BDE expert

Optimal recording and evaluation of

Staff-Production- and Machine data

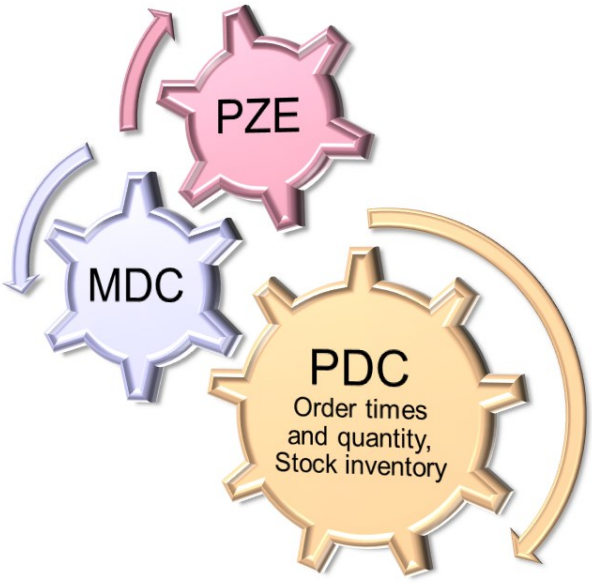
Product information

RGU Expert GmbH
Schweinfurter Str. 28
97076 Würzburg
Tel.: +49 (0) 931 30980-0
Fax.: +49 (0) 931 30980-22
www.rguexpert.de

Table of content

Down to business

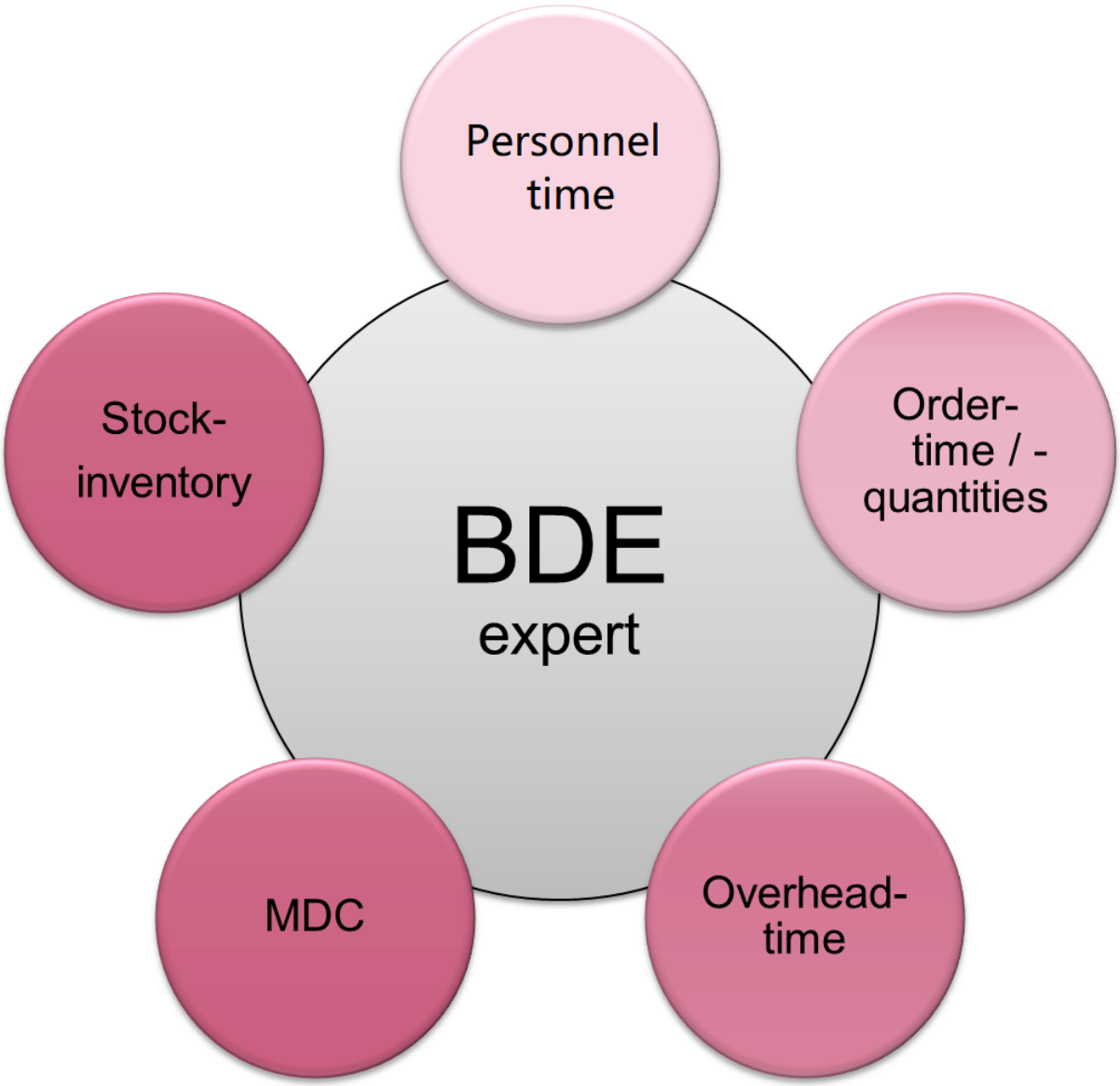
Any company's success now depends largely on the ideal design of business processes. The secure recording and evaluation of production and machine data is an essential component of this success
BDE expert provides the perfect network solution. The module PZE - Time Management manages the working hours of your employees.



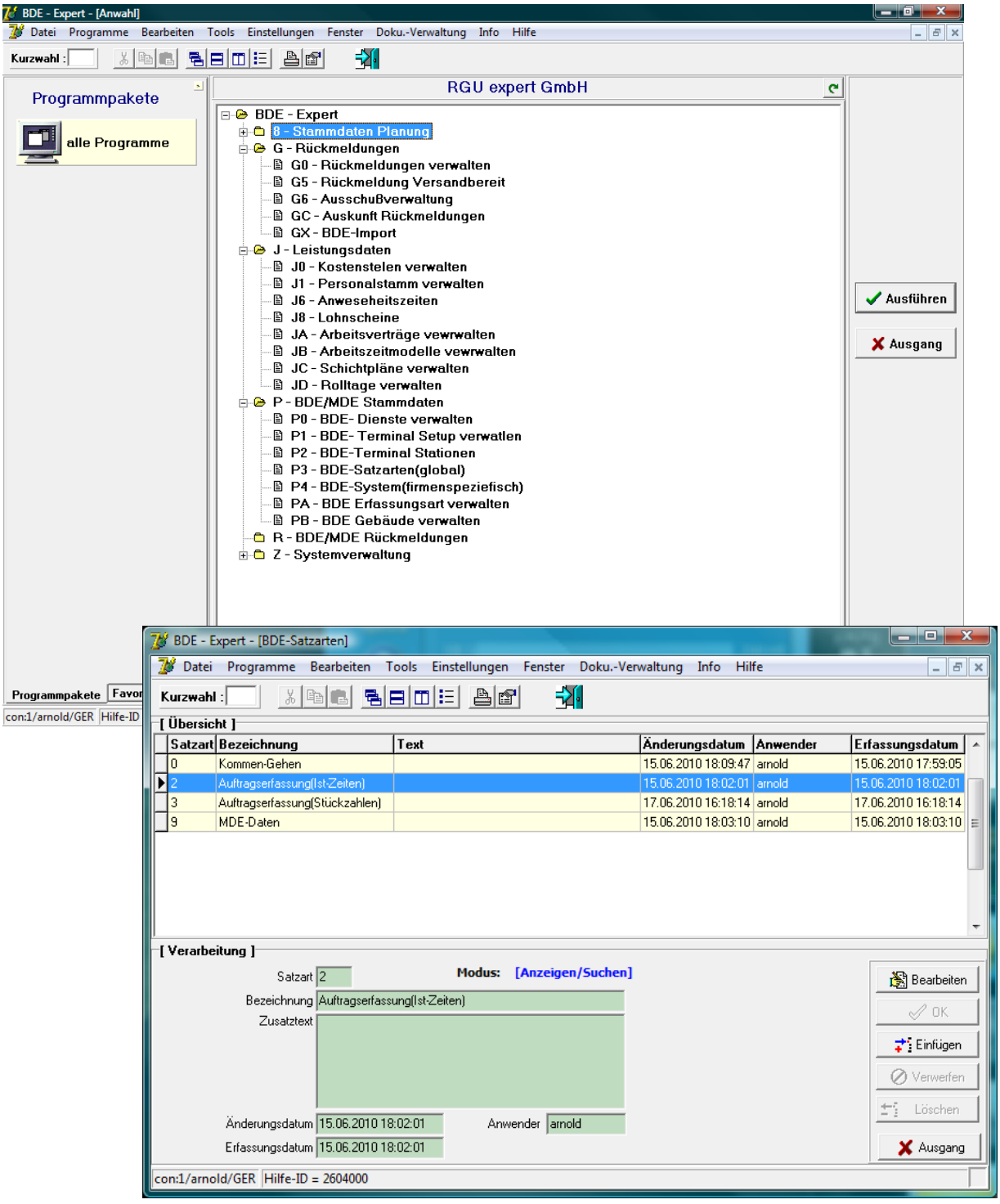
BDE integrates apart from the order times and quantities also stock inventory and the overhead costs time administration. The machine data logging keeps you informed about the machine condition and possible malfunction or non-operation periods up to date. BDE expert creates transparency in the company and increases the productivity.

BDE expert is fully integrated into the PPS modules of structura. The system offers interfaces to external ERP solutions. The data are available in a modern relational database. Own evaluations are to be provided with the integrated report generator and designer in a simple manner.

An overview of *BDE expert*

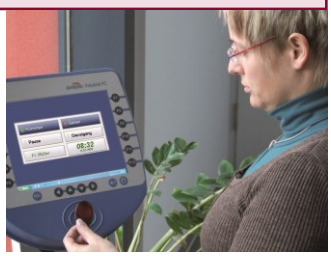


Program areas in BDE expert



PZE - Time management

The working time of your employees becomes ever more valuable, therefore this resources must be planned, seized and evaluated optimally.



In practice the outcome of this is, dependent on industry and organization, the most diverse requirements:

- Working times are today very variable and are often subjected to complex time models. PZE expert manages this tasks and ensures better planning.
- Time absent (vacation, business trip, illness etc.) and individual account standards are to be considered automatically.
- General activities (overhead costs activities) must be booked on cost centres and projects or distributed afterwards on these.
- The presence of the employee must be to production planning and control (PPC) at the disposal, so that the capacity or rather detailed planning can count on reliable personnel data.
- Guiding and evaluating any time accounts.
- interfaces to payroll accounting / cost calculation
- Personnel resource planning ensures greater transparency in the planning of personnel resources.
- Access control system controls the access to companies, or to individual buildings.

