Seventh TRIZ Symposium in Japan, 2011

Collection of Abstracts of All the Presentations from Japan

August 31, 2011
Program Committee (Third announcement)

JI03-Suzuki (Management Technique) (Special Lecture)

Equivalent Transformation Thinking; Thinking Process for Creation and Innovation and Its Application

Shunsuke Suzuki
(Member of The Society for Equivalent Transformation; Keieigihou Co. Ltd)

Equivalent Transfer Theory is a theory about creation and innovation advocated by Dr. Kikuya Ichikawa in 1955. He found a principle that existed in the mind and thoughts of inventors in history of east and west when they created a new idea or concept. And the principle is also applicable to the pattern in evolutions or metamorphosis of species in natural world and even to an excellent art or poet.

Ichikawa explained the principle as follows; that the event of creation of a new thing is considered as a process that a common essence (in other words, “Equality”) underlies in an existing thing is transferred to a newly created or developed thing.

The validity of the theory has been proven by the fact that Ichikawa’s school followers who were designers and industrial engineers in various industries actually developed new products or innovative production methods in each of their fields during 1960’s and 1970’s.

The presentation will address the overview of the theory as a thinking process, the case examples the theory was applied and its effectiveness of R&D practice in industries when it is applied.

JI04-Konishi (SKI) (Tutorial)

What is TRIZ?

Yoshihisa Konishi (SKI)
Hajime Kasai (IDEA)
Manabu Sawaguchi (Waseda Univ.)

The Japan TRIZ Society has decided to prepare materials which explain the basics of TRIZ, the Theory of Inventive Problem Solving, to help more people know about it. To achieve this objective, a task force was set up, and slides created from information brought along by the 3 members designated by the Society will be used as the handout of the tutorial in this symposium.

Since TRIZ has been adopted in many companies as a method for brilliantly solving problems related to development, design, etc., its basic concepts and typical problem solving tools will be introduced in order to truly understand this method.
There are also many simplified and/or derived versions of TRIZ, but in this tutorial, the original version of it directly established by Altshuller will be covered.

JI05-Kumasaka (Kumasaka Office) (Topic Lecture)

Position of TRIZ in the problem-solution tool system TRIZ utilization from the point of average engineers' view

Osamu Kumasaka (Kumasaka Professional Engineer Consulting Office)

The "Monozukuri Engineering Matrix" which relates major problems with solution tools in manufacturing field was introduced at the 5th Japan TRIZ Symposium 2009 as "A Role of TRIZ in the Monozukuri solution Systems", which was awarded the "Best presentation for me" Prize (poster section). The structure and its effects are explained here again, and the relative position of TRIZ in this system will be studied based on the recognition rate, utilization rate and effectiveness evaluation from the statics of an engineer questionnaire in order to indicate TRIZ impression for average engineers.
Utilization examples of the aforementioned matrix and TRIZ in the author's activity are introduced.

JI06-Shikakura (Invention Machine Japan) (Topic Lecture)

Invention Machine Goldfire – Recent Developments

Kiyoshi Shikakura (Invention Machine Japan K.K.)

Invention Machine Goldfire is an innovation software that helps manufacturing companies transform their innovative technology and product developments into sustainable and repeatable processes. Goldfire integrates proven problem-solving and idea generation methodologies with unique knowledge research capabilities for precise retrieval of concepts useful for such problem-solving and idea generation activities. Using Goldfire, Information, Community (People), and Innovation Activities are connected at various stages in the product development life-cycle to help the companies achieve innovations. It also integrates TRIZ-based problem-solving into "knowledge-enabled, sustainable innovation process" and helps more engineers and researchers to take advantage of TRIZ in their development activities.

JI07-Kamimura (Ideation Japan) (Topic Lecture)

The actual state and use of software tools of Ideation International Inc. focusing on DE(Directed Evolution) and CIP(Control IP) -

Teruyuki KAMIMURA (Ideation Japan Inc.)

