

***DELMIA***  
***Process Engineer***  
***Product Presentation***

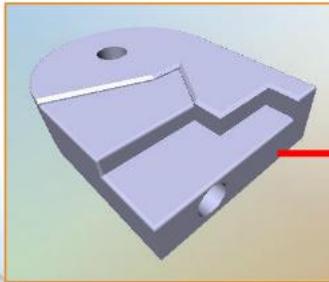
**Pavan Kumar G P**

**09-05-2005**



# Target in general

Product



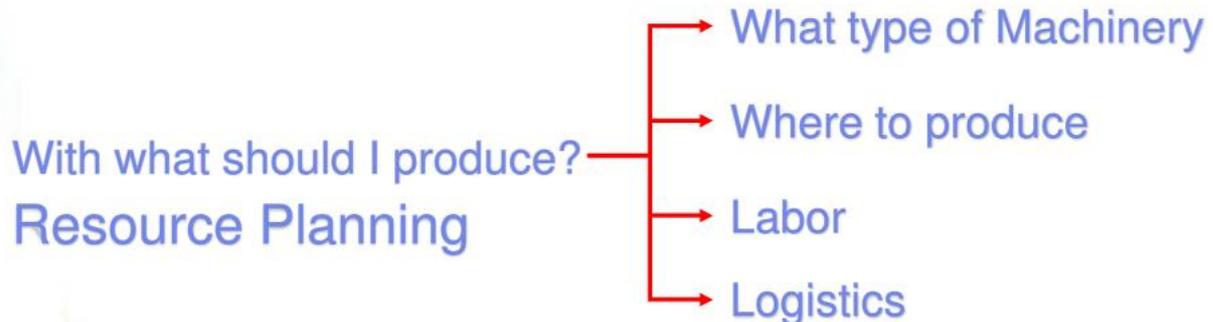
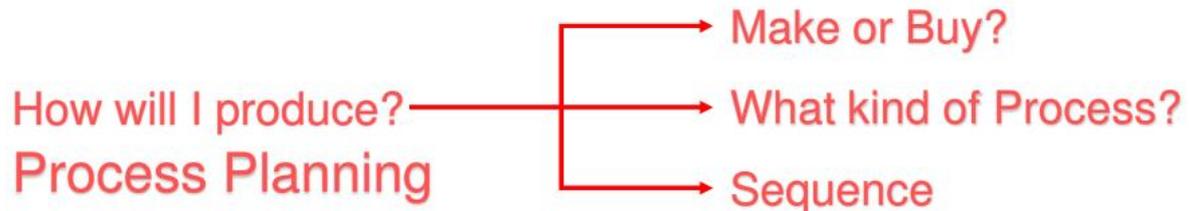
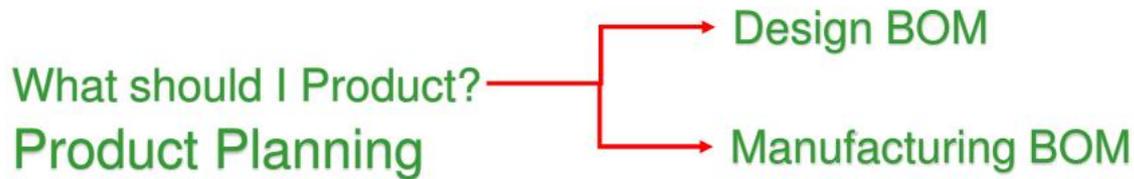
Production



