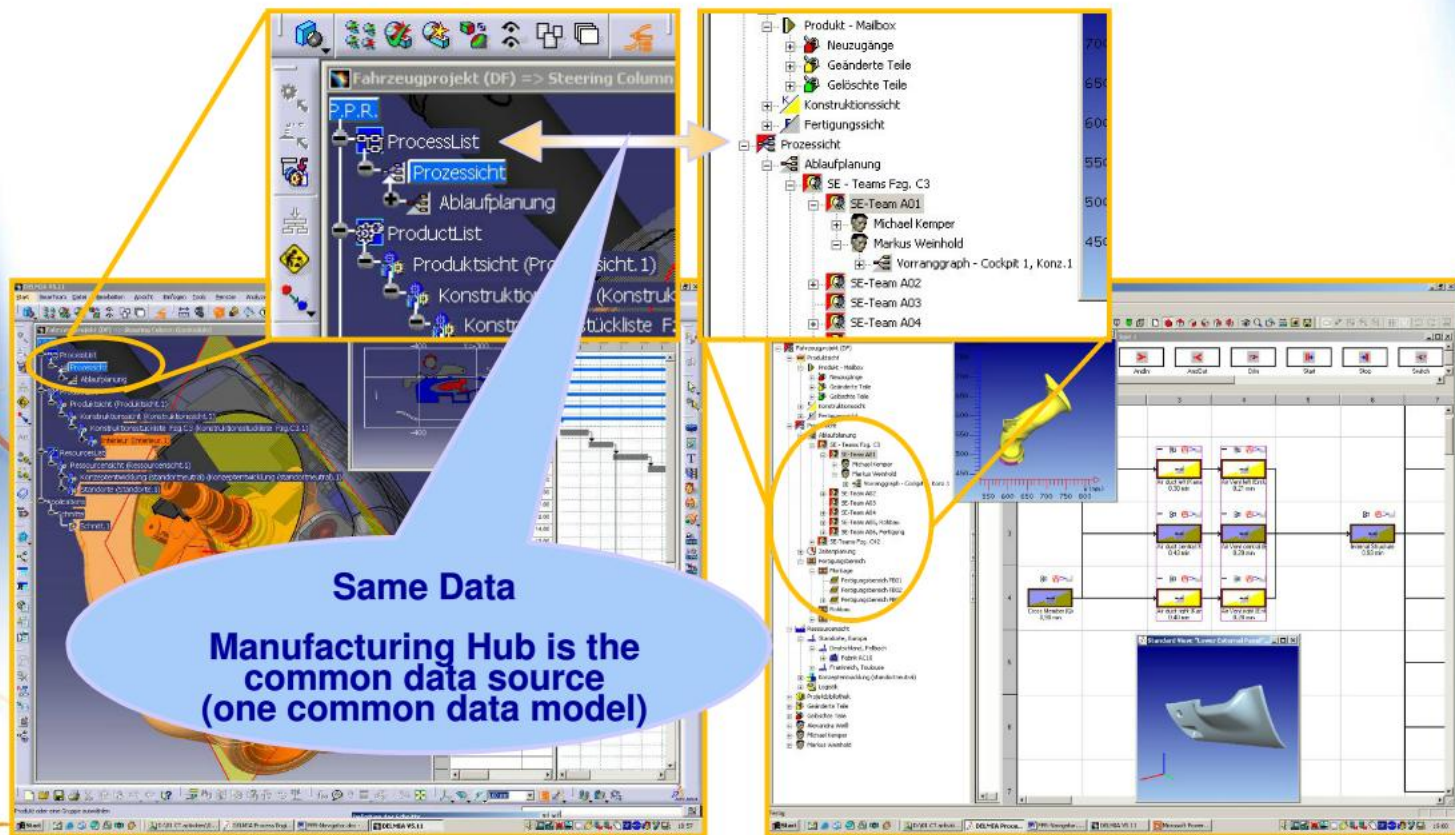


Process Definition

- Create and manage processes in the process structure
- Define in a Graph
 - process precedence constraints
 - process sequence
- Save as Templates for reuse in other projects – Best Practice



DELMIA V5 Interaction



Time Analysis

- Quick and efficient generation of time analyses

Available Standard Time Methods:

MTM-I, MTM-II, Standard Data, UAS, MEK, WF, Office tasks, Visual Inspection,...

