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Process Engineer
Product Presentation

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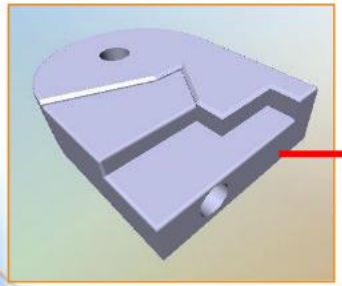
Target in general

Product



Production

?

Market

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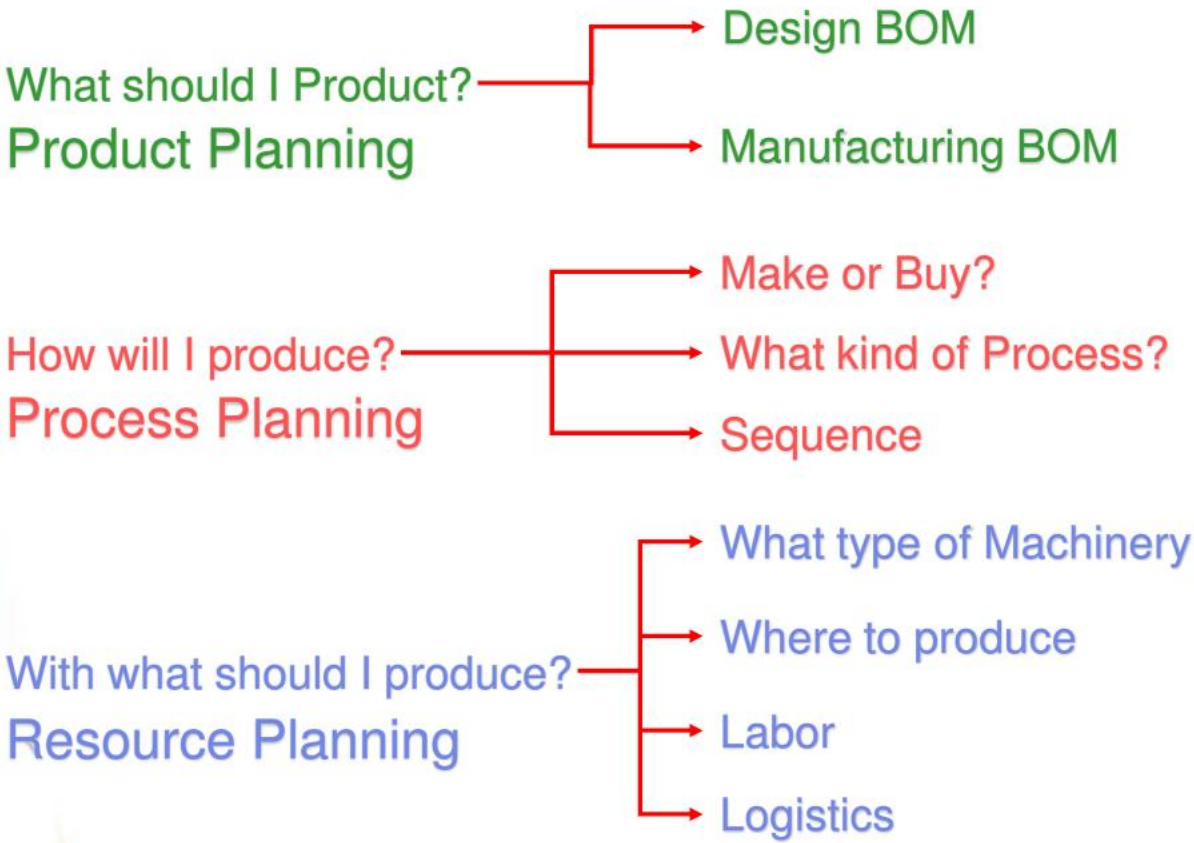
Planning to meet the Market's requirement



