# The 10th Japan TRIZ Symposium 2014
# Abstracts

**June 20, 2014 (4th announcement)**

**Symposium Executive Committee**

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## EI01 Anatoly Gin (Vice President specializing in school education, International TRIZ Association, Russia)

**(Keynote Lecture)**

## Possibility of TRIZ in Economy (Business) and Education as a Means of Improving Competitive Power

In an increasingly globalized world, today, even residents on the other "end" of the earth participate in a worldwide competition. Every day, it is clarified that the success of society and country is controlled not so much by the presence of underground resources, production facility or arms as the development level of human resources.

Dynamically developing society and rapidly changing life conditions induce person constantly to act in a situation of uncertainty. And, new problems which have not been solved so far and are not known how to solve are requested to be solved. What living standard a society achieves depends on how well these problems will be solved.

There are unique methods to solve such problems effectively. TRIZ is a collective entity of such methods.

The field where TRIZ is applied has expanded continuously. Today, TRIZ is used to solve not only technical problems in the sense of engineering but also creative problems in various fields of human activity such as scientific research, pedagogical design, business, PR-technologies, advertisement, etc.

As the formation of a global, dynamic world advances, the value of a simple mechanistic labor decreases. On the other hand, demand for persons who can make true judgments in difficult situations grows more and more. Therefore, it is an important function of the society to educate persons who can make such judgments. And, the

necessity of methods for teaching it to people is growing more and more.

The role and possibility of TRIZ as a means of improving competitiveness in economy (business) and education will be discussed in this lecture. Also, I want to present the author's idea for a reasonable order of activities for TRIZ to take root in society.

## E01 Sergio Baltar Fandino (UEZO/SENAI CETIQT, Brazil)

### The improvement of the fabrics used in the professional market through research on consumer need and engineering parameters. The application of TRIZ methodology in textile under the pilot plant production of SENAI CETIQT - Technology Center of Chemical and Textile Industry in Rio de Janeiro

**Sergio Baltar Fandino - UEZO/SENAI CETIQT**
**Luiz Rodrigue Junior - SENAI CETIQT**
**Rodrigo Ribeiro Maciel - SENAI CETIQT**

Companies operating in the textile industry face an increasingly competitive market. The differential for this segment is to manufacture products that meet increasingly better consumer needs. The purpose of this article is to show the application of TRIZ methodology in textile materials under today, in different sectors, such as textiles used in sport, in the automotive and aeronautics industry, construction, agriculture, defense uniforms, fashion, surface technologies and sustainable processes. The survey was conducted in the context of an industrial plant of an educational institution with the lifting of the engineering parameters of the products surveyed, and the subsequent designation of the relevant inventive solution.

## E02 Lee jong sung (Kumoh national Institute University/POSCO TRIZ College, South Korea)

### Analysis of used TRIZ tools at POSCO TRIZ project

**Lee jong sung, Kim bong kwang**
**(Kumoh national Institute University/POSCO TRIZ College),**

**Ryu min mik, Jeong Young han (POSCO TRIZ College),
Kim Jin han (Kumoh national Institute University)**

In POSCO, TRIZ College was established problem Solving Method that used TRIZ. Engineer And Researcher was solved Many Problem after studied in TRIZ college used TRIZ tool. Curriculum of each course of TRIZ college is configured User(Level1), Advanced User(Level2), Professional(Level3), teaching the theory and concept of Classical TRIZ from Modern TRIZ Method.

In POSCO, applied to problem solving and field that used TRIZ tools after having been educated to problem solving with DSDI Process
However, Tool used for each type business segment, the problem is different
Analysis has been used primarily TRIZ tools to engineers who after training TRIZ Course at POSCO Project and Based on the analysis data, it is intended to reflect business segment, to issue type-specific education

**JI00 Masahiro Kuwahara (IDEA, Inc)**

## (Tutorial)

## Let's Study the Foundation of TRIZ, and the Effective Cooperation Method with Other Methodologies

**Masahiro Kuwahara (IDEA, Inc)**

About ten years have already passed since TRIZ was introduced in Japan, many researches were made also in Japan, and "TRIZ which can be used" has become fruitful. While, at the beginning, opinions of not being able to achieve the desired results because of the complicated body of the TRIZ theory were also heard in companies, by making efforts and learning, practical use of TRIZ leading to results has spread. The introduction of TRIZ shows a spread irrespective to the business scale from practical uses based on major companies to new introductions at medium-ranking and small and medium-sized enterprises. Moreover, also as for the kinds of introducing industries, the practical uses of TRIZ is spreading from fields such as electronics, automobile and machinery to such fields as medical equipment, machine tools, food and software. Therefore, first of all, I would like to outline TRIZ as the basic knowledge for many TRIZ beginners. Then, I will explain how to cooperate with other methods (QFD and quality engineering) for using TRIZ still more effectively through its advantage, a concrete view and an actual product development example, etc. so that the audience hearing about TRIZ for the first time can also understand.

