HOCHSCHULE HAMM-LIPPSTADT

Product Engineering Process / PLM
Produktentstehungsprozess

Prof. Dr.-Ing. Emanuel Slaby

Product Engineering Process PEP
Organisation

Lecture PEP	Thursday 13:00 – 14:30
LAB/Practicum	Thursday 14:45 – 16:15

Exam: Written exam at end of semester (90 Minutes) CVD: 100%, ELE 33 %)

LAB/Practicum: Presentation (30 Minutes) and Handout (7 pages) (CVD: 0 % (unbenotete Studienleistung), ELE 16,6 %)

List of topics & date for the presentation will be available from **010.10.23 20:00 h** on.

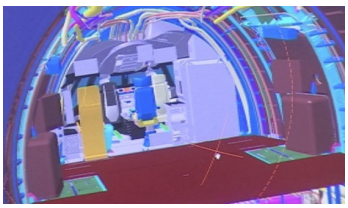
Product Engineering Process PEP
Introduction Emanuel Slaby: University, Airforce

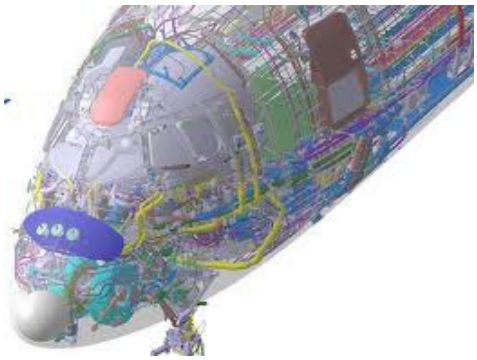
1992 2005

- Dipl.-Ing. Mechancial Engineering (1997)
- PhD Thesis 2002: Use of evolutionary algorithms in the early design phase

Product Engineering Process PEP
Introduction Emanuel Slaby: CAD / PLM Consultant

2005 2008





Product Engineering Process PEP
Introduction Emanuel Slaby: Hella PLM

2008 2016

Product Engineering Process PEP
Agenda

- Introduction
- Todays challenges in the manufacturing industry
- Process Management
- PEP
- Introduction PLM

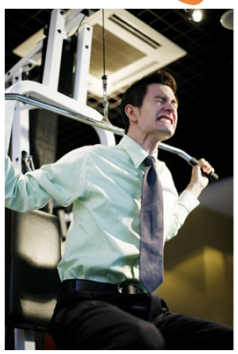
Product Engineering Process PEP
Todays *challenges* in the manufacturing industry

Übung

1. **Find out the difference between:**

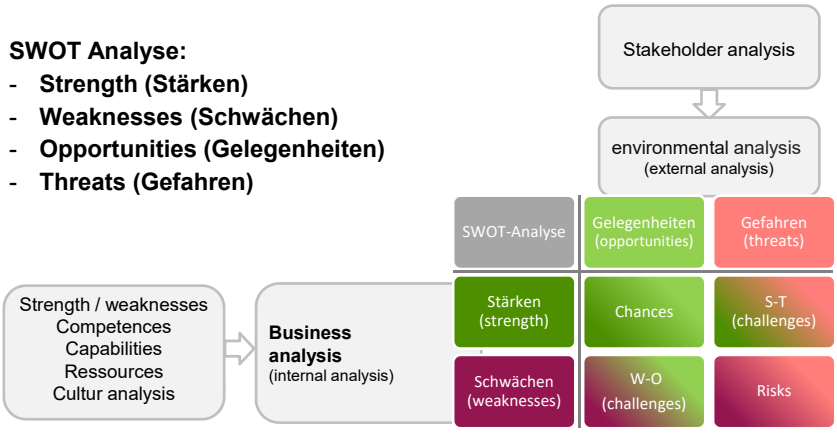
   risk (Risiko)

   challenge (Herausforderung)



Product Engineering Process PEP
SWOT Analysis

SWOT Analyse:
- **Strength (Stärken)**
- **Weaknesses (Schwächen)**
- **Opportunities (Gelegenheiten)**
- **Threats (Gefahren)**