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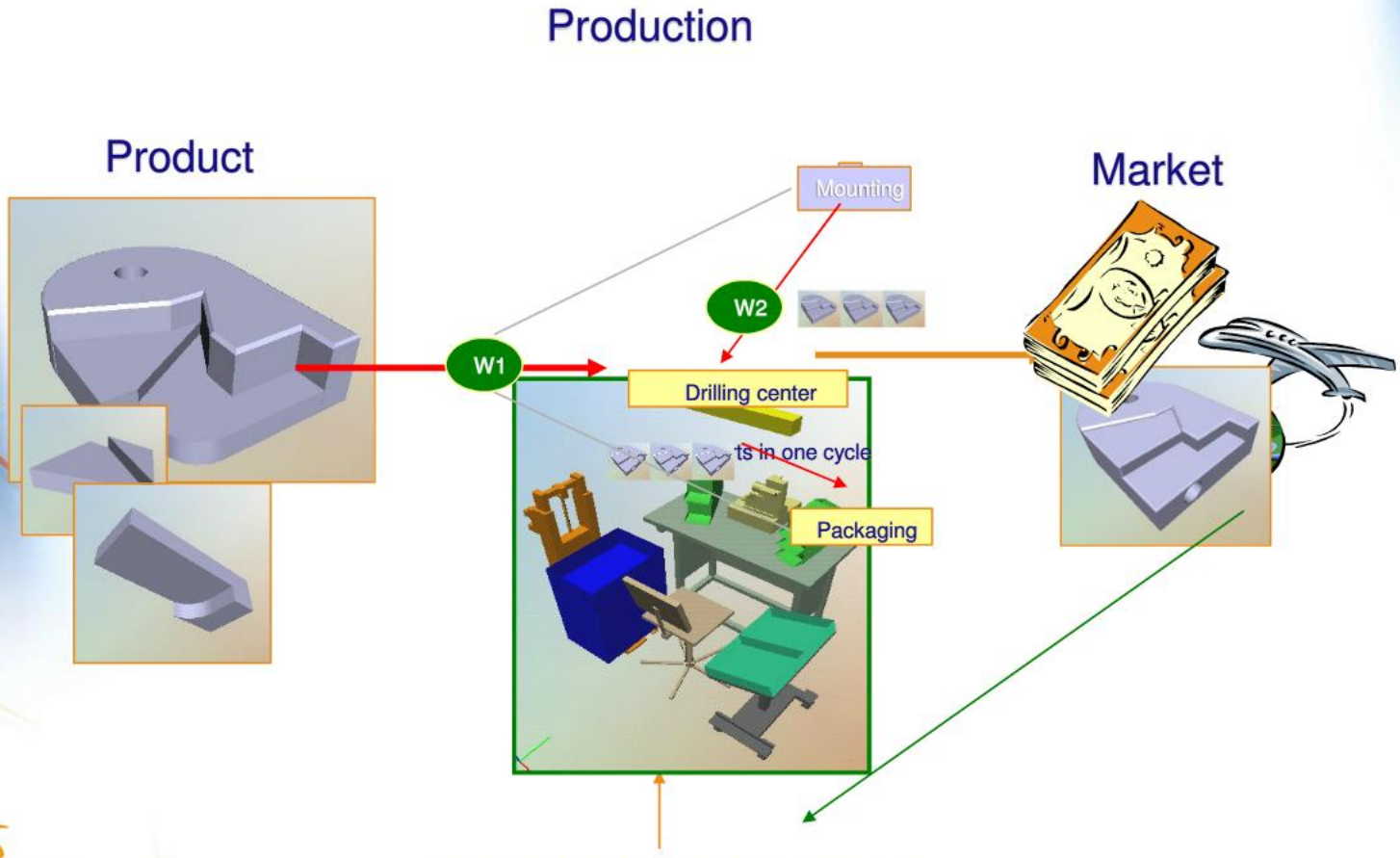
Target in general



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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**

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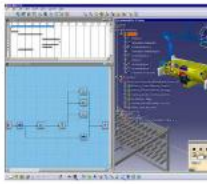
What is the time required to plan and organise ?

