

Seventh TRIZ Symposium in Japan, 2011

Collection of Abstracts of All the Presentations from Overseas

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Program Committee

(Third announcement)

EI01- Litvin (USA) (Keynote)

**Main Parameters of Value:
TRIZ-based Tool Connecting Business Challenges
to Technical Problems in Product/Process Innovation**

Simon S. Litvin (GEN3 Partners, USA)

Today there is no direct connection between business challenges that each industrial company is facing and underlying technical problems. Identification of correct Main Parameters of Value (MPV) is vitally important for addressing companies' business issues. MPVs are product or process attributes which define customer's purchase decision. Correspondingly effective innovation is a significant improvement along one or more MPVs. The main tool for MPV discovery is Function Analysis of interactions between the engineering system (product or process) and its super-system. MPVs may be different for different stakeholders (consumers, customers, manufacturers, etc.); different stages of the product life cycle (production, application, operation, maintenance, storage, transportation, recovery, disposal, etc.); different market niches (groups of population, geographical zones, ages, etc.).

The algorithm of MPV Discovery was developed and tested for numeral products and technologies in different areas of engineering. The presentation is furnished with case studies from real consulting projects.

EI02- Litvin (USA) (Advanced Seminar)

**GEN3 Innovation Discipline (G3:ID)
- an Advanced, Business-Oriented TRIZ-based Methodology**

Simon S. Litvin (GEN3 Partners, USA)

GEN3 Innovation Discipline is an advanced TRIZ-based methodology developed starting from classical TRIZ through Innovative Technology of Design, TRIZplus and TRIZ++. Classical TRIZ experiences two major challenges. First, Theory of Inventive Problem Solving (Russian acronym – TRIZ) is focused on solving of inventive problems. However executive managers of industrial companies don't actually care about technical problems. They are facing a lot of business challenges instead. G3:ID includes several methodological tools that connect these business challenges to specific underlying technical problems of products and technologies. The representative tools are Main Parameters of Value (MPV) Discovery, Innovation Agenda Development, Combined Analysis of Market Trends and Trends of Engineering System Evolution, tools for Patent Strategies development, Adjacent Markets Identification, etc.

The second serious challenge of classical TRIZ is the fact that its deliverables are ideas. However industrial companies are looking for tangible new innovative products and technologies. G3:ID includes number of tools that serve to develop the idea to prove-of-principal prototype, then to working prototype, to a new product/technology, and then to a business impact of this product. The representative tools are Function-Oriented Search, Secondary Problems Identification, Global Knowledge Network, Smart R&D Labs, Synergy Index, Business Impact Identification, etc.

E02- Lin (Waseda Univ., Japan)

Verifying the effectiveness of Technical Contradiction Matrix and 40 Innovative Principles of TRIZ as an idea-generation method

Minli Lin, Manabu Sawaguchi, Takahiro Ohno (Waseda University, Japan)

During the idea-generation, which is critical to products development in companies, engineers have tended to use Technical Contradiction Matrix (CM) and 40 Innovative Principles, which is the typical tools in TRIZ, to generate superior-quality ideas. However, there has been relatively little formal research on verifying the effectiveness of the both tools by using the mathematical analyses. And this contribution examines whether CM and principles are effective as an idea-generation method by using one of multivariate analyses and describe the experiment including an evaluation system.

E03- TJYeoh (Malaysia)

Hybrid TRIZ, SMED & LEAN Case Study in Industry

**Yeoh Tay Jin; Ishak Ismail; and Loh K-hon
(Intel Technology Sdn. Bhd, Malaysia)**

To maximize the return of investment on high capital investment, rapid conversion is crucial in industries today. This paper describes the deployment of 3 techniques in unison, i.e. TRIZ, SMED and LEAN to gain the benefit of the reduction in conversion time. The tool is an equipment (handler) in the Test area. It picks the units from the trays to the Test site. With 2 different types of packages, the conversion took 6 hours. With the creative hybrid application of TRIZ/SMED/LEAN, the conversion was reduced significantly to only 30 minutes. It will be illustrated on how the process and techniques were applied and how the solutions were derived. This showed that TRIZ/SMED/LEAN hybrid can be more powerful than only one standalone tool.

E04- Santad K. (Thailand)

The case study of improve tile cutting edge quality

**Peeramata Peerasak (The CAPAC Rooftile Co., SCG, Thailand),
○ Khandipanichakul Santad (Rayong Engineering & Plant Service Co., SCG,
Thailand),
Pheunghua Tanasak (The Inventor Development Co., Thailand)**

At the cutting step of the wet tile manufacturing process, a lot of variation in raw material condition that causes of the sticky of soil on the cutting blade. And then become to the harmful effect to product (tile) by icing on the edge of tile. The conventional solutions to this problem are to reduce the cutting speed and adding the cleaning-blade nozzle to the system, so there is been a slight reject reduction rate. The solution is accompanied by trade-off between “the improvement results (main useful function)” and “the consequence (harmful function).” Therefore, TRIZ is applied by formulating the problem through substance field model to help understand the function, components and harmful functions of the system. In addition, we applied The Psychological Inertia Tools, Smart Little People (SLP) that can be viewed as simply a special case of encouraging the problem to zoom into the fine details of the sub system of a problem to view what the problem looks like from there. The first inventive solution was found to reduce 2.5% rejects. Most importantly, this concept has changed the viewpoint and behavior of the teams which enables them to think out of the box.