Personnel master data

Working time models

Shift model

Building, area and terminal management

Time logging / Billing / correction

Change of cost center

Time accounts

Interfaces

Extensive evaluation options

Access control system

Example dialogues - Time Management

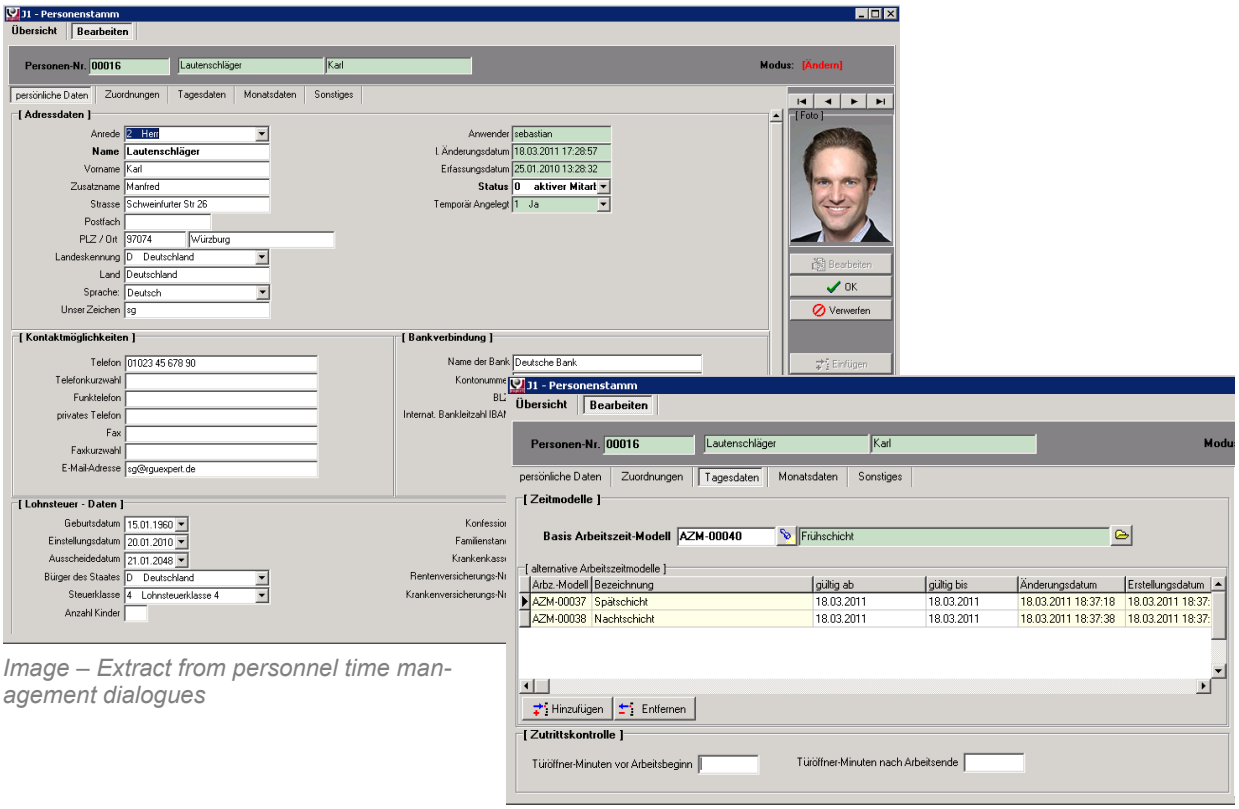


Image – Extract from personnel time management dialogues

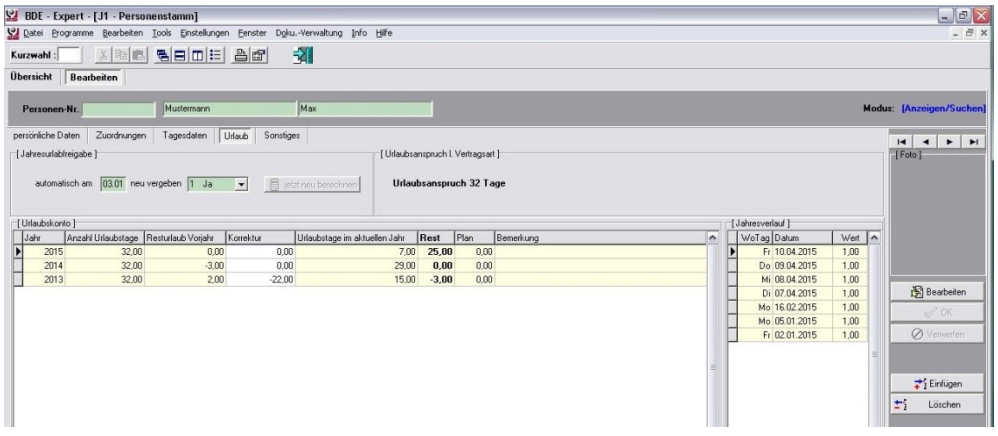
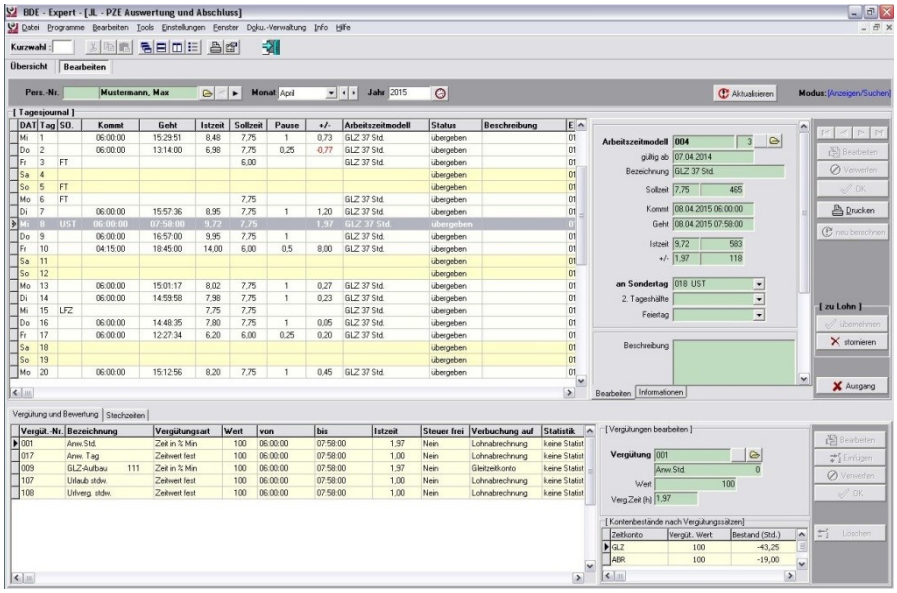
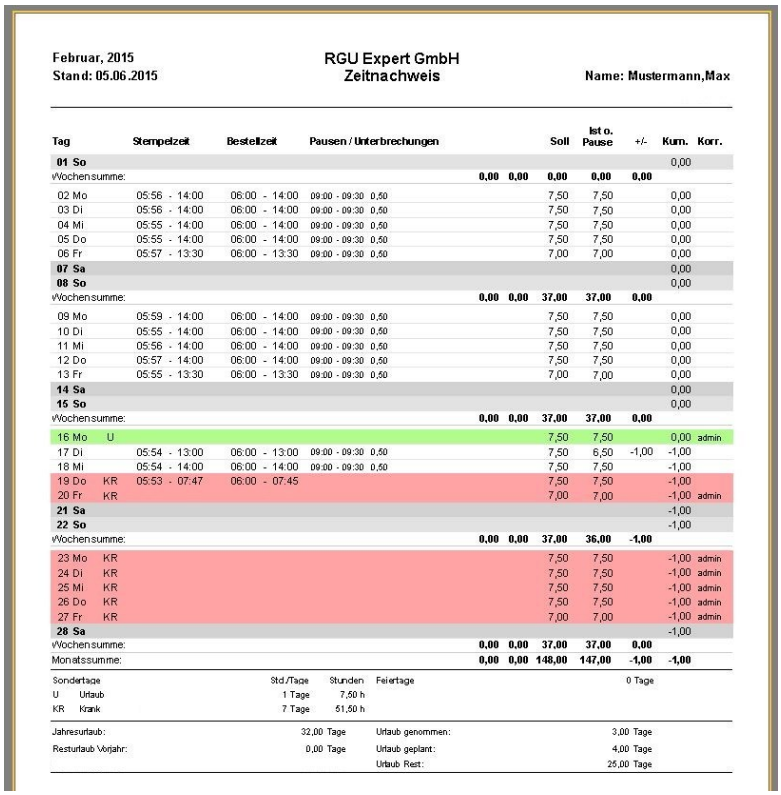


Image – Vacation time management

Example dialogues - Time Management





Februar, 2015
Stand: 05.06.2015

RGU Expert GmbH
Zeitnachweis

Name: Mustermann,Max

Tag		Stempelzeit	Bestellzeit	Pausen / Unterbrechungen			Soll	Ist o. Pause	+/-	Kum.	Korr.
01 So										0,00	
Wochensumme:					**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		
02 Mo		05:56 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
03 Di		05:56 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
04 Mi		05:55 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
05 Do		05:55 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
06 Fr		05:57 - 13:30	06:00 - 13:30	09:00 - 09:30	0,50		7,00	7,00		0,00	
07 Sa										0,00	
08 So										0,00	
Wochensumme:					**0,00**	**0,00**	**37,00**	**37,00**	**0,00**		
09 Mo		05:59 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
10 Di		05:55 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
11 Mi		05:56 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
12 Do		05:57 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		0,00	
13 Fr		05:55 - 13:30	06:00 - 13:30	09:00 - 09:30	0,50		7,00	7,00		0,00	
14 Sa										0,00	
15 So										0,00	
Wochensumme:					**0,00**	**0,00**	**37,00**	**37,00**	**0,00**		
16 Mo	U						7,50	7,50		0,00	admin
17 Di		05:54 - 13:00	06:00 - 13:00	09:00 - 09:30	0,50		7,50	6,50	-1,00	-1,00	
18 Mi		05:54 - 14:00	06:00 - 14:00	09:00 - 09:30	0,50		7,50	7,50		-1,00	
19 Do	KR	05:53 - 07:47	06:00 - 07:45				7,50	7,50		-1,00	
20 Fr	KR						7,00	7,00		-1,00	admin
21 Sa										-1,00	
22 So										-1,00	
Wochensumme:					**0,00**	**0,00**	**37,00**	**36,00**	**-1,00**		
23 Mo	KR						7,50	7,50		-1,00	admin
24 Di	KR						7,50	7,50		-1,00	admin
25 Mi	KR						7,50	7,50		-1,00	admin
26 Do	KR						7,50	7,50		-1,00	admin
27 Fr	KR						7,00	7,00		-1,00	admin
28 Sa										-1,00	
Wochensumme:					**0,00**	**0,00**	**37,00**	**37,00**	**0,00**		
Monatssumme:					**0,00**	**0,00**	**148,00**	**147,00**	**-1,00**	**-1,00**	

Sondertage		Std./Tage	Stunden	Feiertage	
U	Urlaub	1 Tage	7,50 h		
KR	Krank	7 Tage	51,50 h		

Jahresurlaub:	32,00 Tage	Urlaub genommen:	3,00 Tage
Resturlaub Vorjahr:	0,00 Tage	Urlaub geplant:	4,00 Tage
		Urlaub Rest:	25,00 Tage

Image –Staff time logging report

Features of the Personnel resource planning

Personnel resource planning is an important add-on of the module PZE. Considering the working time models, holiday wishes or other miscarriages / overtime the personnel resources allows ideal and simple planning.

Important features of the Personnel resource planning:

- Free selectable planning horizons (shift, day, week, month)
- Selectable group functions (eg department, cost, work group / team)
- Simple schedule of master / change cast,
- Considering the working time models,
- Scheduling of specific times (eg holidays, overtime, sickness, etc.) per grouping concept,
- graphical display of the planned personnel resources with modification possibilities,
- Approval of of staff deployment plans (by status) for further use,
- Accumulation of the planned personnel resources per grouping concept and planning horizon,
- Illustration of deviations of planed / actual allocation by the cost center changes from the PDC system in structura.
- Supply of plan values for capacity planning in structura. Planned personnel resources are automatically considered in capacity planning.
- Illustration of understaffing and miscast staffing of individual departments and planning periods.
-

Free planning horizons

Free selection and group function

Scheduling of specific times

Graphical display and Editing the staff deployment plan

Illustration of deviations plan / actual

Consideration of the staff deployment plan in the capacity calculation

Illustration of lower and miscast

Example dialogues - Personnel resource planning

Visual illustration of staff scheduling grouped by department with modification possibility via drag and drop.

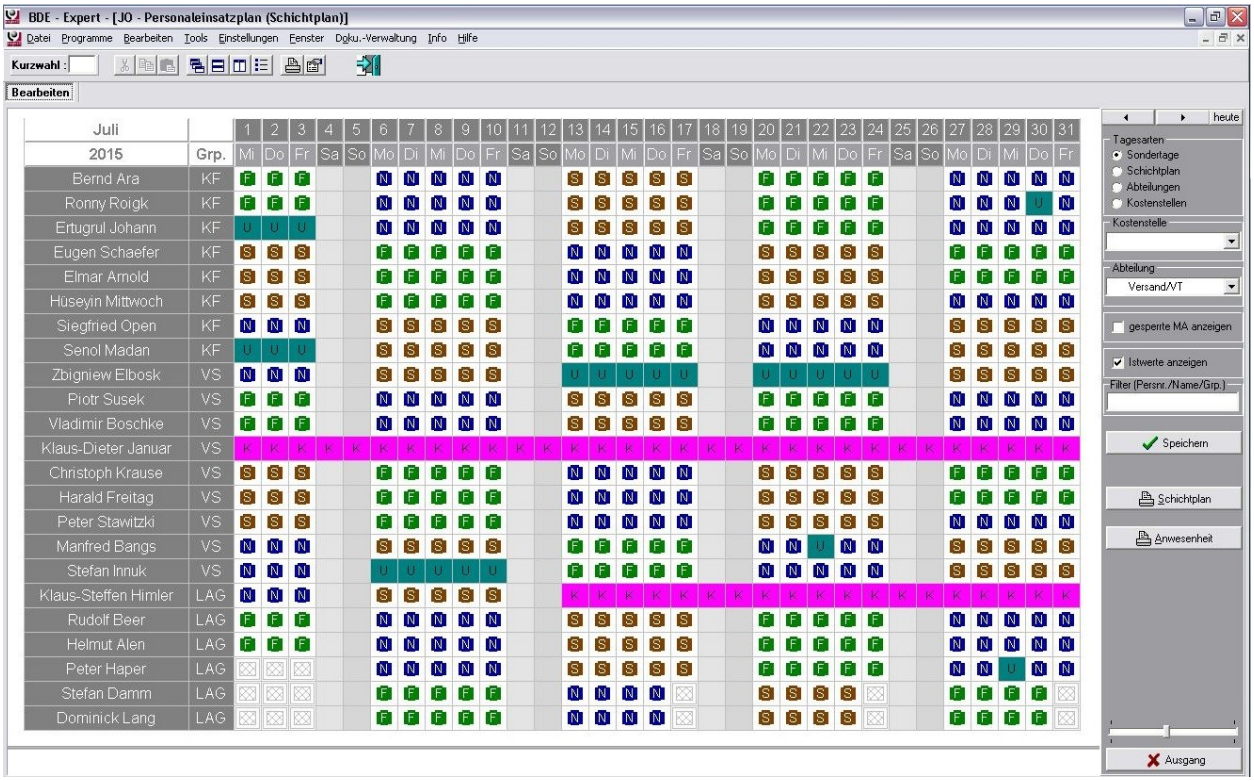


Image - view of the planned staff occupancy by department (upper table) and selected time horizon. Illustration of the planned shifts (working time models) with indication of the missed days. Indication of planned and actual operating times per employee and department for the set planning period.