Needs for Digital Manufacturing

Today's Challenges

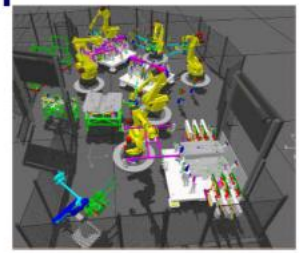
More car/truck programs in a given time frame

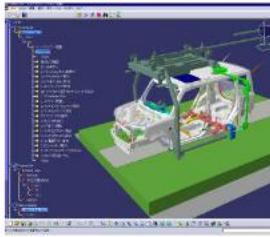
- support the manufacturing engineering teams with computer aided systems



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

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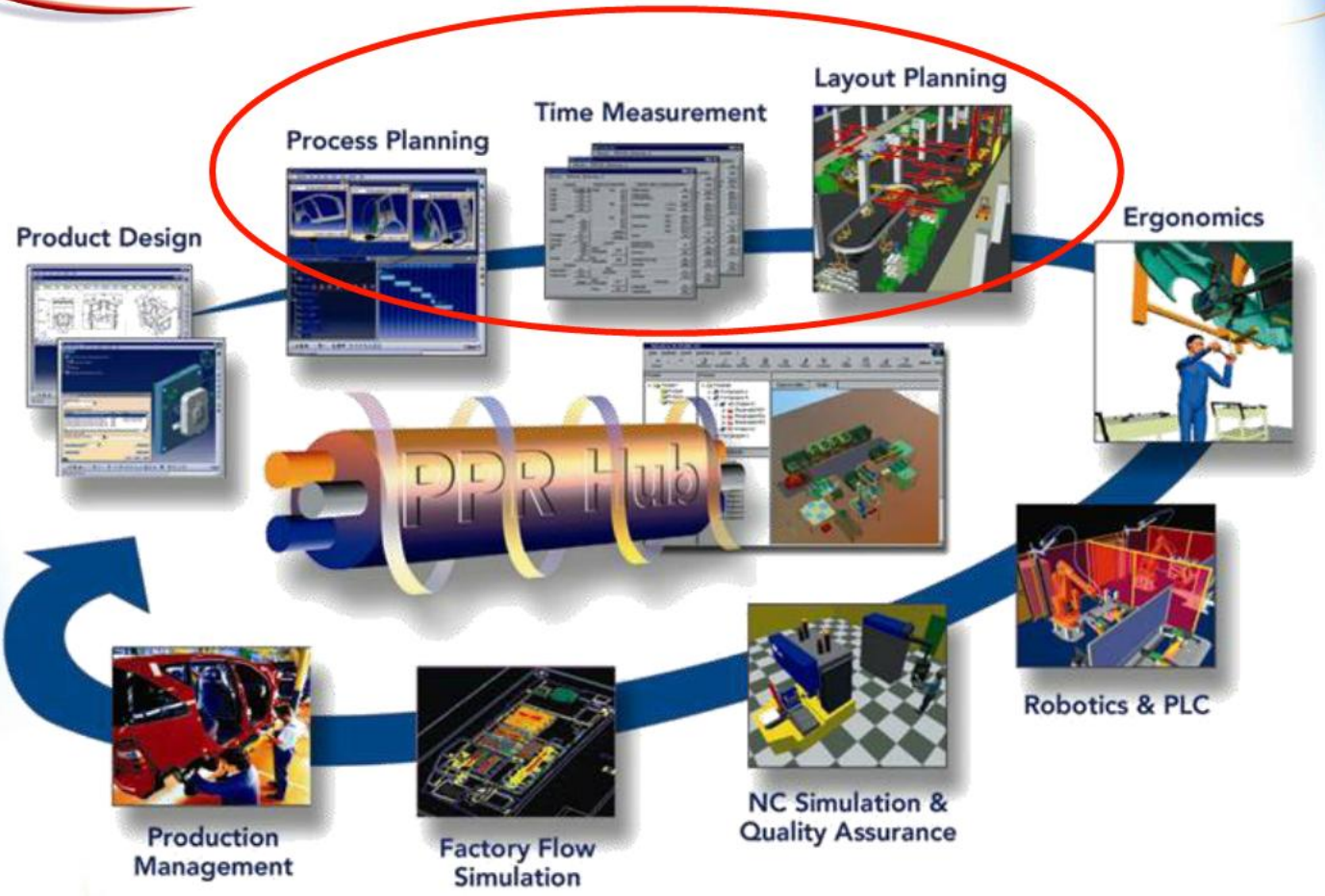
DELMIA Global Solutions