- Time analyses using data cards

- Creation of user-defined formulas for determining process times

- Rule Checking for correctness and completeness




- Flexible search mechanism

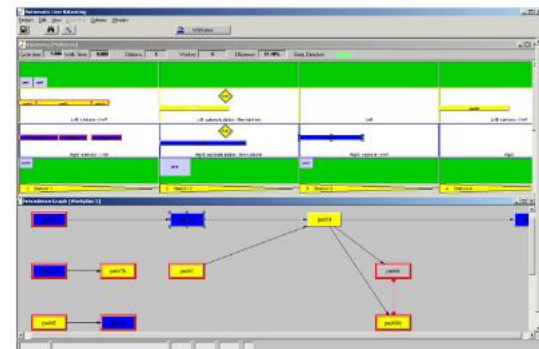
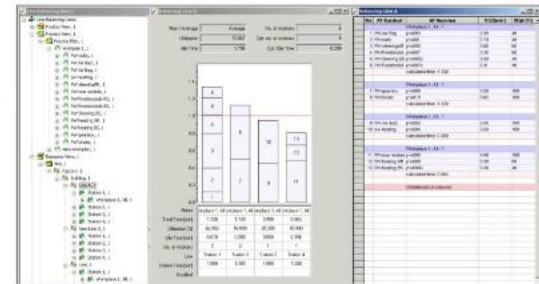
The screenshot shows the 'Work Systems View 1' interface. On the left, there are several data cards for 'Reach', 'Grasp', 'Move', 'Release', 'Process', and 'Disengage'. An orange arrow points from the 'R-B' card in the 'Reach' section to a table on the right. The table has columns: 'Description', 'Freq', 'Quan', 'Code L.H.', 'Time', 'Code P.H.', and 'Quant'. The table contains four rows of data.

Description	Freq	Quan	Code L.H.	Time	Code P.H.	Quant
P10B	1,00	1		23,0	S	1
G1A	1,00	1		6,3	R10B	1
SC12/2	1,00	1		2,0	G1A	1
M10B12/2	1,00	1		4,3	SC12/2	1

Line Balancing

PROCESS ENGINEER provides two line balancing modules:

-  **Work Load Balancing module** is useful for generic line balancing for quickly balancing processes and optimize worker/station occupancy
-  **Automatic Line Balancing module** enables users to balance processes in Final Assembly applications
-  takes into account restrictions



Work Load Balancing

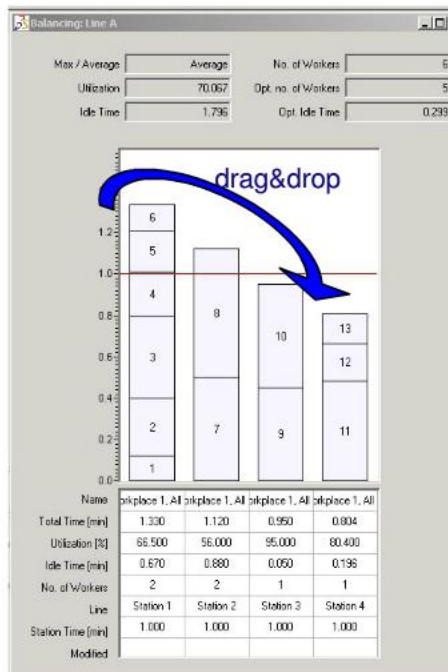
Two different views for balancing:

Bar chart

- ✚ Balance processes by using drag&drop in the bar chart
- ✚ View all typical balancing characteristics for worker/station and full line
 - ✚ Takt time
 - ✚ Utilization
 - ✚ No of workers
 - ✚ Idle time
 - ✚ Total time

Balancing List

- ✚ List up all balanced processes in table incl. Important attributes
- ✚ Balance processes by using drag&drop
- ✚ Show unbalanced processes



