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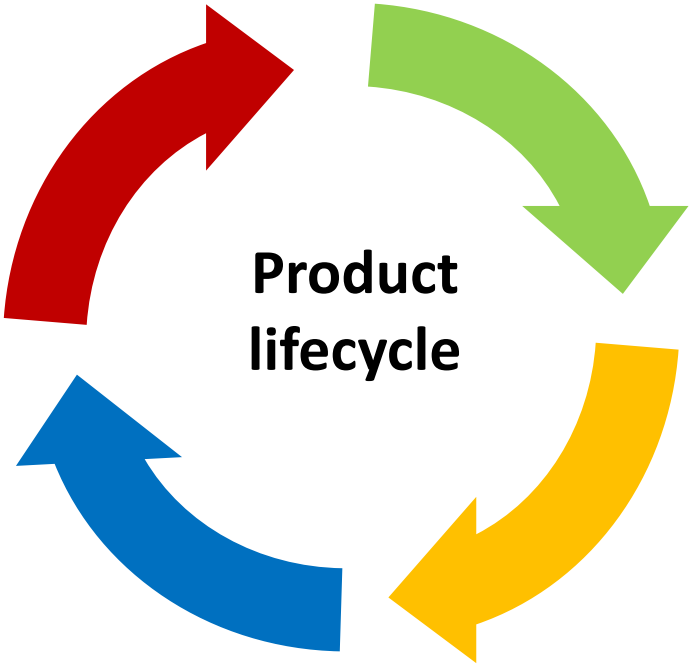
Product lifecycle

Factors affecting design methods

Šimon Kovář
Deparment of textile and single-purpose machines

Try to define the term product life cycle?

