

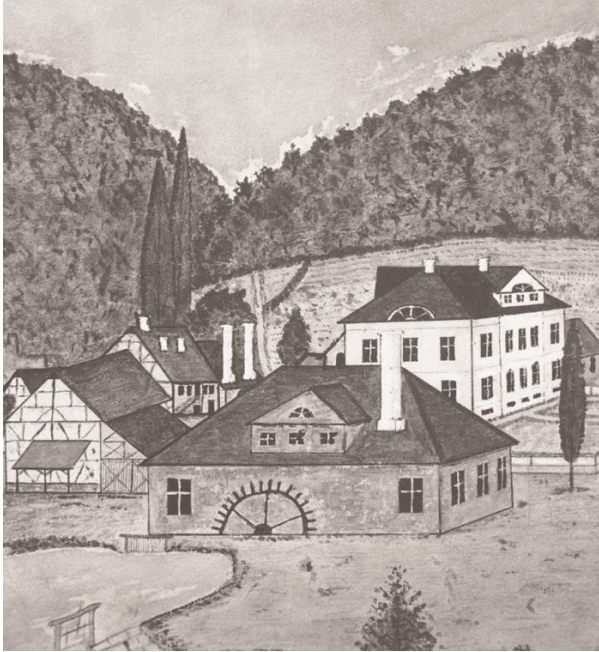
Smart Foundry



CAEF General Engineering Section meeting
Düsseldorf, Germany – March 22, 2017

Matthias Hofmann –
Plant Manager Kurtz Ersä SMART FOUNDRY

Historical Development



- Foundation: 1779 as an iron hammer
- Family owned since 1800
- Iron hammer and Foundry
- Kurtz Ersä diversified company group:
 - 1300 Employees
 - 250 Mio.€ Turnover

Business Segments

Electronics Production Equipment

- Soldering systems
- Soldering tools

Metal Components

- Castings
- Sheet metal
- Machining

Moulding Machines

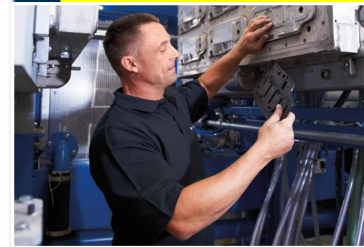
- Particle foam machines
- Foundry machines



Metal Components
25%



**Electronics
Production
Equipment**
42%



Moulding Machines
33%

Electronics Production Equipment



Stencil printers



Reflow ovens



Wave
and selective
soldering systems



Inspection systems



Hand soldering stations



Rework systems



Moulding Machines



Shape
moulding machines



Block moulds



Low-pressure
casting machines



Trimming presses



Kurtz Gießereimaschinen
Kurtz Foundry Machines



Kurtz **PRO**efficiency
Expect more! – Get more!

Produktübersicht

Product Portfolio

Kurtz PROefficiency
Expect more! – Get more!



- Niederdruckgießmaschinen
Low pressure casting machines
- Kippgießmaschinen
Tiltable gravity casting machines

- Schwerkraftgießmaschinen
Gravity casting machines
- Entgratpressen
Trimming presses

- Automatisierung
Automation
- Turnkey Solutions
- Services



ND-Anlagen und Komplettlösungen *LP Plants and Complete Solutions*

Metal Components



Sheet metal technology



Grey/nodular cast-iron

Machining





SMART **FOUNDRY**

The Industry 4.0 Foundry

Status 2012

Product range:

cast iron for:	mechanical engineering, wind power, electrical engineering
material:	grey iron, nodular graphite iron/ductile iron
manufacturing process:	machine moulding, hand-moulding
weight category:	150 kg - 8.000 kg

Sales 2012: 20 Mio €

Employees: appr. 100

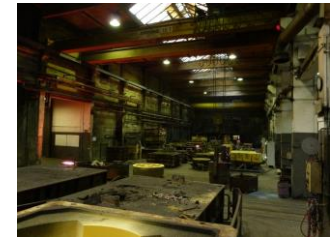
Strategic situation:

- competitive pressure from abroad
- environmental specifications
- increases in energy costs
- slowdown in investment
- Nonsatisfying to a dangerous profit situation for years