Market

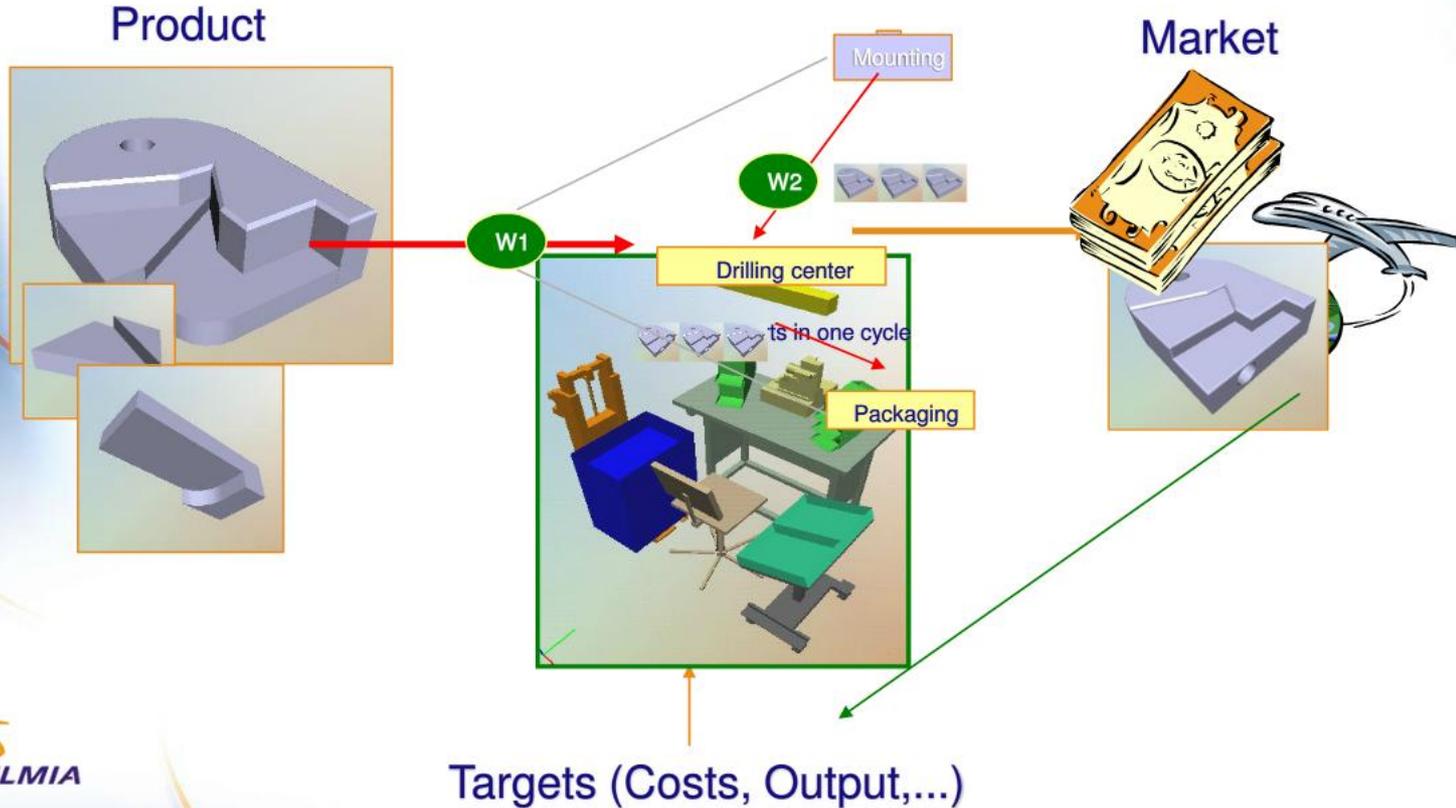


# Planning to meet the Market's requirement



# Target in general

## Production



# 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

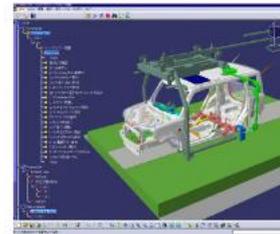
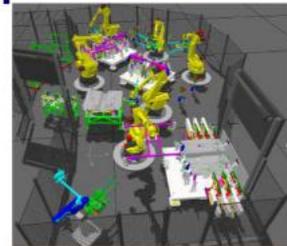
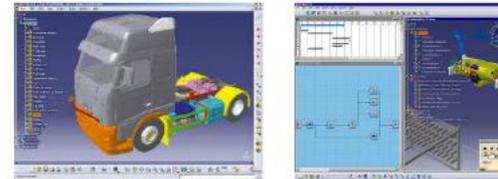
- Visibility of the accurate cost situation during the entire planning phase to make the right decisions

### 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
- 👤 ...

The screenshot displays the 'Premises' dialog box in the DELMIA software. The 'General' tab is active, showing fields for Name (DELMIA), Number (New DD), and Is active in Project (checked). The 'Costs per year' section includes Area Costs, Area Side Costs, Wage Side Costs, Machine follow up costs, and Walker surcharge, all set to 0.00 Euro or 0.00 %.

