QFD example in interaction with HMI

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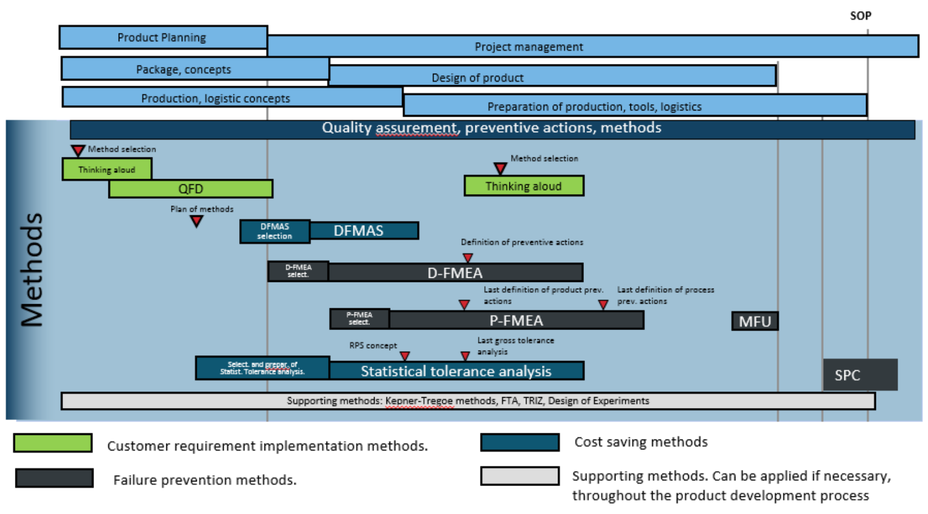
ABSTRACT

The presentation includes the application of the Quality Function Deployment (QFD) method and show how we can use this method at the automotive industry. Cockpit of a modern car is still developing and changing according to the technical progress and customers' requirements. The QFD method allows set the customers' requirements and then put them into technical expression. The matrix of QFD set those technical expressions, which are the most important properties that customers expect. These chosen properties can be testing at the technical development. The testing of new HMI concepts going on driving simulator and can suggested which one is suitable for using in a real car.

INTRODUCTION

Nowadays for automotive industry, the aim of each producer is customer satisfaction, but also a technical progress, which can differentiate them in current competitive environment. A set of quality methods serves for achievement of customer satisfaction in the automotive industry. It ensures production of high-quality and also the corresponding profit.

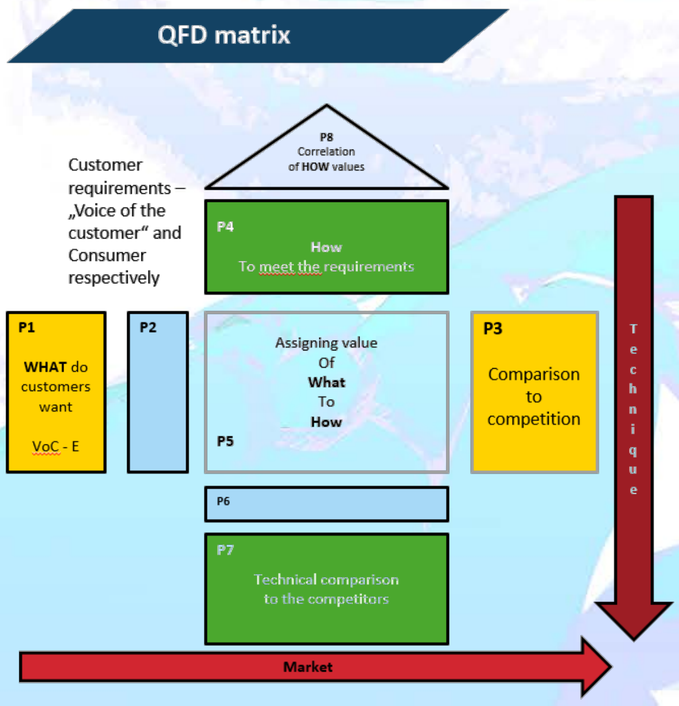
The QFD method, i.e. Quality Function Deployment, belongs to the set of the quality methods used in the product development stage. This method is using most in the first stage of the product development process and it because QFD method allows transformation of customer requirements into technical expression [1]. Its main task is determination of customer requirements and their implementation in the project of the product being prepared.



The basic outcomes of applying the QFD (Quality Function Deployment) method are, in particular, the answers to the two following questions:

- What are customer expectations? and
- How are these expectations to be met? [1]

