TRIZ シンポジウム 2008
The Fourth TRIZ Symposium in Japan

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Japan TRIZ Society

Abstracts (Advanced Program) of

The Fourth TRIZ Symposium in Japan, 2008

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by Program Committee (TN and YK)

Note: This collection is updated to reflect the revised agenda, but the minor revisions by the authors may not be reflected here yet. (Aug. 5, 2008)

Part I. Invited Talks

#I01 (Keynote Lecture)

Directions for Future TRIZ Development and Applications

Sergei Ikovenko, Dr.-Eng, PhD, PE, professor, TRIZ Master
(GEN3Partners / Massachusetts Institute of Technology, USA)

TRIZ is rapidly gaining popularity as a powerful methodology for enhancing innovation and creativity inside corporate environments. Research and development teams, product developers, manufacturers and service businesses are finding TRIZ to be a powerful tool for solving practical problems and building new technologies in their business.

As any system TRIZ is evolving. What are the directions of modern TRIZ development and its potential new applications? No different from other systems TRIZ is going along its S-curve and according to a number of indicators it is at the Transitional Stage form Infancy to Rapid Growth because it is on the market already, but in limited niches. What are the recommendations for a system development if it is at the Transitional Stage? Should we rush to the market or slow down and develop modern TRIZ to completion?

The presentation focuses on these aspects as well as on multi-screen approach of TRIZ development and its application. More and more companies worldwide embrace a new approach to innovation that is focusing to moving the product along so called main parameters of value. The approach provides an algorithmic process of opportunity assessment, innovation agenda development, problems identification and solving, concept substantiation and deployment.

Main Parameters of Value Analysis followed by Function Analysis, Cause-Effect Chain Analysis, Trimming, ultimately classical TRIZ and post-idea generation activities represent an innovation roadmap and the “time” axis

of the multi-screen operator. The subsystem directions include Trends of Evolution development, new rules of Trimming, nuances of Feature Transfer, etc. while the supersystem axis includes TRIZ combined with Six Sigma, DFSS, Lean, Sustainable Design, etc.
The presentations is furnished with examples from leading corporations worldwide.

#I02 (Keynote Lecture)

Can TRIZ work for a Large, Innovative Semiconductor Company? Intel's Learning

Amir Roggel (Intel, Israel)

Intel is the leader in Semiconductor Industry. 40 years of track record in innovation, and global presence in multiple countries and sites, makes introduction of Systematic Innovation methods and TRIZ a challenging journey.
The keynote will outline Intel's Innovation vision into the 21st century and the typical problem solving needs in an advanced semiconductor company.
Audience will learn on TRIZ progress in Intel Corporation, propagation approaches will be discussed and tips will be given on the various aspects of deployment. Examples of TRIZ application will be provided through keynote and separate papers.

#I03 (Invited Talk)

TRIZ activity in Corporate R&D Division
－Application to system, method, and software technology－

Yojiro Fukushima

(Matsushita Electric Industrial Co., Ltd., System Engineering Center)

The TRIZ activity began in Corporate R&D Division of Matsushita Electric Industrial Co., Ltd. in 2003. The Corporate R&D Division takes charge of a basic research and development. The purpose of the TRIZ activity is improvement of development efficiency and engineer's skill. We have applied TRIZ to about 150 themes. About 80 percents of themes are concerning system technology, method development, and software technology.
The efficiency of task was improved on 86 percents of themes to which TRIZ is applied. Patents aided by TRIZ are better than average. TRIZ experienced engineer creates a lot of patents.
We have found that not only the TRIZ process itself, but also pre-process (problem recognition) and post-process (making to effective) are important. We have been improving the total process.

#I04 (Tutorial for TRIZ Basics (only in Japanese))

Introduction to Systematic Innovation: For A First Step to Real Use of TRIZ

Masatoshi Hotta (Sozo Kaihatsu Initiative Co., Ltd.)

The present tutorial intends to give an introduction to the process of systematic innovation in a manner comprehensive even for TRIZ novices. As the principal reference, I will use the textbook "Hands-On Systematic Innovation" written by Darrell Mann and published in Japanese translation in 2004 by our company. The processes for Systematic Innovation described in this book are somewhat different from the so-called Classical

TRIZ, and contain various features which do not belong to TRIZ itself or even to derivatives of TRIZ. Since the process holds a very wide variety of contents and tools, it takes much time and efforts for readers to understand the whole process and to apply it effectively to real problems. This tutorial aims at helping audience understand the overall structure of the Systematic Innovation process and apply it effectively in practices.