## JI02 Shin Taguchi (ASI Consulting Group / American Supplier Institute)

### (Special Lecture)

### The Present Status and View of the Scientific Methods Overseas

### - Optimization of Function Robustness by Taguchi Method -

**Shin Taguchi (ASI Consulting Group / American Supplier Institute (ASI))**

It is exciting to provide goods and services of new ideas which is full of creativity for the world. However, probably, as for the actual condition, there are many scenes where pains are taken to properly exhibit the on-target function and satisfy all the demands of cost, reliability, etc. Many companies in Japan, and also over the world, have introduced activities to support the development of new goods and services. DFSS (Design for Six Sigma) is one of them. Whatever the name of the activity may be, QFD, TRIZ and Taguchi Method are included in such activities in almost all cases. The relationship among these methods will be introduced and the implication of "to know the limit of a new design concept early," which is the role of Taguchi Method, will be discussed. How these scientific methods are used overseas will also be introduced.

## J01 Takashi Ogata (OLYMPUS Corporation)

### Finding the needs of customer by the SN Matrix and TRIZ process

### - The functional approach for connecting methods and 7 solutions -

**Takashi Ogata, Kazuhiro Fujikawa, Hiroyuki Tsuchiya (OLYMPUS Corporation)**

OLYMPUS has introduced and promoted QFD, TRIZ, and Taguchi Method as a scientific method for improving the development process since 2009. Recently, we are promoting 7 Solutions to extend the application of TRIZ to meet the needs and targets of engineers. Focusing on the function of the system is important for connecting smoothly to the methods and solutions.

In this paper we introduce the new effective process in the elemental technology development stage and searching process. This process is re-organizing technology elements (Seeds) according to their function and finding the needs of customers in combination with the Seeds and Needs Matrix (SN Matrix) and TRIZ process.

In our company QFD → TRIZ → TM process was introduced as the ideal development pattern. Especially simplified QFD is useful and effective, for extracting technical problems from customer needs. (Refer to the paper of OLYMPUS in TRIZ Symposium 2011)

QFD is effective for clarifying the relationship of customer needs and product specifications in quality control purposes. However, QFD is not effective in the search stage and planning stage, because seeds and needs are not clear. Engineers want the process that can find the needs based on the seeds for connecting high affinity with TRIZ.

New SN Matrix with the concept of QFD and the function from the point of view of time and space is possible to easily connect TRIZ and other methods as follows.

1. The SN Matrix makes it easy to find the needs of customer by separating the achieved level (quality goals) and function. And engineers have come to be able to determine the priority of technical problems with the customer needs and technology of competitors in each function.
2. The SN Matrix is applied to a wide range of technical issues by analyzing the function from the point of view of space and time.
3. In the process to actualize the seeds, the TRIZ process can remove the boundaries of knowledge and experience of the engineers. This process can lead to find a variety of potential needs.

## J02 Hiroyuki Tsuchiya (OLYMPUS Corporation)

### Design risk prevention by the SN Matrix and TRIZ process - The functional approach for connecting the methods and 7 solutions –

**Hiroyuki Tsuchiya, Tetsunori Shibuya, Takashi Ogata (OLYMPUS Corporation)**

OLYMPUS has introduced and promoted QFD, TRIZ, and Taguchi Method as a scientific method for improving the development process since 2009. Recently, we are promoting 7 Solutions to extend the application of TRIZ to meet the needs and targets of engineers. Focusing on the function of the system is important for connecting smoothly to the methods and solutions.

In this paper we introduce the efficient risk analysis process by using TRIZ and functional analysis in space and time according to the purpose.

Engineers want to analyze the risk efficiently in a short period of time. For analyzing efficiently, we introduce a method that has combined the concept of Reverse Thinking Method (TRIZ AFD) and a functional analysis of the point of view in space and time on design change part in the system.

Risk prevention solution is based on the following key items for raising the efficiency of engineers. 1. It is effective for us to limit the system area from the point of view of time and space. Especially for movable mechanical parts, we are doing a risk analysis by functional analysis along the flow of time.