Image – Annual employee schedule overview data

Example dialogues - Access control

Hardware configuration for access control.

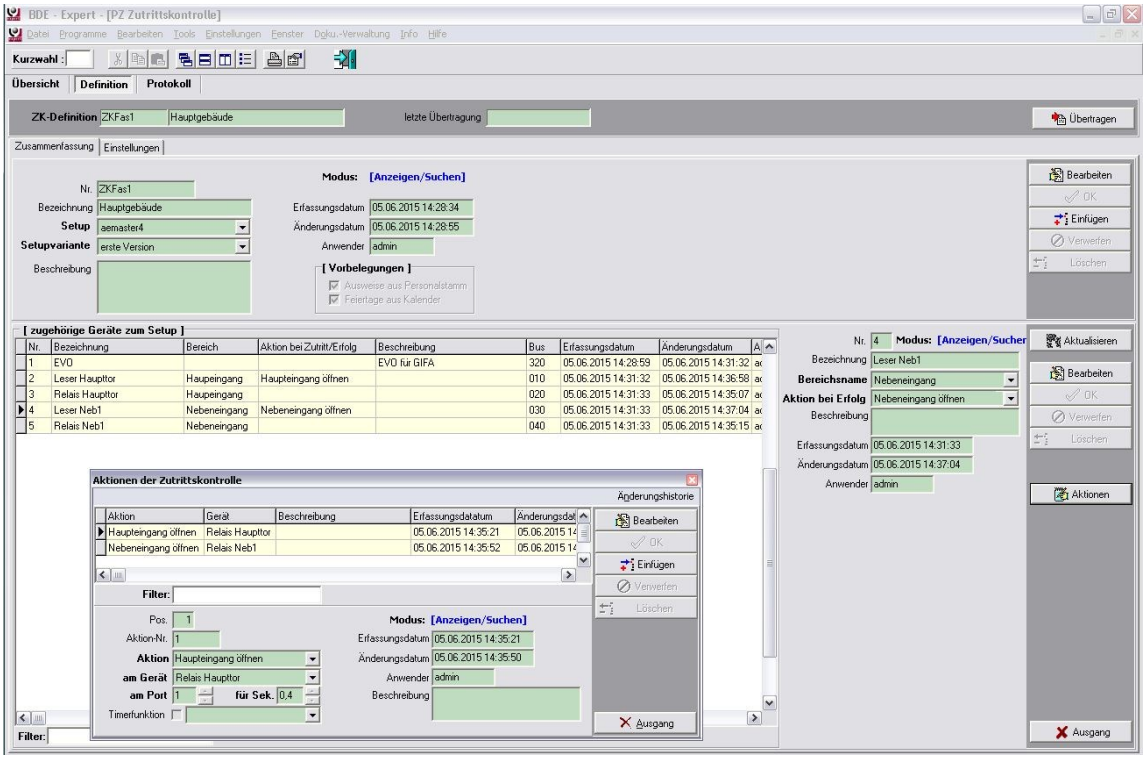


Image – - Reading device configuration, location and procedure

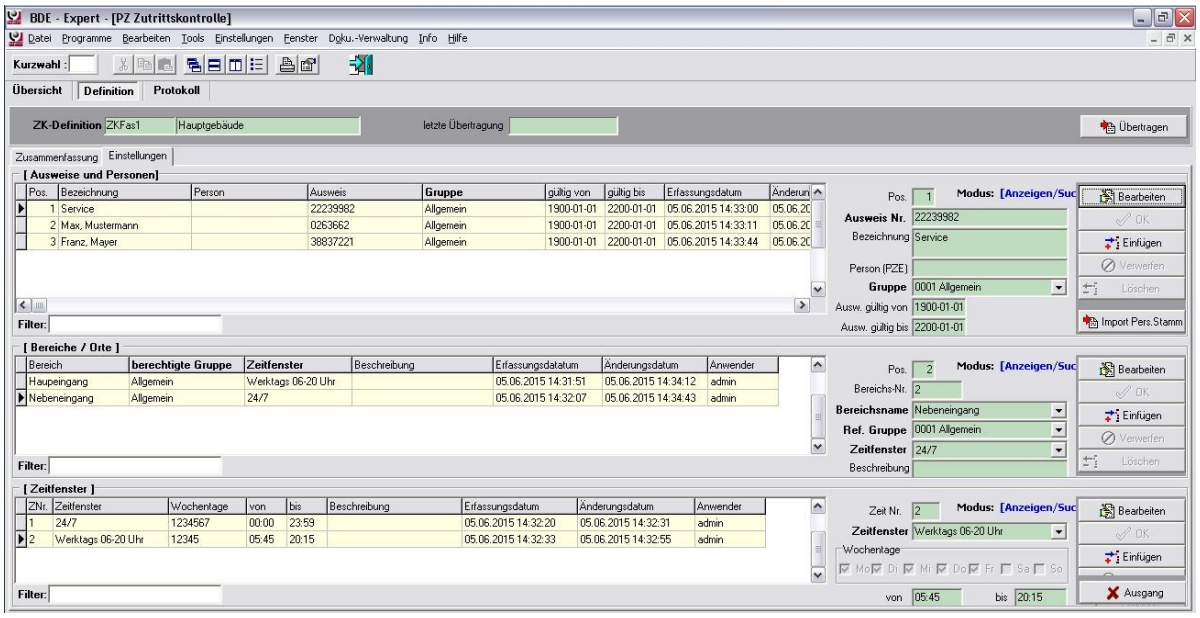


Image – Definition of reading devices, their location and actions on events

BDE – Auftragszeiten und –mengen / Gemeinkostenzeiten / Materialverwaltung

The BDE - module supports you perfectly in the optimization of the manufacturing. The order times/quantity administration books the actual times and quantities to the operating sequence of the current production order and informs you therefore about the accrued costs (concurrent accounting) and the manufacturing progress. Overhead costs times can be assigned to a cost centre, a project or an order for overhead costs. The system provides information over the achieved performance level. The material administration simplifies the handling of the stock item entries. All data are available if required online the ERP system.

Highlights of the BDE module::

- Generation of production orders with production plans and manufacturing parts lists as carriers of the work order times and quantity management.
- Machine or workplace-related detailed planning functions (layer / sequence planning).
- Time near provision of material and wage slips (optional).
- Efficient and error free logging of the production times and quantities to the production order by the support of bar codes or rather RFID's.
- Logging of the overhead costs times (malfunction periods/general works) to an overhead costs order or rather for the cost centre.
- Stock requisition to an order or to the cost centre are locally seized and booked after release.
- The concurrent costing keeps you always up to date over the material and production costs incurred as well as the reached product profitability.
- Interfaces to the existing ERP system.

Generation of production orders with production plans

Sequence planning

Time tickets / Material removal bills

Order times / quantities

Overhead costs times

Stock transfers

Postt costing analysis

Interfaces to the ERP system

Overview – BDE- production data capturing - focus on order times and quantities

The process shows the integration of different recording systems in the field of personnel / MDE and order data collection.

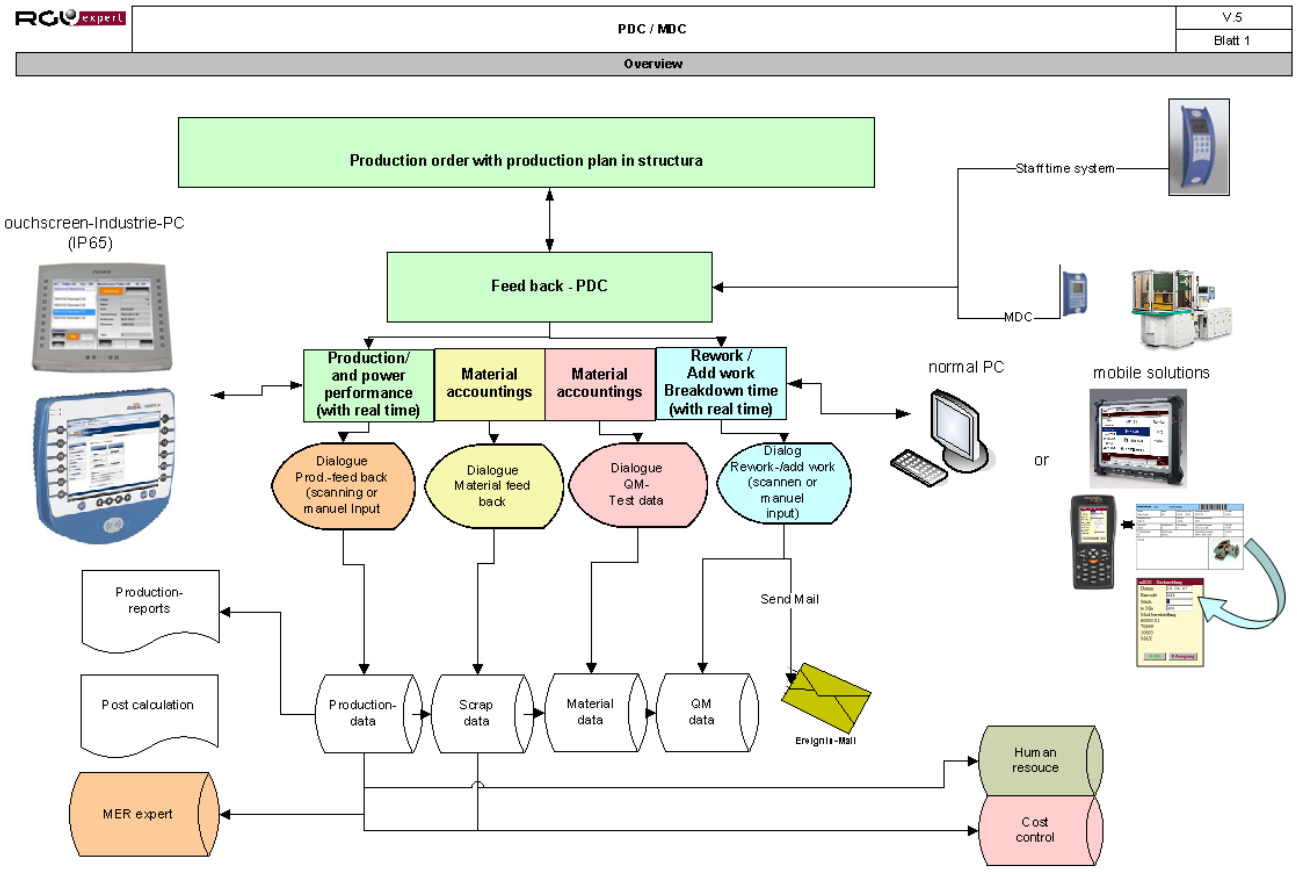


Image - Overview - Integration

Production data capturing master data management with BDE expert

All of BDE expert features rely on master data, which have to be entered once (usually at system implementation). All data can also be transferred from the ERP/PPS system using interfaces.