Quelle: Müller-Stevens, St. Gallen

Product Engineering Process PEP
Todays challenges in the manufacturing industry

1. Less time available for developing new products
2. Higher product complextity
3. Growing competition and tighter budgets
4. Internationalisation of business
5. Shortening delivery times
6. Regulations and common industry standards

Product Engineering Process PEP
Changes in Product time on market

Generation I

Baujahr: 1974 – 1983
Leistung: 50 – 110 PS
Absatz: 6,8 Mio. Exemplare

Generation II

Baujahr: 1983 – 1991
Leistung: 55 – 160 PS
Absatz: 6,3 Mio. Exemplare

Generation III

Baujahr: 1991 – 1997
Leistung: 60 – 150 PS
Absatz: 4,8 Mio. Exemplare

Generation IV

Baujahr: 1997 – 2003
Leistung: 75 – 241 PS
Absatz: 4,3 Mio. Exemplare

Generation V

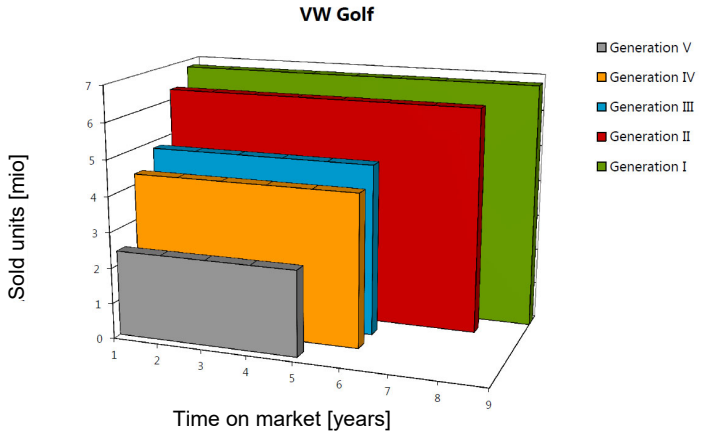
Baujahr: 2003 – 2008
Leistung: 80 – 250 PS
Absatz: 2,4 Mio. Exemplare

Generation VI

Baujahr: ab 2008
Leistung: 80 – 270 PS

Source: Feldhusen, RWTH Aachen

Product Engineering Process PEP
Changes in Product time on market



Source: Feldhusen, RWTH Aachen

Product Engineering Process PEP
Changes in Product time on market

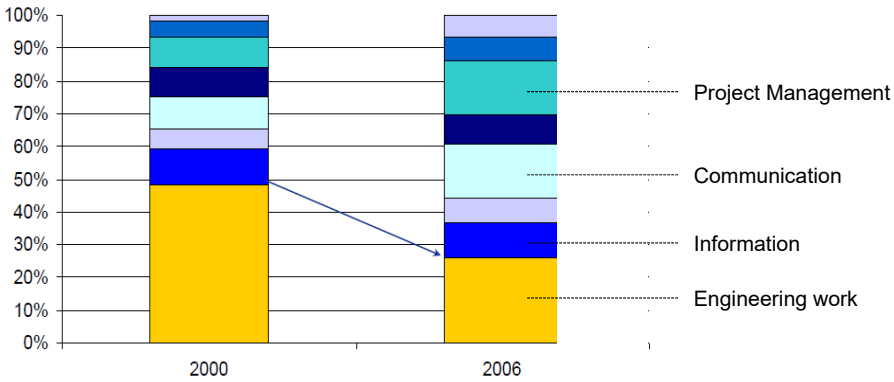
Generation VII

Baujahr: 2012 - 2019
Leistung: 86 – 310 PS
Absatz: 6 Mio.