2. Using the Seeds Needs Matrix (SN Matrix) including TRIZ process will not require engineer's experience and intuition.

3. By introducing the functional analysis of the point of view in space and time, it has come to be able to use TM and TRIZ more easily for risk reduction measures.

## J03 Hisataka Izawa (Sony Corp.)

### Methods and Examples of Applying the Business Management Related Evolution Trend Proposed by Darrell L. Mann - Translating the Evolution Trends from the World of TRIZ into the Daily Business and Management –

**Business and Management TRIZ Research Subcommittee (Japan TRIZ Society, NPO)**
**Osamu Ikeda (NIKON CORP.), Hisataka Izawa (Sony Corp.), Xiaolei He (TAIZE limited company), Fumiko Kikuchi (Pioneer Corp.), Yasuo Moriya (FUJITSU ADVANCED TECHNOLOGIES, LTD.), Ikuo Yoshizawa (The SANNO Institute of Management)**

Most TRIZ application examples exhibited so far were, even if considered worldwide, technical subjects. In order to expand and spread TRIZ further in the future, it is necessary to verify that it is also applicable to the subjects in the business and management fields.

In this study group, we are working for the purpose of helping spread and development of TRIZ aiming at researches and guidance construction for utilizing TRIZ, such as application methods and case studies on the subjects in business and management fields. As the 2nd phase, we have applied TRIZ thinking and a technique in analyzing "hot-selling products and services" among the TRIZ application domains, and created a fundamental framework design of a generation method for a "new product and service". At the 9th TRIZ Symposium (2013), we have showed this framework.

In the shown fundamental framework, we have applied the evolution trend of business management systems proposed by Darrell L. Mann. In the examination process of the application, it became necessary to make the evolution trends of business and management systems proposed by Darrell L. Mann into a tool which was effective and also one that improved convenience.

Therefore, we decided to try the following examinations:

1. To make a description as easy to understand as possible about the definitions of the evolution trend for business management systems proposed by Darrell L. Mann and the definitions of the evolution level
2. To consider the application of the evolution trends for business management systems proposed by Darrell L. Mann in order to raise the validity and to improve the convenience maintaining the fundamental structure of the strategy tools and management tools which are often used daily
3. To consider the application examples of the evolution trends proposed by Darrell L. Mann

## J04 Yuki Taniguchi (HGST Japan)

### The Trends of Technical Evolution by Innovation in the Hard Disk Industry

**Yuki Taniguchi (HGST Japan), Kazushi Tsuwako (HGST Japan)**

The destructive innovation in the HDD industry was a simple thing called the miniaturization accompanying downsizing of a system. High technology development has been aiming at maintaining the locus of the always established improvement in performance, i.e., at raising performance to arrive at the upper right domain of the orbital graph where the profit ratio is high. Although many of such technologies were difficult, they were not destructive. The HDD makers merely pursued the targets which the customers suggested. As for the HDD, a large disk size has always been advantageously from the viewpoint of performance. However, when the low rank models fulfilled certain customer demands, the focus of a customer's selection shifted to reliability, facility and price, and small-sized disk models began to occupy the market.

Although makers with track records possessed technical capabilities to lead the sustainable innovation to maintain, it was the new-entry companies that have developed and adopted a destructive technology on its own initiative.

In this report, the technical evolution of the hard disk drive (HDD) up to now will be introduced based on "The Innovator's Dilemma" (by Clayton Christensen) from the perspective of a person evolved in HDD development.

## J05 Manabu Sawaguchi (Waseda University)

### A Study of Conceptual Design Process for an Ideal Design Way

**Manabu Sawaguchi (Waseda University), Shintaro Ishikawa (Fujitsu Limited)**

Challenging operating environment, most manufacturers have to release the highly-valued new products for customers under the limited management resources. Considering the background, in this study, we decided to focus on the efficiency of conceptual design stage after product planning stage. In particular, even if engineers grasp customer needs in real field, it's not easy to convert good ideas for customer needs

into a commercial reality. Therefore, we thought that respecting "The Independence Axiom (Axiom1)"and" The information Axiom (Axiom2) at "The Axiomatic Design Theory" is directly linked to the efficiency of conceptual design stage. To be more precise, we try to standardize effective conceptual design process, utilizing "Contradiction Matrix (CM)" for Axiom1 and "Information Integration Method (IIM)" for Axiom2. By the way, IIM is an evaluation technique to make it possible to do quantitative evaluation based on the concept of Shannon's information theory, bundling different kinds of features not only performance but also sensitivity field together in a group as a universal scale called "Information". In this paper, testing the evolution of paper cup from past to present as a case example according to the proposed conceptual design process, we finally try to propose next generation paper cup, respecting both Axiom 1 and 2. In addition, we would like to show that proposed next generation paper cup will be basically in the technical evolution laws in TRIZ field.