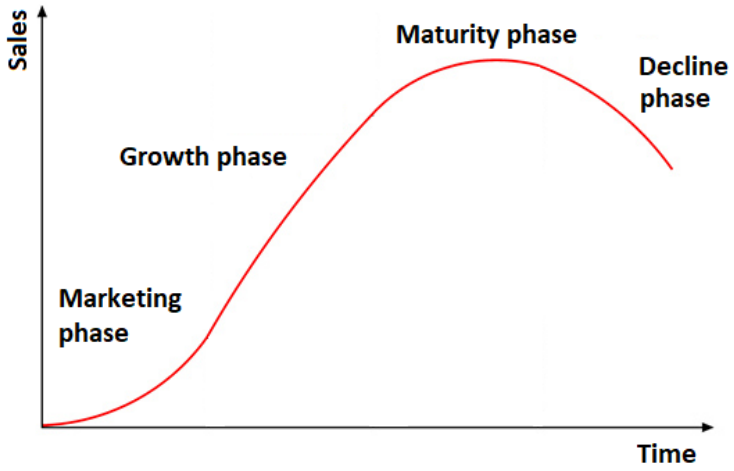


Product lifecycle

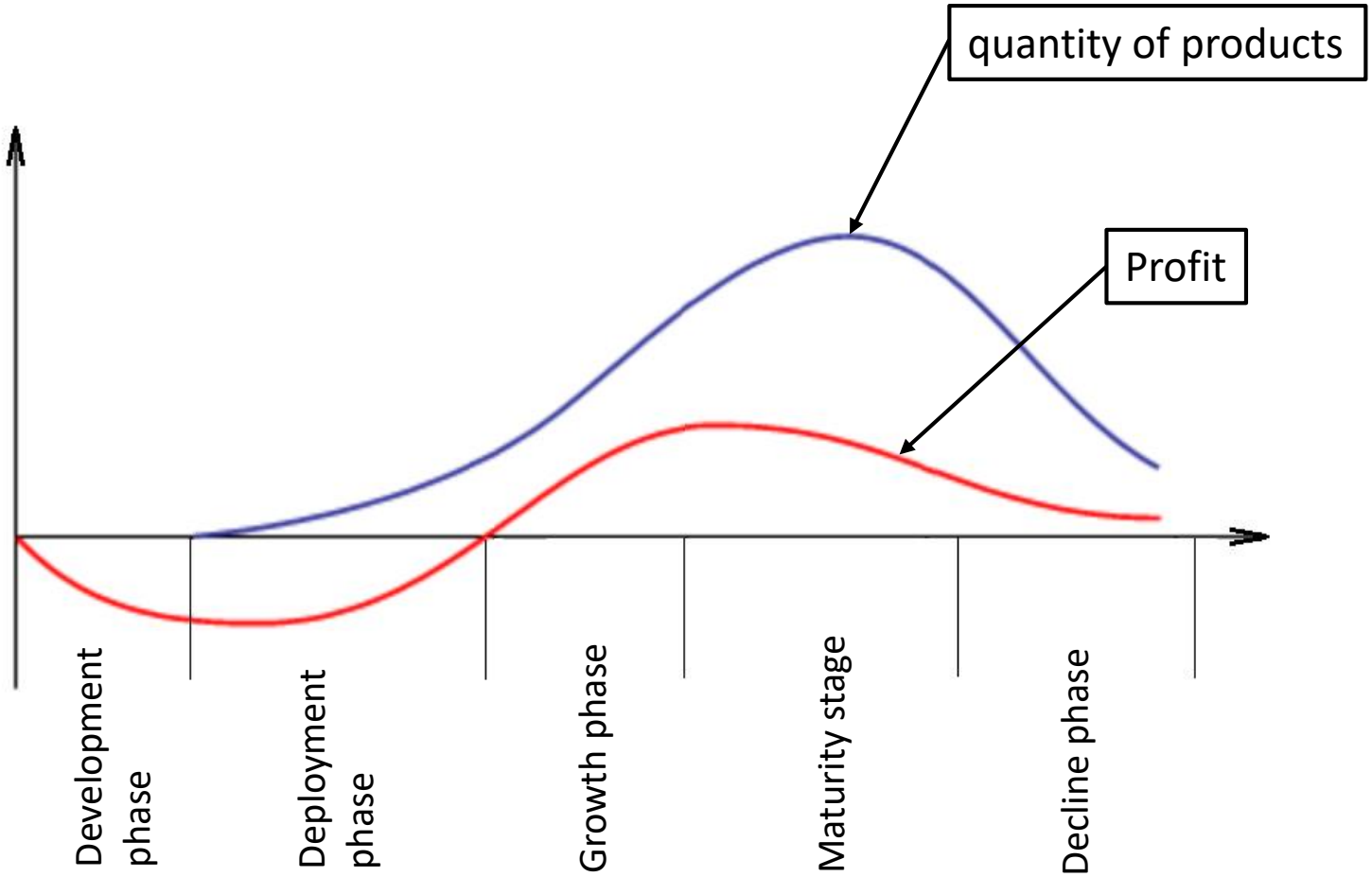
The life cycle is driven by market needs or new ideas. It starts with the planning of the product and ends with its “ecological” disposal. **Design is an integral part of the product life cycle.**