Generation VIII

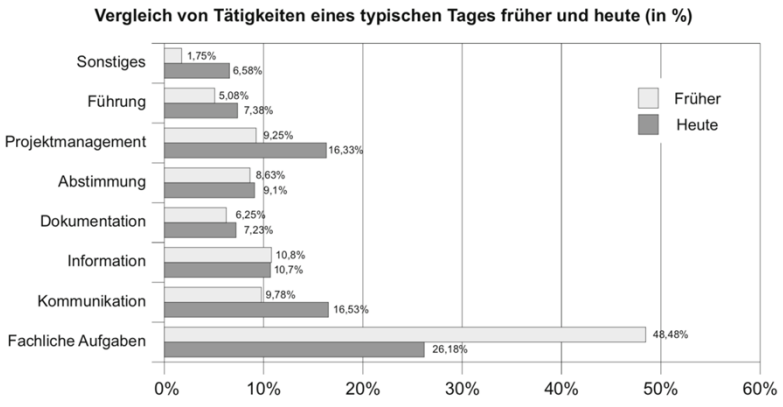
Baujahr: 2019-
Leistung: 90 – 300 PS
Absatz:

Product Engineering Process PEP
The engineers' use of time



Source: VPE, M. Eigner

Product Engineering Process PEP
The engineers' use of time



Source: VPE, M. Eigner

Product Engineering Process PEP
Todays challenges in the manufacturing industry

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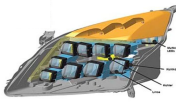

Product Engineering Process PEP
Product complexity 1980

Generation I

Baujahr: 1974 – 1983
Leistung: 50 – 110 PS
Absatz: 6,8 Mio. Exemplare

Product Engineering Process PEP
Product complexity 2009

Generation I

Baujahr: 1974 – 1983
Leistung: 50 – 110 PS
Absatz: 6,8 Mio. Exemplare

Generation VI

Baujahr: ab 2008
Leistung: 80 – 270 PS

Product Engineering Process PEP
Product complexity 2012: Headlamp with adaptive cut off line

Product Engineering Process PEP
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Product Engineering Process PEP
Willingness to pay…

What the customer wants...

Product Engineering Process PEP
Willingness to pay…

What the customer wants...

What the customer is willing to pay...

Product Engineering Process PEP
Todays challenges in the manufacturing industry

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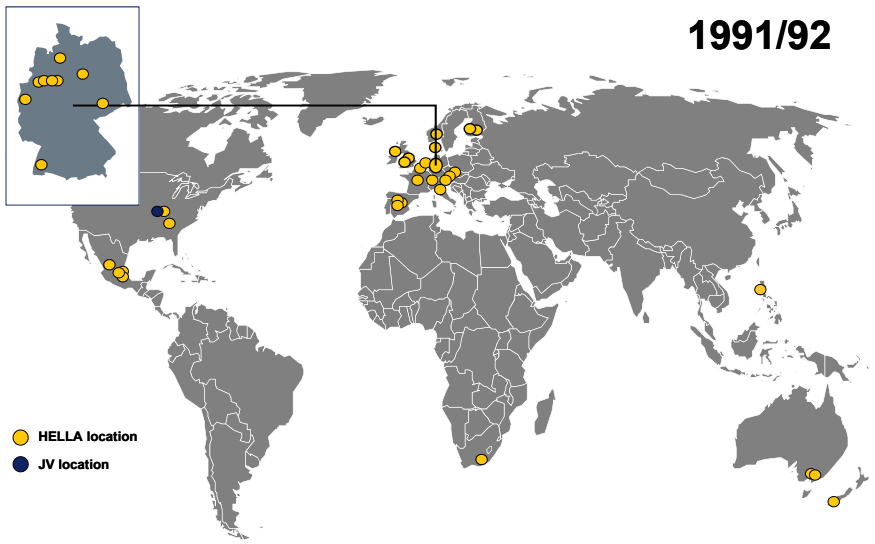
Product Engineering Process PEP
Today: Many locations and suppliers