The feature of software of Ideation International Inc. is that it is possible to naturally utilize the powerful problem solving ability of TRIZ in a linear thinking process even without knowledge of TRIZ, by rebuilding classical TRIZ comprised of a large volume of complicated structures. Further, we mustn't

miss that this is an evolving software. Since 1996, the Windows version of the software, PF (Problem Formulator), KW (Knowledge Wizard) and IWB (Innovation Workbench) have been sold. Since 1997, FA (Failure Analysis) and FP (Failure Prediction), which are software of AFD (Anticipatory Failure Determination), have been sold. Since 2008, the software of DE (Directed Evolution) has been sold. And since 2009, DA (Design Around), DP (Disclosure Preparation) and IE (Invention Enhancement), which are software of CIP (Control IP) have been sold. These were generated from the practice of TRIZ master consultation. Even now, new software incorporating a full know-how of consultant is being provided one after another.

JI08-Hotta (SKI) (Topic Lecture)

Introduction of Support Software from CREAX and IFR

Masatoshi Hotta, Yoshihisa Konishi (SKI)

Innovation support tools provided by CREAX (Belgium) and IFR (UK), who are partners of SKI, will be introduced.
The TRIZ software **CREAX Innovation Suite** from CREAX implements a modernized version of TRIZ suggested by Darrell Mann.
CREAX Innovation Suite, a new innovation support tool which was released by CREAX this year, is a web-based software that supports your innovation process and offers your company competitive intelligence in much greater detail than other tools have done so far,
The contradiction matrix software **Matrix+** from IFR, a software tool aimed at the resolution of contradictions/conflicts, can be utilized in situations where innovative solutions are sought for. This software implements Matrix 2010 (a revision of Matrix 2003), contradiction matrix for Business & Management and one for information technology.

JI09-Nakagawa (Osaka Gakuin University) (Topic Lecture)

USIT: A New Paradigm for Creative Problem Solving -- Its Concept and usage --

Toru Nakagawa (Osaka Gakuin University, Japan)

USIT (Unified Structured Inventive Thinking) is a unified process for creative problem solving, and was developed by Ed Sickafus (USA) in 1995 under the influence of TRIZ and Israeli SIT. We have introduced it into Japan since 1999 as a practical process for applying TRIZ easily and have extended it further. We have reorganized all the solution generation methods in TRIZ into a new system of USIT Operators. In 2004 when we represented the USIT way of thinking with a data-flow diagram in place of an ordinary flowchart, we obtained the Six-box Scheme in contrast to the Four-box Scheme well-known in TRIZ and in science and technology. The Six-box Scheme has been found to be significant as a 'New Paradigm for Creative Problem Solving'. Using a standard method, we obtain the understanding of the present system in terms of Objects, Attributes, Function, Time and Space, and also the understanding of the ideal system. Then we apply the USIT Operators to obtain some core ideas for our new system, and we further build up new solution concepts on the basis of our capability in the applied fields. USIT provides us with a concrete, practical process for achieving the problem solving along the Six-box Scheme. In the lecture I will talk about the concepts and usage of USIT, together with some examples.

J01-Ikeda (Sony)

Report of Lecture Series on Invention at a Graduate School Aimed for Revival of Japan as a Nation of Outstanding Technology

Akihiko Ikeda (Sony)
Masao Ishihama (Kanagawa Institute of Technology University)

How can we improve our inventive mind and skill? When is the best time to start learning invention? The author has been continuously asking these questions to himself since he came across TRIZ for the first time. If we can answer to these questions, then revival of Japan as a nation of outstanding technological power will follow. Further, contribution to the world wide social development will be made by solving problems across country borders through invention. As the first step to answer to the questions above, a lecture series titled “Creative Problem Solving” was conducted at a graduate school of Kanagawa Institute of Technology in the year 2010.

How can we educate students who don’t have any work experience in industry? To meet this challenge, an in-company training program that the author had created was implemented with some modification. In this modification, the author exploited his own experiences of consulting research and development in industry. The author’s first and most important idea for effective teaching was to let the students enjoy invention. This naturally led the students to realizing the importance of creativity. In this report, such items as activities to encourage students move from learning theory to applying it, the students’ impression on this lectures and the teacher’s impression are described.