Status 2012

Problem areas

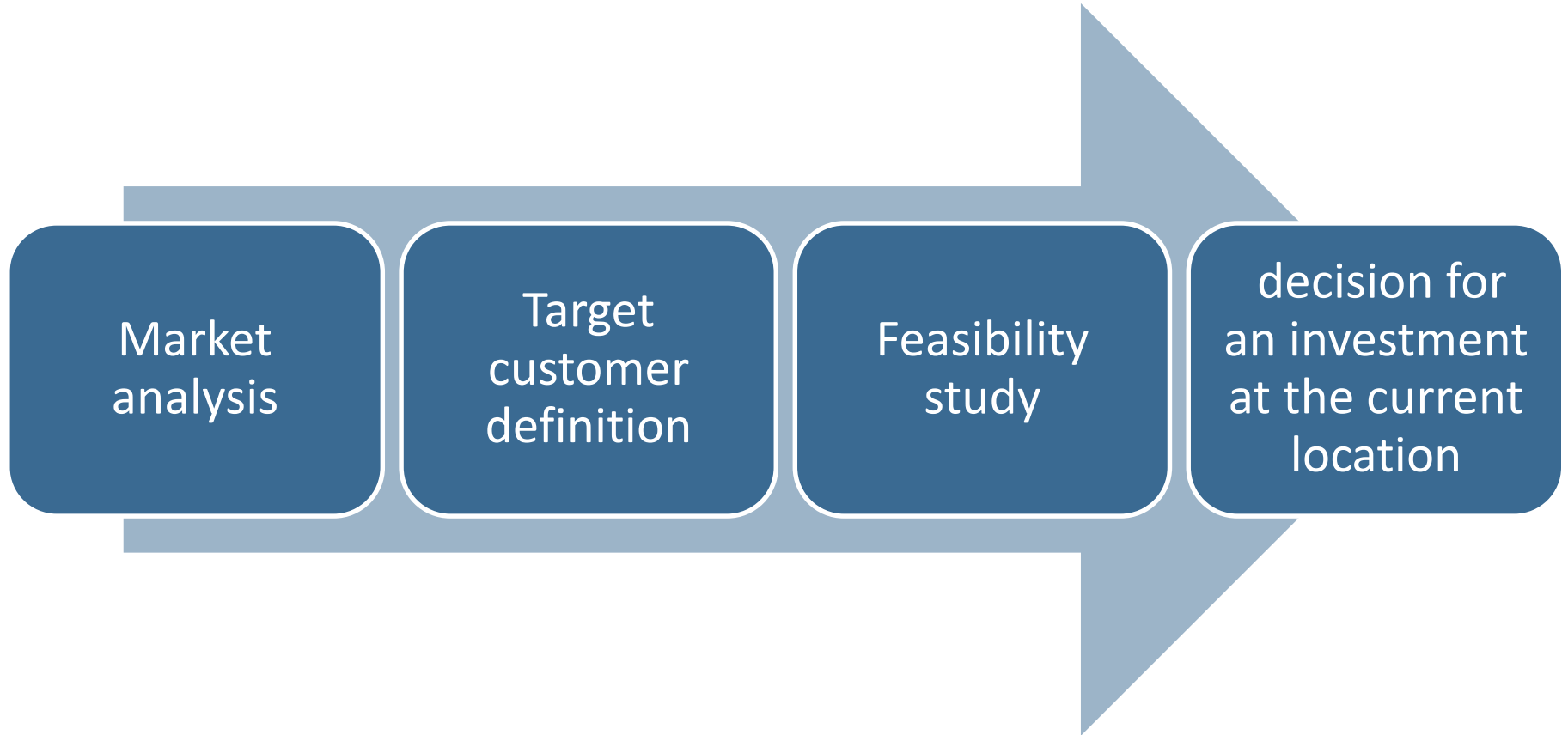
- Working conditions
- Productivity
- Environmental protection
- Material flow
- Shortage of space
- Occupational safety
- High quality assurance effort
- High maintenance costs



Conclusion

- The iron foundry isn't competitive in this situation.
- The iron foundry is at the capacity limit.
- A strategic decision has to be made.