Part 2: Contributed Papers (Oral and Poster Presentations)

#01

TRIZ Improves the Levels of Problem Solving －For Understanding the Effectiveness of TRIZ－

Yoshiharu Isaka (IDEA Ltd.)

TRIZ has been spreading and has shown some positive results as a powerful technique for supporting technical problem solving. However, there are still many people, among leaders and managers in industries, who are skeptical on TRIZ. In the present paper, we are going to demonstrate that usage of TRIZ improves the level of problem solving. As a case study we used the problem of the variable valve system in the car motor. We have shown the ideas generated first by the conventional methods and then the ideas generated further by using TRIZ. This clearly shows the improvement in the levels of solutions by using TRIZ.

#02

Test Pogo Pin (Gold Pins) Reuse Program

Paul Devaraj and Si, Wai Chiang (Intel Malaysia)

In today's highly competitive environment, Operation Cost seems to be the defining factor that decides between the success or failure of any given operation. This is even true in the case of Test Operation. One of the biggest pie in Test Cost stems from the cost of maintaining the test Interface Unit (TIU) of which the Pogo Pins are the biggest contributors. Over the Years, Semi-conductor Test Operations throughout the industry has poured millions of dollars per Annum of their Test operation budget into purchasing of these tinny pieces of Gold pins. This paper discusses a key endeavor to reduce significant amount of that cost without jeopardizing Quality or safety through a Reuse or recycle effort

#03

A Concrete Method for Idea Conception from Systems in the Future

Masahiro Kuwahara (IDEA Ltd.)

TRIZ has been introduced and penetrated in many industries as a powerful technique for supporting technical problem solving. One of the most important tools in TRIZ is "Idea conception from an ultimate ideal solution and an ideal technological system". This tool, however, is often not used or properly applied in the actual projects, I feel. . In the present paper we introduce a concrete methodology for generating solution concepts smoothly. It uses the inquiry table of Altshuller , a system chart, the multi screen method, etc.

#04

RFS Handler Cone Chuck Simplification for effective handling performance

Darin Moreira, Goh Cheng Teik, and Azir bin Romli (Intel Microelectronics, Malaysia)

In today's manufacturing world, higher equipment utilization and lower operating cost is the way forward and the trend these days. Newer machineries are usually well equipped to get the job done as they are manufactured with the latest technology available in the market to meet the ever stringent demands. The earlier

generation equipments are usually phased off or go through a series of improvements to meet the goals but at the expense of higher cost. This paper discusses on how “Less can be More” and uses the RFS handler as a good example of an older generation pick and place equipment, making an impact with the help of TRIZ in this ever demanding manufacturing world.

#05

The overview of TRIZ education using 9-Window Method --- yesterday, today and tomorrow. - The utilities and future perspective of group training, E-learning and correspondence course. -

Shigeru Kasuya (Pro Engineer Institute/Yamaguchi University)

Where does TRIZ education conducted at enterprises and universities stand at? I recognize that it is positioned in the "growth period" in what we call S-Curve analysis. But in fact, the reality of this education is under the severe circumstances I would say. For this reason, I tried to take the bird's-eye view on the past, present and future of the education in order to identify the issues and search for the measures based on the assumption and verification that I had made.

Over the past three years, I have been engaged in assuming and verifying the issues of TRIZ education. I have mainly focused on the following three methods: group training, correspondence course and E-learning. I am going to make a proposition of the actions to solve the issues and present my perspective on this education by digging down the positive effects of the practice of the actions.

It has become clear that E-learning is the effective way to solve these issues. However, there appeared another ones that E-learning need to resolve. I hope you will pick up the essence of my presentation for speed-up of promoting TRIZ education at all of your places.

#06

Application of TRIZ to Production and Process Technology

Masaya Takemura (The SANNO Institute of Management)

In this country, TRIZ is used mostly by R&D engineers. However, users of TRIZ should not be limited to engineers in R&D. It is known by the fact that classical cases used for TRIZ education cover widest variety of technological fields. Author believes that more efforts shall be made in order that TRIZ is used in wider scenes of technological development.

