

Eighth TRIZ Symposium in Japan, 2012

Collection of Abstracts of All the Presentations from Overseas

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Program Committee

(Fourth Announcement)

EI01 Cavallucci (France) -- Keynote Lecture

How TRIZ can contribute to a paradigm change in R&D practices

Denis Cavallucci (INSA-Strasbourg, France)

Tools and methods developed during the era of quality and optimization have shown their limitations and become inappropriate in the context of the requirements of innovation. Nowadays the need to rebuild design practices in enterprises is strongly felt both in terms of human skills and methodological expertise. In part, a way to face the innovation era's difficulties has been provided through the theory of inventive problem solving. But as TRIZ becomes more popular both in academia and industry, difficulties to obtain the best out of it is strongly felt whether we use its simplified versions or its computerized one. This keynote addresses this difficulty in presenting an original and complete framework, using industrial examples, that integrate most of TRIZ fundamentals in a methodology namely Inventive Design Method (IDM).

EI02 Cavallucci (France) -- Advanced Seminar

From TRIZ to Inventive Design Method (IDM) : towards a formalization of Inventive Practices in R&D Departments

Denis Cavallucci (INSA-Strasbourg, France)

In today's methodological world, TRIZ has undoubtedly its place in the myriad of methods and tools useful for engineers in companies. Mostly dedicated for solving inventive problems, TRIZ is appreciated for its capacity to widen the scope of possible domains in which the solution is sought after. In that regards, it is often perceived by companies as a potential replacer of creativity techniques such as Brainstorming. We disagree with this statement in presenting TRIZ as, firstly, a theoretical framework for inventive thinking, second, as any theory, it aims to serve as a framework for developing new methods and tools useful in a certain context. Inventive Design Method (IDM) has been developed to re-structure and complete TRIZ body of knowledge with other theories like graph theory or Pugh's theory. The objective is to integrate companies' set of methods to pragmatically serve an innovation strategy with engineering tools open to invention. This advanced seminar is provided to describe, with concrete exercises, the main stages of IDM.

EI03 J.H. Shin (eTRIZ, Korea) – Special Invited Talk

How to learn TRIZ with ease and fun

Jeongho Shin (eTRIZ, Korea)

As TRIZ is undoubtedly one of the most popular methodologies for systematic problem solving, it is now widely used to improve products, services, and systems. However, most of the people who learn TRIZ for the first time think that TRIZ is very difficult and assume that it takes much time to go to the level of applying TRIZ. In order to invite them to the TRIZ world, there should be a measure to help them. This paper introduces three approaches that help learn TRIZ with ease and fun. Firstly, the SCM (Simple Contradiction Modeling) has been developed for easy modeling of contradictions using a diagram that consists of 5 components. A user can easily describe contradictions and explain to others with the help of the visual diagram. Secondly, the Invention Song helps memorize invention principles. Each line of the song stands for one of 8 invention principles selected from 40. Lastly, the Invention Card can be used for playing as well as brainstorming. Using this card, a user can easily check all the invention principles and those typical examples and apply to generate ideas like playing. It is illustrated that easy and funny approaches can be utilized as good instruments for training TRIZ beginners.

E01 Khandipanichakul (Thailand)

Application of TRIZ and Enneagram Methodology

**Santad Khandipanichakul
(Rayong Engineering & Plant Service Co., SCG, Thailand)**

The most effective approach to solve the problem for competitive demands requires quicker, more effective and innovative problem solving. In petrochemical industry, problem solvers are required to quickly provide solutions to increasingly complex problems, all the while reducing time to solve the problem and cost. The variation in radioactive level measurement of high pressure separator, LDPE process is caused by the harmful effect from malfunction of radioactive detector. This paper describes the deployment of 2 methodology unison that comprises of Enneagram and TRIZ to obtain effectiveness of problem solving. This paper will illustrate how the approach and techniques were applied and how the solutions were derived. This paper shows that the integration of Enneagram and TRIZ is the most powerful approach to achieve the results in problem solving.