Decision Phase



Decision phase

Goals

- Elimination of all mentioned problem fields.
- Competitive product line
- Introduction of a sequenced production line
- Cooperation with approval authorities
- Expansion capabilities for the future
- Elimination of the investment backlog
- Profitable growth
- Preserve all 100 jobs



SMART FOUNDRY

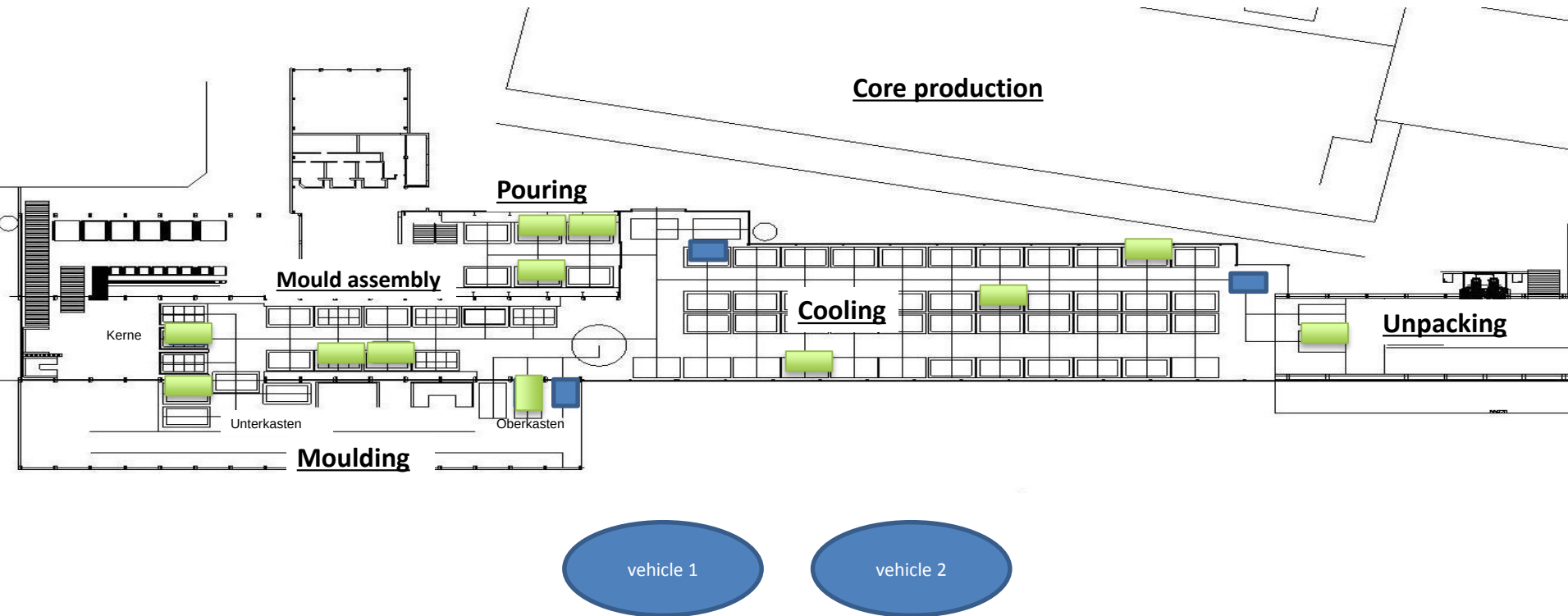


SMART FOUNDRY

The Industry 4.0 Foundry



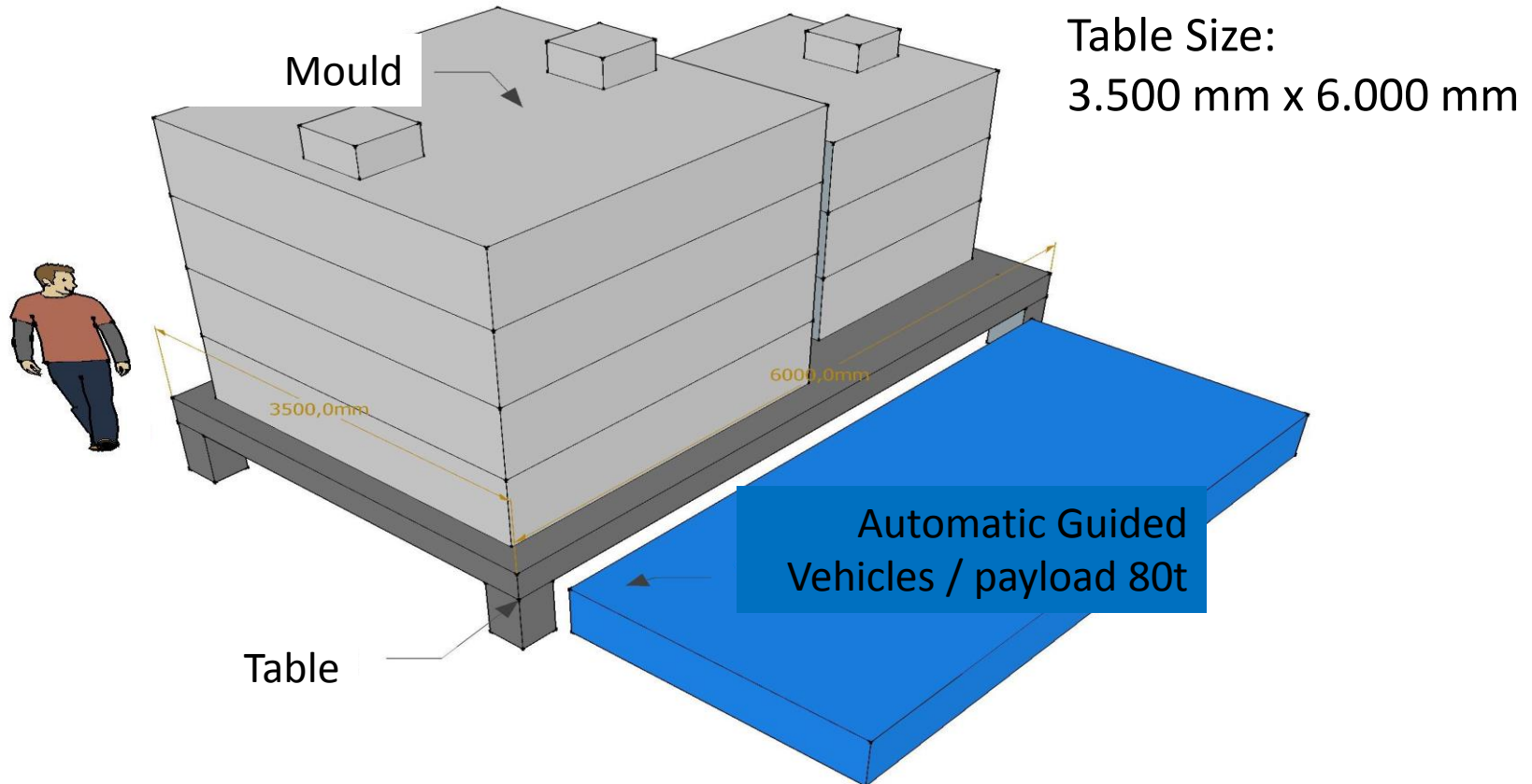