The paper is written on the basis of the author experiences of problem solving by application of TRIZ to problems in fields of production and process technology in production of electronic parts and industrial materials. The author discusses here how TRIZ 1) guided engineers to find and define problems properly, 2) shortened the time for problem solving and 3) enhanced assessment of effects of the problem solving. In conclusion the author proposes approaches to introduce TRIZ into the fields of production and process technology.

#07

Contemporary Issues of TRIZ to be a Scientific Method

KUROSAWA, Shinsuke (The SANNO Institute of Management)

TRIZ is often considered to be a set of Idea Generation Tools or, in the better cases, a system of Problem Solving Tools. TRIZ, actually, is a new field of human wisdom and eventually has a far broader potential to be a science with a system of knowledge which can be applied to many fields of human activities. However to the author’s regret, TRIZ today seems to lack prerequisites to be called a science. The presentation is the author’s attempt to bring forward the challenges of TRIZ to become a really big something. The presentaion is prepared for the sake of the catalyst to activate discussions over the issues.

#08

Usage of TRIZ and USIT in Developing A Novel Duplex Printing Machine

Hiroshi Kanno (Tohoku RICOH Co., Ltd.)

A mimeograph process is known as a process to perform pseudo-drying by emulsion ink penetration to paper and has no fixing system. It has long been a dream for us to develop an automatic duplex printing machine in digital mimeograph printing process. The difficulty was caused by the limitation of the pseudo-drying process itself. We challenged such a development and in March, 2007 we released a novel duplex printing machine, Satelio DUO 8, and got very favorable customers' evaluation. The machine is a full-automatic ultra-high speed printer of 240 pages per minute, and is just the same size as the preceding products in virtue of very compact duplex paper handling mechanism. In this paper we present our usage of TRIZ and USIT in the development of this novel dream product.

#09

TRIZ and innovation culture at Samsung Electro-Mechanics Company

SeHo Cheong; Vasily A. Lenyashin; Alexander T. Kynin; Naum B. Feygenson; YongKwan Lee; and Seungheon Han (Samsung Electro-Mechanics Company, Corporate R&D Institute, Korea)

Samsung Electro-Mechanics activity is concentrated on the three main fields of technology: materials, radio frequency components and optic elements. First steps of TRIZ application were made here in 1998. At now the international high skilled interdisciplinary team is created for effective TRIZ implementation on the corporative level. The general directions of the team activities are TRIZ- consulting of projects for R&D groups, education and certification of engineers and researchers inside of manufacturing plants and development new TRIZ-methodologies. TRIZ education is provided under the guidance of experienced mentors and oriented to practical solving of real problems. Specific features of consulting projects are deep and close interrelation between TRIZ consultants and project's team members, TRIZ application in different manufacturing processes and technologies, transfer the best of created solutions for functional related engineering areas.

Such organization allows us to resolve many complicated manufacturing problems, to prepare sufficient amount of certificated in MATRIZ specialists and to provide research for TRIZ development as the science.

#10

Why Water Striders can stand and slide on the Water? A Summer Homework by Son and Father with TRIZ

Taichiro Miyanishi (2nd Grader, Kenroku Junior High School／Son)

○ Katsuya Miyanishi(／Father)

Last summer, Son in the 1st grade of a junior high school said: "Why the water striders can stand and slide on the surface of water? I want to study about it as my summer homework." This was the start of the present work, carried out by Son and Father together. We will report our process of research on water striders worked together especially with guidance of TRIZ-thinking by father.

The following TRIZ tools were used: "Searching for mechanisms and setting up hypotheses": "NAZE-NAZE deployment (Root-cause analysis)" ,"Scene deployment", "Strength/weakness analysis", "Making conceptual prototypes for trial and verification", "Product Analysis", and "SFR (substance-field resources)".

This work received a favorable evaluation inside and outside the school. A Fine-Work Prize was won from Kanazawa Kids Science Center in the point of "Interest and scientific search to a familiar mystery". In the current era of children's "Losing interest in science" and "Spending much time in Web search", I wish children get familiar with TRIZ-thinking in the elementary and junior high school days. I wish they enjoy TRIZ-thinking, which cultivates their "Inquisitive mind" and "Ability to think voluntarily".