J02-Isaka (IDEA)

Applying TRIZ to Solve Job-Related Problems ～Job Function Deployment and Enhancement of Innovative Power through TRIZ～

Yoshiharu Isaka (IDEA Inc.)

Currently, many companies have been making efforts to improve their manufacturing product quality assuming that post-processes are left only to customers. However, in terms of these processes in a broader sense, there should be problems among organization units regarding the work passing process between them. Close inter-organizational coordination is especially essential in developing innovative products.

On the other hand, inter-organizational cooperation tends to be neglected under the current condition that short-term outcome is required. As a result, problems regarding the work passing process have often risen up to the surface. It is necessary that the problems not be treated as individual management problems but be solved through facilitating collaboration between organization units. To achieve that, we will suggest problem-solving ideas through the TRIZ method, which helps enhance the innovative power of individuals as well as the organization units.

J03-Kurosawa ( ) [Jul. 31, 2011 Revised by the author.]

Five Main Discoveries of TRIZ

Shinsuke Kurosawa

A number of discoveries have been made during the history of TRIZ, the Theory of Inventive Problem Solving (in Russian: Теория решения изобоетательских задач). Some of the discoveries are more important with lasting value while others are less. If we study works left by G. S. Altshuller, the main author of classical TRIZ, it seems to be obvious that which discoveries are more important for him. Unfortunately, however, when the theory was introduced out of its homeland in 1990s, the most important understandings failed to be transferred together with other pieces of knowledge. The present paper has two aims. The first is to highlight most important 4 discoveries of TRIZ through a review of G. S. Altshuller 's works from the present view point and a overview of the development after him with the aim to confirm its real nature. The second is to discuss potential discoveries of TRIZ which is a logical consequence of the above 4 discoveries. The study of said potential discovery is on the stage of a hypothesis. It requires further detailed analysis of the earlier 4 discoveries and verification through checking it by knowledge in psychology and psycho-physiology. The author considers that the potential discovery is the most fundamental fifth discovery of TRIZ that facilitates efficiency of TRIZ as the method in the background.

J04-Izumi (Izumi Products)

Proposal of an effective cost reduction method based on TRIZ

Heikan Izumi (IZUMI products Co.), Hideaki Koike (IZUMI products Co.), Manabu Sawaguchi (WASEDA University)

Although a lot of manufacturers actively utilize VE (Value Engineering) as one of cost reduction methods in a real field, some of them are feeling a limitation regarding cost reduction activities based on conventional methods including VE. Therefore, in order to realize much further cost reduction, we would like to propose a new cost reduction method based on TRIZ. Focusing on original contradiction matrix to solve antinomy-like technical problems, we redesigned a new contradiction matrix for cost reduction because of typical antinomy (Cost Reduction VS Function Achievement) happening in cost reduction process in a real field. In addition, we confirmed the effectiveness of this matrix through one of feasibility studies by applying it to a real case example (a rotary shaver) at our company.

J05-Yoshizawa (Sanno Institute)

An Application of TRIZ Way of Thinking and Its Tools for Evolutionary Business Systems Construction

Ikuo YOSHIZAWA (The SANNO Institute of Management)

This article is about trying to apply the methodology and technique of TRIZ to the creation of "evolutionary business systems". TRIZ is originally a methodology for discovering and solving problems of engineering systems. The characteristic point of TRIZ as a methodology is that it discovers

contradictions inherent in a system and shows methods to settle problems. And it also found that engineering systems evolve according to special patterns which the market accepts. These are shown as the patterns of engineering systems evolution.
I tried to make full use of associated methodologies and techniques centered on the patterns of engineering systems evolution to create a scheme (frame) for the construction of "evolutionary business systems".
As the approach method for building the scheme, I have set "function emphasis type approach" and "meaning change type approach". Based on it, I have considered the "basic process of evolutionary business systems construction and practice". The 32 evolution trends shown as applications of TRIZ to business & management by Darrel Mann [Hands-On Systematic Innovation for Business & Management (First Edition 2004)] were taken up as the patterns of technological evolution for the trial this time.