Process Simulation



The Moulding Shop



Table System and AGV



Mould Assembly



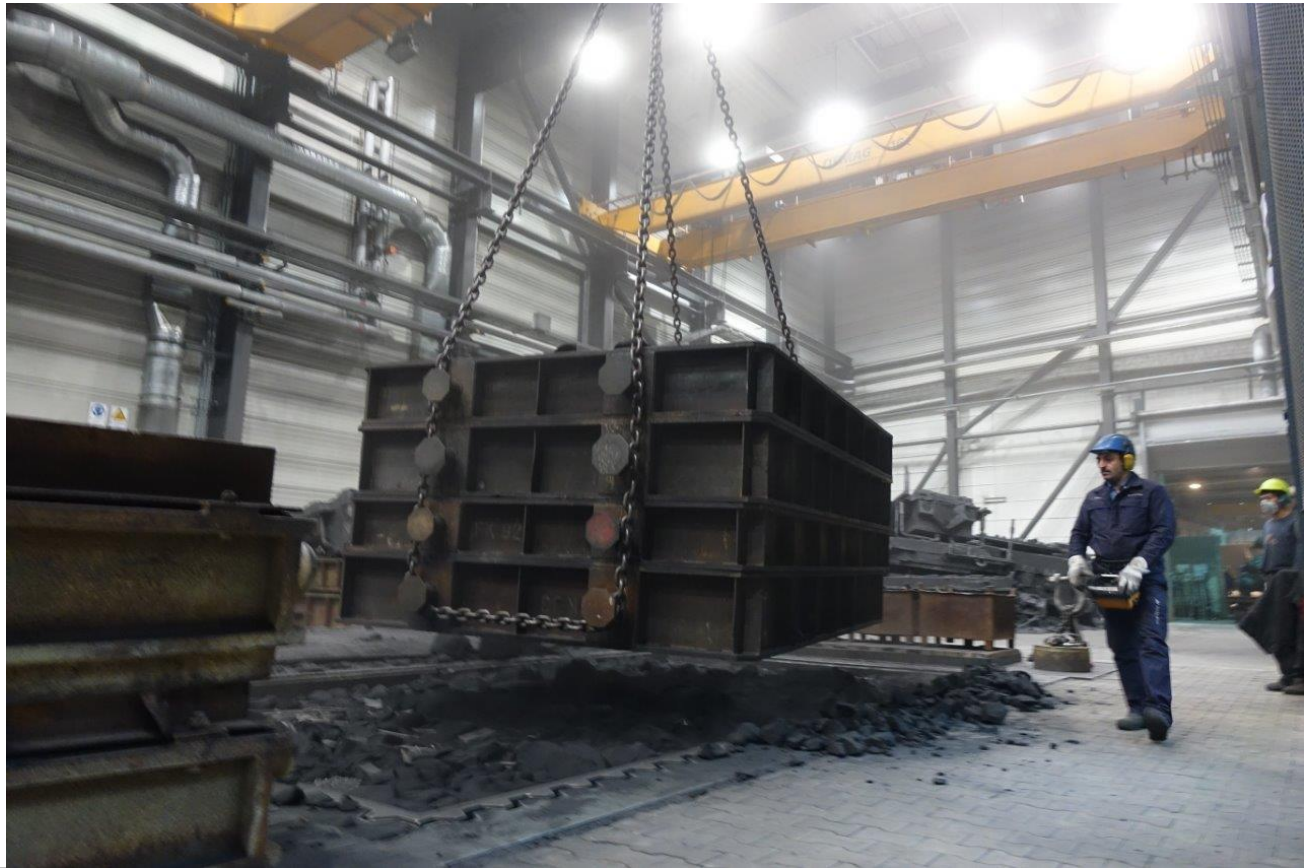
Pouring



Cooling



Unpacking



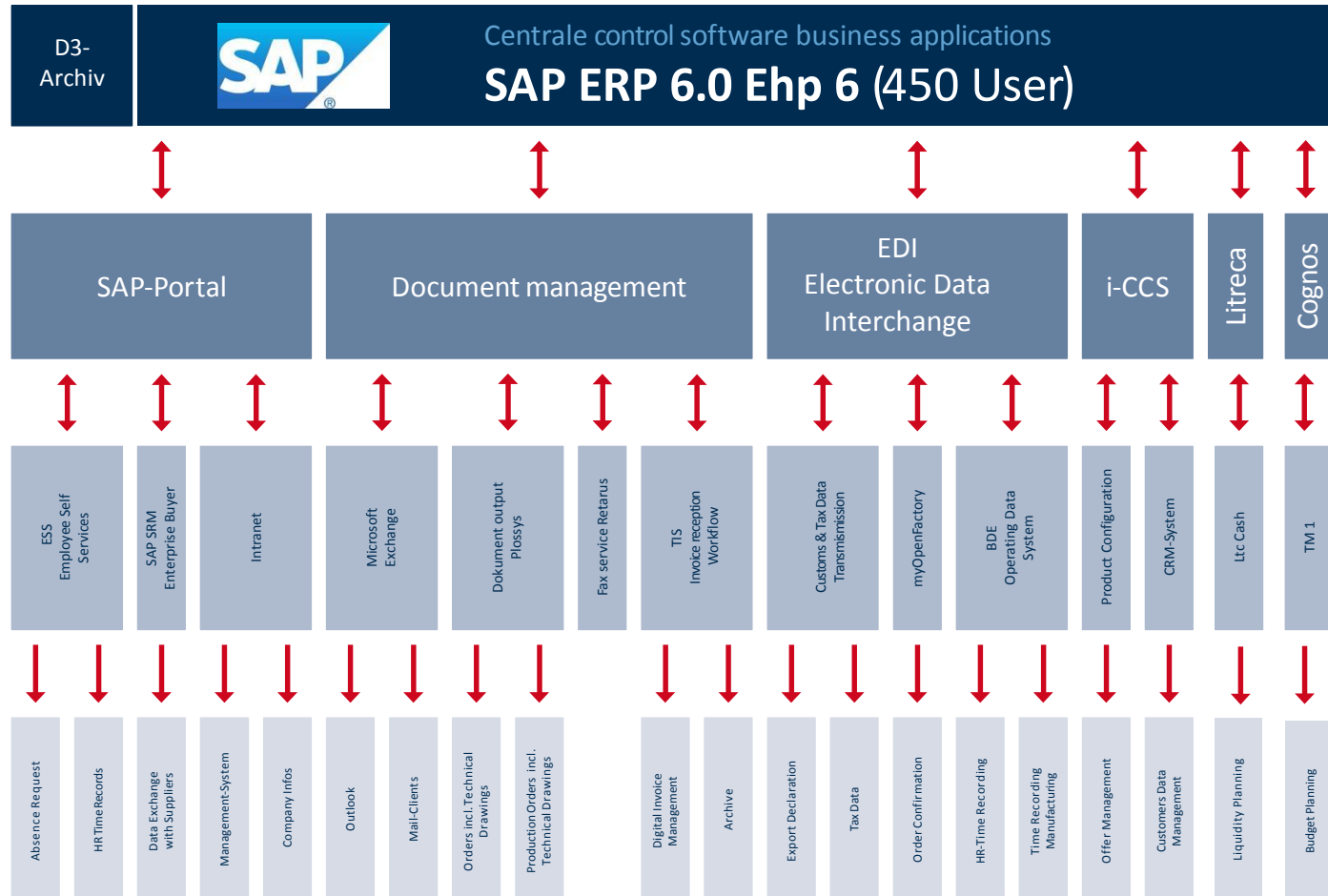
Why Industry 4.0?