Product life cycle phases

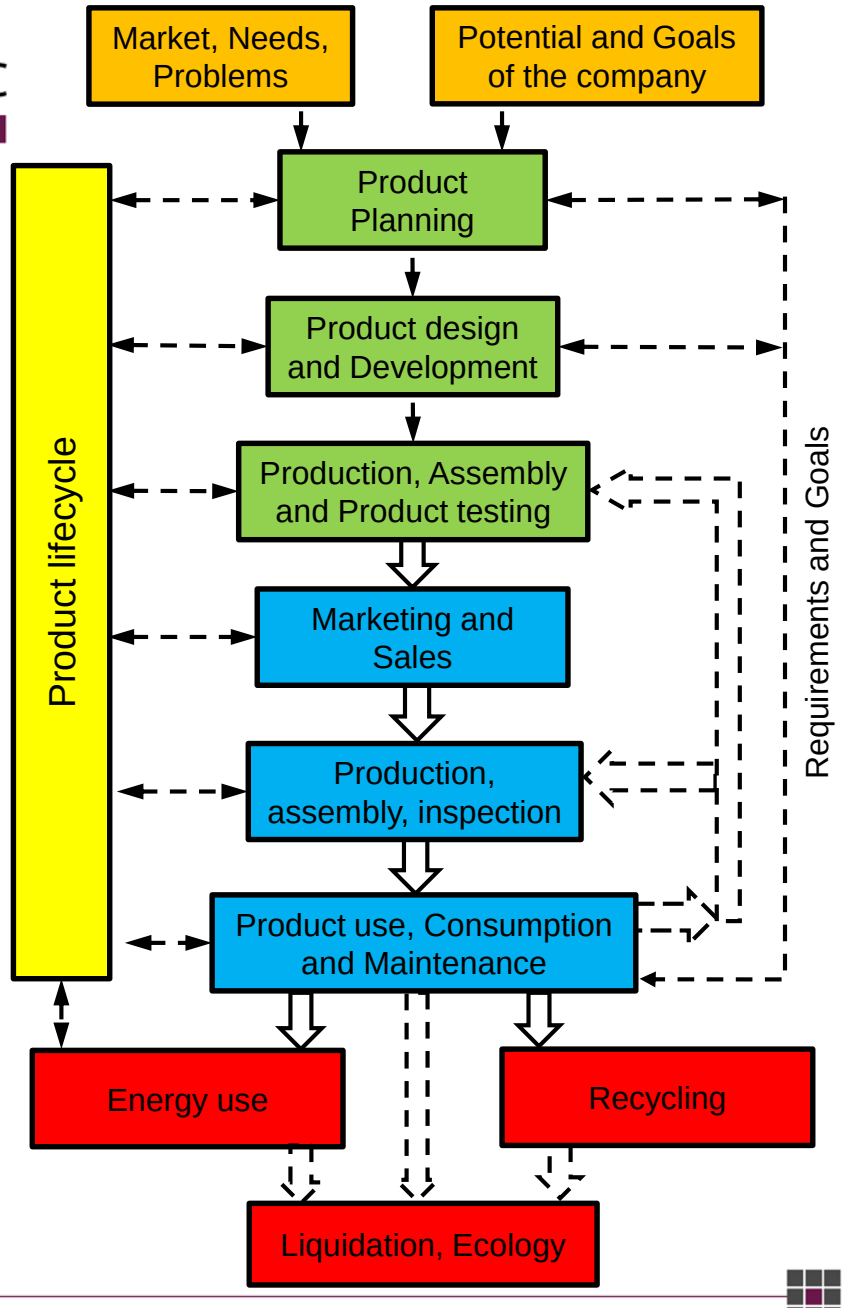
- Product launch – product marketing phase
- Product launch - product growth phase
- Ripe of the product – product maturity phase
- Attenuation of interest in the product – product decline phase