J06-Ishii (Sumitomo Electric)

Study of Development-type TRIZ Tool (part 5)
Case Study on Laws of Engineering Systems Evolution

TRIZ Spreading/Use Study Group of Japan VE Association Kansai Branch

**Masayuki Ishii (Sumitomo Electric Industries, Ltd.),
Kazuyasu Ikeda (Sekisui Engineering Co., Ltd.),
Hiraki Yoshitaka (GLORY LTD.),
Ikuhiro Oyatani (Mazda Motor Corp.),
Makoto Unno (Kawasaki Heavy Industries, Ltd.), et al.**

In Japan VE Association Kansai Branch, as part of the VE technical research, "TRIZ Spreading/Use Study Group" was established in 2003 focusing on TRIZ technique as a means for new value-added creation. With the intention of using VE and a variety of TRIZ techniques in fusion, we have examined various related TRIZ tools extensively. In our Study Group, we consider applications of specific tools expecting to crystallize the method of application and to utilize efficiently at the new product concept planning phase and technical development phase for new value-added creation especially at the manufacturer's side. Since 2006, case studies have been done for precise understanding of various TRIZ tools' features, and this activity is planned to be continued till 2011. In this presentation of our 5th case study, the contents of that conducted last year on "Laws of engineering systems evolution" together with the practical and useful knowledge obtained from it will be reported.

J07-Migita (Prezio IP Firm)

Application of I-TRIZ for invention enhancement:
Improvement of patent quality through secondary problem solving

**Shunsuke MIGITA (Prezio IP Firm)
Yohei TAKAHASHI (IRus International Patent Firm)**

The number of patent applications in Japan has been decreasing since 2006. The main reasons for this seems to be the economic depression and a change in the patent application policy of each company, namely from “quantity” to “quality”. In such an era, new qualifications are required of a patent attorney. From now on, for a patent attorney, just to extract technical thoughts from the invention (embodiments) proposed by the inventors and draft claims and a specification is insufficient. We think it is important to actively provide proposals or findings to the inventors so as to enhance the invention and to act to improve the quality of the patent together with the inventors. In this report, using a concrete case example of Inventive Problem Solving (IPS) using Innovation Workbench (IWB), which is one typical type of Ideation TRIZ (I-TRIZ) software, we show how to enhance an invention focusing on secondary problem solving. Further, we explain certain points concerning the enhancement of an invention and the examination practice regarding inventiveness in patent law, from the viewpoint of a patent attorney.

J08-Ogata (Olympus)

Promotion of scientific methods including TRIZ - Challenge to the output against time in the development field -

Takashi Ogata, Naohisa Nakahara (OLYMPUS Corporation)

OLYMPUS has introduced and promoted QFD, TRIZ, and Taguchi Method as a scientific method for improving the development process since the 2009. From fiscal 2010, through a trial stage of group trainings by outside consultants, promoting corporate sector consultants and department consultants help to solve technical problems in medical, imaging and life science businesses. In this activity, TRIZ turned out to be applicable to various technical problems. On the other hand, busy developers are pushing for high-quality ideas in a short time.

In this paper, we report the following results of applying this scientific method flexibly according to the development field:

1. Simplified QFD for TRIZ to solve technical problems
2. The importance of root cause analysis in TRIZ process for effective Ideas
3. Promotion system and future challenges for scientific methods including TRIZ

J09-Tsuwako (Hitachi GST)

Introduction of the collaborative activity of KT Method & TRIZ to improve Hard Disk Drive’s Quality and Reliability

Kazushi Tsuwako, Masaki Ootsuka, Satoshi Suzuki, Mizumoto Naoshi (Hitachi Global Storage Technologies Japan, Ltd.)

The activities to promote TRIZ was started from 2005 in Hitachi GST. Some seminars and events were held for research/development engineers. Mainly we focused on Contradiction Matrix for the TRIZ beginners.
And also KT Method is very popular for engineers as a problem solving method.
In this paper, the collaborative activity of KT method and TRIZ is introduced.