## J06 Takayoshi Ohtsu (Suzuka National College of Technology)

### TRIZ in Robot Education

### - Application of the Block Robot to TRIZ Education -

**Takayoshi Ohtsu (Suzuka National College of Technology)**

In the U.S., the importance of STEM (Science, Technology, Engineering and Mathematics) education is advocated, and science, technology, engineering and mathematics education is tackled with a good balance. In Japan, on the other hand, although science and mathematics are examination subjects which occupy much time, little time is allocated to technology. Moreover, also in extracurricular activities such as club activities, as compared with the club activities of gymnastics, fine arts, and music as practical skill subjects, there are few junior high schools with a technical club, and an improvement in the balance of STEM education is desired. Therefore, I examined a method for the creation education through TRIZ education using the block robot by Artec blocks with which the assembly to all the surfaces was possible as a good material to put creation into a form and verify with the purpose of attracting interest about the technology and improving the basic ability to discover and solve problems starting at the elementary school age. Furthermore, I carried out TRIZ education using the block robot not only as school education but also as local science-technology communication

cooperating with home and social education. This report will describe the application example of TRIZ education using the block robot

## J07 Narumi Nagase (SONY)

### New approach for excavating invention comprehensively

### — Four Twist Matrices Approach to excavate intellectual properties —

**Narumi Nagase (SONY)**

There are many inventions and intellectual properties as a result of engineer's hard work. These properties contribute greatly to the company management as a pillar of business strategy, resource of the profit or entry barrier. On The other hand, it is also true that there are many properties that are not utilized because of changes of the business environment or social needs. These properties are waiting expecting future.

Though many trials are going on in order to activate inventions in a resting stage, the results of them are limited.

We built a new approach unearthing many inventions in bird's-eye view instead of the approach starting from a few core inventions.

This new approach started with studying the technology and the principle for product planning (information for a diversion or application), then turned into a stage understanding comprehensive market and all properties which are owned.

The new approach can excavate many inventions with high possible use simultaneously. Furthermore, a new customer value is logically promoted from the information of unearthed invention group information.

This paper presents the new practical approach which is doable at the real R&D scene, using familiar examples.

## J08 Nobuaki Arai (ARAI & ASSOCIATES)

### Technology Forecasting Applying the Technology S-Curve through Patent Application Plotting

**Nobuaki Arai (ARAI & ASSOCIATES), Masahiro Kuwahara (IDEA Inc)**

Doubts are thrown on the state of the intellectual property strategy of Japan these days. The number of patent applications of Japan, which had been at the top in the world till 2005, was 343,000 by the total of the end of 2012, although it decreased. Although losing the lead to China and the U.S., it is the 3rd application power in the world still now. However, Japan has not broken free of long-term stagnation in global competitiveness. We have to accept the indication that the intellectual property, which normally should have collateralized competitive power, is not functioning. The authors think that one of the reasons why intellectual property is not functioning is because there are many technical developments and accompanying patent applications which are not unrelated to competitive power contribution. Although there is no change in the necessity and importance of technical development itself using TRIZ in any way, it is necessary to narrow down the object technology which is developed using TRIZ. In this paper, we are going to offer a tool which, paying attention to the technical S curve, can narrow down the object technology by predicting from the number of patent applications of the specific technology at which stage the concerned technology is.

**J09 Ikuo Yoshizawa (The SANNO Institute of Management)**

## Creation of Answer Proposals to the Open Tasks Using Substance-Field Analysis and Standard Solutions

**Ikuo Yoshizawa (The SANNO Institute of Management)**

**[Educational Research Subcommittee of a New Era (Japan TRIZ Society, NPO)]**

In November, 2013, the "Educational Research Subcommittee of a New Era" was launched at Japan TRIZ Society with Shinsuke Kurosawa as its chair.

In this study group, the research and guidance construction to utilize TRIZ such as application methods and case studies aiming **"Way of Teaching TRIZ"** and **"Utilizing TRIZ to Increase the Effectiveness of General Education"** are set out, and activities are carried on intending to spread and develop TRIZ. One of the study themes is to design workbooks and explanatory casebooks based on **"Utilizing TRIZ to Increase the Effectiveness of General Education"** for students and general adults. Part of this

study will be introduced:

1. Pick up an open task as the object for case designing. An open task means "a problem the answer of which is not studied as knowledge, but an answer of which is searched for." This approach is proposed by the "Education of the New Era" laboratory operated by TRIZ Master Anatoly Gin, etc., who are promoting development and spread of teaching methods based on the TRIZ way of thinking.
2. Consider how to apply the "Substance-Field Analysis" and Standard Solutions, which are characteristic methods of TRIZ, to the problem definition and solution searching of the open task.
3. Apply "Substance-Field Analysis" and Standard Solutions to the open task.

