



Design methodology

Introduction lecture

Šimon Kovář

Department of textile and single-purpose machines





Introduction:

The aim of the lecture is to get general knowledge, definitions and concepts in designing technical objects.



General information about „Design methodology“

The main goal of CAD engineers is to apply their **scientific and technical know-how** to solve technical problems with the consequent optimization of these solutions within the requirements of the product with respect to the conditions given by **material and technological possibilities, economic parameters, legal regulations, meet ecological limits**. Solved problems become specific tasks that technicians have to solve to create new technical products. This is happening today especially in teams for the purpose of realizing **interdisciplinary product development**.

General information about „Design methodology“

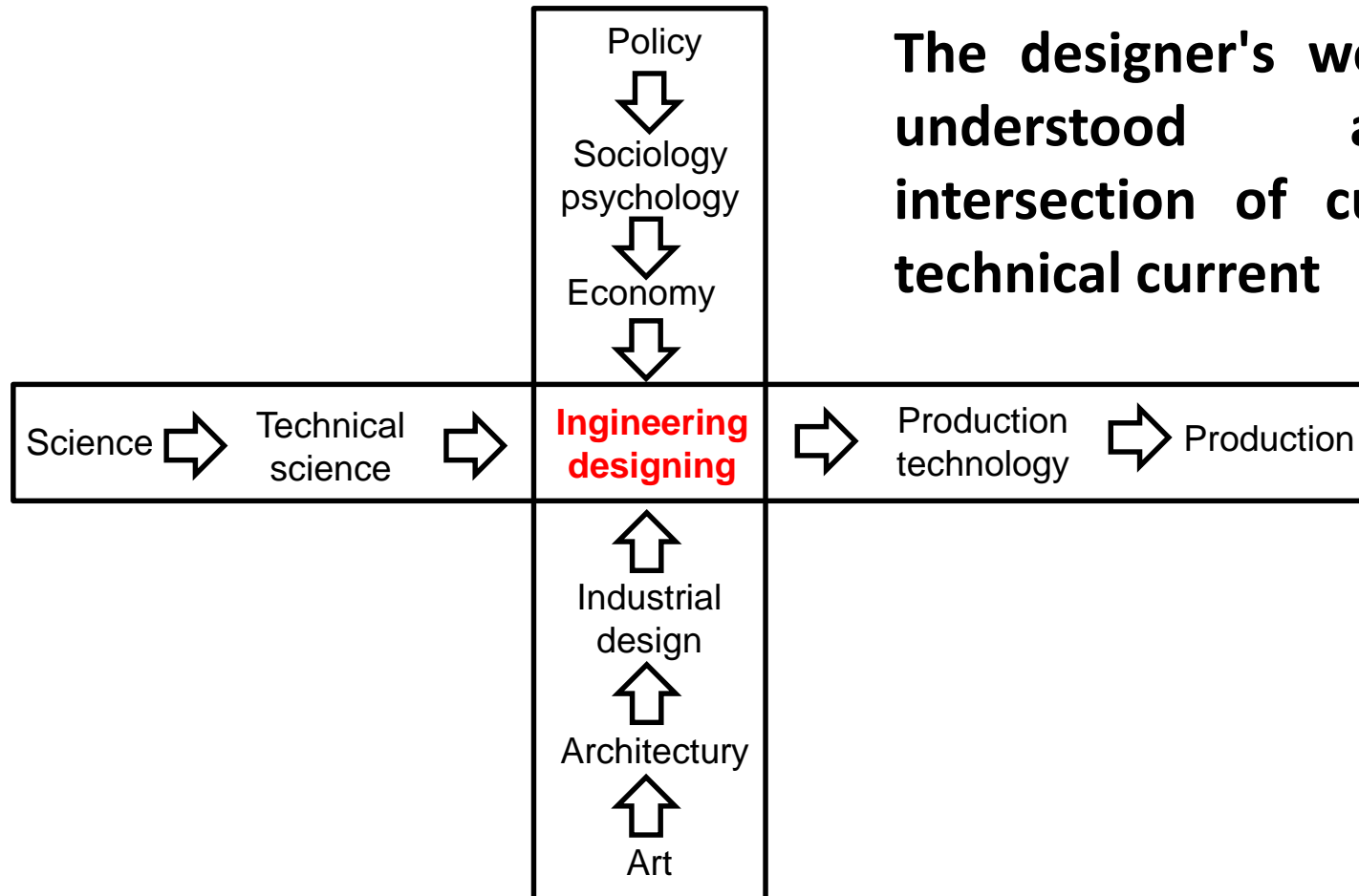
The mental creation of a new product is the task of **design and development engineers**, and physical implementation is then the responsibility of **production engineers**. **Designer** is used as a synonym for design and development engineers. Designers contribute to finding solutions and product development in a very specific way. They have the primary responsibility because their ideas, knowledge and skills decisively determine the **technical, economic and environmental characteristics of the product**.