The particle sensitivity of hard disk drive is getting higher and higher by its capacity up. Contamination creates scratch and illegal write on the media, and it means the serious data lost on the customer environment. And its failure rate is getting higher and higher on every new product. This data lost due to the scratch failure were analyzed by KT method (PA). The failure mechanism was shown. Some actions

were taken to improve this failure on the past products. However on the recent 3.5" HDD, the air spoiler is getting bigger and bigger to increase its capacity. It was found that the amount of contamination under the air spoiler was increased. Much more improvement was required. And TRIZ was used to think out some ideas for new air spoiler design to improve this contamination problem.

J10-Ishida (Hitachi Consulting)

Reconstruction of a Business Solution by Abstracting a Current Problem Solving Result and Introducing Service Oriented Mind

Atsuko Ishida (HITACHI CONSULTING Co., Ltd.)

'Abstraction' is one of essential elements of creativity. In this report, it is used for introducing a new way of idea creation along with service oriented mind. The way has 4 steps.

(1) Pick up a pair of problem and solution based on current technology.
(2) Take an essential problem by abstracting the problem. Service oriented mind would be useful.
(3) Create a new abstract solution from the essential problem. Abstracting the current solution would be useful.
(4) Get a concrete solution from an abstract one.

The way is applied to a medical data sharing system using large database and high speed network. As a further study, the way is applied to a remote sensing data sharing system using observation satellites. Solutions obtained from these case studies are based on cloud service and technology.

J11-Kataoka (Patbrain)

Comprehensive creation of inventions utilizing I-TRIZ: Building a patent network that is difficult to circumvent

Toshimitsu KATAOKA (Patbrain Ltd.)
Ryoichi ISHIBASHI (Willfort International Patent Firm)

The main purpose of applying for and obtaining a patent is to gain an advantage over competing products with one's own products by exclusively implementing effective inventions, thereby forging ahead with one's business. In order to attain this end, the following two requirements must be met: (1) Creating excellent inventions and applying them to one's own products; and (2) Preventing other companies from applying effective inventions including inventions which can obtain effects equivalent to one's own inventions. In order to simultaneously meet these two requirements, we think the key is to create inventions comprehensively. The reason for this is that it is possible to select the best invention and apply it to one's own products and to obtain patents comprehensively concerning groups of comparable better inventions and build a patent network that excludes competitors. In this report, taking a concrete case, we describe the results obtained after comprehensive creation of inventions by application of Inventive Problem Solving (IPS) using Innovation Workbench (IWB), Ideation International's TRIZ software.

J12-Shoji ()

A Practical Study of the TRIZ Process on “Comfortable Dry Shoes”

**Takahiro SHOJI, Yosuke KOGA (Individual),
Tsuyoshi YOSHIDA (Project Management Society)**

In this paper, a report on a practical study of the TRIZ process is presented. In the study, we first evaluated the standard TRIZ process as an example of “Comfortable Dry Shoes” and discussed on issues and methods to improve the process in order to be able to utilize the TRIZ in real research and development stages effectively. Concerning one of the important issues obtained from this discussion, “difficulty to think up sufficient ideas for technical problem solutions”, a new logical thinking method is proposed. Furthermore, an original facilitation method merged with the concepts and methods of project management and logical thinking is introduced for effective study and discussion.

J13-Hasegawa (JTS IP Research SC) [Aug. 29, 2011 Corrected by the Authors.]

Invention value evaluation according to patent information and market information -- “electrical toothbrush” as a case example –

**Kimihiko HASEGAWA, Hiroshi UEDA, Toshimitsu KATAOKA,
Shigeru SUZUKI, Nozomu TAKEUCHI, Narumi NAGASE, Toshiaki MASAKI
(The Intellectual Property Creation Research Subcommittee of Japan TRIZ Society)**

We think what can enlarge the market scale of the product and service or improve the market share has high patent technical value concerning the product and service (useful technique). From such a point of view, the Intellectual Property Creation Research Subcommittee decided to conduct invention value evaluation by comparing patent information for the specific product with market information therefore. This time, as the preparatory step, we cover 520 official gazettes concerning utility model and patent of “electrical toothbrush” published in JPO from 1991 to 2010 and extract about 20 applicants (companies and individuals) in order of the amount of applications. Then, as to creation of:
(1)inventive diagram where a selected drawing and structure of the invention, actions and effects are presented as a causal correlation, and “patent information sheet”, which describes cost for research development (guess value) so as to obtain a patent on one page per one case; (2)“market information sheet”, which describes a name of the article, a type, a photo (drawing), features of the structure, launching time, and market-share, etc. on one page per one case, a progress report will now be made.