## J10 Yoshiharu Isaka (IDEA Inc.)

### One Method for Expanding TRIZ Application

### - Applying TRIZ to Products that TRIZ can be Hardly Applied to -

**Yoshiharu Isaka (IDEA Inc.)**

There are products with a simple mechanical structure that have not had a major structural change from a long time ago. As required functions are not many, it is considered that there should be no other structures.

Even if TRIZ is applied to a product like that, it is hard to find a useful theme, and the application procedure cannot go further. To increase competitiveness by using TRIZ, which will contribute to better company management, first it is necessary to think of a beneficial theme. Even if the theme is not about a function or cost, it is possible to increase competitiveness if there is a differentiation factor.

This time, I suggest that we find a theme that makes differentiation, by actually setting a user and thinking of potential needs of the user, and then forcibly changing each part of the product.

Though the conventional method of getting ideas is used, this presentation can break-through the mind tendency of avoiding nuisance things or new ideas, and can successfully be applied to improve the product. By doing so, if a technical problem or task is found, it can be linked to TRIZ. In summary, the objective of this presentation is for expanding the area of TRIZ application without conducting any special training.

## J11 Satoshi Okada (Hitachi, Ltd.)

### TRIZ Application to the Development of Robots Utilized in Severe Environments

**Satoshi Okada (Hitachi, Ltd.)**

The inside of a nuclear power plant, especially a pressure or containment vessel is in a severe environment such as closed space, narrow space, underwater and high radiological environment. And, the robots for work will measure environmental states such as visual check, temperature and dose, moving inside of such an environment.

In general, electronic devices, cameras, etc. are weak in radiation, but they are indispensable for the checking work. In addition, although a robot's move equipment has to run stably, it is necessary to move in narrow space and to restrict the size in order to suppress diffusion of radiation.

I will report how the classic TRIZ thinking was utilized to solve these physical contradictions and find out the solution in this development.

## J12 Yui Kato (Waseda University Graduate School OG)

### Research on Process Improvement of Design Service

**Yui Kato (Waseda University Graduate School OG),**
**Manabu Sawaguchi (Waseda University)**

Generally, the design work in product development calls for design execution from an understanding of various factors such as customer's taste, trend of the market, design expression technique, cooperation system with the development persons concerned, restrictions of the production plant and sales environment in addition to the technical knowledge of design.

Although the specialty demanded is high and the value which design business bears is large, the thinking and process is very ambiguous and not easily visible in an organization, and are black-box-ized. And the individual difference and ambiguity to

determination or evaluation of such a design proposal have been a problem in the organization.

Therefore, not only the strengthening of the strong points of each design skill but also the management of a design service with high transparency and reproducibility by visualization of skill and design development flow is important.

Under such a development environment of goods design, this research paid attention to TRIZ and AHP. And, an approach for the visualization of design service and problem solving using these two methods was proposed. Further, this approach was applied to an actual design development case, and the effectiveness whether it is possible to visualize the evaluation criteria and problem solution which lead to design improvement avoiding personal design development was tested.

## J13 Shinsuke Kurosawa (trizstudy.com)

### Eight Principles of TRIZ as Technology of Thinking - An Attempt at Interpretation

**Shinsuke Kurosawa (trizstudy.com)**

The main reason why TRIZ attracts attention in each country over the world is the expectation as an effective means to realize technical innovation in manufacturing, and there is no exception about this situation also in Japan. However, on the other hand, many TRIZ specialists are completing remarkable track records in other fields than manufacturing such as education, design, advertisement or theoretical and methodological improvement of TRIZ itself, etc. The common point of these specialists is to boldly give a broad interpretation to the method of TRIZ advocated by Altshuller and having completed an original new method system which demonstrates a perfect validity in one's special field of study. A big cultural difference lies between the state of the manufacturing in the former Soviet Union where Altshuller lived and that called for in the present-day world. The author thinks that it is insufficient just to master the TRIZ methods of Altshuller or to improve it superficially to harness TRIZ in the maximum in manufacturing which gazes at the future from the present age, and that it is indispensable to use the system of a new method developing the TRIZ thinking.