What is Industry 4.0?

***„The 4th industrial Revolution: On the way to the intelligent and adaptable production“
Logical use of chances by networked communication***

Quelle:
<http://www.plattform-i40.de/I40/Navigation/DE/I40/Industrie40/WasIndustrie40/was-ist-industrie-40.html?sessionid=B674D04FCA7465B9146B32E2C8A3CF48>

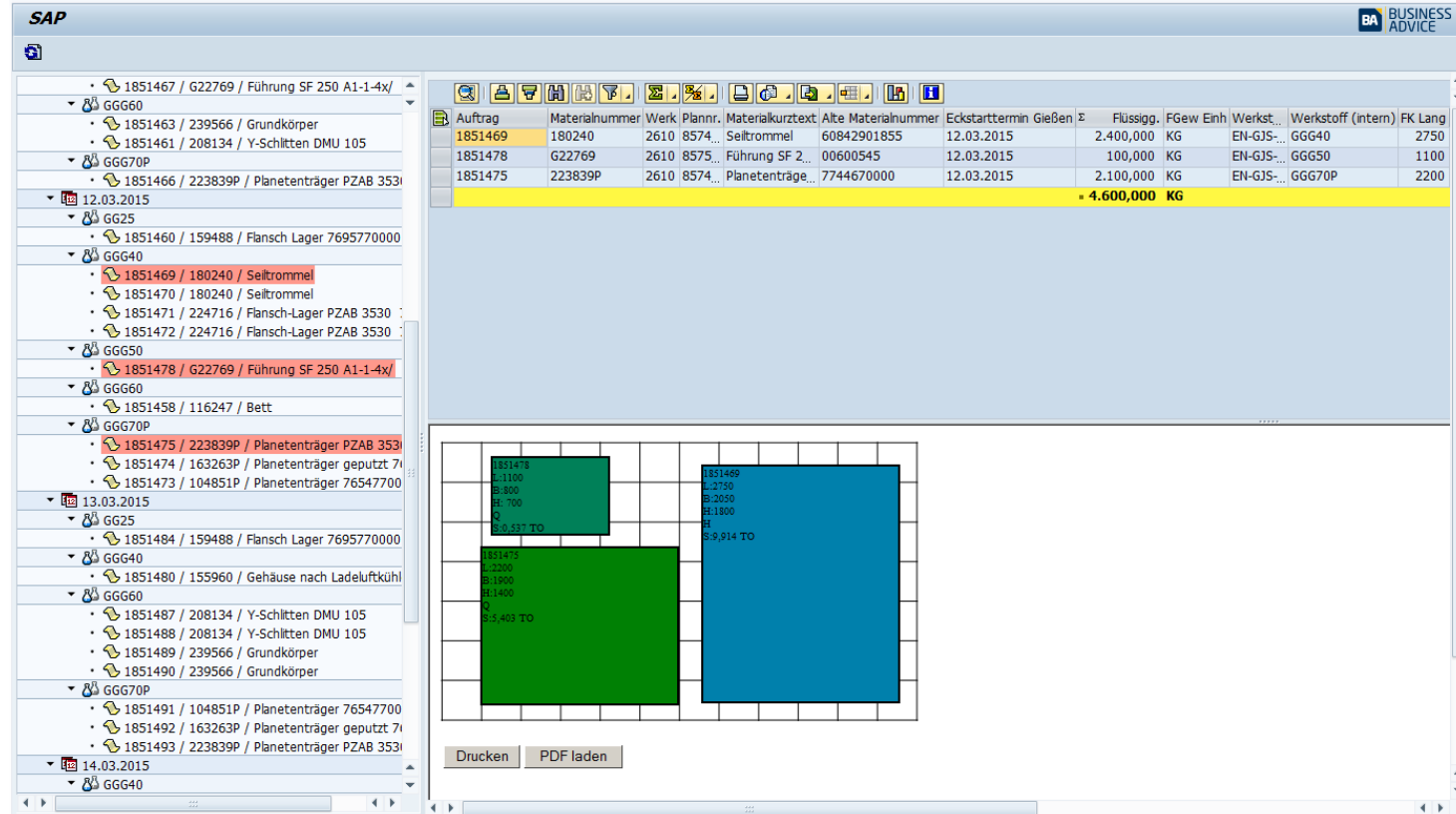
Electronic Processes



Why Industry 4.0?

Production Planning and SAP

SAP BA BUSINESS ADVICE

The screenshot shows the SAP Production Planning (PP) interface. On the left is a hierarchical tree view of a production order (1851467) for a 'Führung SF 250 A1-1-4x'. It lists various components like 'Grundkörper', 'Y-Schlitzen DMU 105', 'Planetenträger PZAB 353', and 'Flansch Lager 7695770000'. The right pane displays a table of materials and their quantities, with a total of 4,600,000 KG. Below the table is a 3D visualization of the production process, showing two main components (1851478 and 1851469) with their respective dimensions and weights.