J15-Takahashi (Willfort Patent Office)

Intellectual property control as to avoidance of conflicts and creation of improved invention - “suspension substrate with a circuit” as a case example -

Yoshifumi TAKAHASHI (WILLFORT INTERNATIONAL)

In order that a patentee might obtain substantive profits, it is important that the patent invention should be protected by a fulfilling patent specification. On the other hand, from the standpoint of a company that competes against the patentee, the company should try to develop products comprised of techniques which are not included in the technical range of the patent invention. More specifically, in the case where the product is invented later in the technical field and the company would not like to pay the royalty to the patentee, it is necessary to avoid the right so as not to infringe the preceding patent. Further, in the case where the company tries to enlarge its own market scale in the technical field, the company should develop a technique that is more useful than the preceding patent invention, and complete such a powerful invention that the other companies cannot follow. This time, we will explain a case where intellectual property control according to the modern TRIZ was performed such as avoidance of conflict with the preceding patent concurrently with improved invention of the patent invention.

J16-Kosha (MPUF USIT-TRIZ)

Application of familiar material for USIT training (Centering the yolk of boiled egg using USIT)

Hideaki Kosha (MPUF USIT/TRIZ study team)

USIT(**U**nified **S**tructured **I**nventive **T**hinking) inexperienced engineers have difficulty in finding out a USIT training theme in the real problems they are related. The author selected the egg for the USIT training theme, because of anytime-anywhere availability. The USIT problem was “When cutting a boiled egg in round slices, eccentric yolk doesn’t look nice”. We applied the closed world method.
The author has come to find that USIT inexperienced engineers could enjoyably find ideas from several viewpoints imaging attributes and their temporal and spatial changes, through the egg’s USIT training. The author intends to develop USIT fans using the egg’s USIT training and search other materials for USIT training.

J17-Kamimura (Ideation Japan)

Proposed case example of the next generation system using Express DE as to a future automobile attracting the young -

Teruyuki KAMIMURA (Ideation Japan Inc.)

From the high growth period to the bubble period in Japan, all Japan had to do was to imitate automobiles, electric equipments and computers, which were invented in Europe and the United States, catch up with and overtake them. All we had to do was mass-produce those which are comprised of many components inexpensively with higher quality than others and gain profits. At that time, we did not have to create a large vision. We Japanese are good at making products, but, unfortunately, poor at designing a total system comprised of such goods and services. Now, in Japan, the ability to create a large vision from strategies/tactics to ideals is required. DE (Directed Evolution) developed by Ideation International Inc. in 1990 is a methodology for designing a future total system. Since 2009, DE software incorporating this know-how has been sold. Therefore, we will now introduce a case where “Express DE”, which can be said as a DE software introduction course, is applied to a theme of “a future automobile”.

J18-Nakagawa (Osaka Gakuin University)

Problem Solving in Everyday Life: On Methods and Tools for Weeding (or Removing Weeds)

Takahisa Miyake and Toru Nakagawa (Osaka Gakuin University)

"Weeding" (or removing weeds) is a labor work which has been performed long since ancient days, and hence a large variety of tools and machines have been developed in the history. However it is still a heavy burden of labor at home, at farms, in parks, in town, etc. How can we reduce the burden of Weeding? This problem appears small and simple at first sight, but it is actually big and difficult. Difficulty stems from the fact that the problem situations are quite different (especially depending on the climates and culture). What is the purpose (i.e., what types of results one wants), at what kind of place/ground, what kinds of weeds/grass are growing, what kinds of useful plants are there, etc. How can we classify the methods of weeding (i.e., cutting/pulling/removing/etc. weeds)? How should we classify the tools? On the basis of consideration from these viewpoints, we have built up the guidelines where in various situations (of purposes, places, types of weeds, etc.) we recommend the types of methods and types of tools/machines to be applied. One of the conclusive recommendations is 'cutting the weeds just below the ground surface' rather than 'cutting the weeds above the ground' or 'pulling the weeds out'.