#11

Snow vs. TRIZ

Yuichi Furukawa ( )

This is a report of solving a problem cause by snow, by using TRIZ. In a snowy country where I live, it is a big problem how to remove snow on the top of roof easily and safely. The snow on the top of second-story roof can cause a damage when it drops suddenly in a big amount onto the first-story roof . I solved this problem by use of TRIZ Contradiction Matrix. The solution is to make the snow on the first-story roof slide down onto the ground earlier and to make the snow on the second-story roof slide down little by little onto the clear first-story roof without damage. This solution seems to be a new technique not known before in the house-building industries.

#12

Advances In The Application of Computational Linguistics for TRIZ Practice

James Todhunter (Invention Machine Corporation),
Kiyoshi Shikakura (Invention Machine Japan)

Altshuller’s information fund concept is central to TRIZ. The application of TRIZ relies upon the individual practitioner’s familiarity and facility in leveraging knowledge from the information fund. However in practice, engineers are constrained by local knowledge and the psychological inertia that this parochial view engenders.
Advances in computational linguistics are elevating the practical use of TRIZ to new heights providing knowledge workers with unprecedented access to the knowledge that spurs innovation through TRIZ practice. In this session, the state of the art of computation linguistics for TRIZ and problem solving is presented with examples of this application from industrial experience.

#13

Atsushi Takeuchi (Japan) ----- Withdrawn

#14

Invention Analysis through the Patent Journal

Kimihiko Hasegawa, Toshimitsu Kataoka, Teruyuki Kamimura, Hiroshi Ueda, Mikio Suzuki, and Shigeru Suzuki
(Intellectual Property Creation Research Subcommittee, Japan TRIZ Society)

In the Intellectual Property creation research subcommittee meeting, we have carried out a research of “invention analysis through the patent journal”. The cases we analyzed include approximately 50 patent publications in the technical fields of daily necessities, machines, electric and electronic technologies, information technology and chemistry.
Here, the term “the invention analysis through the patent journal” means a technique to interpret the inventor's thinking process toward the completion of the invention. From the contents described in the patent publication,

we first figure out a contradiction which the inventor met in improving the conventional solutions and then confirm how such a contradiction has been resolved by the new technical means in the invention.
Patent publication describes the prior art and the problems to be solved in the invention, and hence we can interpret the content of the improvement to be made and also the hindrance which exists to prevent such improvement.

#15

Study of Development-type TRIZ tool (part 2)

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

**Masayuki Ishii (Sumitomo Electric Industries, Ltd.),
Nobuhide Matsuda (Matsushita Electric Industrial Co., Ltd),
Kazuyasu Ikeda (Sekisui Engineering Co., Ltd), and
Makoto Unno (Kawasaki Heavy Industries, Ltd)**

In Japan VE Association Kansai Branch, we established in 2003 the "TRIZ Spreading/Use Study Group" for the purpose to study TRIZ technique as the means for new value-added creation. With the intention of using VE and a variety of TRIZ techniques in fusion, we have examined various TRIZ tools. Usually TRIZ is regarded as an effective thinking tool for problem solving and hence is often applied to the design phase of product development. However, industries have much desire to obtain effective methods especially in the planning and development stages of new products aiming at creation of much new added value. Thus in our Study Group, we focus on the usage of TRIZ in the development of new products/new technologies. We have set up a four-year project, 2006-2009, for this purpose. In applying TRIZ to the development of new products/technologies, we recognize two main phases, i.e. the task analysis phase and the idea generation phase. For these two phases, we are examining various TRIZ tools to apply and constructing effective processes for applying them. In the present paper we are going to report our findings in the second year of the project.

#16

Discovery Of An Innovative Process Analysis In Preventive Maintenance Optimization

**Nagappan Annamalai, Subramaniam Muthukarappan,
Nitin Dhansukhlal (Intel, Penang)**

Burn-In is a reliability screen for manufactured silicon products which uses a combination of high voltage and temperature stresses over certain time duration to screen out reliability failures. SHBI (Self Heat Burn-In) is a tool used to support this process. SHBI integrates with multi-axis robots into chamber wall using individual device burn-In board (BIB). SHBI tool requires performing long hour activity such as Preventive Maintenance (PM) monthly basis (leading to a total of 15% monthly capacity loss). This paper will discuss on how the PM Optimization been analyzed through TRIZ methodology.

#17

Chan Shia Fen et al. (Malaysia) ----- Withdrawn.