E02 Sereeviriyakul (Thailand)

Rearranging the Packaging of Roof Tiles to reduce damages and to save storage areas

○ **Vithayavut Sereeviriyakul (Siam Fibre Cement Co., Thailand) and
Jaran Sabseree (SCG Center of Excellence and Sustainability Development,
Thailand)**

Some roof tiles, which were checked good at the manufacturer, were found cracked at the customer's site. This problem was caused by the load of the products. The conventional solution for reducing the damage of roof tiles was to use more impact-proof roof tiles. However, such impact-proof roof tiles are expensive. Another solution was to reduce the number of finished goods in a stack; but these solutions increase the cost of storage. These solutions face with trade-off relations among the cost of impact-proof roof tile, the damage of roof tile and storage area. TRIZ has been applied to the problem by using functional diagram and 40 Inventive Principles. An solution was implemented according to the guideline of Principles "New dimension", "Do it in reverse", "Segmentation", and "Excessive action". The solution was found to reduce the storage area by 50%, to reduce the damage of the roof tile at customer site more than 80%, and to reduce the usage of impact-proof roof tiles by 50%.

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The New Process Technology for Making Natural Surface on WPC Deck

○ **Kosit Noorit and Preecha Ladjampa**
(Nawaplastic Industries Co., Ltd., SCG, Thailand)

WPC (Wood Plastic Composite) deck is a product used for outdoor flooring. A requirement of product surface must be rough and anti-slip, furthermore, natural-look skin will be attractive. It needs a process to scratch on surface of product. The wheel brushing method with steel wires becomes a basic solution because it can give a natural look surface. But an incipient surface of the product was very hard. It reacts as a harmful function for the steel wires on brushing process by make them hot and weak then split into factions. The streak on surface may be consistent just only a half hour of brushing. The process has to recuperate after that. A lifetime of the steel wires is short and affects to conversion cost.

Therefore, TRIZ was applied by formulating the problem through substance field analysis to clarify the technical system and understand useful/ harmful functions of the system components. An inventive solution was developed with new components (special rugged sand belt acts with vibrated sawtooth comb) that can imitate the main useful functions of the steel wires, but overcome the harmful functions from the hard skin of product. The improvement result gives more continuity with consistency of streak on surface and can reduce around 5 times of the conversion cost.

E06 Khalifeh (Jerusalem) -- DEEP

The impact of TRIZ application on achieving a competitive advantage in UNDP's economic empowering program, DEEP Project

○ **Eyad Khalifeh and Shireen Al-Jaouni (Al-Quds University, Jerusalem)**

This paper aims to outline the Impact of TRIZ Theory application on achieving a competitive advantage for UNDP's Economic Empowerment Program which titled "Deprived Families Economic Empowerment Program (DEEP)" to form an inventive engine of creative problem solving techniques.

The recent emergence of the approach in the developed nations, especially successful privately and publicly held companies (i.e. Apple and Google), has created much interest with NGOs and academia, and a growing awareness in governments. Although innovative thinking originated in mechanical engineering, the paper demonstrates the underlying principles are more broadly applicable for NGOs.

The positioning of the approach relative to other design tools is an active research area and the opportunity to integrate innovative thinking for NGOs, its complexity, barriers, and benefits are discussed.

The research problem focused in answer on the following question: Is there an impact to the TRIZ Theory on achieving a Competitive advantage in UNDP's Economic Empowerment Program.

E07 Khalifeh (Jordan) -- Industry

**The Impact of Inventive Managerial Problem Solving Technique “xTRIZ”
on Achieving a Competitive Advantage
in Some Industrial Companies in Jordan**

Eyad Khalifeh (Arab Amman University, Jordan)

The study aimed to measure the impact of “xTRIZ”; the inventive managerial problem solving technique, on achieving competitive advantage in some of the industrial companies in Jordan. The study dealt with the xTRIZ technique, which included the basic xTRIZ process and inventive principles. Fifteen inventive principles were selected. The other dimension was competitive advantage and five variables were addressed: quality, cost, delivery, flexibility, and time.

The methodology of the study was adopted by making an assessment of six industrial companies in terms of the problems they face with regard to the five variables were addressed: quality, cost, delivery, flexibility, and time.

We did trainings on xTRIZ Techniques especially RCA+ in those companies in order to improve the problems management skills by applying those techniques in their working duties, then we made a pre and post questionnaires which completed by the targeted groups after six months.