J19-Makino (Waseda University)

A study of a support for effects by optimized function definition

Koichi Makino, Manabu Sawaguchi (Waseda University)

The Effects is one of effective ways to achieve a useful function by choosing effect and theorem. It has relatively a high possibility to implement some ideas good in quality from the Effects compared with using brainstorming. To compensate for the above, it is important, too, to get some ideas from function near to such as function at the high level. To do so, it is important to define function appropriately. The technique of definition of function method of VE is worthy. The definition of function in VE is one needful to users. It is almost the same as a useful function in TRIZ. The optimized definition of function is to enhance the number of ideas in VE. This compensates the Effects. This paper describes a method for enhancing ideas by optimized definition of function in VE. The optimization is tried through numbers of examples in corpus. The definition of function is composed of noun and verb in Japan. The verbs describe a function. The hypothesis is that, if verbs have many examples, they make many ideas. The results of research did not indicate any relation between the number of examples from corpus and the number of ideas from verbs. On the other hand, a questionnaire on the order of verbs felt easy to show ideas indicates a significant difference among verbs. This result suggests that the optimized definition of function affects the number of ideas. The optimized definition of function will be the support of effects if an efficacy of the definition of function will be verified in future.

J20-Maeda (Takumi System Architects)

Business Opportunity Ocean and TRIZ with Cloud Computing

Takuo Maeda (Takumi System Architects, Ltd.)

Since I first encountered TRIZ, I have been focusing to solve problems on information technologies and software. Especially, I have targeted to locate where and when to be applied in the software life cycle and how to utilize it effectively. I am still on the way to the goal. Meanwhile I am wandering in the jungle of TRIZ, problems have expanded more broadly and got more serious. For example, globally expanded internet, marketed various new devices like smart phones, newly delivered services such as Facebook and Twitter cause information explosion (information flood or information tsunami). Many organizations, business persons and IT/software engineers fall into maladaptive syndromes, including the lost of data and software integrity, the leak of electronic information, and losing the governance of information and business as well as jobs. It is risk or opportunity? How can we recognize and catch opportunities? With TRIZ or not?

Even under such situation, information and information technologies are growing even larger and faster. TRIZ can help us at any moment and in quicker rhythm? Before TRIZ saves us, TRIZ may need to make itself adapted to new paradigm? My presentation will focus on new paradigm, especially technologies and businesses with cloud computing, and how to apply some TRIZ tools to create new services and devices under cloud environment and to increase value of businesses and engineers.

J21j-Makino (MPUF)

Implementation of a Methodology like TRIZ in Marketing Section - Methodology as Dialectic Style -

Hirotake Makino (MPUF, Japan)

As my opinion, one of the important purposes of a methodology (like TRIZ) is to get results in real practice.

But, I felt severe situations when I tried to use TRIZ & other methodologies in real practice at my place of work.

When I suggested solving issues by using TRIZ & other methodologies, I used to hear voices like “there is not enough time”. So, I thought that one of the severe situations to use TRIZ & other methodologies is the time shortage. To get over this situation, I used TRIZ & other methodologies in a dialectic concept at my place of work, and got results. The application field was the business domain of manufacturing industries. As the result, we estimate the sales of the targeted products to increase 1.5 times. Now, we continue the activity for realization. In this paper, I will describe the dialectic concept in implementing the methodology and a real practice at my place of work.

J22-Arita (Hitachi)

Activities for TRIZ Penetration into Hitachi Group and Some Typical Application Cases

Setsuo Arita (Hitachi research Laboratory, Hitachi, Ltd.)