#18

Contradictions and Resolving Differences within Two Variables —A Method of Resolving Differences Based on the Concepts of Functions and Process Objects Part 3—

Toshio Takahara ( )

The history of human being is an accumulation of autonomous changes and intentional Resolving Differences. I study resolving contradiction from a view of number of objects and a form of resolving contradiction. Intermediary principle and segmentation principle are the most basic ones in its method. Resolving Differences within two variables consists of the method within one variable discussed in the previous paper, segmentation of attributes and object, qualitative and not qualitative change of attributes and objects with two variables.
Object has inner structure and total attributes which produce function to the outside. From this point of view we can classify the 40 principles in TRIZ into seven types of principles consisting of plus principle, dynamic principle, structure principle, replace principle, minus principle, equal principle and “anti” principle.

#19

Case Study of Introducing and Applying TRIZ to Real Projects for Obtaining Results (= Benefits): Innovating the Product Development Process by use of QFD, TRIZ, and TM together

Tomohiko Katagiri, Toshiaki Tsuchizawa, and Takeshi Yamanouchi (Koganei Co. Ltd.)

Our company is a manufacturer having 800 employees for producing and selling pneumatic equipments of all kinds. As usual for an SME manufacturer, engineers in charge of product development also have to work in close contact with people for marketing research, sales, production, prosecution, etc. and have to manage all of their catalogue products of about 300,000 types. And from the management they are requested the results rather than the processes. Under these conditions, we have started to innovate our product development process since October 2006. Considering the actual situations of engineers and the requests by management, we have set our strategy in the following way:

- We introduce and apply not only TRIZ but also QFD and TM (Taguchi Method) in the whole process of product development.
- We apply the methods to 3 real projects of product development, and the schedule of training of the methods are synchronized with the schedule of the product development.
- We set up the relevant organizations, tools, techniques, etc. in parallel to the schedule of product development.
- The new products developed in these projects should produce their results (= benefits) in three years after the start. The effectiveness of the methods will be evaluated at that time.

In the present paper, we will report the overview of the promotion and the case studies of the three products.

#20

Computer-aided Problem-solving Assistant for Su-Field Analysis

D. Daniel Sheu and David Lee (National Tsing Hua University, Taiwan)

The substance-field analysis with inventive principles is one of the most difficult and less used TRIZ tools although it is reported as among the more likely tools which can generate breakthrough results. The paper established a new coding and su-field based problem solving scheme allowing automatic generation of ISM (Initial Su-field Model) in coded form, intelligent identification of possible corresponding standards, and allowing users to select identified standards and generate solution trigger DSM (Desired Su-field Model) automatically. The system is an Excel-based intelligent problem-solving assistant for su-field analysis. Upon identification of solution triggers, the system will also provide examples to aid human generation of specific

solutions given the solution triggers. It will enable a novel user to quickly generate solution triggers without detail knowledge of the su-field knowledge and laborious manual exercise.

#21

From Idea Creation to Patent Acquisition by TRIZ: For Improving the Living Situations Just after the Evacuation from Natural Disaster

Yuji Mihara (Creative Technology Institute Co., LTD)

Toshimitsu Kataoka (Patbrain Co.,LTD)

In 2001 in a working group of Mitsubishi Research Institute's Users Study Group, we challenged to make a successful case of TRIZ application for facilitating the penetration of TRIZ into industries. We chose a problem of improving the uncomfortable living situations in a gymnasium just after the evacuation due to some natural disaster. The group practice generated a nice idea of a composite cushion which is flexible to bend in one direction while stiff in the other direction. After refining the idea, we filed an application for patent in 2002. In the course of the examination, however, the Patent Office refused it by showing 14 cases of prior art, which discouraged us much. However, we worked to find solutions from the viewpoint of TRIZ. As the result of our amendment, we have finally won the patent in March, 2008. We made a mini-size prototype and demonstrated it of practical usability and convenience. We wish you to show this example to people for promoting TRIZ.

#22

Applying USIT to Improve the Application Practice of USIT to Technical Development

Tateki Oka (Konica Minolta Business Technologies, Inc.)