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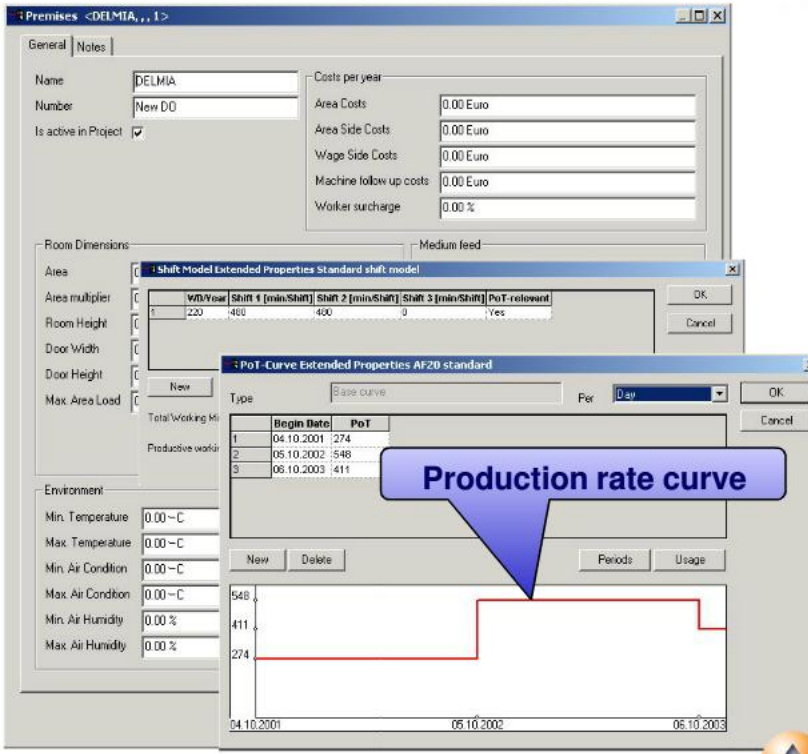
Planning Premises

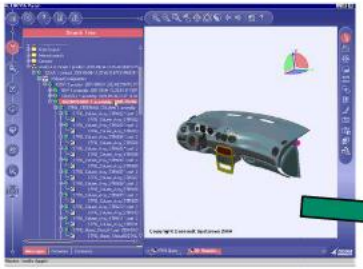
... Define the boundary conditions for production planning when starting a new project

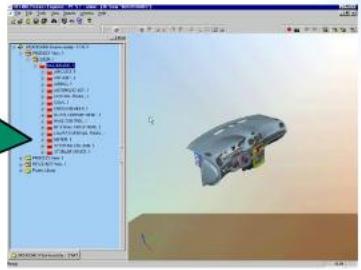
- **Premises properties**
  - quality requirements
  - location requirements
  - Shift models
  - Cost targets
  - cost rates
  - Production rate
  - Planning targets
  - Project-Milestones
  - ...