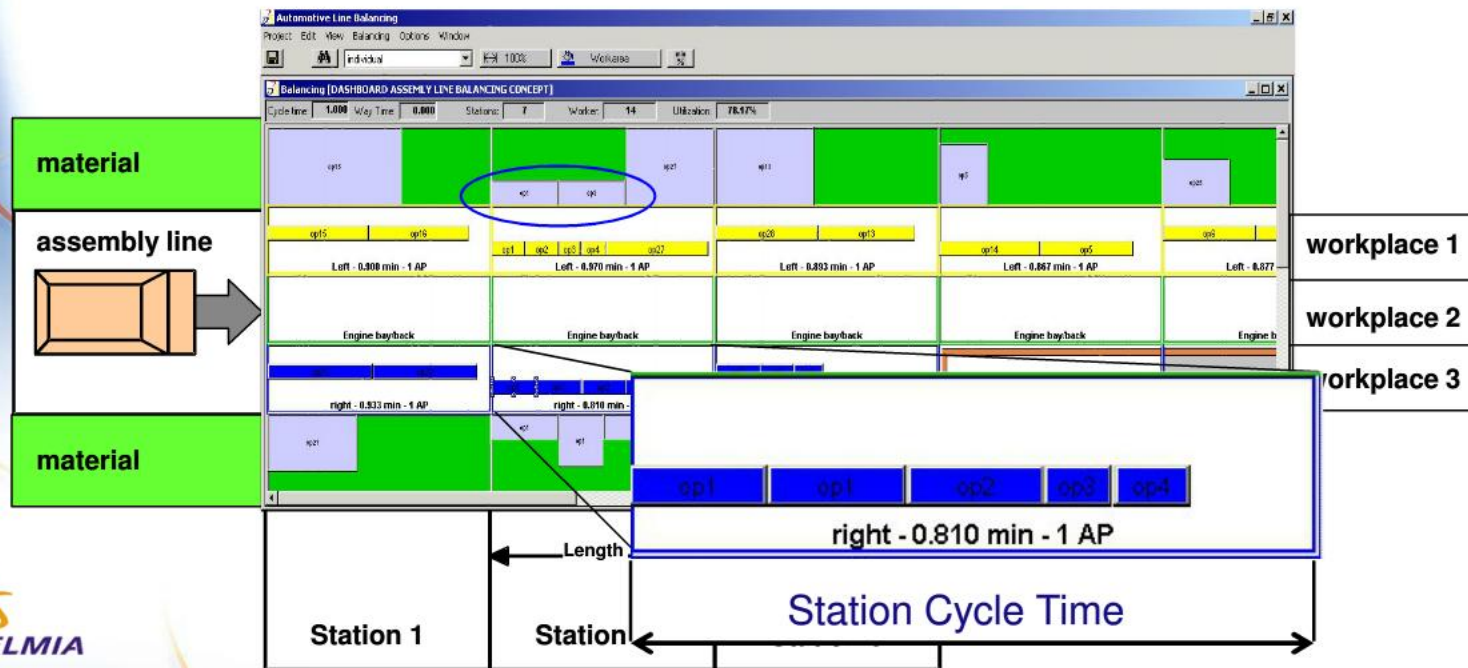
Bar chart

No.	AF	Kurztext	AF-Nummer	VGZ (min)	High [%]
Workplace 1, All - 1					
1	PW Air Bag	pw003		0.30	40
2	PW radio	pw001		0.70	40
3	PW steering AR	pw005		0.66	60
4	PW Frontmodul	pw007		0.35	60
5	PW Steering BS	pw005b		0.50	40
6	PW Frontmodul	pw007b		0.31	40
calculated time: 1.330					
Workplace 1, All - 1					
7	PW gearbox	pw009		0.60	100
8	PW Under	pw010		0.62	100
calculated time: 1.120					
Workplace 1, All - 1					
9	PW Air duct	pw002		0.45	100
10	pw heating	pw004		0.50	100
calculated time: 0.950					
Workplace 1, All - 1					
11	PW rear module	pw006		0.48	100
12	PW heating AR	pw008		0.30	60
13	PW heating BS	pw008b		0.36	40
calculated time: 0.804					
Unbalanced processes					

