

Design for cost

A radical method of
reducing costs significantly



Competitors and customers are pushing down prices, and so are the constantly growing costs of input, energy and wages. As a consequence, there is a decrease in the profitability of products. Companies have tried hard to reduce costs further. Now there is a new, promising method that focuses on eliminating costs in the design stage: »Design for Cost.« by Ján Chal

Companies that want to offset cost increases often deploy traditional methods such as Lean or Six Sigma to reduce costs. Despite the successes, sometimes you need to take a more radical step that would reduce product costs significantly, even by tens of percent. It has to be a more effective approach to reduce the direct cost of the product, without compromising functionality or the quality of the product. Not only the big players like Ford, Apple, and VW have chosen an approach called »Design for Cost« (DFC).

Influence the product design phase

Design for Cost is based on the Lean approach, but is already applied in the phase of product design. In the actual production process, it will reduce the direct and indirect costs of the product by a range between ten and 30 percent. The methodology is applicable to all manufacturing companies that have their own development, or can at least influence product development. The most recent cases show that the principles can be applied in service industries, as well. The key success factor applied in the DFC approach is the so-called »principle of predetermination.« It says that any decisions made in the product design phase determine 70 percent of the real direct costs in the manufacturing process. That means that DFC is the strongest in the concept phase of the development. Here, we can achieve more than double the savings than during the detailed design phase. This may sound quite logical, but it also implies that the development team must be able to judge and compare the costs during the concept stage already, long before the individual components are known.

The idea of finding opportunities for cost reduction in the pre-production stage is obvious, but the strategies to achieve it are manifold. Each strategy within the DFC umbrella has its own name, usually starting with »Design For ...,« and contains its own processes and tools. These tools need to be combined in order to reduce costs. The best known DFC strategies are:

- Design for assortment costs – search for savings in costs related to a wide assortment of goods and a wide product range.
- Design for assembly costs – reduce the costs of product assembly.
- Design for manufacturing costs – reduce production costs.

- Design for quality costs – reduce the costs of defects, poor quality and repairs.
- Design for robustness – reduce costs associated with customer complaints and repairs for the customers.

Tens of percent savings

Design for Cost is usually considered and managed as a project through a series of workshops. The average duration of the project is, based on our experience, between six and 12 months. This period includes the analysis, design of experiments, prototyping and implementation. Project progress can be described in five consecutive phases (see illustration).

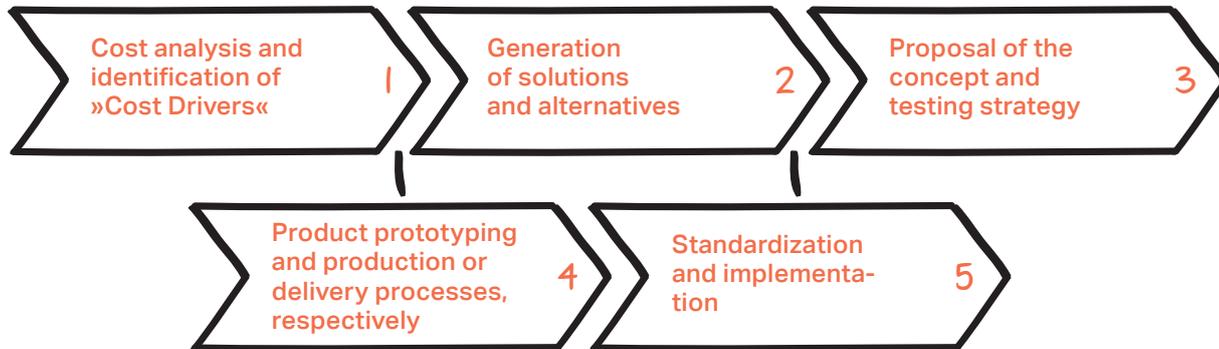
The savings in direct costs range from ten to 30 percent. Risk of failure to achieve the project objectives is around 30 percent – which is acceptable if we consider the possibility of such a radical cost reduction. We could achieve significant results in our projects:

Area of application	Reduction	Duration
Production of large-sized bearings	10 %	5 months
Production of office furniture	30 %	8 months
Production of envelopes	25 %	5 months
Production of optical equipment	30 %	8 months
Production of the drainage system	25 %	12 months

During the DFC project, a team will apply several strategies and generate several ideas. Based on these, two to three concepts are developed and prototyped. It is very important to properly evaluate all ideas and select the most feasible ones with the biggest impact on costs. But costs are not the only metrics for selecting a concept. There are several aspects worth considering:

- **Cost:** Savings are the primary metrics. The project team, together with finance, needs to calculate direct cost savings (related to the newly developed product or service) but also needs to consider indirect costs including saving of working capital.
- **Risk:** Each change in components, production process, materials or in the whole design is con- ▶

Five consecutive phases of the project process



nected to potential risks. Therefore, risk evaluation and risk management solutions must be evaluated and used for final decisions.

- **Investment:** Solutions usually need some investment. Return on investment is a key management question when a new product or service is designed. Based on our experience, we can usually achieve an ROI of 10 : 1.
- **Time:** Some concepts and ideas are quickly implemented and some of them require changes in the process, which takes time. Before it is decided which concept is to be implemented, we evaluate the time for investment return and finally the time for the utilization of the solution, as well.

Design for Cost at ACO Group

ACO Group is the global market leader in drainage technology with its headquarters in Germany and 29 plants worldwide, with 3900 employees. We worked with the Czech branch, focusing on the design of a new drainage water system for the floors of industrial buildings. The three objectives of the DFC project were to reduce product costs by at least ten percent, to meet – as one of the first producers – the new EU standard on hygiene, and to become more flexible in customizing the systems with no impact on costs. We looked at their product at the design level and came up with several improvements. During 12 one-day design workshops with the project team and seven client

workshops, an improved product was developed. The new drainage system consists of a reduced number of parts, is of thinner material, and is made of plastic instead of metal. While it still looks quite the same, it is now easier and faster to install because the new components reduce the number of necessary technological operations. Additionally, we moved production to some formerly unused machines. To a large extent, we exploited the principle of unification and the results were excellent. There has been a 30 percent increase in quality compared to international standards and a reduction of direct costs by more than 20 percent.

The Design for Cost principles are also applicable in processes of service design. In a project with a design company, we reduced the expenditure of time spent on the architectural design process by about 25 percent. In this case, we changed and standardized the original form of how to start the design work.

ICG Design for Cost program

Within the ICG group, we have successfully employed this approach in several projects. We have been able to reduce costs for more than ten industrial companies in areas such as sports binoculars, office furniture, and kitchen furniture for airplanes. In addition, we have prepared a new open training program for the Design for Cost Academy, designed for managers of pre-production stages in cooperation with leading Czech companies. ●