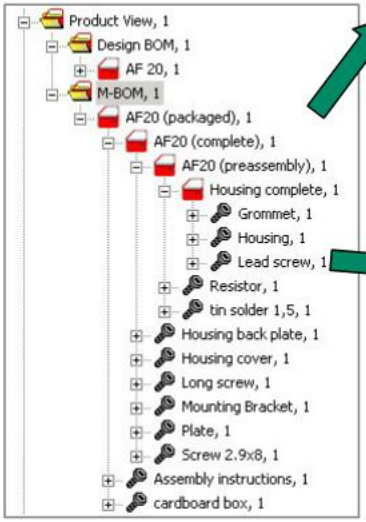


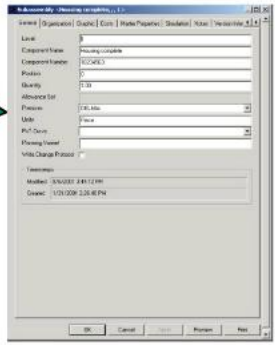
Product Evaluation

- **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**









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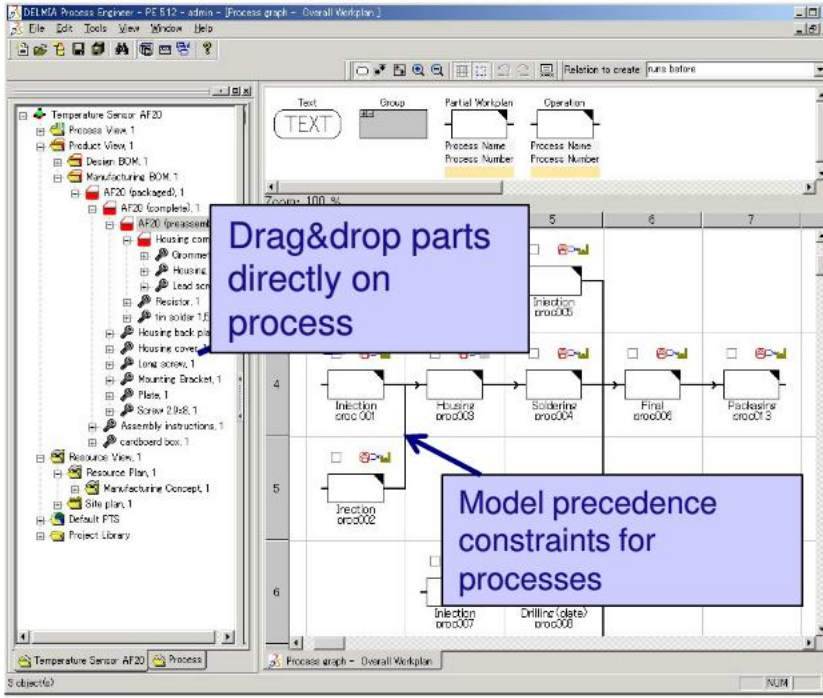
Process Definition

- **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**



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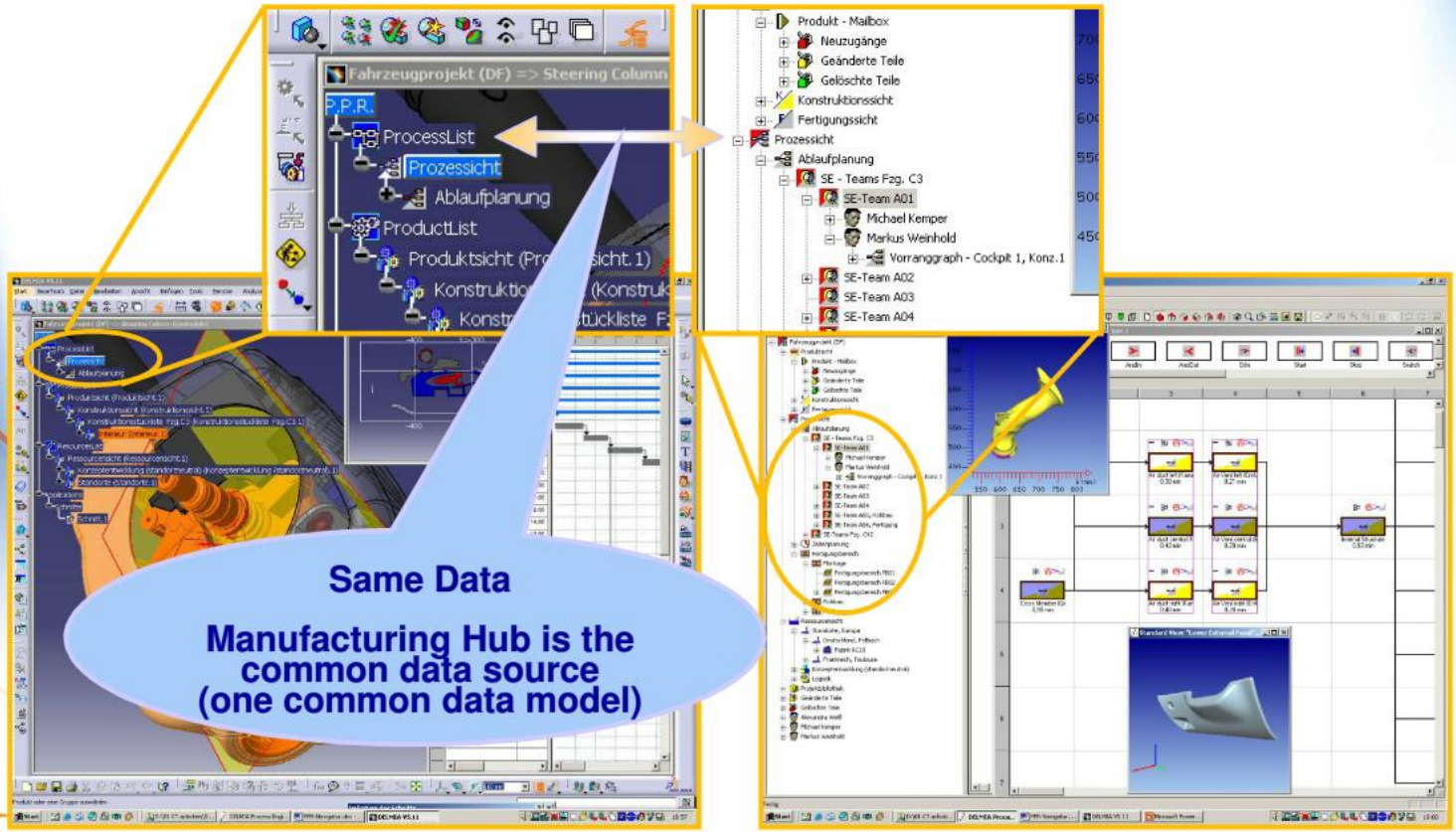
DELMIA V5 Interaction