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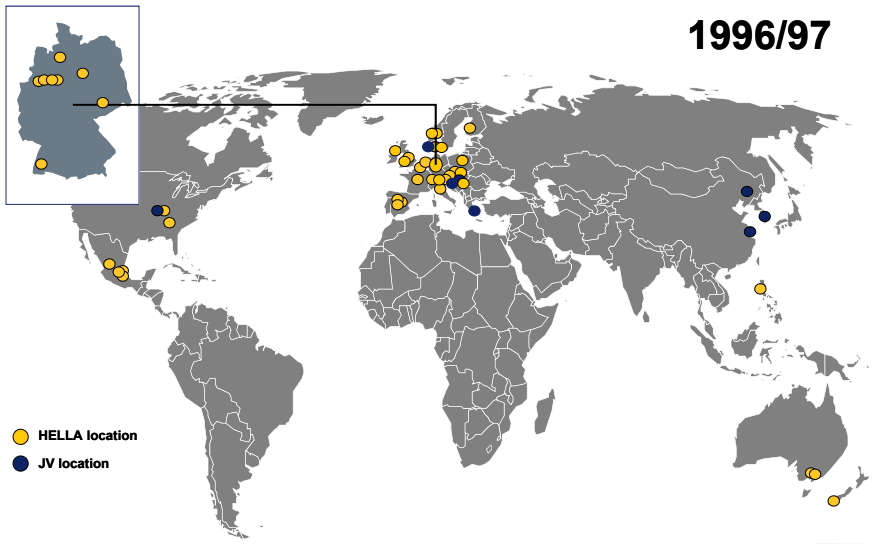

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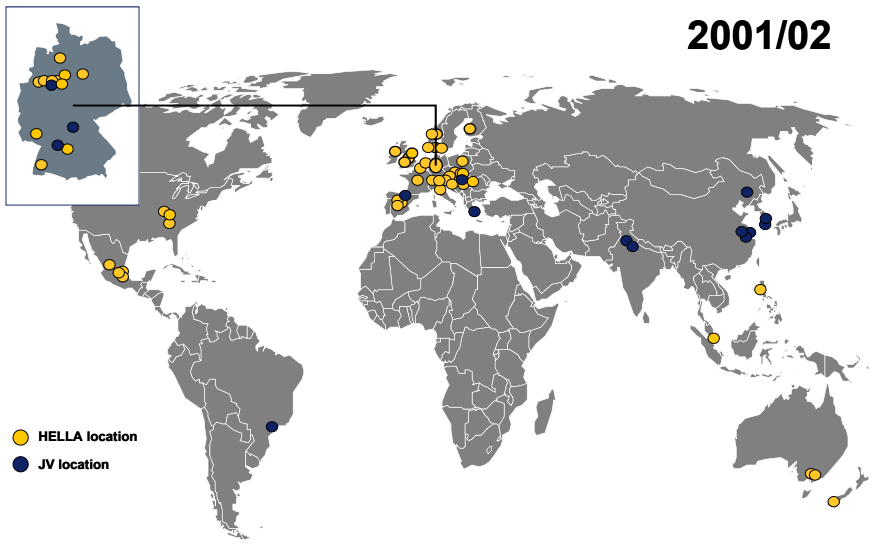

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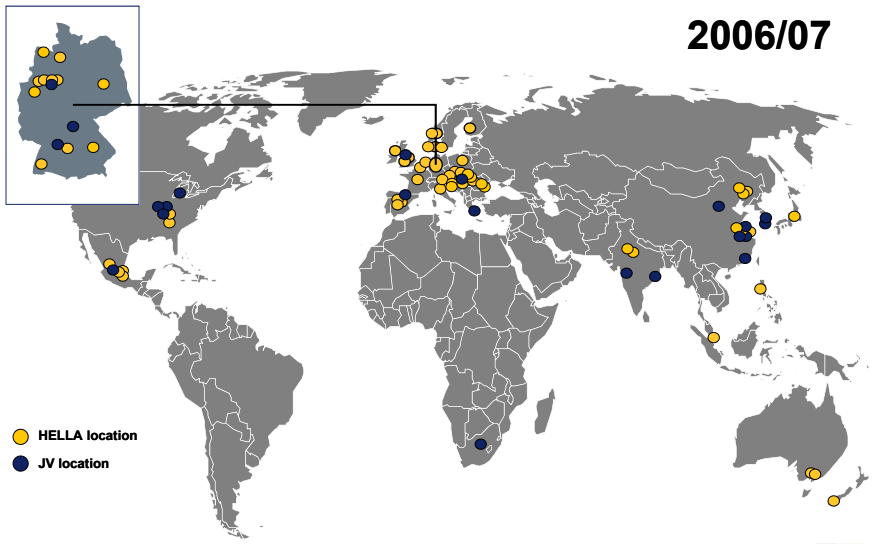