In this paper, I will consider the principles of the idea and method of TRIZ which the TRIZ specialists in various fields use widely as a material to consider how the system of such a new method should be.

## J14 Kimihiko Hasegawa (Intellectual Property Creation Research Subcommittee, Japan TRIZ Society)

### Proposal of an Easy Value Evaluation Method by Means of TRIZ

### - Taking the Proposal for a New Life Style of the Elderly People as an Example - (Part 1)

**Kimihiko Hasegawa, Nozomu Takeuchi, Toshimitsu Kataoka, Narumi Nagase, Shigeru Suzuki, Toshiaki Masaki, Hirotsugu Ishihara, Sadao Nishii**
**(Intellectual Property Creation Research Subcommittee, Japan TRIZ Society)**

We will propose a method for discovering a new problem based on a vague awareness of an issue by describing the circumstances determining "Proposal for a New Life Style of the Elderly People" as a multi-year research subject to tackle. Specifically, we have (1) clarified the cause for the problem of the object system by "SWOT Analysis," (2) examined the measures in four scenes by "Cross SWOT Analysis" and (3) determined the "ideal situation" as the vision of the research subject and the target of focus by "Purpose Deployment." As a result, we have determined "Elderly people and the persons concerned lead a fortunate life" as a vision, "Elderly people solve their problems and others' problems" as the target, and clarified to start with "Elderly people re-acknowledge their favorite things to do and what they are good at" to realize the target.

Furthermore, we will propose a valuation basis "local ideality," which combines the elegance of the engineering field and the ideality of TRIZ so that a value evaluation of the problem solving result by the elderly person himself/herself, who is the problem-solver, can be performed, and a concrete evaluation example will be reported.

## J15 Tsuyoshi Todome (MPUF)

### How to Supply Water to a Planter during 10 Days' Absence

**Tsuyoshi Todome, Yuji Mihara, Kazushige Aoki, Tatsuhiko Atsuta, Takashi Shikata,**

**Noritaka Nakayama, Tetsuya Nagai, Yasutake Makino (MPUF)**

A study group "Anybody-could-do Problem Solving Study Group" (abbreviated name: Kai-Ketsu-Ken) was launched at MPUF in July, 2013. The purpose of the study group "Kai-Ketsu-Ken" is "The members who tackle spreading and practically using USIT/TRIZ in the company take the lead, make USIT/TRIZ, which is an effective means, known to MPUF members without solution, and get them to use it. To discuss the collection of examples (those of failures and successes) for this and improvement of the method."

Now, before the activity of the study group, it turned out that there was difference in the member's skills. Therefore, a USIT study meeting by volunteers was held for the purpose of dissolving this difference in skills and re-acknowledge the method.

"How to Supply Water to a Planter during 10 Days' Absence" became the subject of this study meeting.

This presentation is the result report of this USIT study meeting (USIT-club). In addition, four kinds of top ideas including 1 kind of prototype, three reflections and points which were obtained through the study meeting will be introduced.

## J16 Tetsuya Nagai (MPUF)

### Deployment for Searching the Causes: (DeSC)

### - To complete causes of the problem -

**NAGAI Tetsuya (MPUF, Japan),**
**Yuji Mihara (Creative Technology Institute Co.LTD., Japan),**
**Tsuyoshi Todome (MPUF, Japan)**
**HIDEAKI KOSHA (USIT manufacturing technology support, Japan)**
**Takashi Shikata (KUBOTA Corporation, Japan)**

During a problem solving process with TRIZ, the "why-why" method is often used to examine the problem. But you might go wrong with "why-why analysis," that which is a means to analyze quality problems. On the other hand, "why-why deployment" can be suitable for creative problem solving because it begins with a divergence process and then converges them inductively.

But when we made a trial why-why deployment in the study group, most of the members were not able to diverge effectively. We therefore made a checklist for beginners and other practitioners to make the exhaustive divergence be easy. It was obtained by extracting some viewpoints based on the trials and marshaling them. When we tried another why-why deployment with the checklist, we achieved a very exhaustive deployment tree.

We named the method doing why-why deployment referring to the checklist "Deployment for Searching the Causes: DeSC".

## J17 Shigeru Hisanaga (DENSO CORPORATION)

### How to Lead Beginners to TRIZ at the Place of Practice

**Shigeru Hisanaga (DENSO CORPORATION)**

In 2003, TRIZ was introduced to our company, and its practical use in the company has been promoted until now. There, candidates in the company, with in-company promoters, have gone focusing on practices aiming at solutions applying TRIZ to their actual business. In order to extend TRIZ practical use, as a matter of course, many of the practitioners are TRIZ beginners.