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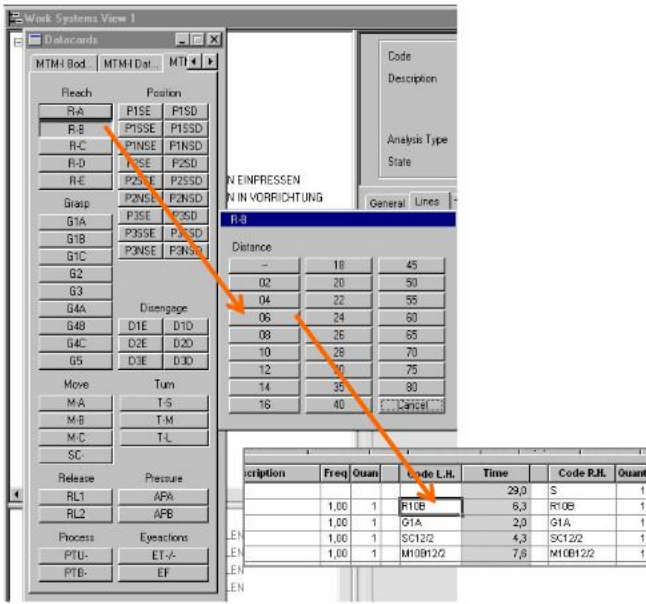
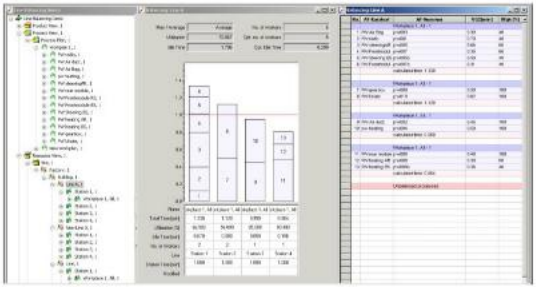
Time Analysis