Machine master data

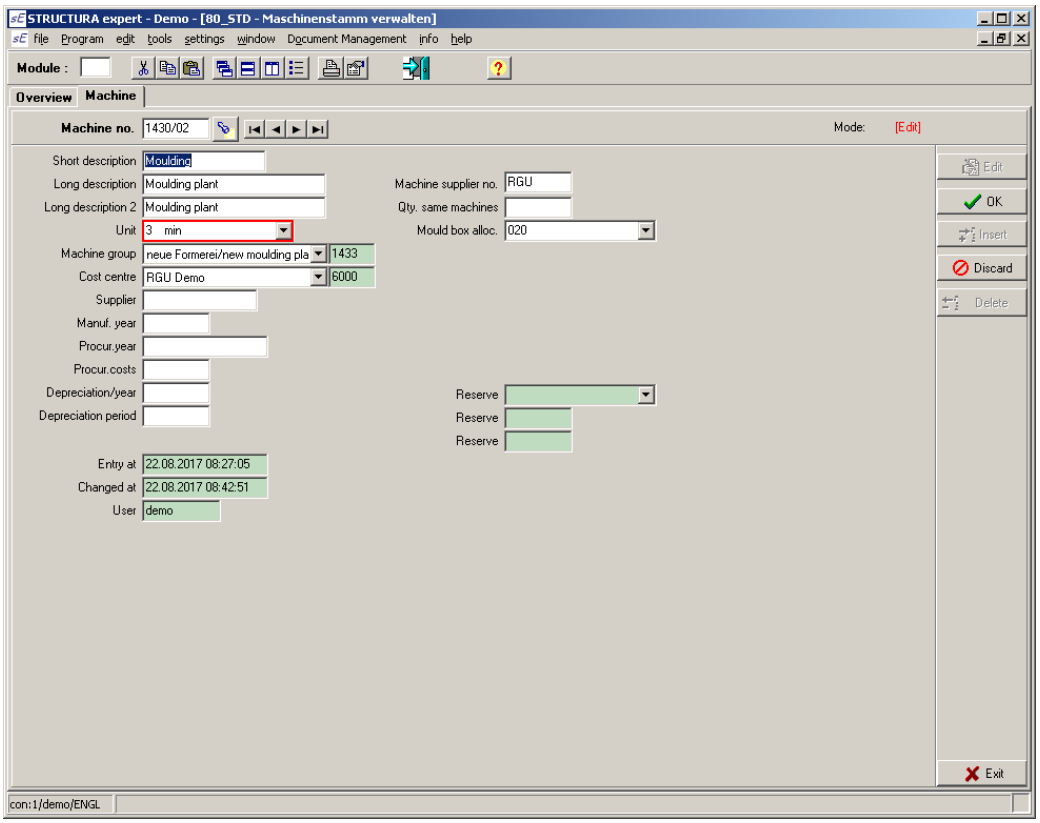


Image – Machine master data in BDE expert

All required machines and work stations have to be entered in the machine master data program and cost centers have to be allocated.

Machine groups

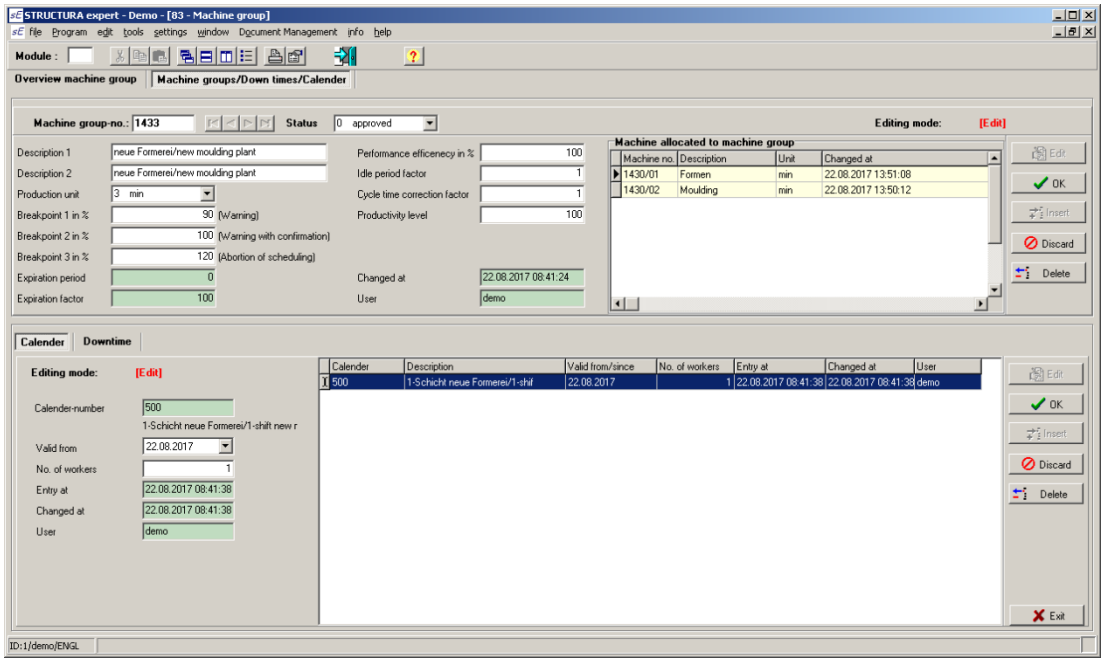


Image – Machine group master data in BDE expert

Multiple machine can be grouped in one machine group. Machine groups also contain the shift calender.

Work steps

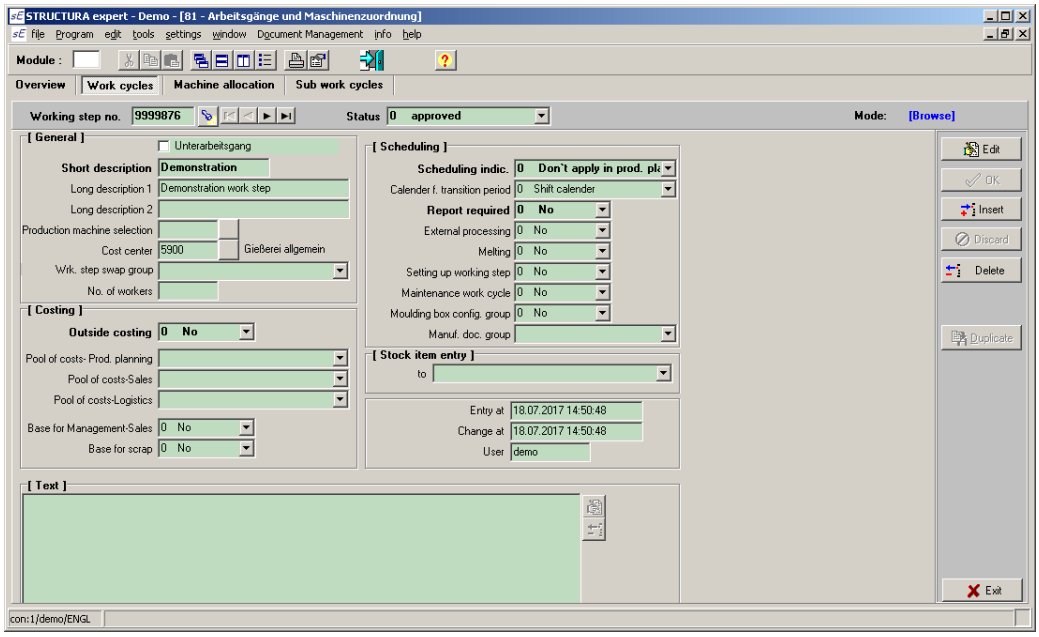


Image – Base configuration of work steps in BDE expert

Entered work steps with a machine allocation. Multiple work steps can be allocated to one and the same machine.

Article master data with method plan and equipment

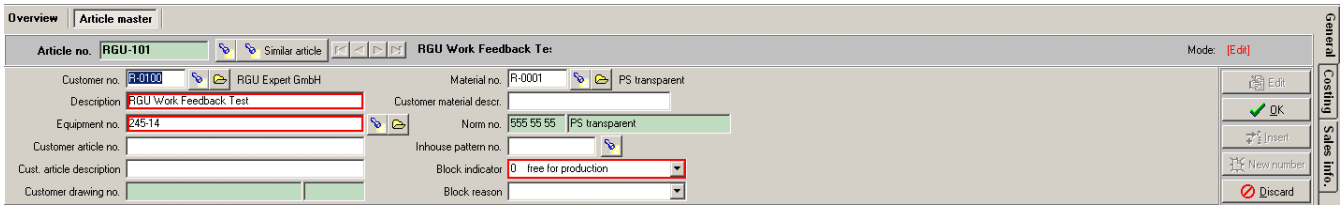


Image – Article master data

The article master data consists of basic data which is imported from the overlaying PPS system.

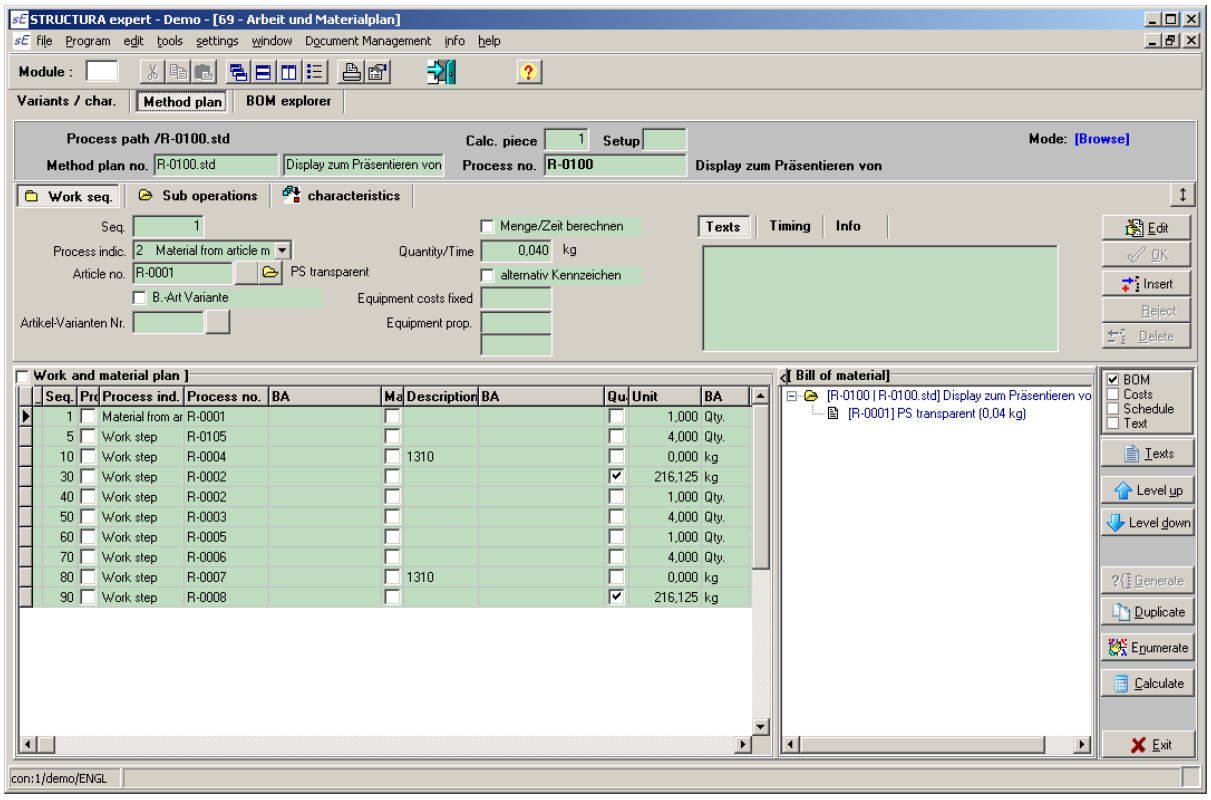


Image – Work step and equipment allocation using the method plan

Work steps and equipment is allocated in the so called “Method plan”

Equipment management (optional)

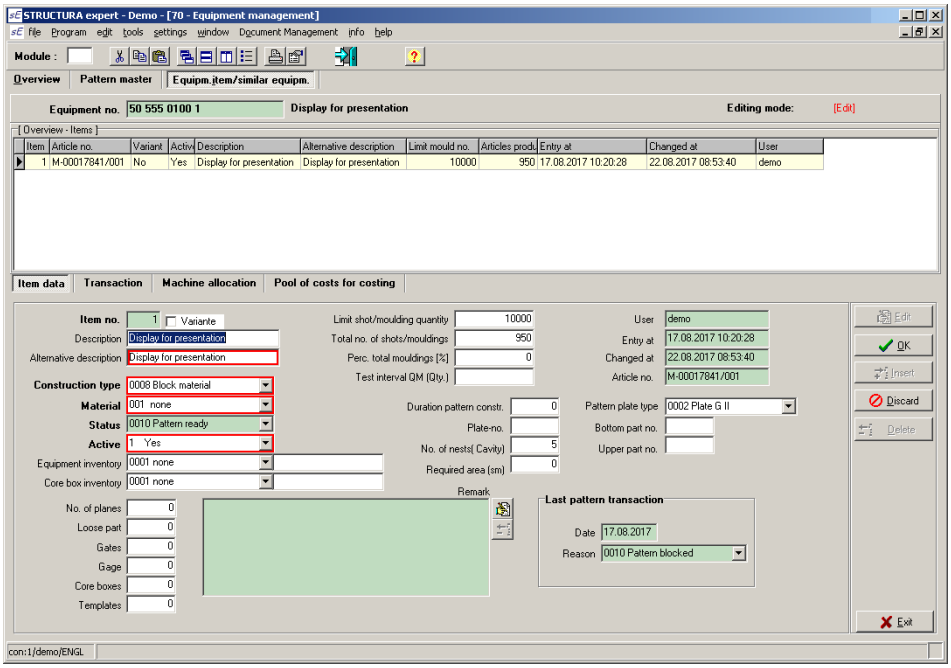


Image – Equipment management

1. Easy management of equipment data. Each equipment may contain several items.
2. Transparent equipment transfer data: Depending on the requirement, each movement/transfer of the equipment can be traced back.
3. Machine allocation: Allocation of machines on which the equipment can be used. (Validity check for detailled planning)