While we promote the application of the USIT method to product design and technical development, we have met various problems in our company. To solve such problems, we have applied USIT itself.
First we discussed where are the main problems in applying USIT, e.g. in some stage of USIT process, in some tool of USIT method, in some scheme of applying USIT, etc. We extracted that the largest problem is the difficulty in finding out the real essence of the problem situations. So we illustrated the present situations of our problem solving practices by using the USIT space/time characteristics analysis. Then we considered the ideal situations and figured out desirable behaviors and properties by using USIT Particles method. In this manner, we succeeded in deploying concepts of solutions and we generated many concrete plans for solving the problems in current style of promoting/applying USIT. .

#23

Human-Oriented Consideration for the Popularization of TRIZ －From Viewpoints of Symbiotic Systems Theory and Dale Carnegie's Approach－

Mitsuo Morihisa (Current: S K I, Former: Kyoto University), Hiroshi Kawakami, Osamu Katai, and Takayuki Shiose （Kyoto University）

TRIZ is going to raise expectations for the technological breakthrough, as it has richer contents on invention and creative inspirations than any other problem solving methods. In this paper, the benefit of not only the symbiotic systems theory which yields each full inherent characteristics with harmonious symbiosis among Man, Systems

and Environment but also the pioneering practice of Dale Carnegie in the field of both adult education (andragogy) and human relations is shown to the fulfillment of "the human system" for spreading the TRIZ.

#24

Application of TRIZ to Noise and Vibration Problem Solving - Fusion with Traditional Theoretical and Empirical Approach -

Masao Ishihama (Kanagawa Institute of Technology)

Conventional textbooks on noise and vibration (NV) control almost always describe analysis methods only and don't provide methods of solving problems. On the other hand, handbooks contain solutions of "specific" problems, but they don't necessary give readers solutions to general problems. In this study, the author tries to connect NV theory with TRIZ idea of solving problems for giving engineers rules of thumb of NV technology. This method converts specific concrete problems into abstract general problems by sorting symptoms by frequency, time dependency, etc. Then these general problems are placed in suitable categories classified by equation of motion in NV theory. Then rules of thumb described with problem solving manner is given.

#25

The utilization of creative thinking method in school education

Sachio Matsubara (Niigata University)

This Paper is devoted to consideration of the utilization of creative thinking method in school education.
The purpose of our research is to increase the student's creativity by utilizing the creativity thinking method, such as TRIZ, together with Learner-Centered Teaching method.
The technical theme for our research course is improvement of estimation standard and estimation method of texture of food.

#26 --

#27

Problems to be solved and Technological Evolution of Magnetic Recording Media

Hiroyuki Suzuki (Hitachi, Ltd., Central Research Laboratory)

A preliminary investigation of thin-film metal disks was performed using vacuum evaporation in the 1960s. A sputtered disk for longitudinal magnetic recording was developed in 1970. In this paper, five patents spanning the evolution of longitudinal recording media from its early stages to the end of its development are discussed. In these patents introduced between 1986 and 2005, the transforming of a single magnetic layer into a multilayer was proposed to reduce media noise and thermal fluctuation. This was a trend that included at least three inventive principles such as Segmentation of the recording layer and underlayer, Move to a new dimension, and Composite materials.

#28

Practical Application of TRIZ to Novel Electrical Devices Development

Shuji WAKAIKI, Koichirou ADACHI and Hiroshi KOTAKI
(Advanced Technology Research Laboratories, SHARP Corporation)

We are working on research and development for novel electrical devices. We have introduced TRIZ to our prototype fabrication process in this study resulting in finding practicability. Many problems have to be confronted and sorted out when you attempt to modify and improve conventional fabrication process. These problems can be made clear through TRIZ work sheet, and the most critical issues are derived from them accordingly. We obtained ideas from the derived critical issues through Analysis of space characteristics, Analysis of time characteristics and Smart Little People Method. We then successfully prepared the guideline for our new fabrication process and consequently confirmed that TRIZ is effective in our research and development.