Product Lifecycle phases – graph



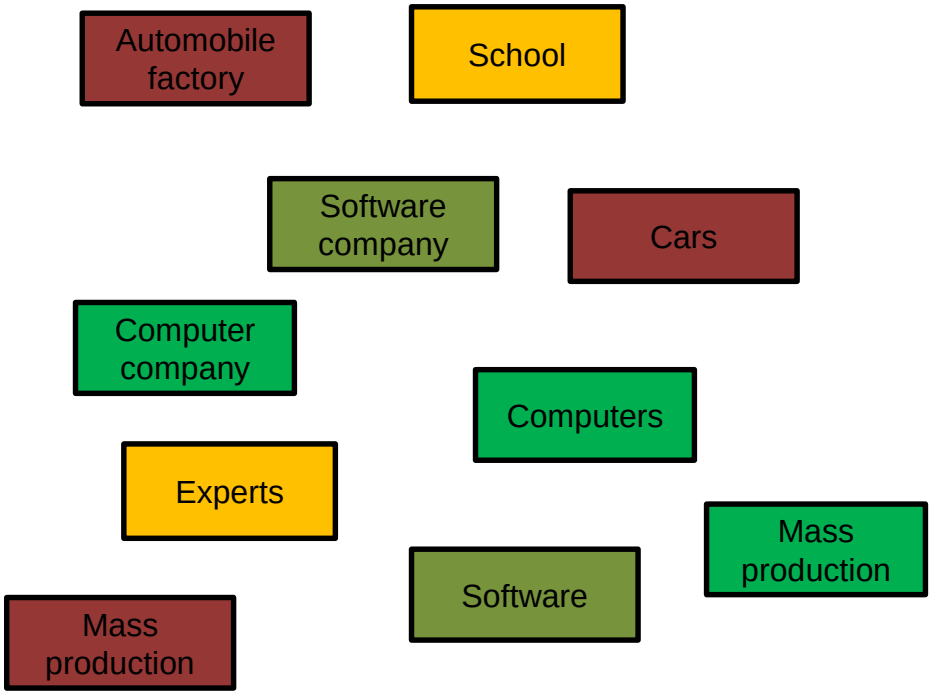
Product life cycle is basically the process of converting raw materials into high added value product. Designers must work closely with specialists from a wide range of disciplines to design.



Factors influencing product lifecycle

A number of factors influence the approach to the design of the final product.

- Type of Production
- Type of Product
- Type of Organization
- Product Identification



Mass production

Mass production projects usually begin with product planning after a thorough market analysis. Furthermore, there is usually a lot of spaces for **specific solution of designers**.

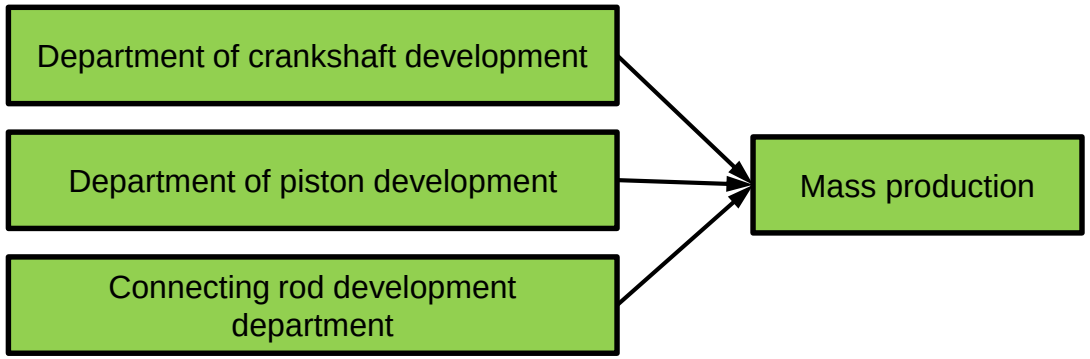
Organization of the design process

The organization of the design and development process itself depends primarily on the way the company is organized. Companies can be oriented to:

- **Product**
- **Problem**

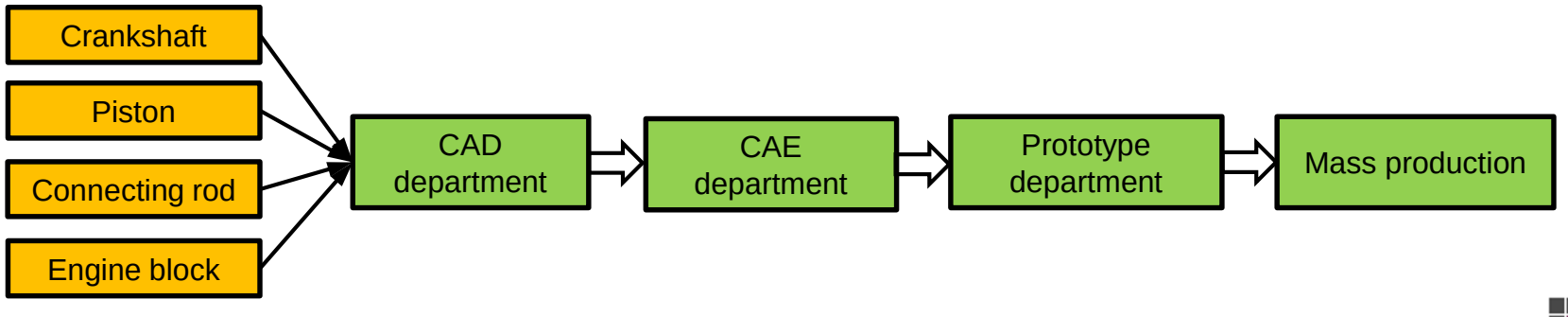
Product oriented organization

For a product-oriented company, the responsibility for development and subsequent production is divided between the various departments of the company according to the specific product type. For example, individual parts of an internal combustion engine - piston, crankshaft, camshaft, engine block ……



Problem-oriented organization

In a problem-oriented society, we allocate responsibilities according to the type of task. It can be divided into partial tasks (eg. in CAD engineering "Computer-Aided Design", control systems, material selection, FEM analysis, etc.). In this arrangement, particular attention shall be paid to the coordination of the work as it passes from group to group.



Adaptive design

In adaptive design, we adhere to **well-known** and **established solution** principles and adapt them to changed requirements. In this type of construction, the emphasis is on geometry, strength, stiffness, production, material, etc.

Variantly arranged product

In a variant, the size and arrangement of the parts and assemblies are within the limits of the previously designed product structures. Variant design requires original design effort only once and does not present significant design problems for a specific order. It contains proposals in which only the dimensions of the individual parts have been changed to accomplish a task.

Dimensional Series

Influence of quantity of produced pieces on product development

The number of pieces produced plays a **crucial** role in the **development** of a new product. For **piece production**, it is uneconomical to produce **prototypes**. Particular attention must be paid to construction and thus minimize risks. **Functionality and reliability have a higher priority** than **economic** optimization. Products that will be produced in large quantities (large batches, mass and batch production) must have their **technical and economic characteristics fine-tuned before commencing mass production**. This is achieved through models and prototypes. It often requires several stages of development before starting mass production.

Development of personal cars

The development of a new type of car costs several billion crowns and takes about **3.5** years. Development begins with design and definition of all requirements. This is followed by the actual development and demand of parts suppliers. The first pieces are **handmade**. **Imitation of series production and zero series follows.** All these cars are intended for testing (crashtests, climatic, life-tests… - intended for homologation, photography, exhibitions). The zero series is followed by the start of series production to fine-tune other manufacturing details, appearance…. Only after this phase is mass production for the end customer.

Influence of product use on its development

Engineering includes a wide range of tasks. Solution requirements are extremely diverse and always require the use of specific methods and tools. For example, **foodprocessing-machines** must meet specific **hygiene requirements**; **machine-tools** must meet specific requirements for accuracy and **operating speeds**, **drive-units** must meet specific requirements regarding power to **weight** and **efficiency**; **agricultural-machines** must meet specific performance and robustness requirements and **office-machines** must meet specific **ergonomics** and **noise** requirements.

Conclusion

The way of designing is determined by a number of factors. When working as a designer (CAD engineer) it is necessary to proceed so that the work is **efficient** and **synchronized** with the follow-up activities. The development of the new product is currently linked not only within the parent company, but also within the supplier and customer companies.

Review questions:

- What is the role of CAD designer in the product lifecycle?
- What factors affect the product lifecycle?
- What is the base of the product life cycle?

Topic of the next lecture:

„ Teamwork “

Thank You

Used literature and sources of information:

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