Balancing list

Automatic Line Balancing (I)

- Automatic Line Balancing offers data in a visually intuitive, easy-to-use manner so that the right kinds of data are available to the planner.
- The user interface shows a 2D display of the assembly line with its stations and the material supply zones along the line:



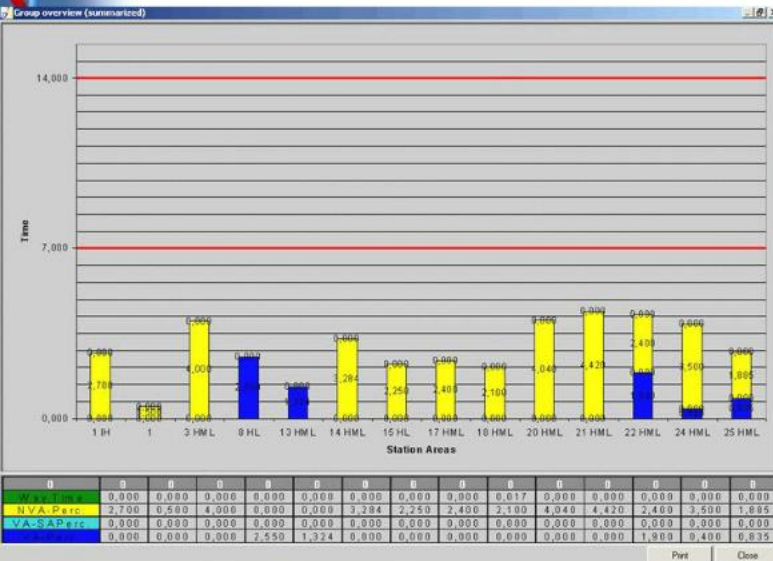
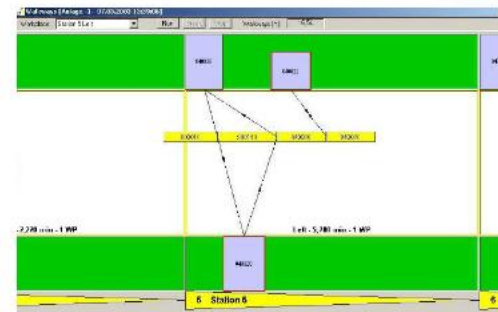
Automatic Line Balancing (II)

Constraint checking



Calculate Walk ways

Walkways [m]: 20.25



Balancing Results

- Optimal Station Utilization
- Determination of plant location for operations
- Determination of Part Bin locations
- Optimal labor utilization
- Optimal process sequence
- Process Documentation
 - Work instructions (list of processes)
 - Station Assignments

From the Manufacturing Concept...



Evaluate capacities for different production rates

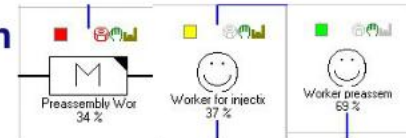
Track cost targets

Item	Standard Cost	Actual Cost	Variance	Unit Cost	Target Cost	Actual Cost	Variance
Item 1	1000	1050	50	10.00	10.00	10.50	0.50
Item 2	2000	1950	50	20.00	20.00	19.50	0.50
Item 3	3000	3100	100	30.00	30.00	31.00	1.00
Item 4	4000	3900	100	40.00	40.00	39.00	1.00
Item 5	5000	5100	100	50.00	50.00	51.00	1.00
Item 6	6000	5900	100	60.00	60.00	59.00	1.00
Item 7	7000	7100	100	70.00	70.00	71.00	1.00
Item 8	8000	7900	100	80.00	80.00	79.00	1.00
Item 9	9000	9100	100	90.00	90.00	91.00	1.00
Item 10	10000	9900	100	100.00	100.00	99.00	1.00

Compare with alternative manufacturing concepts



Traffic light evaluation of Occupancy levels



Create 3D layout



Create customized documentation



Simulate material flow