- **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**

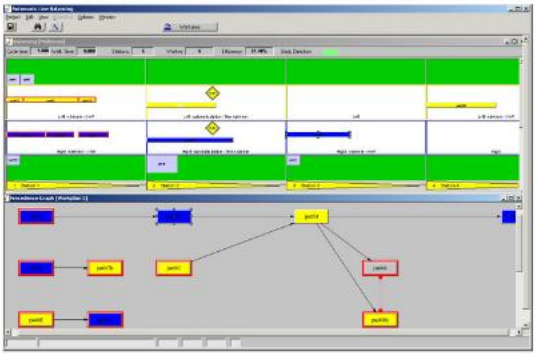


Line Balancing

- **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



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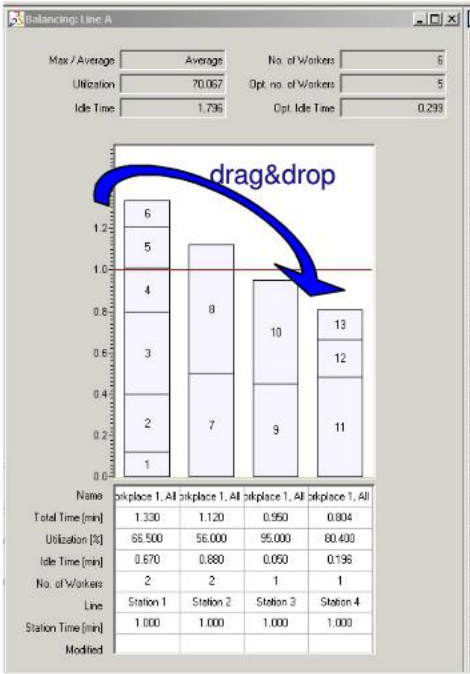
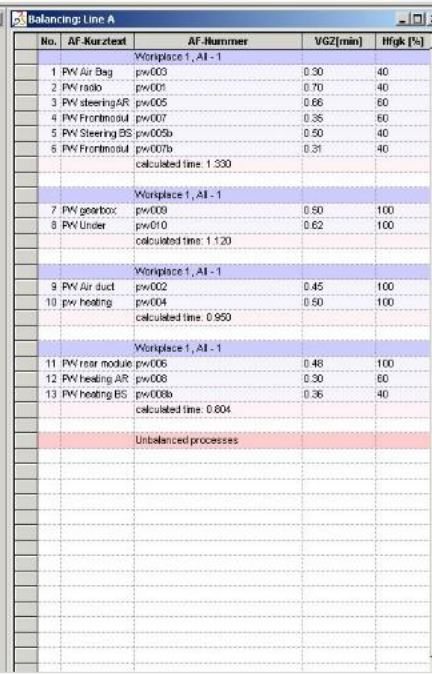
Work Load Balancing