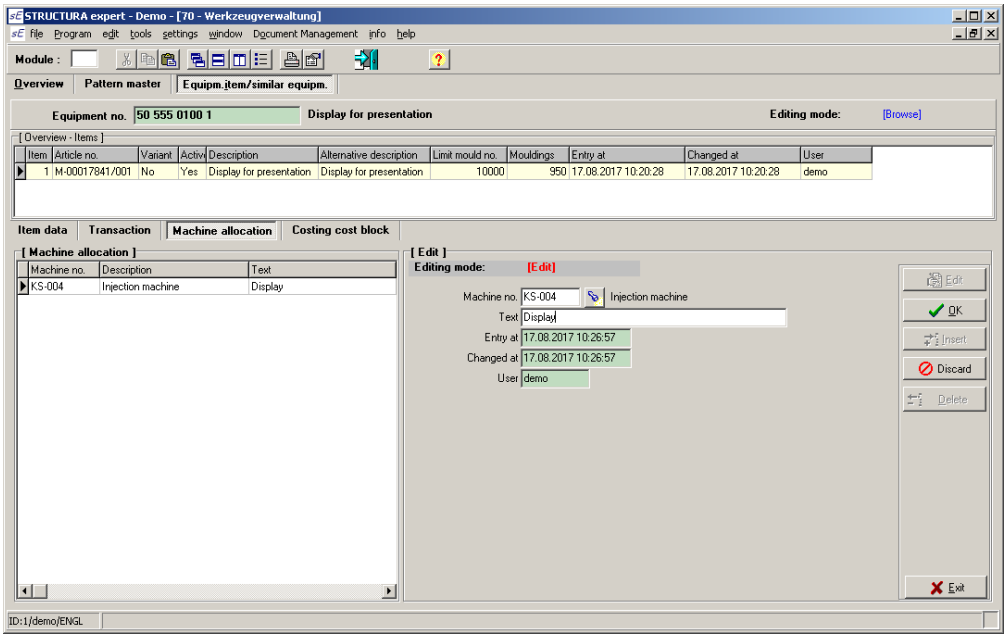


Image – Equipment – machine allocation dialogue

The featured document management system can be used to upload and save text and image files.

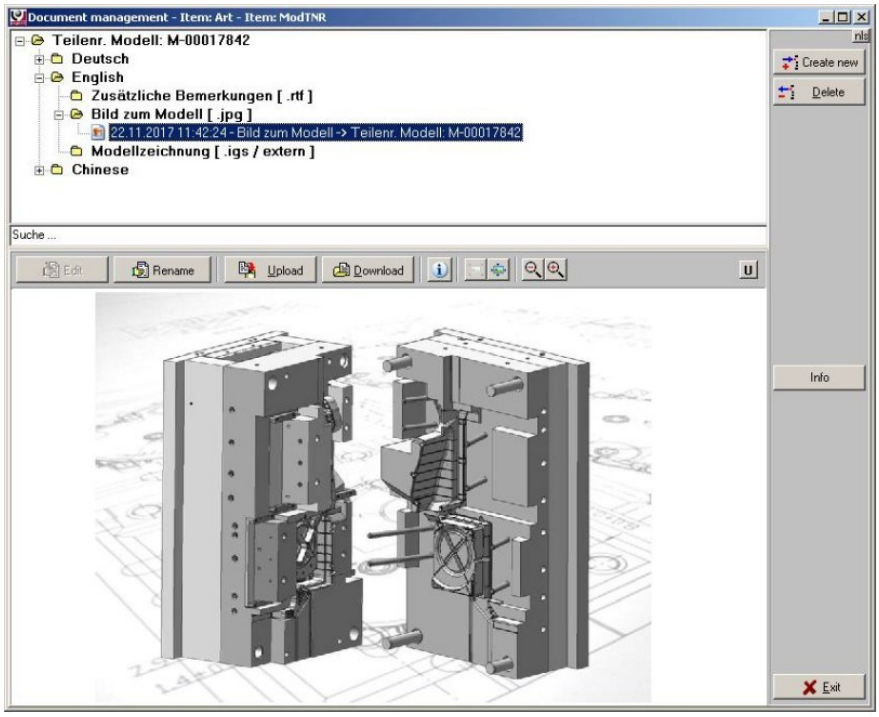


Image – Document management for the equipment master data

Equipment transfer dialogue (equipment check, withdrawla etc.)

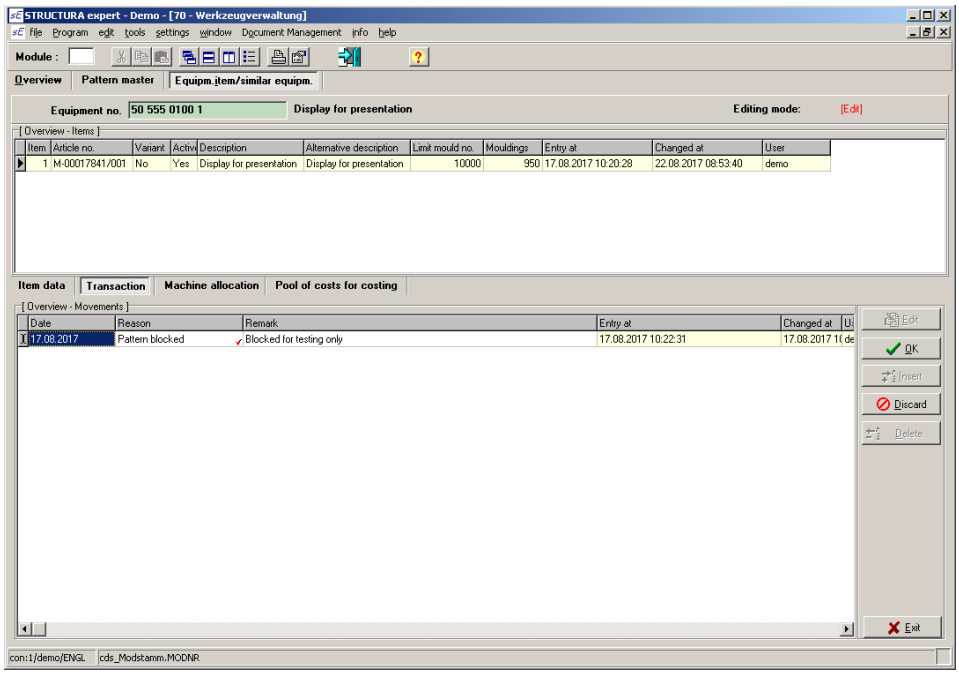


Image- -Equipment transfer dialogue

Production order data

Generating production orders is done using interfaces with the overlaying PPC system. BDE expert delivers detailed information on the production status and saves all data for a multitude of analysis requirements, such as information on production duration and down times, which all can be used for post costing analysis.

Production order

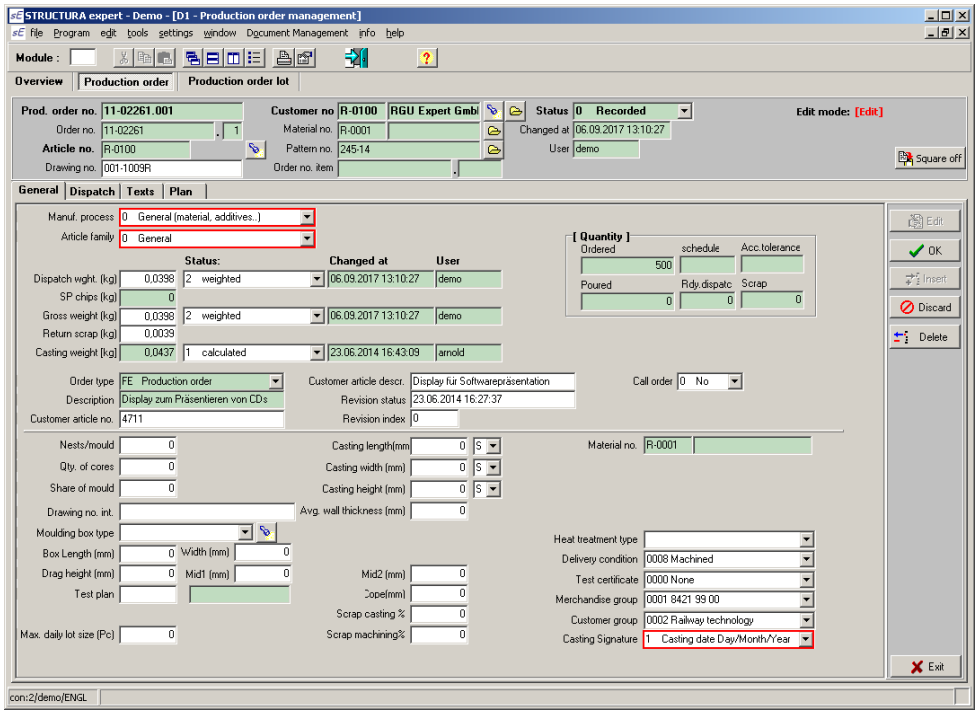


Image – Example of an in-house production order

Production order scheduling according to delivery schedule

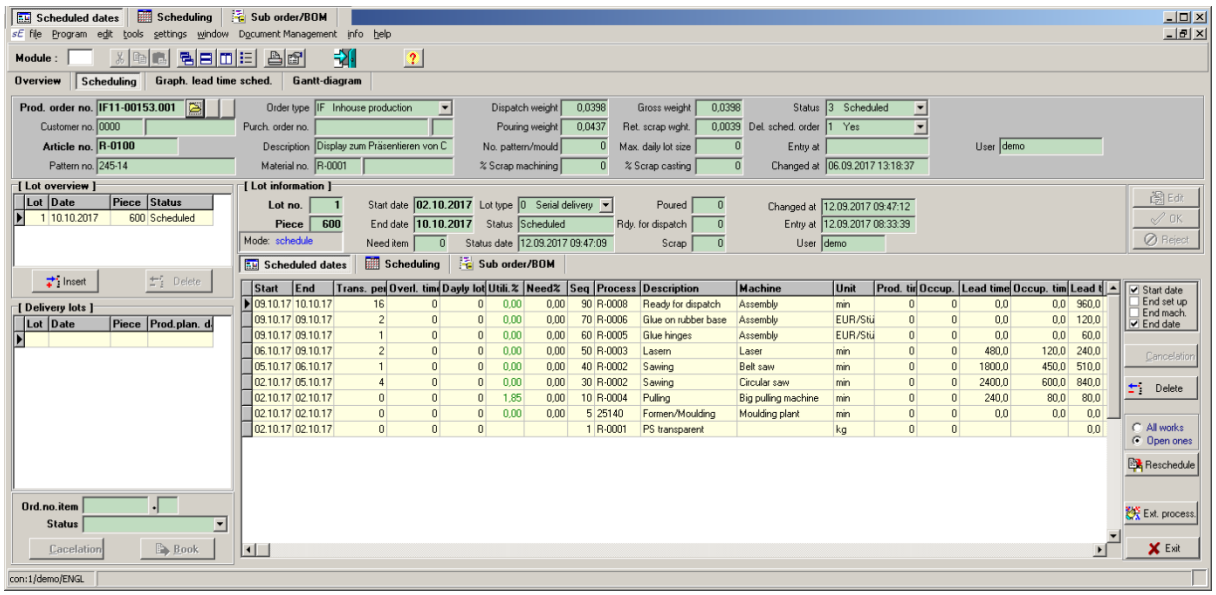


Image – Example of simple scheduling

Detailed planning using the planning board (optional)

Based on production orders and defined shift models, the extra feature of a detailed planning using a planning board is usable. The scheduled sequence of each production order is displayed graphically for each machine. The planning board can be zoomed in and out of in different time scales.