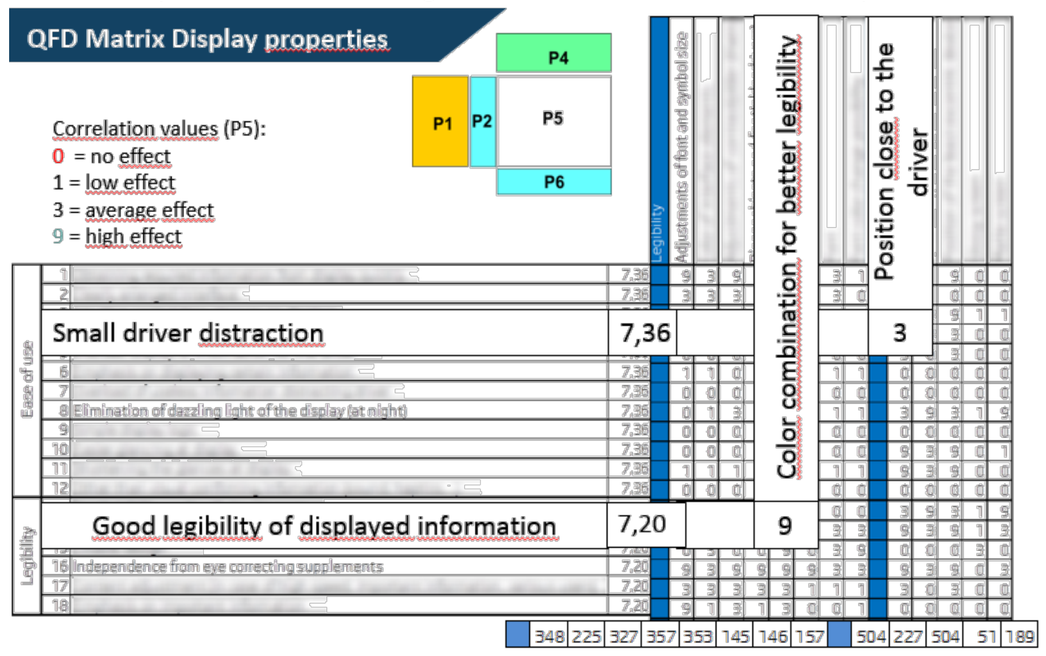
The QFD method is based on QFD matrix, which is often marked as the "House of Quality" and consists of a team of experts. The overall structure of the QFD matrix has 8 specified fields, but while using the QFD matrix not all fields need to be completed. It is possible to use only a part of the QFD matrix, as required by the project. The QFD matrix you can see at the graph below, where is describe the most important field.



At the present time the load of the driver while driving is increasing. This is caused by the improvement of technology and development the HMI systems in the cars. Also proportion of displaying and controlling components in the cockpit is growing. The activity of these car systems and displaying components may affect safety of driving in a remarkable way.

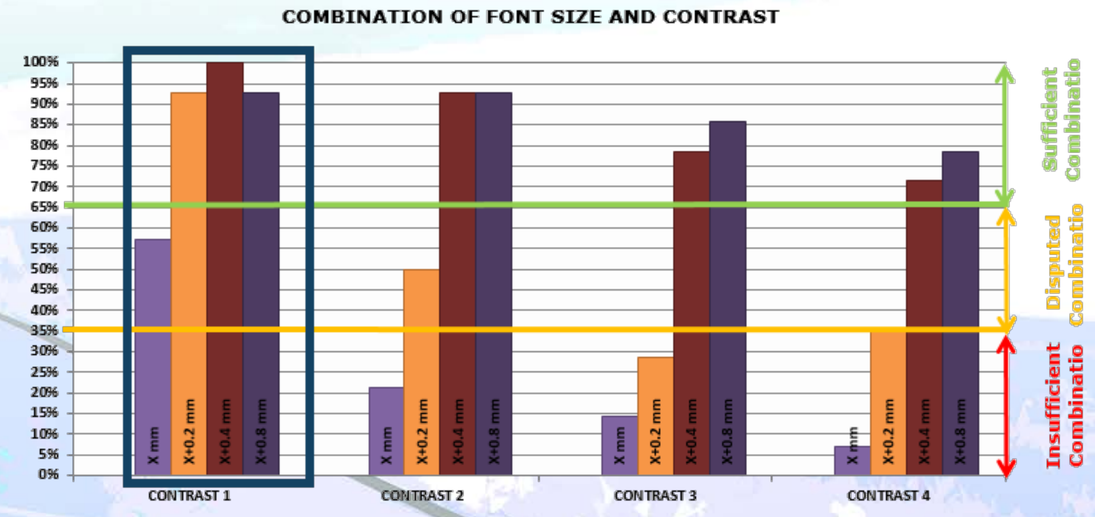
The interaction of these car systems, displaying components and drivers may affect safety of driving in a remarkable way. [3] We need to optimize of the display to ensure safe operation while driving. For set the properties of the car´ display we used QFD method.

The first step for using QFD method we need to find out which display properties customers find the most important. These was the inputs into QFD matrix and we use the qualitative and quantitative techniques and methods for this. Input data were received due to evaluation of the questionnaires, where probands assessed general properties of the display independent of the tested concepts. For these customers expectations the technical experts set the technical parameters, which is in the field P4. Than the teams set the correlations between customers expectations and technical parameters at the field P5. After the calculations of QFD matrix, the field P6 we can set which technical parameters have the greatest effect on the customers expectations.



The most rated technical expressions from the QFD matrix were tested at the technical clinic at driving simulator. At these clinic the most rated expressions were: font size, font legibility, text understanding and contrast. These parameters were tested separately on the separate screen.

Several chosen screens from the display menu were tested. They display various combinations of the script sizes and contrast. The probands are expected to assess the individual items of each screen, such as the script legibility, the text comprehension and contrast. The above-mentioned testing revealed that the best combination for good display legibility for customers is the second biggest size of the tested script with combination the best contrast (contrast 1), because the biggest size of font can distracted them [2].



CONCLUSION

The QFD method is an integral part of product development in the automobile industry. Its contribution is provable in all stages of the car development process as well as in the area of the HMI concepts testing. The main objective of testing the HMI systems is minimization of the time that these systems are controlled and thus the time that the driver is not concentrating on driving. Together, these methods contribute to customer satisfaction, which is emphasized more and more in the automotive industry.

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