

The 8D problem solving method, which is well known in the automotive industry, is introduced. Lean manufacturing is a systematic method to identify and eliminate waste in processes. Other terms such as Kaizen, standardized work, Kanban and lessons learned, are introduced.

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|---|----------------------------|---|
|  | 1. Over-production | Producing more than asked by market |
|  | 2. Waiting | Waiting, idling or defect equipment |
|  | 3. Transport | Transporting materials or products |
|  | 4. Over-processing | Taking unneeded steps to process parts |
|  | 5. Inventory | Unnecessary supplies or stock |
|  | 6. Movement | Searching and unnecessary movements |
|  | 7. Defects | Faults, scrap or bad quality |
|  | 8. Unused expertise | Not using existing expertise or knowledge |

Muda - 8 Types of Waste

Working in a team demands leadership. Furthermore, working in international and multidisciplinary teams brings even more challenges. One of the learning elements is dedicated to quality awareness, leadership, cultural diversity and its influence.

Examination and Certification

After the training, the participant can obtain a certificate when they have fulfilled the exam requirements. The Automotive Engineer curriculum is certified by the ECQA. Therefore it offers internationally recognized examination, certification schemes and facilities. The ECQA is the most successful European platform in the area of standardization, unification, certification of skills and competences for modern job roles in industry. It currently offers 30 professional certificates, and promotes curricula and training materials that have been developed by international consortia. The number of certifications and trainings offered is steadily growing in terms of professions and languages offered.



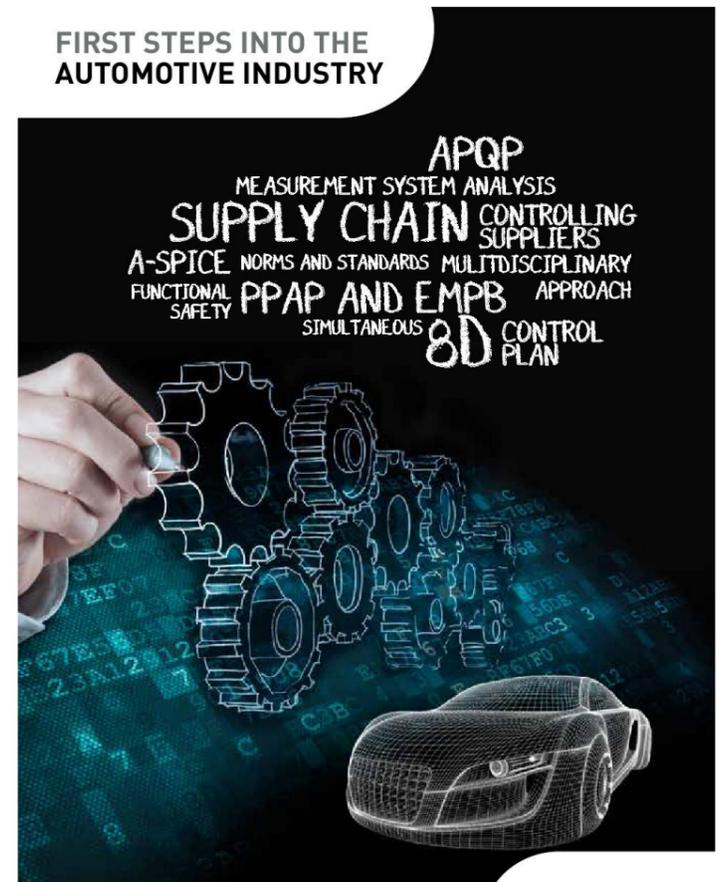
AUTOMOTIVE ENGINEER TRAINING
**CHALLENGES OF WORKING IN THE
AUTOMOTIVE INDUSTRY**

Computerization in the automotive industry demands new skills and highly trained employees

The “computerization” of cars has a huge impact on the variety of job roles in the modern automotive industry and their associated skills and consequences. In particular, the spectrum of relevant engineering skills has widened significantly from purely mechanical engineering to electrical engineering, electronic engineering, software engineering, material engineering (lightweight construction), as well as more traditional domains such as design and acoustical engineering. The automotive industry, OEMs and Tiers, therefore recruits engineering employees who have a large variety of engineering backgrounds.

Automotive industry stakeholders have reported a gap between what automotive engineers need in practice, and the knowledge and practical experience they receive at their educational institutes. Professionals from over 30 major industry companies, OEMs and Tiers, were consulted on numerous occasions when developing a concise curriculum that includes the fundamental knowledge and skills needed to form the core to the increasing variety of engineering roles in the automotive industry.

Target groups for this training are VET, students with higher education and professionals who already work in the automotive industry but lack knowledge and practical experience in this sector.