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



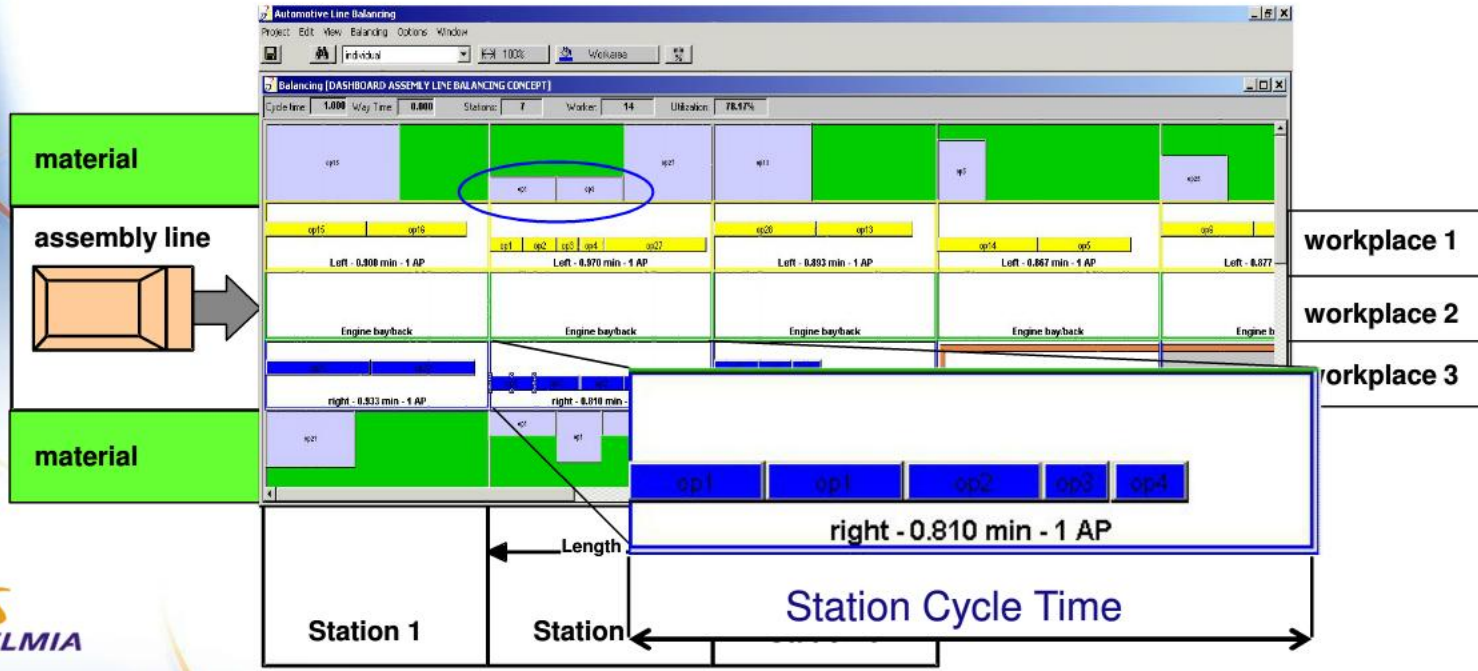
Bar chart



Balancing list

Automatic Line Balancing (I)

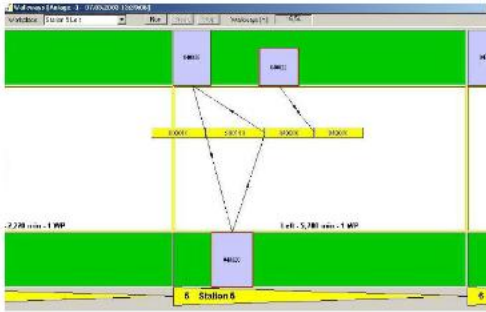
- Automatic Line Balancing offers data in a visually intuitive, easy-to-use manner so that the right kinds of data are available to the planner.
- The user interface shows a 2D display of the assembly line with its stations and the material supply zones along the line:

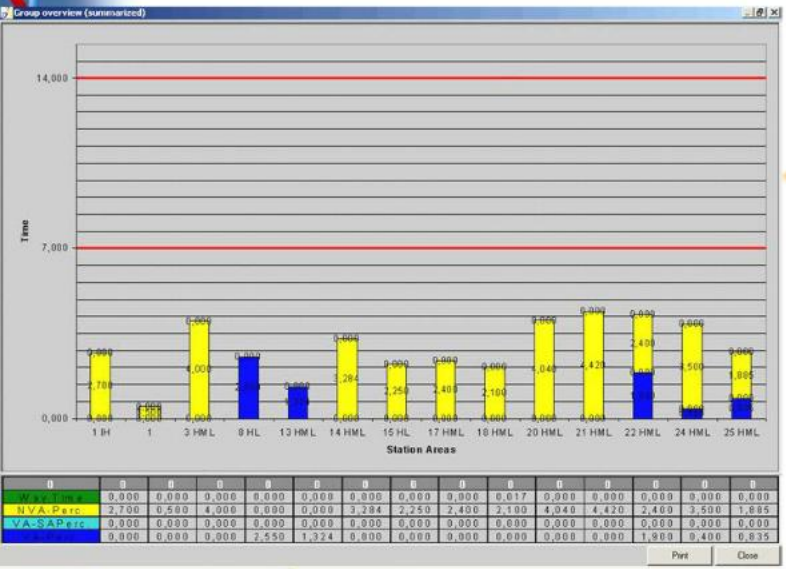


Automatic Line Balancing (II)

Constraint checking

Calculate Walk ways

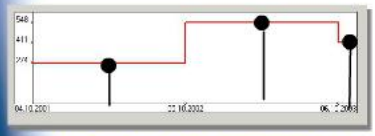




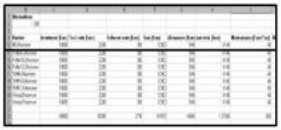
Balancing Results

- 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*

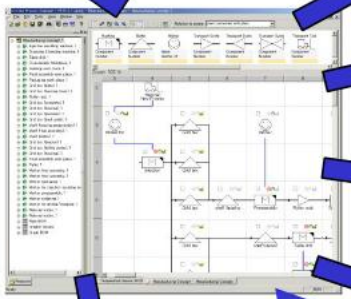
From the Manufacturing Concept...



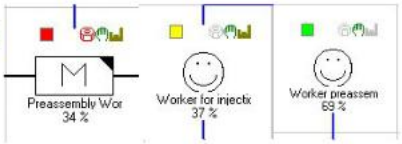
Evaluate capacities for different production rates



Track cost targets



Compare with alternative manufacturing concepts



Traffic light evaluation of Occupancy levels

Create 3D layout

Create customized documentation

Simulate material flow