One of the important roles of an in-company promoter is to propose which tool to use and what kind of approach to take to various themes. In selecting the tool and approach, it is important to match not only the theme but also the practitioner's needs. Especially, in the case of beginners, it is necessary to consider enough for the needs they have in order to have them recognize the usefulness of TRIZ and to urge their continuous practical use.

Based on the examples "What of TRIZ charms the beginners and what can they not understand" and "What have carried out well and what have not gone well," which have been experienced through the practice of about 250 subjects during some 10 years from the introduction to the present, it will be considered how to lead beginners to TRIZ.

## J18 Tatsuya Suzuki (UNIVANCE CORPORATION)

### TRIZ Application Case in Unit Development for Cars

**Tatsuya Suzuki (UNIVANCE CORPORATION)**

UNIVANCE CORPORATION is a specialized manufacturer handling drive system parts of cars, farm machine and construction equipment, and offers products in a consistent organization from design to manufacturing. Recently, in the automobile field, fuel consumption and CO2 effluent control are severe globally, therefore, each automaker company is reducing the energy loss to the utmost limit starting from the engine to the tire by all policies, or is groping also for policies of recovery or reuse of energy. Under that situation, I think that continuous idea creation and research & development of this idea are required so that a more competitive product can be timely proposed and offered to the customers. Therefore, in fiscal year 2013, I began to tackle TRIZ as an idea creating method receiving consulting. In this presentation, I will report the contents of this approach.

## J19 Koji Matsuda (SHINWA Controls Co., Ltd.)

### Development of a High Durability Electric Motor-operated Valve by TRIZ

**Koji Matsuda, Takuji Yamamoto, Hidemitsu Ohoka, Katsumichi Hiraoka**
**(SHINWA Controls Co., Ltd.)**

At SHINWA Controls Co., Ltd., from 2010 to 2011, QFD and TRIZ were carried out, the miniaturization of the precision hygrothermal air feed unit was promoted, and the aim was achieved.

Thereafter, the approach has been continuing in the company, and in the development of a motor valve, it is being promoted using TRIZ in the development of a highly durable valve. This presentation will report this approach.

## J20 Naoyuki Yoshida (JNC Corporation)

### Introduction of TRIZ Practical Use Case at JNC Corporation

**Naoyuki Yoshida (JNC Corporation)**

JNC Corporation is a diversified chemicals company, which is now conducting business by using liquid crystal material as core products. In order to win in the fierce competition, I tackled TRIZ and have extended the activity in the company since the fiscal year 2010 with the intention to concentrate the limited talented people and to introduce a new tool ahead of the competitors utilizing it effectively.
For four years, we have approached various themes by trial and error, and while gaining some results, the style of our company seems to have become visible. This presentation describes a result example in the research-and-development stage and recent approaches.

## J21 Tomohiko Katagiri (IDEA Inc.)

### Development of a Spinning Top by TRIZ & TM & Simulation

**Tomohiko Katagiri (IDEA Inc.), SWCN (Solid Works Club of Nagano)**

At the 2nd All-Japan “Koma Taisen” (Spinning Top Competition) held in February, 2013, the SWCN team, to which the author belonged, took second place, while 100s of competing teams from all parts of the country crushed. Also, its technical capabilities are top class in the whole country taking first place in the prefecture level team event in July, 2013.

SWCN (Solid Works Club of Nagano) is a group dominated by engineers engaged in the manufacturing industry of Nagano Prefecture, and is a manufacturing exchange sharing and dispatching information on the latest digital tools, the latest methods, etc. in a spirit of "give 5 and take 1." Participating in All-Japan “Koma Taisen”, the SWCN team, by making full use of TRIZ, Taguchi Method, 3D CAD, motion analysis and SNS, has developed a unique and strong spinning top in a short period of time while raising cooperation between members.

I would like to introduce this approach to product development, being an advanced measure valid to how to enter into a completely new product field outside one's

experience, as its concrete example.

## J22 Yoshinori Takagi ( )

### Invention Principle “Sugoroku”
### - 40 TRIZ Invention Symbols on the 9 Screens -

**Yoshinori Takagi ( )**

In order to make it easy to memorize and easy to use, I have divided the 40 Invention Principles into 9 groups in almost its order, and have arranged them on the 9 Screens. Also, I have kept the strokes of the Invention Symbols mostly within 3 strokes so that it might be easy to draw them.

