

Design and Development Process Engineering Technologies and TRIZ

-MOT for Design and Development Engineer-

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Abstract

In the recent era of quick change of market and diversification of values among the people, it is required to deliver, timely and speedily, highly customer-satisfied products to the market. For this, it is important to capture requirements exactly, to design them rationally and leanly, and to implement quality products so as to prevent reworks in the later process or trouble after shipment. It is the important point how we can do them in front-loaded fashion in upper stream and/or in origin.

To realize this, it is necessary to recognize the design and development work, not as empirical skill and/or technological characteristics of the product but as engineering characteristics of each process, and to quantify, systematize and visualize each engineering process technology as sharable and transferable overt knowledge. These engineering process technologies have been developed individually and yielded prominent results at actual development site, so far. On the other hand, they were not necessarily effective in case of exceeding applicable condition or range. Therefore, it becomes very important 1) to grasp tools, methods and methodologies, comprehensively and from point of bird's-eye views, that support engineering processes in design and development as the design and development engineering process technologies, 2) to apply some optimal method and/or tool in each engineering process stage and 3) to allow us to make clear decisions on engineering issues. This means that they give technological management methods for front-line engineers. So, I have called them another MOT (Management based On Technologies), compared with original MOT (Management Of Technology). In this lecture, I will offer commentary how we should grasp the design and development process engineering technologies and give place of TRIZ within it.

Extended Abstract

Engineering issues on design and development are mainly divided into development strategy planning matters and development execution matters.

The former is to decide what we should make and whom we should make for. The followings are required to be addressed;

- How can we understand and predict the market and technologies?
- How can we know customer needs and wants?
- How should we define the product specification (Function and Implementation)?
- How can we predict risks and response to them?

The latter is to realize the strategy without fail. The followings are required to be addressed;

- ◆ How can we create good ideas?
- ◆ How can we make a breakthrough on a matter?

- ◆ How can we develop advanced technologies?
- ◆ How can we apply for effective patents?
- ◆ How can we realize an optimal design?
- ◆ How can we predict the quality and build it into the product?
- ◆ How can we avoid waste in processing and re-work?
- ◆ How can we manage the project well?

A group of technologies providing effective engineering methodologies and methods for the above is the design and development process engineering technologies. Various methodologies, methods and tools such as QFD, Taguchi Method, Competitive Strategy Theory and Risk Management Theory are included in it.

TRIZ is positioned as an important methodology in it and is widely applicable from development strategy planning phase to development execution phase. Software engineering technologies and digital engineering technologies are important technologies in the design and development process engineering technologies, too.

During a decade, the company I had been working for has been getting big results achieved through a company-wide program to spur engineers' technological aptitude and realize the design and development process innovation and engineering quality improvement, using the design and development process engineering technologies.

However, the results by these technologies are invisible directly and have not been recognized by the managers of many companies in Japan. And also, its education and research have hardly been done in almost of all universities. I strongly hope that these technologies are educated and researched as common basic engineering technologies in universities in near future and are comprehensively utilized in many companies.

Presenter's Profile: Mr. Toshihiro Hayashi

He was born in 1945 in Osaka, Japan, and graduated from Osaka University in 1967.

After graduation, he joined to Hitachi Ltd. and had majored in software engineering technology and application of it to many real-time systems for 30 years. After being moved to the Head Quarter of Hitachi Ltd., he has been in charge of the planning & promotion of design & development process re-engineering project using the design & development process engineering technologies for 10 years.

After retirement from Hitachi Ltd. in 2007, he started a professional engineer office. He has also working for various public technological societies during this time, is current secretary general of Collaborative Board of TRIZ Promoters and Users in Japan

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