Overlaid on the dialog are two smaller windows:

- 'Shift Model Extended Properties Standard shift: model' with a table:

Wk/Year	Shift 1 [min/Shift]	Shift 2 [min/Shift]	Shift 3 [min/Shift]	PoT-retolow
1	230	400	0	Yes
- 'PoT-Curve Extended Properties AF20 standard' with a table:

Begin Date	PoT
04.10.2001	274
05.10.2002	548
06.10.2003	411

The 'Production rate curve' graph shows a step function with values 274, 548, and 411 over time from 04.10.2001 to 06.10.2003.

# Product Evaluation

## Import/Update E-BOM from external source

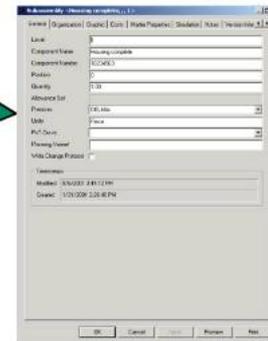
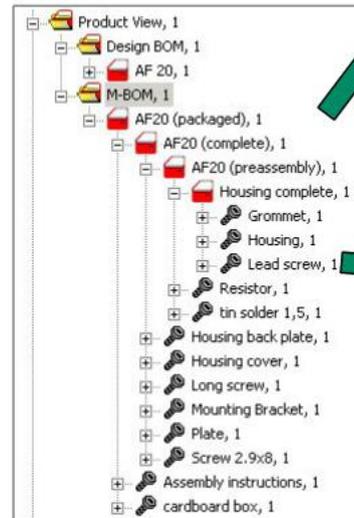
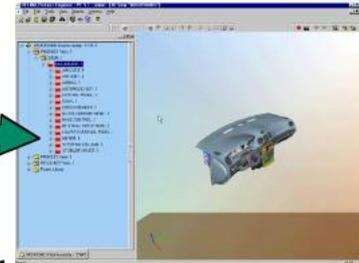
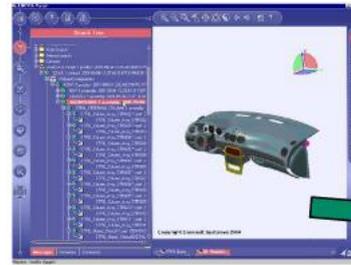
E.g : From VPM or PDM or Excel File

## Generate M-BOM

## Manage product variants

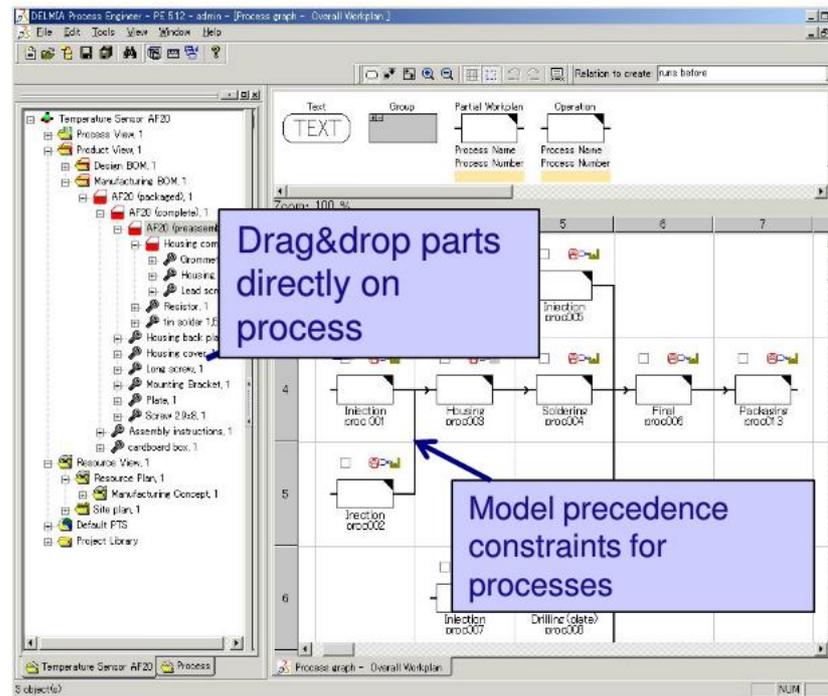
By use of variant codes and mathematically logical expressions