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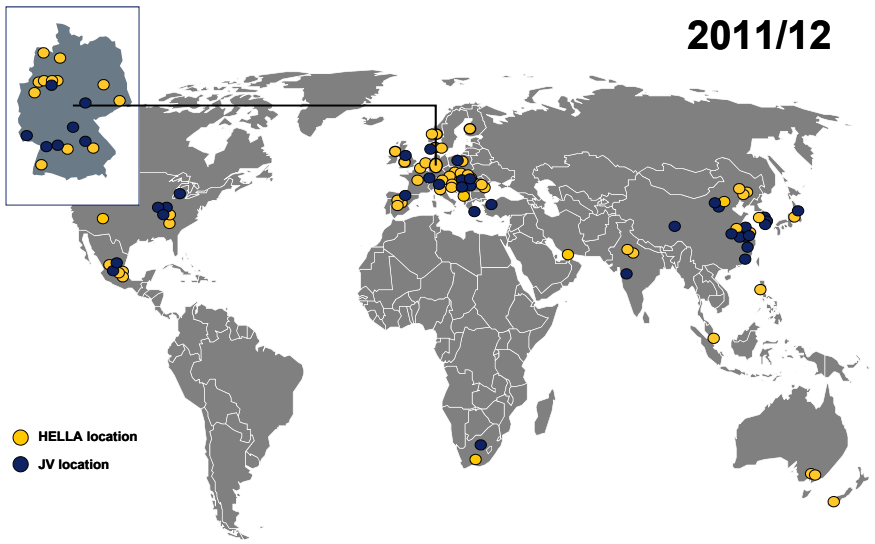
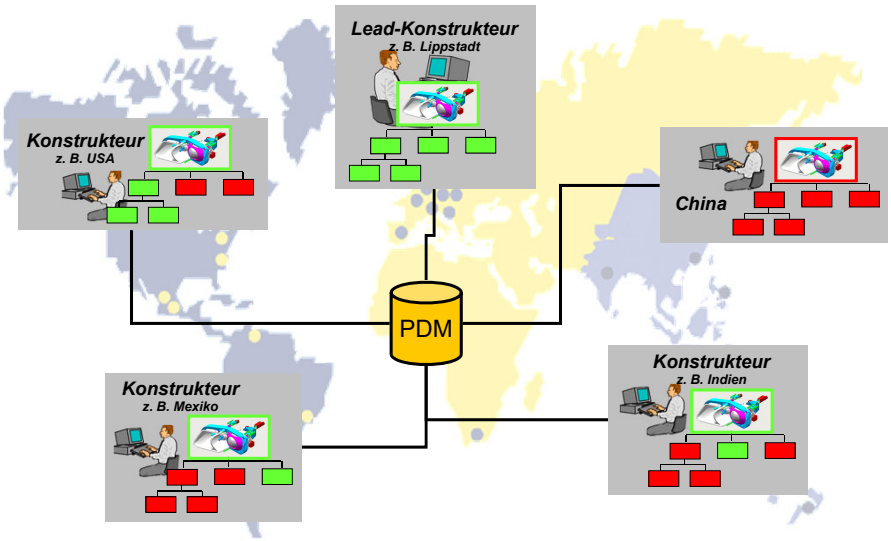