Auftrag	Materialnummer	Werk	Plannr.	Materialkurztext	Alte Materialnummer	Eckstarttermin	Gießen	Σ	Flüssigg.	FGew	Einheit	Werkst...	Werkstoff (intern)	FK	Lang
1851469	180240	2610	8574...	Seitrommel	60842901855	12.03.2015		2.400,000			KG	EN-GJS...	GGG40		2750
1851478	G22769	2610	8575...	Führung SF 2...	00600545	12.03.2015		100,000			KG	EN-GJS...	GGG50		1100
1851475	223839P	2610	8574...	Planetenträge...	7744670000	12.03.2015		2.100,000			KG	EN-GJS...	GGG70P		2200
									= 4.600,000		KG				

3D Visualization Data:

- 1851478 (Green):** L.1150, B.900, H.700, Q. 5,511 TO
- 1851469 (Blue):** L.2750, B.2050, H.1800, Q. 5,914 TO

Buttons: Drucken, PDF laden

Why Industry 4.0?

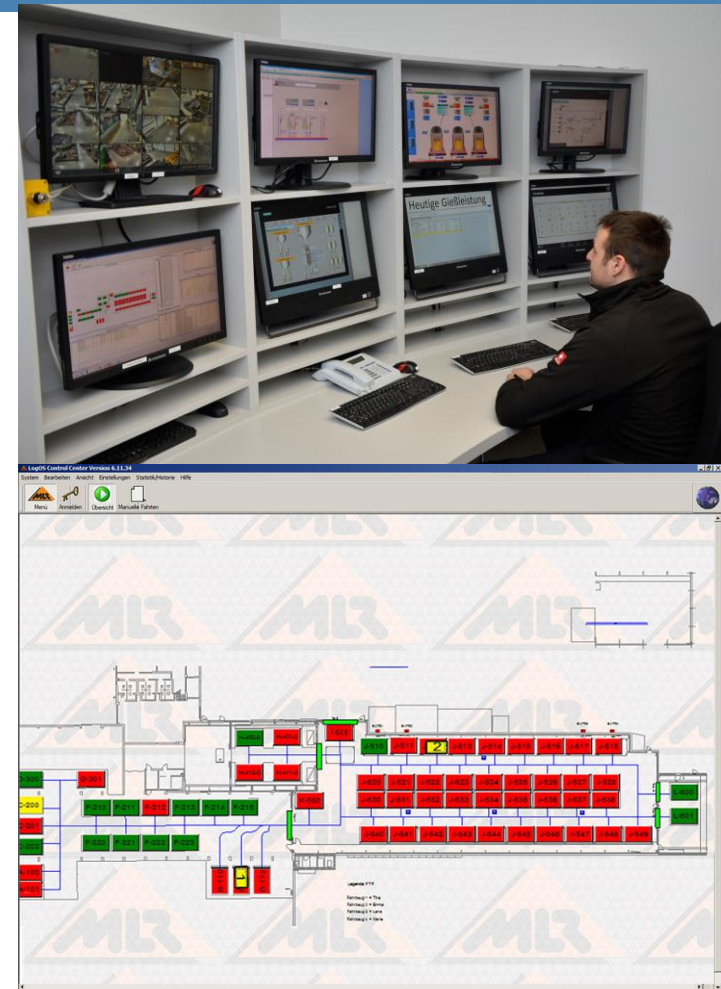
Networked Workstations

- Work orders are electronically sent to the production line.
- Display of the incoming and outgoing work orders at each workplace