## 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

Same Data  
Manufacturing Hub is the  
common data source  
(one common data model)

# 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

Work Systems View 1

Databases

MTM I Bod | MTM I Dat | MTM I

Reach	Position	
R-A	P1SE	P1SD
R-B	P1NSE	P1NSD
R-C	P1NSE	P1NSD
R-D	P1SE	P1SD
R-E	P2SE	P2SD
	P2NSE	P2NSD
Grasp	Disengage	
G1A	P3SE	P3SD
G1B	P3NSE	P3NSD
G1C	P3NSE	P3NSD
G2		
G3		
G4A		
G4B	D1E	D1D
G4C	D2E	D2D
G5	D3E	D3D
Move	Turn	
M-A	T-S	
M-B	T-M	
M-C	T-L	
SC		
Release	Pressure	
RL1	APA	
RL2	APB	
Process	Ejections	
PTU-	ET-A	
PTB-	ET	

Code  
Description

Analysis Type  
State

General Lines

R-B

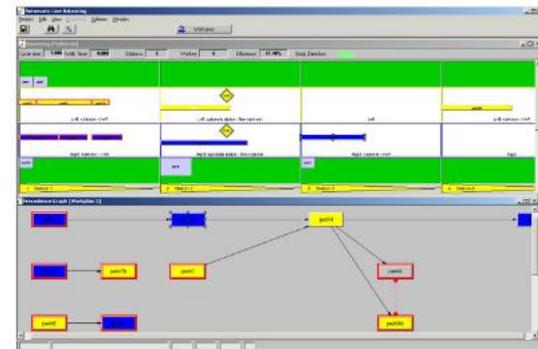
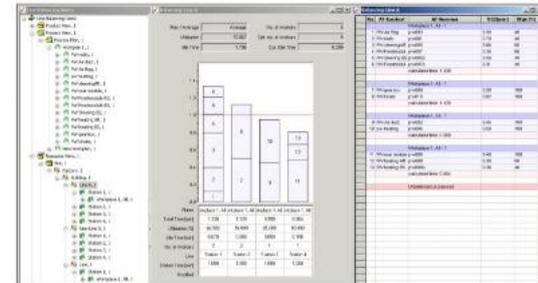
Distance	18	45
01	20	50
02	22	55
04	24	60
06	26	65
08	28	70
10	30	75
12	35	80
14	40	
18		

Description	Freq	Quan	Code	L.H.	Time	Code	P.H.	Quant
	1,00	1	P1SE		23,0	S		1
	1,00	1	G1A		6,3	R10B		1
	1,00	1	G1A		2,0	G1A		1
	1,00	1	SC122		4,3	SC122		1
	1,00	1	M10B122		7,8	M10B122		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