In 1997, Hitachi, Ltd. decided to implement innovative engineering methods within all companies of the Hitachi Group to keep ahead of rapidly changing approaches in product development and design. The Hitachi Group is a multinational corporation and its products are in various fields such as information and telecommunication systems, electronic devices, and power and industrial systems. Because of the Hitachi Group's involvement in a multitude of technical fields, implementing a Group-wide improvement program seemed impossible. However, it was judged possible to implement these methods because they provided a strategy to understand and solve the essence of a problem by applying general solution techniques, without depending on a specific technical field. Hitachi facilitated the introduction and penetration of these techniques, and promoted the development of more advanced methods based on them. It was required that all engineers acquire these techniques as general knowledge rather than as special skills.

We believed that innovations in the product development and design processes could be possible if the QFD, TRIZ, and the Taguchi method played a major role in the processes. In 1999, we started the introduction and penetration of these techniques into the Hitachi Group under the project called HiSPEED21, *Hitachi Innovation Program toward Super Process with Excellent Engineering & Digital Technologies for the 21st Century.* We also facilitated use of various general problem solving techniques by engineers to enhance their engineering abilities. TRIZ was actually introduced into Hitachi in1997 and its penetration has been continuously promoted since then. We guided each division in the Hitachi Group to promote the development of its leaders.

We developed educational materials including applications of the TRIZ and used them to introduce TRIZ to management leaders and engineers. Furthermore, we taught the leaders how to apply TRIZ and how to teach engineers to apply TRIZ. We aimed for an increase in adoption and penetration of TRIZ by holding forums on engineering techniques focused mainly on applications of TRIZ, and by holding regular meetings with the TRIZ leaders at the divisions. Moreover, regular follow-ups were held every six months. And Hitachi commended engineers who obtained excellent results in TRIZ applications. The total number of TRIZ applications completed between 1997 and September 2010 was about 3950.

Some TRIZ activities in EERL (Energy and Environmental Systems Laboratory) are presented as a representative division. TRIZ applications in actual work were promoted from the top-down and the bottom-up within EERL. If TRIZ or another problem solving technique was applied, a higher individual evaluation score was given as an incentive. During the research and development phase, the problem was examined and the appropriate technique was selected. A plan to apply the technique was developed over a six month period, with the leader guiding the plan development and suggesting solutions to any problems. A formal progress check was held after three months. Currently about twenty TRIZ applications are in progress in any given six-month period, mostly related to effective patent applications. An evolved version, TRIZ-Directed Evolution has been applied to create a development strategy for new products. In some cases, TRIZ alone is not sufficient to find the cause of a problem. Therefore, we merged the KT (Kepner-Tregoe®) method into TRIZ to compensate for the weaknesses in TRIZ. The hybrid method is more powerful than using each technique separately. Some application cases will be presented at this conference.

J23-Ishii (Miyagi TRIZ Study Group)

TRIZ as an Ability to Survive

Rikie Ishii (Miyagi TRIZ Study Group / Idea Plant)

A Great Earthquake hit Miyagi Prefecture on March, 11th. Since then, huge aftershocks followed, and the infrastructure had been broken for a long time. Here, missing many things, we had no other choice than to somehow squeeze through. In such an environment, people who generated ideas and put them in concrete form improving them immediately were stronger than those who could follow the rules without mistakes. Evidently, creative power was a part of the abilities to survive a crisis. Looking back, the "ingenuities" exercised while things were not available used plenty of the essence of Inventive Principles (and the Idea Pop-up Cards paraphrasing them). I also generated many ideas even in the earthquake disaster confronting many challenges, and went through the Trial->Failure->Improvement->Use cycles. Idea examples and Inventive Principles leading to them will be reported.

J24-Takahara ()

A Preparatory Study for Resolution of Contradiction of Unity

Toshio Takahara ( )

Contradiction consists of two opposites and mutual relation between two opposites from inner point of view. It has function of movement from outer point of view. It is an approximate element of structures and processes of the world.
The form of human history especially in institutional area is segmenting objects and partly merging objects to acquire progress in life. But, now we need some unification between object and me, between community and me, between viewpoint and attitude, between philosophy and method, between humble attitude and critical attitude, etc. These "opposites" form the contradiction of unity.
Contradiction has three types, which consist of autonomous movement, movement to ignite action and that of unity. The differences in autonomous movement and contradiction of unity can be resolved by movement to ignite action, which has three types of "physical contradiction" and eight types of "technical contradiction".