E05- Pheunghua (Thailand)

Application of 3D Substance-Field Modeling

Pheunghua Tanasak (The Inventor Development Co., Ltd., Thailand)

Generally, the Substance Field modeling is used to explain the system that we need to improve or develop to be better. The Substance Field is able to telling us about what is function of the interesting system, what is the scientific under that system.

We found to understand more clearly about the system over the time, Substance-Field itself may not be well explanation. Because we write down the static system under the boundary and one of boundary is time domain. The modification Substance field was done by adding one more time axiom. The system we observe will be easier to explain and contradiction point finding.

E06- HJKim (Korea)

PTC-Modeling Core of Business TRIZ

Hyo June Kim (www.trizacademy.net, Republic of Korea)

Many persons have tried to use TRIZ in non-technical area. I think that there will be no right way or wrong way. Every trial will have own unique value and contribute to the effort to use TRIZ in non-technical area. In this paper, I will introduce another way of using TRIZ in business area. Absolutely, this method will be based on classical TRIZ but I believe this thinking will expand the usage of TRIZ to some higher degree. At first I will define creativity in unique and simple way. I also found another value of 40 inventive principles and separation principles based on such an definition of creativity above. Finally I will explain the relationship between Technical Contradiction and Physical Contradiction, which I call PTC modeling. You could analyze the structure of problem based on such an relationship between two kinds contradictions. If you understand such a thinking flow, you could find simple and powerful method about “How to use TRIZ in non-technical area”. You can also understand why Altshuller called “Physical” contradiction and “Technical” Contradiction. This paper will just analyze classical TRIZ in unique way. But such a new approach will introduce another usage of TRIZ in various fields including business, political, diplomatic area etc. I will not say something true or not-true, but I just hope to suggest possibility at symposium.

E11- Sheu (Taiwan)

Innovative Problem Solving and Equipment Re-design through Systematic Component Trimming

D. Daniel Sheu, Chun Ting Hou (National Tsing Hua University, Taiwan)

Trimming is a method to remove components from a system. Most engineers use “+” method to solving by adding components to the existing system. Trimming uses “-” to solve problems. This paper presented a systematic method to remove components from a system while solving the system problem without suffering any functionality loss. Theory of the trimming process consistent with the TRIZ problem model is presented. The 2-loop overall Trimming Algorithm is presented. The concept of a Trimming Plan to orchestrate the whole trimming processes is introduced. The roles of Trimming Rules, Trimming Tasks, Trimming Problem, Trimming Method, and Trimming Model are explained. A recursive trimming process allowing maximum trimming effect is also proposed. A real-world semiconductor equipment-process problem was used to test the method. The systematic trimming process reduced the system components count from 18 to 3 while permanently resolved its equipment problem. 95% of the component cost was trimmed and approximately 99% operational energy can be saved.

Contributions of the paper includes: 1) Establishing the process and theory of trimming connecting it with TRIZ problem solving process; 2) Creating a Trimming plan to systematically organize the trimming steps and terms in the trimming process; 3) Creating a Recursive Trimming algorithm to maximize the trimming power; 4) Demonstrating a way to utilize Resources for trimming.

E12- YWSong (Korea)

Application of TRIZ in Korea Engineering Education

**Yong Won Song, Seung Hun Kang, Igor Ivanov
(Korea Polytechnic University, Korea)**

The Korea students estimated that TRIZ education greatly contributed to the development of their problem solving ability and creativity, especially to the highly positive change in their confidence that they can solve whatever problem they may face. TRIZ turned out to be a very useful tool for the development of problem solving ability and creativity through the training of systematical thinking. This paper shows that the Theory of Inventive Problem Solving (TRIZ) can be a good method to teach Korea students systematic thinking and creative problem solving skills.

E14- Khandipanichakul (Thailand) [Aug. 3, 2011 Accepted.]

The Psychological Inertia Application

**Khandipanichakul Santad (Rayong Engineering & Plant Service Co., SCG, Thailand),
Pheunghua Tanasak (The Inventor Development Co., Thailand)**

Petrochemical industrial is a high technology and complex system that general approach for many solutions are mostly referred to intrinsic knowledge and from previous experience. This paper is shown you how to reduce or avoid the Psychological Inertia (PI) that's the represents the inevitability of behaving in a certain way, the way that has been indelibly inscribed in the brain. It also represents the impossibility as long as a person is guided by his habits. There are two cases application for this TRIZ approach. First, We applied the Psychological Inertia of usual parameter to break out of PI for improve normal bag sealing quality that has been controlled the latent parameter. The first case has 100% achieved sealing quality. Second, We applied PI of usual form for reduce any complex component of flushing unit. This case was found to reduce 80% MTRR for flushing header and improve reliability of system. Mainly, this concept has fulfilled TRIZ learner to generate the best solution.