General information about „Design methodology“

Design (Engineering Design) is an interesting engineering activity including:

- Affects almost all areas of human life
- Uses the laws and knowledge of science
- Derivated from experience
- Provides the assumptions for the real realization of ideas
- Requires professionalism and responsibility

The central activity of designing



The designer's work can be understood as the intersection of cultural and technical current

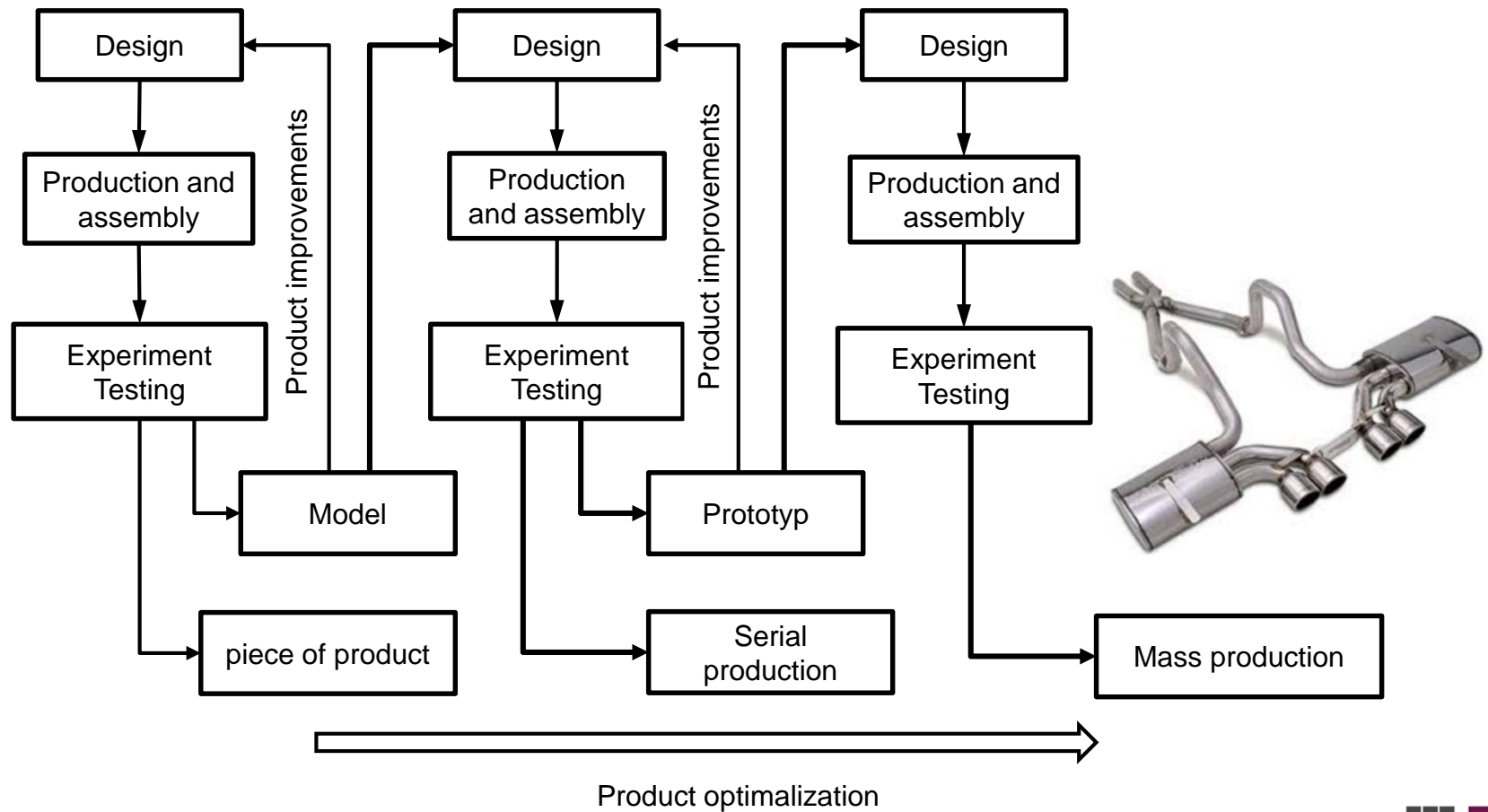
Main activity of Engineering design

Designing is a creative activity that uses the **knowledge of mathematics, physics, chemistry, mechanics, thermodynamics, hydrodynamics, electrical engineering, manufacturing engineering, materials technology, machine elements and design theory** as well as knowledge and experience in the area of interest. Important features of good designers are the **economic view, toughness, optimism and a sense of teamwork.**

Systematic work

It is an effective way of rationalizing the design and manufacturing process. It makes it possible to **efficiently** use **already-known solutions**. Structuring the problem will make it easier to identify **application options using so-called design catalogs**. The goal is to select and **optimize the product at an early stage** with less make effort.

Development of new products including tasks



Goals achieve

Design tasks must be directed towards meeting the objectives to be optimized, taking account of the limitations involved. New features, longer life, lower costs, production problems, and ergonomic changes are possible reasons for defining new goals. Also **environmental issues** often require completely new products and processes. This requires a global view on the part of the designers and cooperation with professionals from other disciplines. This is easier if designers manage general workflows, understand production and evaluation methods, and are familiar with familiar solutions to existing issues.

Designer activities can be divided into:

- **Conceptualization**, search for principles of exercise generally applicable. Methods can be used along with special methods.
- **Visualization**, an insider's principle of choice for general layout, and the preforms and materials of all components.
- **Detail**, completes production and operational details.
- **Calculation**, this occurs in all phases of the process and the proposal.



Sources of information:

1. Patent research
2. Fairs
3. Technical literature
4. Journals
5. Examples
6. Internet

Conclusion

In today's globalized world, it is necessary to consider **CAD** engineers as a very important part of the product lifecycle. The level of knowledge and technique requires a close specialization of CAD engineers and effective teamwork.

Questions:

- What is the main goal of CAD engineers?
- What tasks involves developing a new product?
- What are the activities of designers?
- What are the sources of information?



Topic of the next lecture:

„Methods of creative work “

Thank You



Used literature and sources of information:

Engineering Design, G. Pahl, W. Beitz, J Feldhusen, K. H. Grote, Springer (2007)