How to meet the future requirements of the automotive industry?

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R. Messnarz, D. Ekert, ISCN, Graz, Austria

30th of August, CIS 2019 – Salerno, Italy
1. How did the automotive industry change in recent years?
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Percentage of total vehicle weight

<table>
<thead>
<tr>
<th>Year</th>
<th>Plastics</th>
<th>Rubber</th>
<th>Metals</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>6%</td>
<td>79%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>1980</td>
<td>6%</td>
<td>76%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>1990</td>
<td>5%</td>
<td>65%</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>2000</td>
<td>6%</td>
<td>63%</td>
<td>14%</td>
<td>2%</td>
</tr>
<tr>
<td>2010</td>
<td>6%</td>
<td>61%</td>
<td>16%</td>
<td>2%</td>
</tr>
<tr>
<td>2020</td>
<td>7%</td>
<td>55%</td>
<td>18%</td>
<td>2%</td>
</tr>
</tbody>
</table>

A.T. Kearney analysis

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2. How will the automotive industry change in the upcoming years?
2. How will the automotive industry change in the upcoming years?

- E-Mobility
- Digitalization
- Zero-Emission
- Connected & Automated Driving
- Energy Production
- Smart Car
- New Infrastructure
- Trust, Safety & Security
- New Materials
- And many more!
3. How to be prepared to these changes in the best possible way?
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How to be prepared to these changes in the best possible way?

➢ The Development and Research on Innovative Vocational Educational Skills
• EU Blueprint in Automotive Sector
• 24 Project members from 11 EU countries
• Project Duration - January 2018 - December 2021
• Funded by Erasmus + Sector Skills Alliances Program (4 Mio €)
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• Project Coordinator

VSB – Technical University of Ostrava, Czech Republic

• Steering Board Leaders

ACEA
European Automobile Manufacturers Association

CLEPA
European Association of Automotive Suppliers

ETB
European Tyre & Rubber Manufacturers’ Association
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1. Survey & Interviews with stakeholders from automotive sector
   - Information about their future needs (skills of employees)

2. Comparison of these needs with existing training possibilities
   - Identify gaps between needs of the industry and educational programs

3. Develop & implement 30 new job roles needed by the automotive sector
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Goal of DRIVES

- Re-qualify people in industry (access from the workplace) to sustain their value for the company and remain employed
Why a certified training?
Why a certified training?

• Training is always up to date
• Training is independent of specific companies and their interest for the market
• High quality and Europe wide acceptance
• Worldwide recognition
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Automotive Sector

- E-Mobility
- Digitalization
- Zero-Emission
- New Infrastructure
- Trust, Safety & Security
- New Materials
- Connected & Automated Driving
- Energy Production
- Smart Car

And many more!
Automotive Sector

E-Mobility  Digitalization  Zero-Emission

Connected & Automated Driving  New Infrastructure  Trust, Safety & Security

Energy Production  New Materials

Smart Car

And many more!
Driving Forces

What are the driving forces for further innovations?
What are the driving forces for further innovations?

**CO₂ reduction:**

- 30% of all energy is used for mobility
- 18% of the worldwide CO₂ emission is due to mobility
- 3/4 of these emissions are coming from road traffic

„Kunststoffe im Auto – was geht noch?“, GAK 4/2013 Jg. 66, p. 248-258
What are the driving forces for further innovations?

1 l CO₂ = 1.96 g
1 balloon = 2.5 l
→ 10 g = 5.1 l

„Kunststoffe im Auto – was geht noch?“, GAK 4/2013 Jg. 66, p. 248-258

- 35 g CO₂ = 3.5 balloons / km
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Driving Forces

• The driving resistance of a vehicle directly affects fuel consumption and CO₂ emissions

• The 3 main driving resistance parameters of a car are:
  • Mass
  • Rolling Resistance (RR)
  • Aerodynamic Drag
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<table>
<thead>
<tr>
<th></th>
<th>CO₂ % / 10 % red.</th>
<th>Current Trend (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>- 7 %</td>
<td>+ 0.4 %</td>
</tr>
<tr>
<td>Rolling Resistance (RR)</td>
<td>- 1.5 %</td>
<td>- 1.3 %</td>
</tr>
<tr>
<td>Aerodynamic Drag</td>
<td>- 3 %</td>
<td>- 0.3 %</td>
</tr>
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- Mass has highest influence on CO₂ emission
- But RR has the highest potential to be improved

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**Driving Forces**

**EU-regulation for RR of tires**

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<td>9.0</td>
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<td>8.0</td>
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*Coefficient of rolling resistance in kg/t according to ISO 28580

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*Coefficient of rolling resistance in kg/t according to ISO 28580

‡ The limits are becoming tougher!

Contribution of Different Tire Parts to the Rolling Resistance (RR)

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Contribution of Different Tire Parts to the Rolling Resistance (RR)

The main influence on RR comes from the tread.

Modern Passenger Car Tire: Green Tire

- 30% lower rolling resistance
- 5% less fuel consumption
- 7% improved wet grip
- better winter performance

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**Definition of a domain:**
An umbrella term to describe a specific field of interest
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New Job Role – Silica-Silane Specialist

- Automotive
  - Advanced Material
  - Quality Management
  - .....  

- Recycler
- Rubber Technologist
- Silica-Silane Specialist
- .....
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Job Role: Silica-Silane Specialist

- Production
  - silica
  - dosage form
  - influence on final properties
  - ...

- Characterization
  - SSA
  - structure
  - PSD
  - ...

- Reactive Mixing
  - silica / silane reaction
  - mixing process
  - ...

- Reinforcement
  - filler-filler interaction
  - chemical bonding
  - reinforcement theories
  - ...

- Application
  - Green Tires
  - Truck Tires
  - Earthmover Tires
  - Seals
  - ...

- Silica-Silane Specialist

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- Green Tires
- Truck Tires
- Earthmover Tires
- Seals
- ...
Silica-Silane Specialist Status

Status:

• to be finished until 2021 (just started)
• available on academic level
• online training including a lab phase (practical work)
• Close co-operations with:
  • ETRMA (steering board)
  • Consorcio (Spanish Rubber Association)
  • IFOCA (French Rubber Organization)
• Contact to:
  • DIK (German Rubber Institute)
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Automotive Sector

- E-Mobility
  - Advanced powertrain engineer
- Connected & Automated Driving
  - IT specialist for communicating cars
- Energy Production
- Smart Car
  - Predictive maintenance
- Digitalization
  - Artificial Intelligence (AI)-Expert
  - Zero-Emission
- New Infrastructure
  - Trust, Safety & Security
  - Cybersecurity engineer
- New Materials
  - Silica/Silane specialist
  - Rubber technologist

Job Roles under preparation

And many more!
Thank you for your attention

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