Product Engineering Process PEP
Today: Many locations and suppliers



Product Engineering Process PEP
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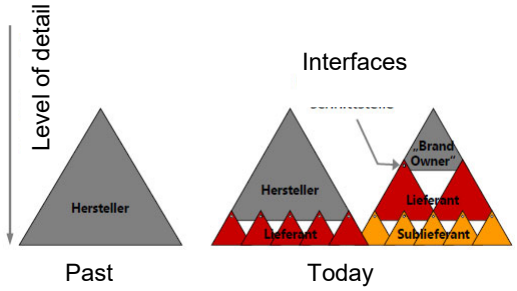

Product Engineering Process PEP
Todays challenges in the manufacturing industry

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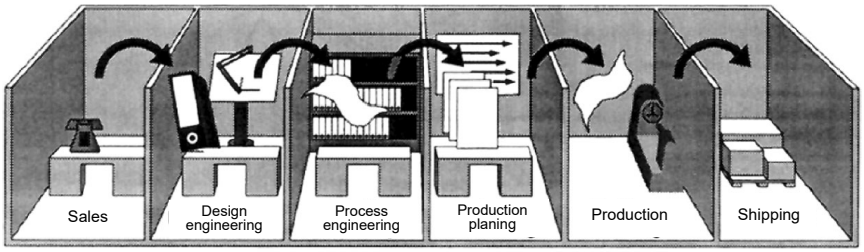
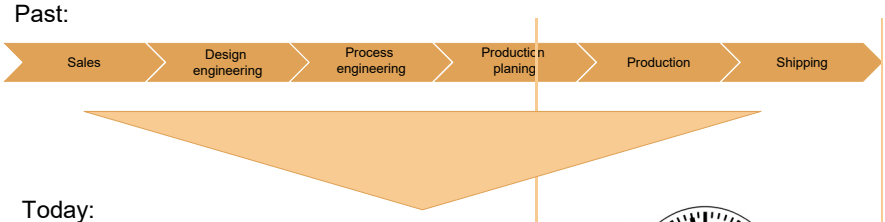
Product Engineering Process PEP
Past: Sequential processes



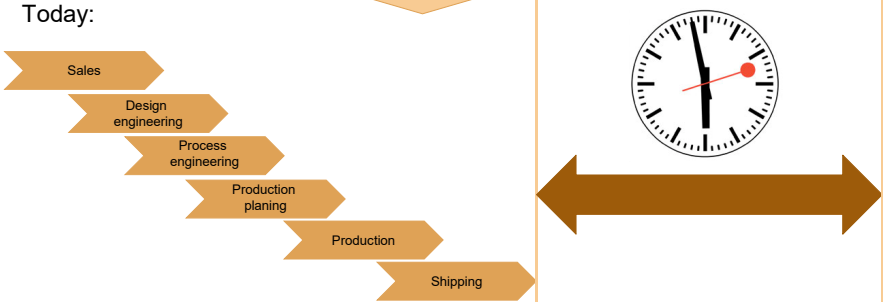
Source: Dr. Montau, ETH Zütich

Product Engineering Process PEP
Next step: Simultaneous engineering

Past:

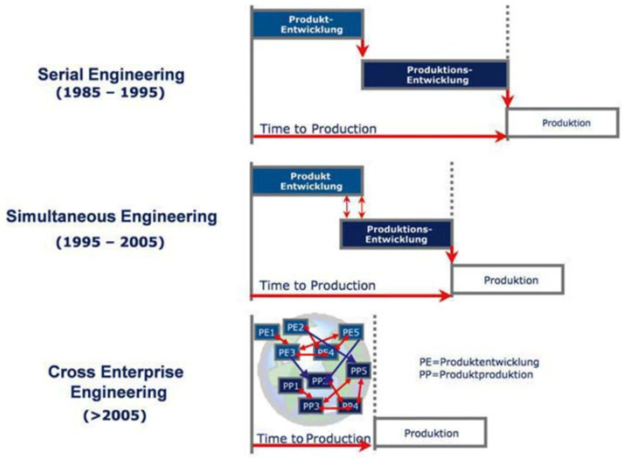


Today:



Product Engineering Process PEP
Today: Cross enterprise engineering

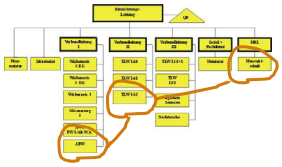
Less time for the Product Engineering Process



Product Engineering Process PEP
Projects to keep all focused on a common goal

Why Projects?

Cooperation of departments over the borders of organisation



Focus activities of many people from different units towards one common goal

Product Engineering Process PEP
Todays challenges in the manufacturing industry

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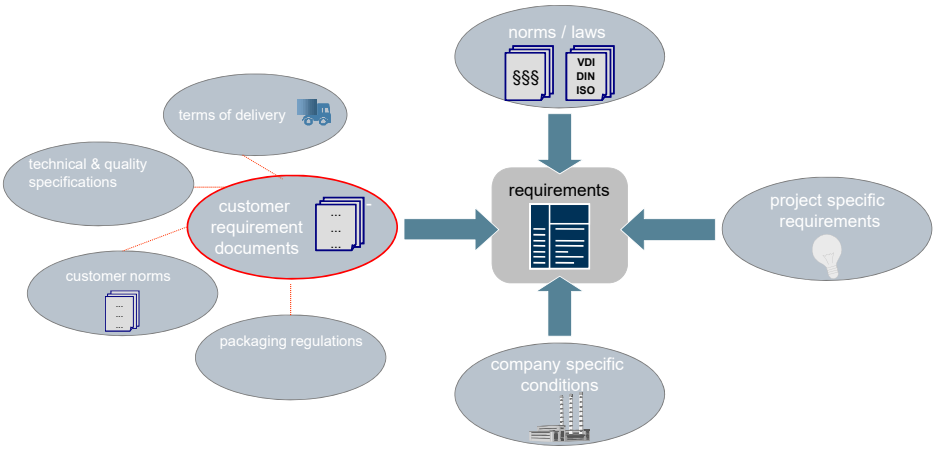
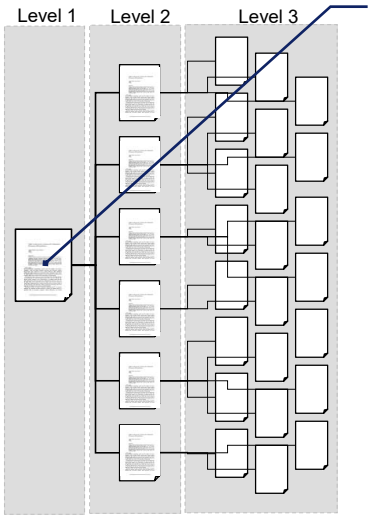
Product Engineering Process PEP
Customer Requirements Documents



Product Engineering Process PEP
Customer Requirements Documents



Level 1	Level 2	Level 3
LAH 000.945		
	TL217 (VW)	
		Prototypenteile (VW)
		QP A001 (VW)
		TL 52132 (VW)
		VW 01155
		VW 13750
		VW 91101
	TL1010 (VW)	
		VW 5180
		VW 91101
	...	
		...
SUM	1	27	393

General requirements document VW

Product Engineering Process PEP
Herausforderungen der Industrie

1. Less time available for developing new products
2. Higher product complexity
3. Growing competition and tighter budgets
4. Internationalisation of business
5. Shortening delivery times
6. Regulations and common industry standards

Huge amount of engineering related information and processes

Product Engineering Process PEP
Herausforderungen der Industrie

Übung

- **Build Teams (2 -3 P.) and look for examples (non-automotive) for the 6 challenges (30 Min)**
- **Present your example (3 Min)**

1. Less time available for developing new products
2. Higher product complextity
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