Why Industry 4.0?

- Networked system controls
- Networked logistics
- Networked quality data
- Computer-assisted maintenance
- Improvement in work place conditions



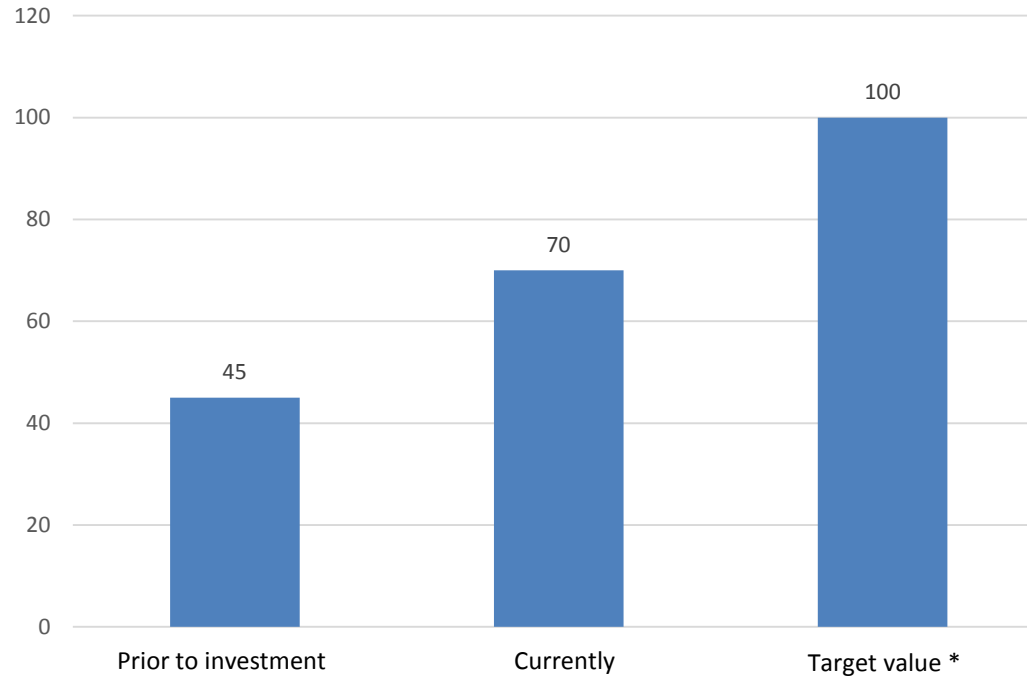
Smart Foundry

Advantages Energy and Environment

- Improvement in material and resource efficiency
- Heat recovery
- Fuel consumption down 80%
- Clearly reduced environmental impact by new filters and air circulation arrangements



Average daily casting performance (metric tons)



* further investments required

Smart Foundry

Casting



Smart Foundry

Transport System with automatic guided vehicles (AGV)

Time lapse

Vehicle speed:

0,22 m/s – 0,28 m/s

or

0,8 km/h – 1,0 km/h



Experience

SOP	Today	System components
☹️	😊	Availability of the AGVs
😊	😊	Environmental protection
😊	😊	Sand quality
😊	😊	Workplace conditions
☹️	😊	Change Management
☹️	😐	Productivity
☹️	☹️	Flask management

Status 2017:

Product range:

Iron castings for:	machinery production, wind power industry, shipbuilding
material:	grey iron, nodular graphite iron/ductile iron
production process:	hand moulding with automated transport system
weight:	500 kg - 9.500 kg

Turnover 2017: approx. 30 Mio €

Employees: approx. 110

Current situation:

New SMART FOUNDRY started in March 2015

Increased productivity but maximum capacity not reached yet

Tough competition worldwide

Environmental issues solved

Net profits not as expected due to slow run-up

Thank you
very much
for your attention!