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Introduction

The automotive industry is changing more rapidly than ever. Working in the automotive industry requires special knowledge that is different from any other industry. Assuring quality in automotive has grown to a huge challenge. The competition factor is driven mainly by the permanent cost pressure in a mass market that is increasingly confronted with the safety criticality of various mechatronic systems and subsystems.

The objective of this training program is to prepare recent graduates for making their first steps in the automotive industry successfully as an automotive engineer. This will be accomplished by teaching them the basic knowledge and required skills, in modern automotive development and manufacturing processes.

Skill sets

The Automotive Engineer curriculum consists of two skill sets, one at foundation level (VET) and the other at practitioner level (higher education). They comprise of the basic knowledge and skills required in the modern automotive development and manufacturing processes, including different sustainability dimensions.

Target group

The Automotive Engineer training program has been inspired by major industry stakeholders who have observed that engineering graduates in the automotive domain have hardly any specific knowledge of the automotive industry. Therefore, the training is focused on students from VET and higher education with little or no knowledge in the automotive domain, as well as individuals working already in the automotive industry with basic knowledge.

Training materials

The training material was developed in close cooperation with major automotive OEMs and suppliers. Experts, teachers and trainers with extensive knowledge and experience in the automotive domain were also highly involved. They were supported by the European Certification and Qualification Association (ECQA) and Lean Six Sigma Academy (LSSA).

The training material consists of:

Training slides with presentations for each learning module (element).

Book a well-structured reference book serves as a guide to the Automotive Engineer training, with extensive descriptions, explanations and examples from the automotive industry.

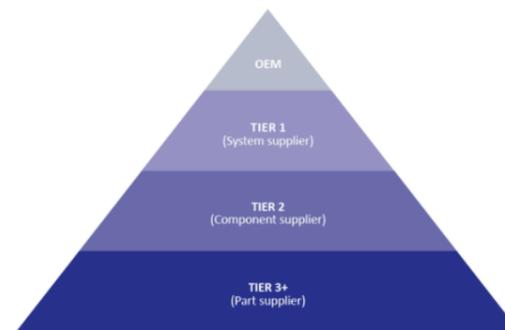
Exercise book with exercises and assignments to explain and practice the newly learned knowledge.

The training is divided into four units.

Unit 1 - Introduction to the Automotive Industry Sector

Unit one gives an introduction to the automotive sector in terms of its history, evolution and future, as well as the supply chain, key terms and key challenges. The characteristics of the sector are discussed, in particular the supplier structure, product and releases, along with the importance of customer focus. Typical automotive engineering job roles are introduced to help trainees orient themselves towards specific fields of interest. Another important learning element in this unit is the overview of a small selection of the most important legal documents, regulations and standards relevant for the sector.

Unit one ends with the importance and essence of processes and process thinking in the automotive sector. The increasing dominance of mechatronic subsystems in modern vehicles implies an important role of multidisciplinary challenges in engineering organizations and processes.



Automotive Supply Chain

Unit 2 - Product and Process Development

The second unit focuses on selected engineering aspects of product and process development in the automotive sector. The unit starts with the explanation of the product life cycle and sustainability. A closer look is taken at the development phase of a product by discussing the product development process (APQP), and its activities. Systems engineering is explained, because of its particular importance in modern vehicles where system-level functions are implemented by numerous cooperating subsystems such as software, mechanics and electronics.

“The only thing that is certain is that the system is going to fail”

Murphy's Law of Fault Tolerance

Functional safety, i.e., the safe behavior of subsystems in case of failure, is discussed in the context of a module on risk management. This module also contains an introduction to the FMEA, i.e., Failure Mode and Effect Analysis, which is one of the most important methods of risk management on both product and process levels in automotive.

Unit 3 - Production

The third training unit deals with the automotive production process, with a particular focus on the quality assurance measures. It explains how to control the process risks identified in the process FMEA. The key topics here include the process capability (CP and CpK) and process control (MSA) based on statistical tools. In addition, measurements, work instruction, training, out of control action plan and contingency plan is explained and discussed.



Process Capability & Process Performance

Since suppliers have a key role in the automotive development and production process, it is essential that the quality of the product is assured. For mechanical parts this can be achieved by using tools such as PPAP and EMBP. To ensure the quality of systems with embedded software, the assessment framework Automotive-SPICE[®] is introduced.

Changes during the design development as well as production phase can come with certain risks. They need to be identified, reviewed and approved before implementation. Maintaining records is an important part of the process in terms of the product's development history and future.

Unit 4 - Continuous Improvement

The fourth and last unit deals with continuous improvement as an essential element for the success of automotive development and production processes.

“Without a standard there is no logical basis for making a decision or taking action.”

Joseph Juran