Detailed planning

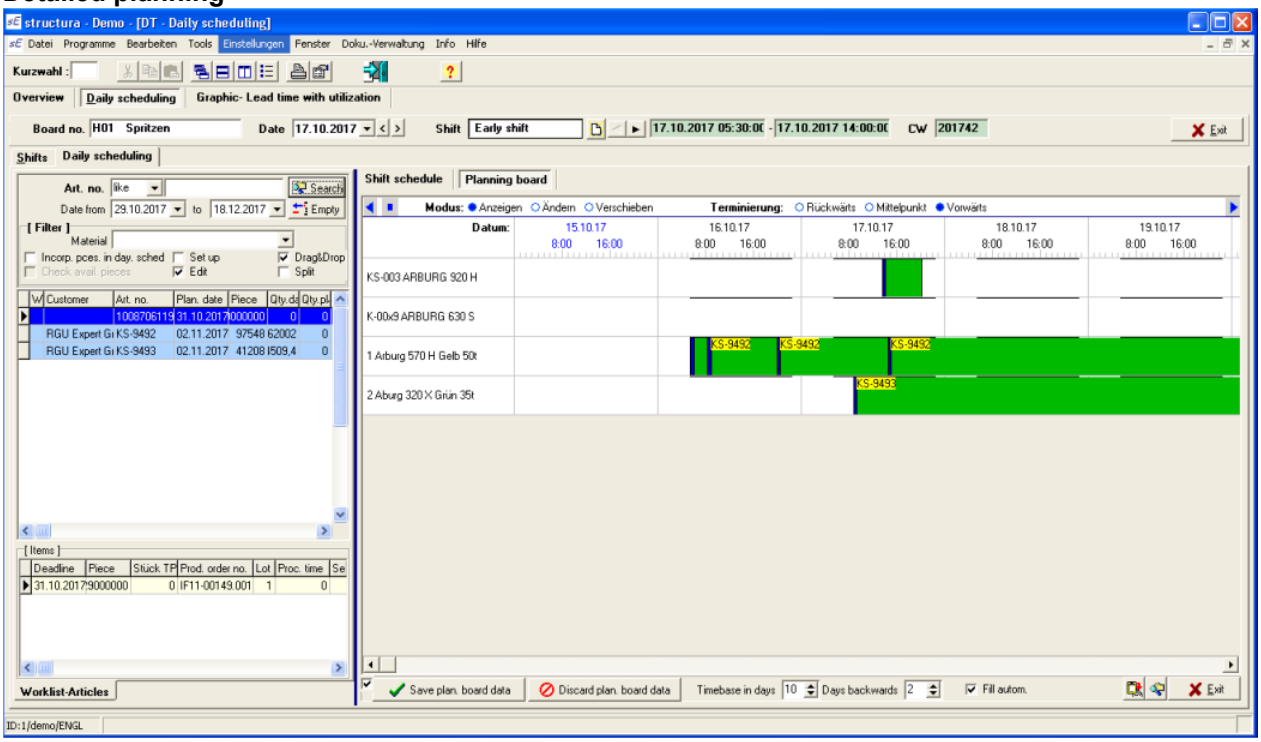


Image – Production order scheduling using the planning board

The detailed planning can be used to pause or reschedule already scheduled production orders. The planning board can be linked with machine data feedback, showing production progress, thus enabling a comfortable, remote production overview. Depending on used configuration, the delay in production triggers an automated rescheduling of the subsequent production orders. For additional views on detailed scheduling see chapter „Evaluation“.

BDE-examples – Feedback using touch PC

Menue on a Touch-PC

The touch PC menue is designed for easy operation. The whole menu is configurable and work steps can individually be allocated to feedback stations. The type of feedback can also be configured, be it a start/stop feedback, downtime feedback with reason, production feedback including scrap feedback.

Image – Touch PC menue

After the employee logs in, the work step for the feedback is selected. The employee then selects the production machine/work space (middle section) and selects the feedback type (normal feedback, downtime feedback or work list)

Work task list
All pending tasks are displayed in a task list depending on the selected machine. A production order is selected via the screen. Alternatively, a bar code can be scanned.

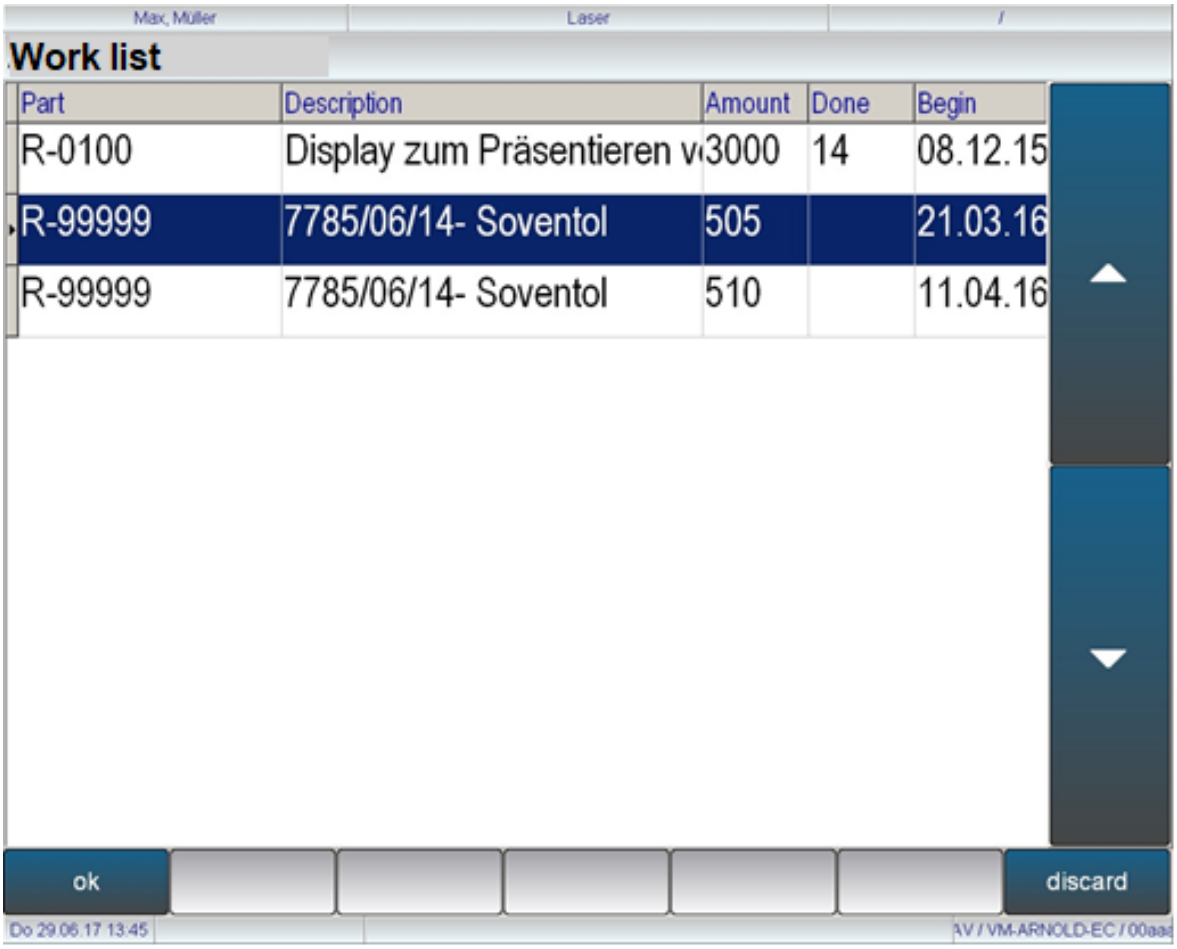


Image – Touch PC production order selection

Production feedback

Production feedback can be handled with a start-finish-feedback or a quantity based feedback can be configured. The worker here either gets a list of production orders displayed, or types in a production order number or article number. The same goes for scanning barcodes.

Image – Example of a start/stop production feedback

Image – Example of the „Work done" feedback with quantity input using an on-screen keyboard

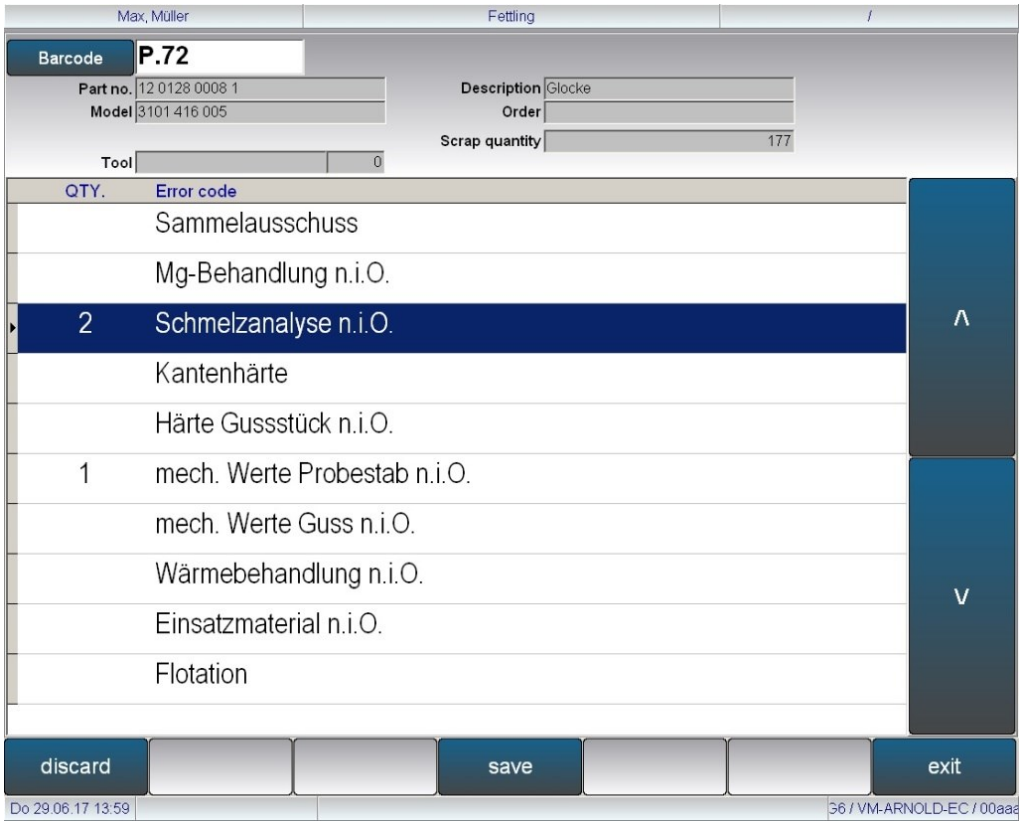


Image – Example of scrap reason selection

Downtime feedback

Image – Downtime feedback display

Downtime and overhead cost feedback can be assigned to each production order or just by cost centre. The selection of a downtime reason and overhead cost can be mandatory or optional.

Document management on the Touch-PC
Using the „document management“-feature, recorded documents (pictures, working instructions etc.) can be displayed.

Image – Document management on the touch PC

BDE – mobile data capturing

RGU Expert provides you with the possibility to operate production data acquisition and visualization via 1D/2D barcode or RFID identification on a mobile device.

- Data capture via wireless LAN or optional GSM / GPRS is possible on the entire company property
- no download and upload of datsa - always up to date of production (real-time feedback)
- Validation checks always relate to current data in the database
- Browser application - simple design of dialog
- Management of applications on the server provides simple administration and support

Mobile use on the entire company property

Online Data Validation

Easy to use - Browser Application

Integrated Barcode and RFID - capture

Application examples - mobile data capture

Application areas of mobile data recording is available on the entire production line and the movement of goods. Be it as mobile information terminal, a feedback system in production or for commissioning.

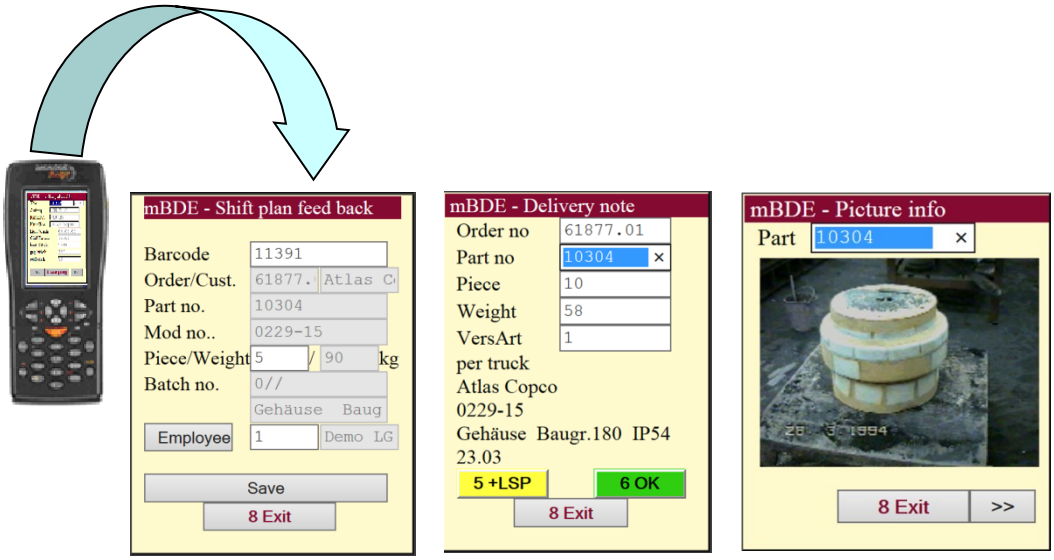


Image – Browser application - free design of the dialogues (HTML)

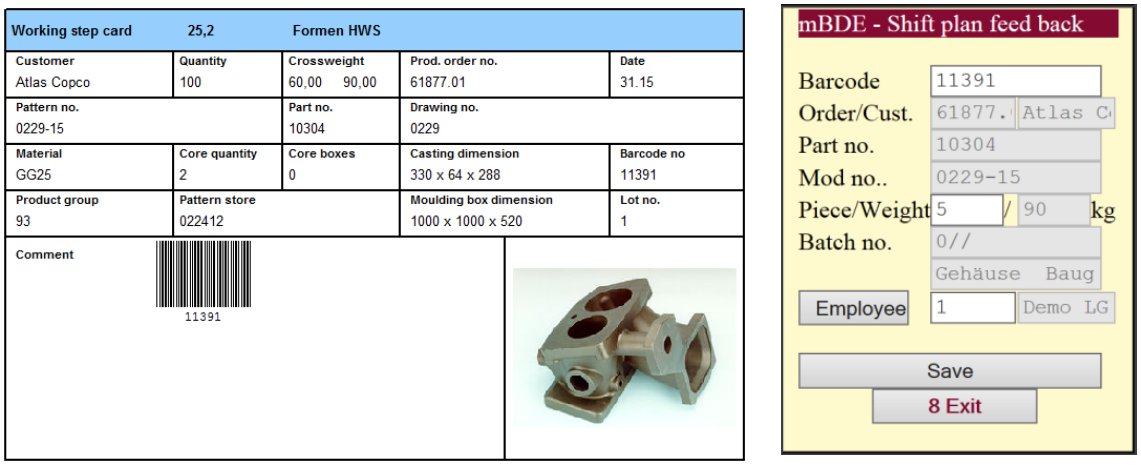
- **Warehouse and equipment management**
  with model Storage and Stock removal and model delivery notes and information on the state of the model.