The impact of applying xTRIZ Application on six industrial companies enriched by ideas from in- and out of the box for finding innovative solutions that led to reduce time and increase flexibility as well as give them the comparative advantage to leapfrog its competitors and provide a service and a product to its customers that will meet its expectations.

E09 De Carvalho (Brazil)

IDEATRIZ: New Product Ideation Methodology and Software

○ **Marco A. de Carvalho, Jônathas G. B. Grillo, and Rodolfo K. Tessari
(Federal University of Technology – Paraná (UTFPR), Brazil)**

IDEATRIZ is a methodology based on heuristics for new product ideation. The heuristics are derived from TRIZ, Value Analysis, Disruptive Innovation and the General Theory of Innovation. IDEATRIZ has four main stages: definition of the target product for innovation, generation of new ideas, resolution of contradictions and evaluation of ideas. IDEATRIZ was tested and the results were promising. However, its process is complex in comparison with the most used new product ideation technique, brainstorming. And complexity naturally hinders adoption. Therefore, a project aimed at developing IDEATRIZ-based software began, with a focus on improving the usability of the methodology. In this presentation, we describe IDEATRIZ and the current stage of development of IDEATRIZ software.

E10 S.H. Yoo (Korea) -- Engineering Education

**A suggestion on the revolutionary engineering education
by using TRIZ effects module**

○ **Seung-Hyun Yoo, Se-Chul Jeong, Kyung-Yeol Lee, and Dong-Gun Moon
(Ajou University, Korea)**

It is well known that current engineering education system is based on department which evolved following the industrial needs. These 'discipline' based engineering education are criticized on incapability to provide good engineering students who can deal with more and more complex modern practical problems. Convergence is the keyword to overcome this deficiency but there is no proven practical methodology in this direction. As a radical and potential solution of this phenomenon, the TRIZ effects module has been tried in engineering design courses successfully. As modern TRIZ software collected almost 10,000 effects of phenomena, principles, laws of technology which had been used in patents, it is impossible that one departmental curriculum cover all of them. Instead, the existence of the database of TRIZ effects module is introduced and students are exposed to use the module and the results were greatly improved. Students brought many good engineering solutions in short time. As the experiences show big potential for future engineering education, the authors suggest expansion of this program in general engineering curricula. This paper reports the potential of the TRIZ effects module in engineering education reform and also the points of further study for full implementation on current engineering education system.

E11 J.Y. Han (Korea) -- Art School

**A Case Study of Application of TRIZ
into Convergent Education of Engineering and Art**

**Eunkyung Kwon (Kaywon School of Art and Design, Korea),
○ Jiyoung Han (Daejin University, Korea), and
Seung-Hyun Yoo (Ajou University, Korea)**

Educational interests have been increased on the systematic innovation tools, such as TRIZ, as the social needs for students with creativity and ability of problem solving ever increased. The purpose of this study is to present a case study of applying TRIZ into convergence education of art and engineering on university level and evaluate the educational effects. The 18 students in the art college finished projects applying TRIZ approaches. Drawing projects using processing tools were also practiced. The results show that students have gained improvement in systematic problem analysis and solving, and also confidence. At the same time, it was shown the students had certain difficulties in following course due to unfamiliar terms and lack of knowledge in technology

E12 K.S. Kim (Korea) -

Development of a Contradiction Matrix for the Strategy TRIZ using Thirty-Six Stratagems

**Sung-Ho Park, ○ Kisoo Kim, Young-Hwan Park
(POSCO, Korea)**

Application of TRIZ in strategic decision-making area has not been observed. Based on the Thirty-Six Stratagems in the ancient China, a contradiction matrix has been suggested for strategic decision-making usages. Parameters were categorized by using 4M1E (Man, Machine, Material, Method, Environment), and further subdivided and determined into 15 parameters. A MECE (Mutually Exclusive and Collectively Exhaustive) principle was applied between 15 parameters selected. This matrix could be used for finding a way of problem solving in a complicated situation, minimizing conflicts and negative effects. In a suggested matrix by selecting of an improving feature and a worsening feature, 4~6 possible approaches are chosen from Thirty-Six Stratagems to drive possible solutions.