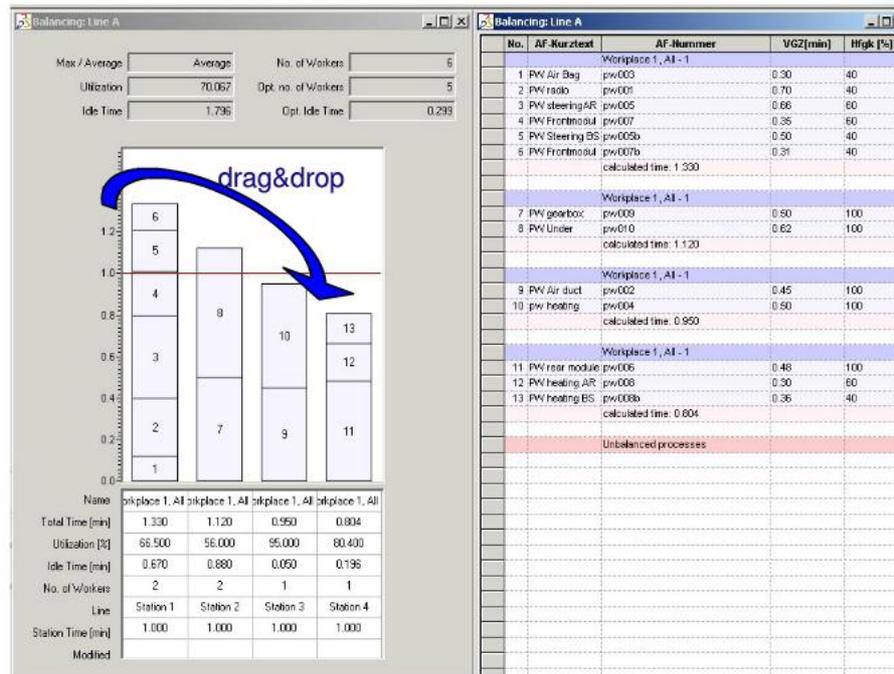
Two different views for balancing:

## 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

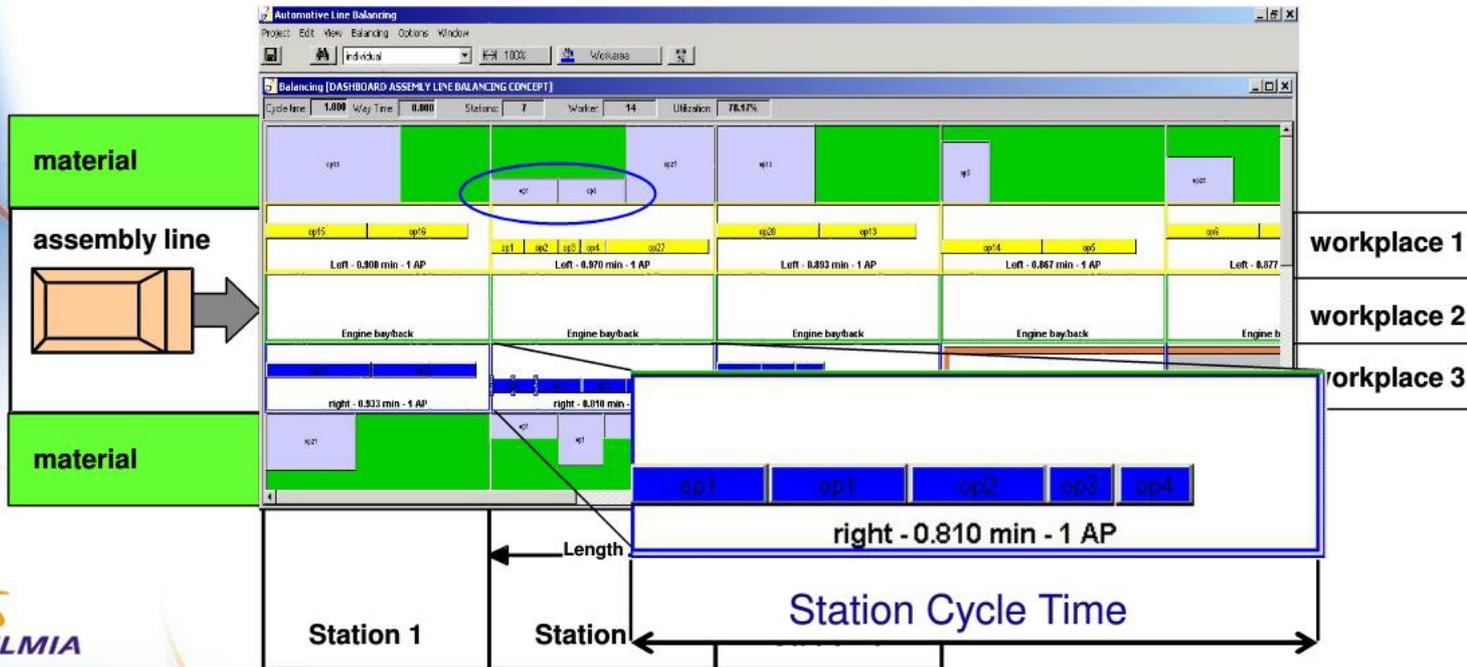


Bar chart

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:

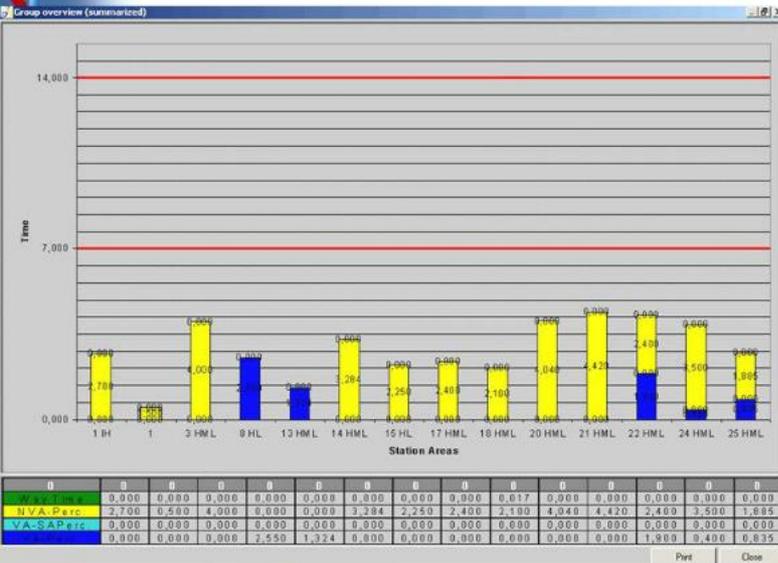
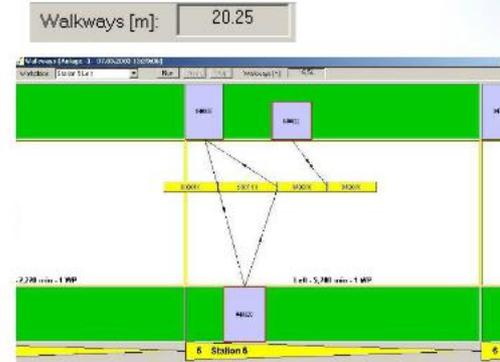


# Automatic Line Balancing (II)

## Constraint checking



## Calculate Walk ways



## 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

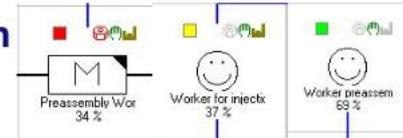
Track cost targets

Item	Number	Unit Cost	Material Cost	Labour Cost	Overhead Cost	Standard Cost
1000	1000	1000	1000	1000	1000	1000
1001	1000	1000	1000	1000	1000	1000
1002	1000	1000	1000	1000	1000	1000
1003	1000	1000	1000	1000	1000	1000
1004	1000	1000	1000	1000	1000	1000
1005	1000	1000	1000	1000	1000	1000
1006	1000	1000	1000	1000	1000	1000
1007	1000	1000	1000	1000	1000	1000
1008	1000	1000	1000	1000	1000	1000
1009	1000	1000	1000	1000	1000	1000
1010	1000	1000	1000	1000	1000	1000
1011	1000	1000	1000	1000	1000	1000
1012	1000	1000	1000	1000	1000	1000
1013	1000	1000	1000	1000	1000	1000
1014	1000	1000	1000	1000	1000	1000
1015	1000	1000	1000	1000	1000	1000
1016	1000	1000	1000	1000	1000	1000
1017	1000	1000	1000	1000	1000	1000
1018	1000	1000	1000	1000	1000	1000
1019	1000	1000	1000	1000	1000	1000
1020	1000	1000	1000	1000	1000	1000

Compare with alternative manufacturing concepts

A screenshot of a software window displaying a list of manufacturing concepts with various data columns and a tree-like structure on the left.

Traffic light evaluation of Occupancy levels



Create 3D layout



Create customized documentation



Simulate material flow