- **Order overview and production progress indicator**
  always shows you the current status of production and provides an overview of yet to be produced orders.

- **Feedback** of work processes
  The mobile BDE offers a, on foundry conditions customized, real-time production control tool.

- **Mobile information system for pictures and work instructions**
  This Image information is available in the parts master, model and work process.

- **Dispatch modul**
  From the commissioning, delivery notes to the consignment note printing this module makes your Dispatch mobile.



Working step card	25,2	Formen HWS		
Customer Atlas Copco	Quantity 100	Crossweight 60,00 90,00	Prod. order no. 61877.01	Date 31.15
Pattern no. 0229-15		Part no. 10304	Drawing no. 0229	
Material GG25	Core quantity 2	Core boxes 0	Casting dimension 330 x 64 x 288	Barcode no 11391
Product group 93	Pattern store 022412		Moulding box dimension 1000 x 1000 x 520	Lot no. 1
Comment	11391			

Image – mobile data capturing.

Article identification via RFID and mobile reading devices

- **RFID tags on metal**
  Special RFID tags are attached to a particular operation on the parts and thus enable:
  - the rapid identification of the part,
  - the indication of the current production status,
  - the indication of information about further processing steps,
  - the capture of feedback.

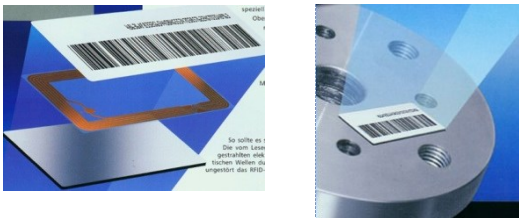


Image – special tags with iron shielding on the backside

- **Application of capturing devices and data exchange**
  A mobile capture device reads the RFID tag, identifies the part and exchanges current data with the PPS server via the mobile network.

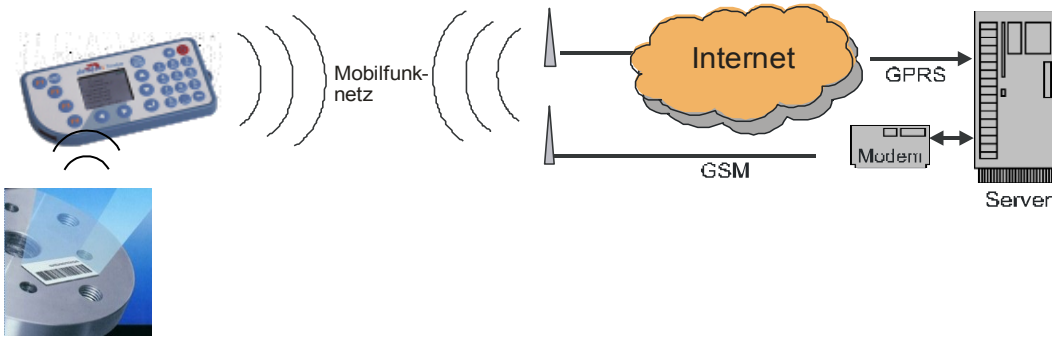


Image – mobile data capturing using RFID

- **stationary data capturing**
  With special reading devices (LF Long Range Box), it is possible to read RFID tags on metal parts over longer distances (up to 3.5 m). Thus,areas in the Company can be set up where it will be automatically identified and reported (eg, locks on truck transit).

MDE – Maschinendatenerfassung

- The machine data capturing keeps you up to date about the machine condition and possible malfunction or non-operation periods. If necessary, the machine uptime can be optimized:

- Management of machine setup parameters
- Connections over SPS controls and professional BUS connections (DP-coupler)
- Management and control of article specific machine parameter data
- Acquisition of machine run times, malfunction or non-operation periods
- Storage of data in its own MDE database
- Optimization of machine run times - e.g. by employment of intelligent transport systems
- Visualization of critical production areas (manufacturing layout)
- Visualization of machines and aggregates(Dashboard)
-

Machine-Setups and machine parameters

Machine connection

Machine runtimes malfunction and deadlock

Optimization

Visualization of production

Application examples of machine data capturing MDE

The following examples show the hardware connection and data integration in BDE expert as well as some evaluation examples.

Application example of MDE connection using IO box

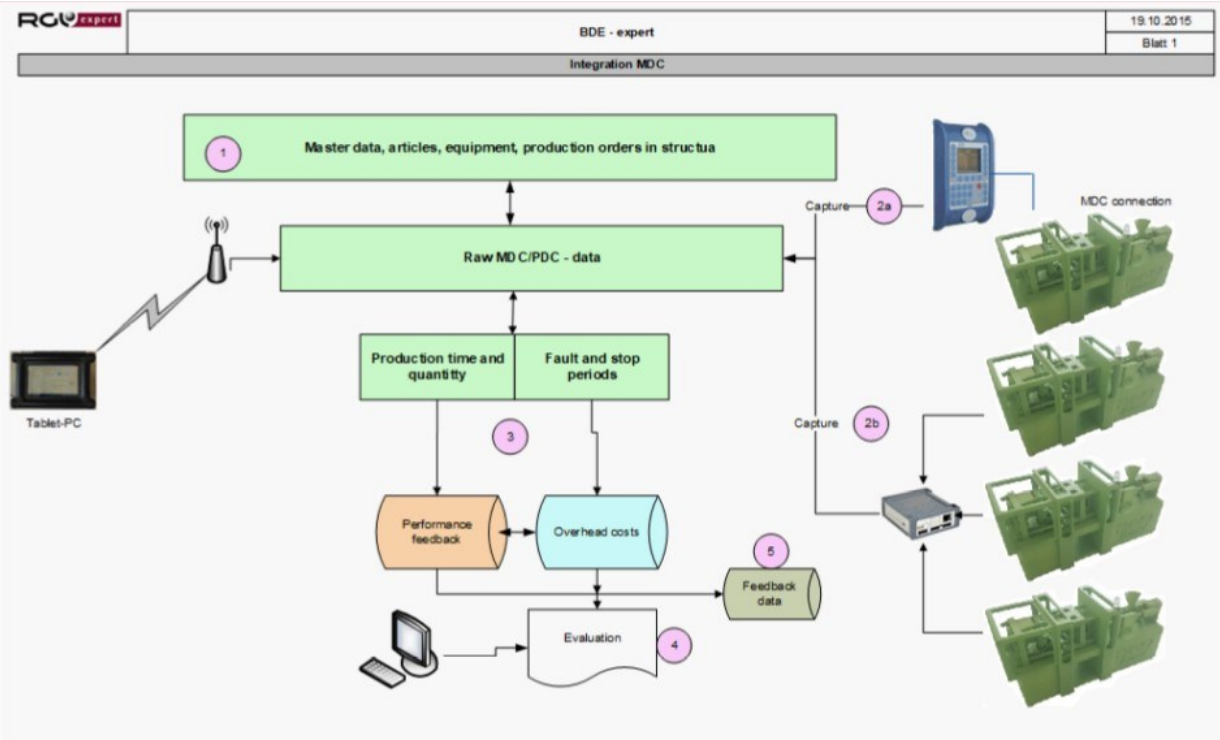


Image – IO box V4 machine data connection

Up to 16 production machines per IO box V4 can be connected to the network. The IO box V4 reads and saves all data including a time stamp, as raw data. A signal will be sent, when the machine enters a new production cycle. Exceeding a pre-determined cycle time, a warning signal will be sent. After the correction of the error, employees can enter a downtime reason and approve the machine for further production. Machine connection can be done by any skilled electrician. RGU expert offers to test any connection on-site.

Startet production orders and MDE raw data are allocated to each other on a time scale to create real production data feedback. Therefore, all production orders and machine data is documented.
Miscellaneous analysis reports are offered by the system. A special reporting tool allows for the creation of unique reports.

Evalution expample with graphical display

Example 1 – Machine uptime monitoring (ONLINE display)

Actual machine data for setup, production time and quantity, scrap quantity, downtime come together in BDE data tables and are displayed visually for the user. Extensive evaluation possibilities can be done using the Report Designer and Report Cube. OEE key figures can be determined in connection with planned values.

Image – Display of current machine data

Example 2 – Report Cube evaluation– Production and downtime comparison

Selektion:

Maschinengruppe	between	3800	5100
Datum	between	20120101	20121231

Kreuztabelle:

	Jahr, Felder	
ABG	2012	
	Produktionszeit	Störzeit
3.800,00	125.918,73	14.272,00
4.500,00	499.564,40	5.790,00
4.700,00	106.640,56	0,00
5.100,00	687.417,50	27.796,00
Gesamtsumme	1.419.541,19	47.858,00

Chart:

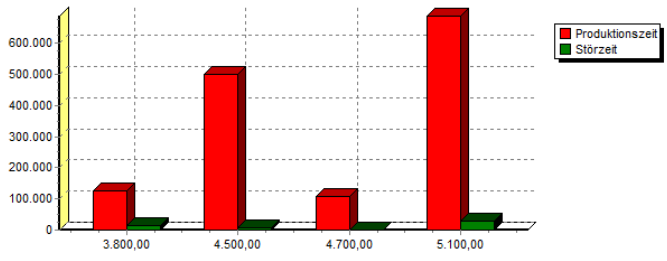


Bild – Report Cube – Production time (red) and downtime (green) comparison

Example 3 - Dashboard (OEE – key figures)
The OEE key figure display is crucial for the monitoring of groups of machines and single machines.

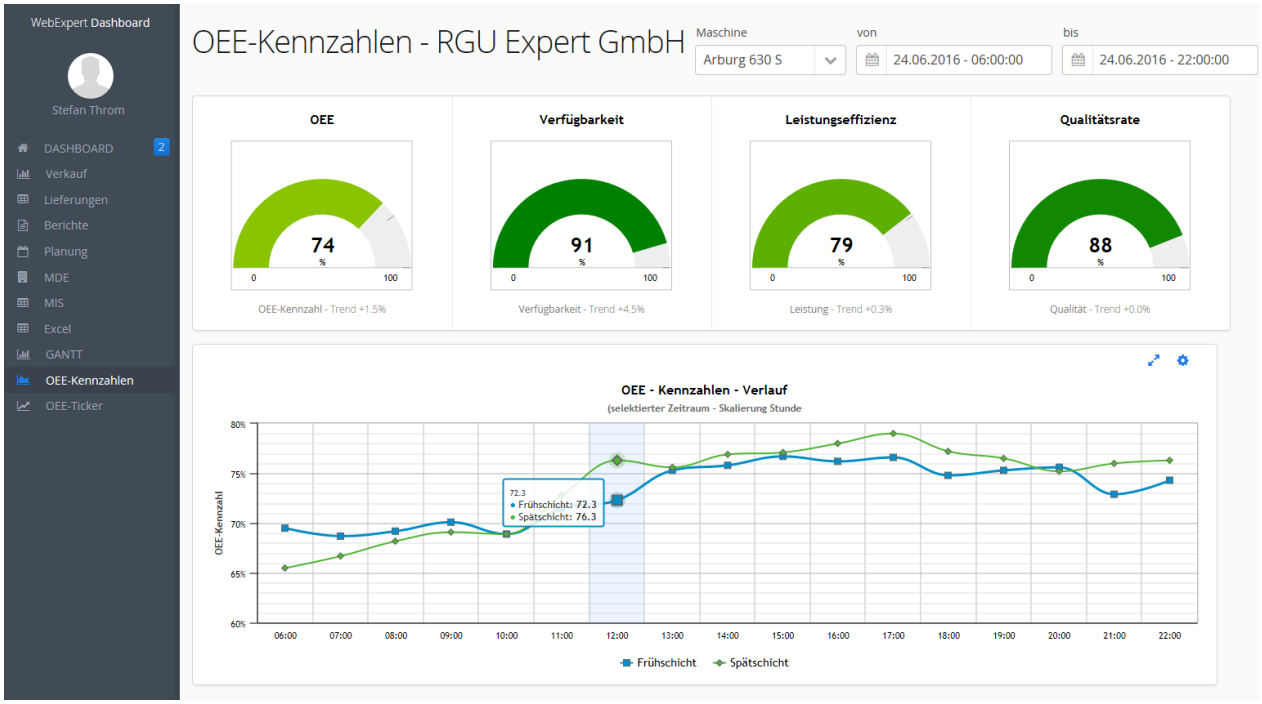


Image – OEE key figure display of a single machine

The evaluation report above for availability, efficiency, quality and the overall OEE key figure determines and displays all data as a chart (solid gauge). Different display colours can be used for different OEE limits. All data can be selected by date and machine.