## J23 Koji Tsumagari (LOGO Corporation)

### How to Spread TRIZ across Business
### - Why does it not get to a Manager's Heart? -

**Koji Tsumagari, Masaaki Sakai (LOGO Corporation)**

TRIZ is almost unknown to managers in our country. Even if there is a manager who knows it, there is no recognition that it is an important management issue to spread it in the company. The authors, belonging to the project management (PM) industry and investigating the right way to work from 2001, will introduce the point of spreading TRIZ seen from the PM industry and a part of the approach.

The notability of TRIZ in the business community of our country is very low. TRIZ is one of the idea generating ways for almost all the persons who know TRIZ in the low notability. Though it is true that TRIZ is one of the powerful methods for idea generation, this is only a part of its value.

TRIZ has its original conceptual system, uses its original terms such as resource, contradiction, ideality, law of evolution, etc., and constitutes its original world. Assuming that an engineer's work is to create an unknown system which does not exist in a world, it is indispensable for an engineer to have a appropriate world-view (technical view). TRIZ is one of the leading candidates as a technical view which an

engineer should rely on, and here is the key to spreading TRIZ.

## J24 Hisao Kobayashi (Association of Risk Management Japan)

### Risk Management for the Improvement in Performance by TRIZ - Growth Timing and Market Size Known by Risk Management –

Hisao Kobayashi, Hakaru Koine, Nobuyuki Suzuki, Kumiko Matsuoka
(Association of Risk Management Japan)

Although risk management (RM) manages the uncertainty element which affects a business target, being influenced by the impression which is received from the Japanese word "risk", only the minus aspects which affect business targets, such as disasters, damages, etc., serve as its object in many cases.
Especially after the Great East Japan Earthquake, BCP has been attracting attention, and it has been focused on how to reduce the loss. However, as can be seen in the definition of risk management, there are also aspects in an uncertainty element which act to the plus rather than minus, and it is possible to raise achievements by managing it. On the other hand, although TRIZ starts an innovation, this will serve as a serious business risk if it is seen from the side receiving the innovation. About these opposing events, a new risk management which raises achievements from a new product injection to the timing of growth and expansion of market size by uniting two methods that realizes it will be explained.

## J25 Shigeru Kasuya (Pro-engineer)

# TRIZ Marketing
## － How should we catch customer needs? -

**Shigeru Kasuya (Pro-engineer)**

In the first TRIZ symposium of 9 years ago, we carried out the questionnaire about the problem of TRIZ. As a result, we extracted the following problem.

① Because TRIZ software tool is too high, we cannot buy it.
② It is not usable in the field of IT software and business.
③ In an educational institution and the research organization, TRIZ hardly spreads.

In addition, I performed some lectures, seminar, consulting for 9 years. Therefore the important opinions that I collected are as follows.

① For students, the conventional TRIZ example is difficult. Give us examples easy to understand.
② What should we do to train the abstraction skill?
③ How is it different from the scientific tool which we used in TRIZ so far?
④ How should we make use in a patent?

Therefore I squeezed a target to a beginner and thought about a method to have you be interested in TRIZ. I paid my attention to the needs (current needs and potential needs) of three elements of a law of AIDOMA of the marketing and the marketing domain and devised the countermeasure. This report clarified those processes and gathered up the contents which I tried to engineer mainly.

**J26 Toru Nakagawa (Osaka Gakuin University & CrePS Institute, Japan)**

# General Methodology of Creative Problem Solving and Task Achieving (CrePS): Reorganizing Various Application Cases and Their Methods in the 'Six-Box Scheme'

**Toru Nakagawa (Osaka Gakuin University & CrePS Institute, Japan)**

The present author has been advocating the need and the possibility of establishing a General Methodology of Creative Problem Solving and Task Achieving ('CrePS'), and proposed the 'Six-Box Scheme' as its basic paradigm. For clarifying such a methodology and its concepts, I have been working in the following aspects:

(1) Reorganizing various case studies of creative problem solving (including those in literature) in the 'Six-Box Scheme' and preparing for learning materials of CrePS application.

(2) Surveying various methods (including those other than TRIZ) for creative problem solving and describing them in the framework of 'Six-Box Scheme' (thus enhancing the components of methods in CrePS).

(3) Classifying the purposes of employing the creative problem solving and proposing recommendable, concise and effective, procedures for each type of the purpose. Evaluation and selection of component methods are necessary before proposing recommendations.

(4) Understanding and reorganizing the activities which are necessary and in practice in the 'Real World' (in the 'Six-Box Scheme') and clarifying how the creative problem solving in the 'Thinking World' (i.e., CrePS) can contribute to them effectively.

I am going to present the current status of study in these broad aspects.