Example 4 – Display of various machine data using the Dashboard

Image – Display of important production machines using the Dashboard

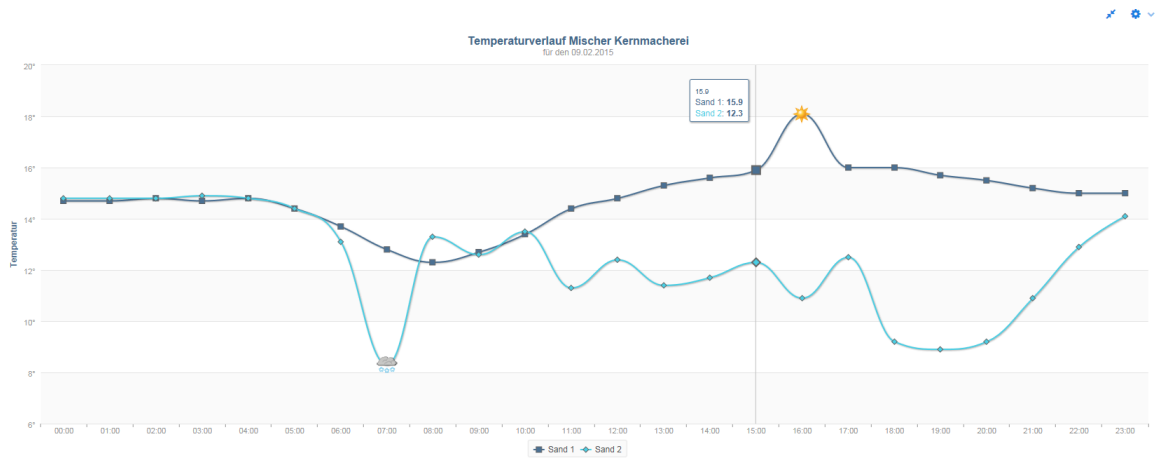


Image – Display of temperature of a sand mixer

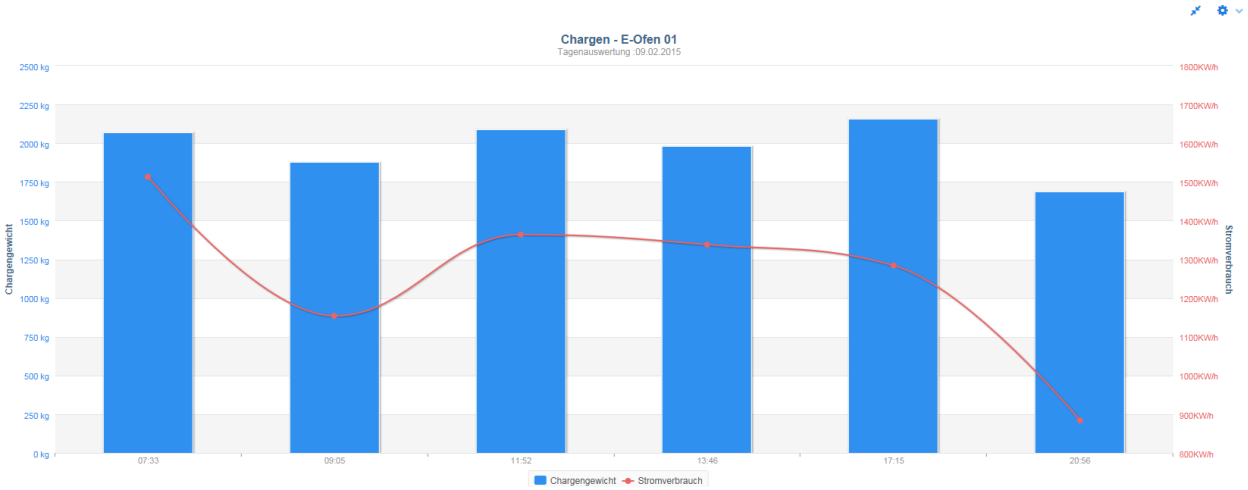


Image – Display of electricity use for each batch

Example 5 – Production visualisation (Hall monitor)

Image – Machine data and transprot system data with visualisation

Hardware configuration example

The following shows the integration of production and machine data in BDE expert, as well as data transfer with the existing PPC system.

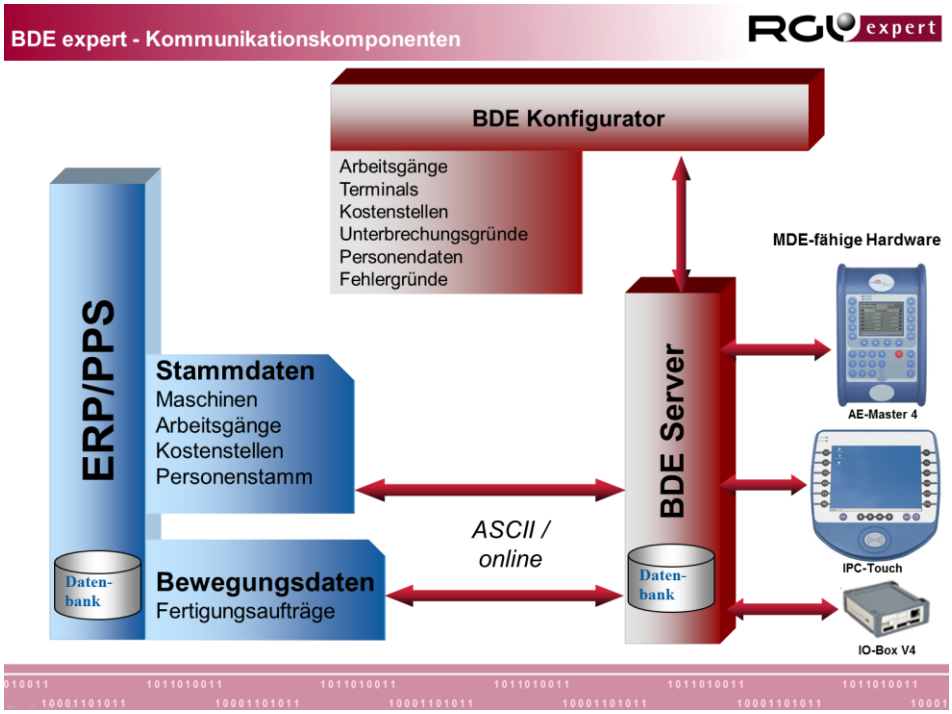


Image – Schematic of production and machine data connection dung

In terms of hardware, we use systems of the market leader (Datalogic DataFox, NOAX, DLoG, etc.), which have already proven themselves in practice for many years.RGU Expert has direct hardware-related connections to these devices.

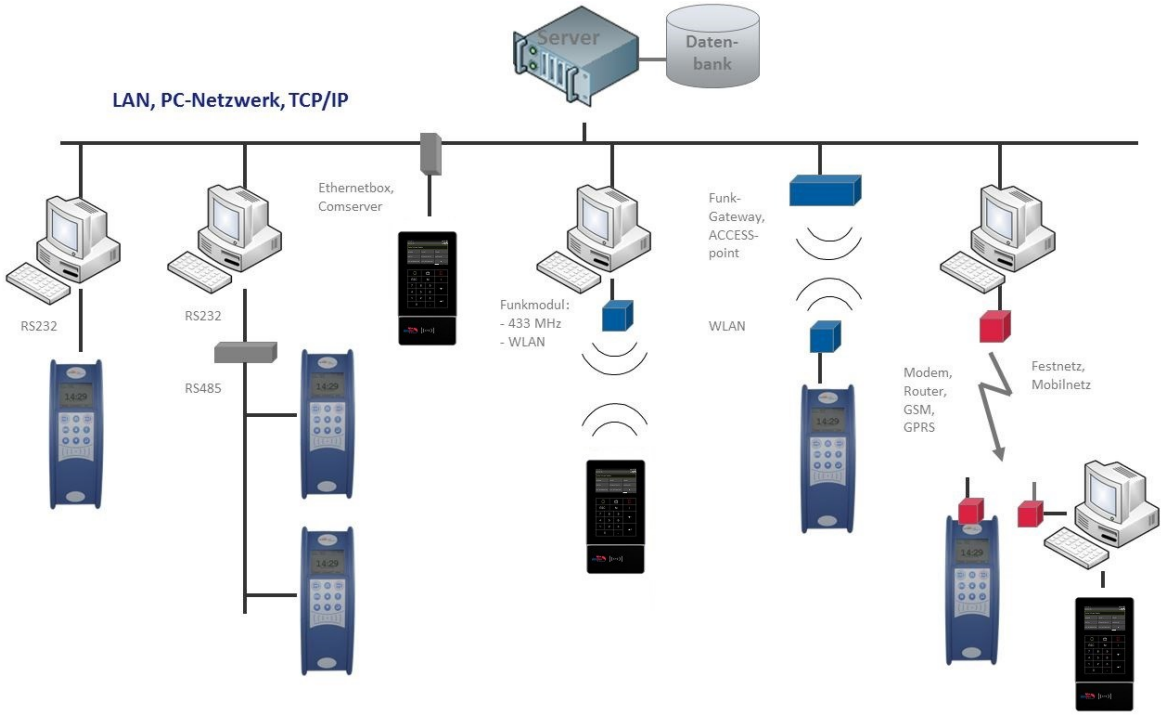


Image – Hardware integration overview

		
Tablet-PC (DLOG)	Falcon (DATALOGIC)	Touch-PC (Noax)

Image - Examples - mobile capturing devices from Datalogic and DLoG

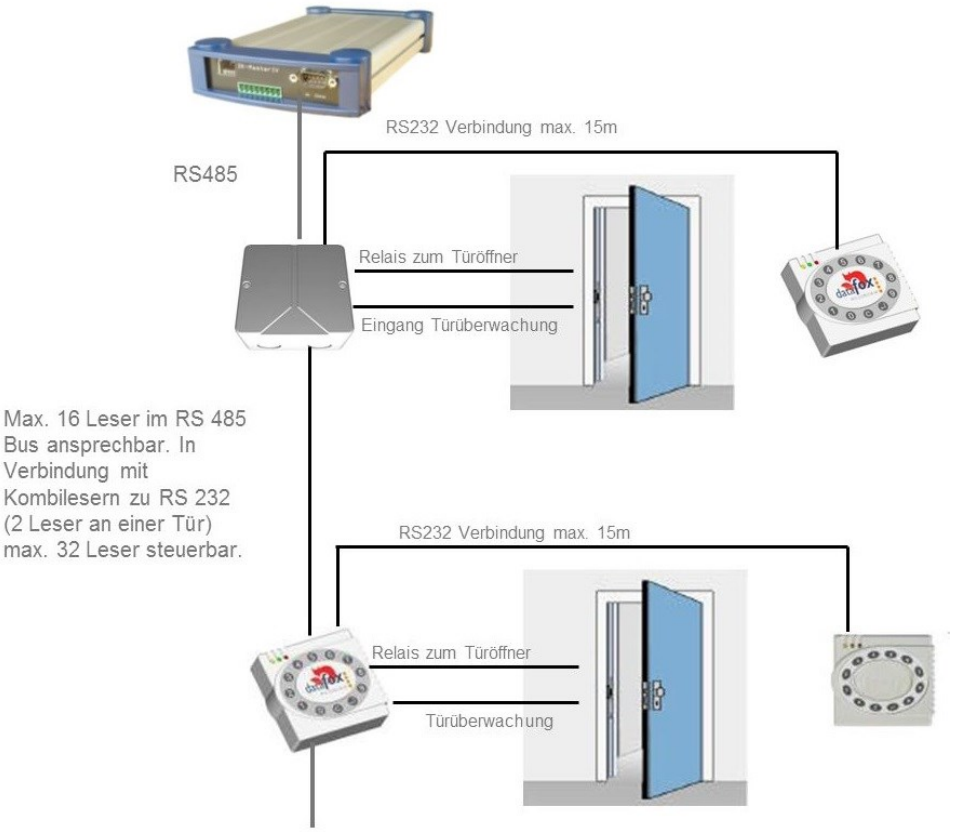


Image - Hardware to control an access control