#29

USIT Case Study: A Mom's Bicycle Able to Carry Two Children Safely

USIT Training Seminar Group (IDEA Co.):

**Tetsuya Sudo (Sekisui House Co.),
Hiroshi Sakata (Hitachi Research Laboratory, Hitachi Ltd.),
Keiichi Hasegawa (Bridgestone Co.),
Katsura Hino, Akira Kato (Kokuyo Furniture Co.),
and Toru Nakagawa (Osaka Gakuin Univ.)**

This is a report of USIT Case Study obtained recently at a 2-Day USIT Training Seminar (Instructor: T. Nakagawa). We heard a TV news: "Even though the current Road Traffic Law prohibits to carry two children on a bicycle, the National Police Agency showed, on the strong voice of needs from Moms, the intention to modify the law to approve it under the condition that bicycles are improved to do it safely". So we have chosen to solve this problem at the Training Seminar. Clarifying discussion about the scope of problem during the problem definition, confirmation of the dangerous situations/timings in the time-characteristic analysis, making images of ideal results and constructing a hierarchical scheme of desirable actions of the magical Particles in the Particles method are all found useful. In the stage of solution generation, it was effective to clarify/display the whole perspective of the solution space and try to figure out possible conceptual solution ideas in each branch of the solution scheme. Since the five members are all non-specialists and the duration of practice was short, we have much limitation in the individual solution ideas. Even so, we would like to provide an overall view on this real problem and suggest some proposals for future concrete solutions. This case study shows a typical way of applying USIT to a real problem and its capability of problem solving by a non-specialist team.

#30

Generoso G Restubog et al. (Philippins) --- Withdrawn.

#31

Alexander Theodor Narbut (Ukraine) ---- Withdrawn.

#32

Cheok, Chai Har et al. (Malaysia) --- Withdrawn.

#33

Creative Problem Solving Process Where We Use Only 12 TRIZ Principles: Generating Ideas and Combining Ideas

Creativity Study Group
Nobuhide Matsuda (Matsushita Electric Industrial Co., Ltd.),
Hiroshi Kamijyo (Iteq International Co. & IWEL Co.),
Hiroto Hayashi (IWEL Co. & Iteq International Co.),

In our preceding paper, we have presented a creative problem solving process where we use only 12 TRIZ Principles. This process aims at generating effective solution ideas for improving our system of problem in a time-efficient way. In the present paper, we focus on the latter half of the process more closely. In the stage of idea generation, we first try to identify the physical contradiction, and then guided by the separation principle in TRIZ we apply appropriate TRIZ Inventive Principles. At this phase we apply only 12 TRIZ Principles selected from 40; the narrowing of the variation of tools to a limited number of effective ones makes the idea generation process time-efficient and yet productive. At the final stage we combine two ideas so as to enhance good features and further refine the ideas. The process will be demonstrated and discussed in detail with a case study.

#34

The Application of USIT to the Development of the next-generation Computer-to-Plate Printing

Hideaki Kosha (Fujifilm Corporation)

Engineers often have difficulties in finding plausible root cause(s) of their technical problems, rather than in generating solutions to them. Thus in 2005 at First TRIZ Symposium in Japan, we presented the modification of USIT for presuming plausible root cause(s) of technical problems. We have recently applied the Fujifilm-style USIT to the development of Thermal Non-processing Plate for CTP (Computer-to-Plate) Printing, which aims at the next-generation, environment-friendly CTP Printing. We will demonstrate the effectiveness of our Fujifilm-style USIT in the technology development in material science.

#35

A Comparison of the Problem Solving and Creativity Potential Shown in Engineers using TRIZ or Lean/ 6 Sigma

Dr Paul Filmore (University of Plymouth)

Engineers are generally effective at problem solving but often do not look for the most highly effective and creative solutions. For many engineers and their managers, Lean and 6 Sigma have recently become synonymous with problem solving in their organisational thinking. This may be in part due to the financial and human resources tied up in these approaches. In a previous paper the author related the characteristics found in highly effective engineers to those enabled by TRIZ tools. This paper continues this research by trying to relate the Lean and 6Sigma tools again to the same characteristics found in highly effective engineers. Comparing the results, it appears that TRIZ tools have far more problem solving potential than those used in Lean and 6Sigma. The implications are that organisations with a Lean/ 6Sigma mindset may be constraining creativity and problem solving in their workforce and thus their competitive advantage.

#36

Idea Process using only 12 Principles

Creativity Study Group
Hiroto Hayashi (IWEL Co./ Iteq International Co.),

Nobuhide Matsuda (Matsushita Electric Industrial Co., Ltd.),
Hiroshi Kamijyo (Iteq International Co./ IWEL Co.), et al.

The idea creation can be performed by utilizing effectively the "Invention Principles" of TRIZ which is one of the creative techniques in the thinking process of invention. By choosing "The 12 Principles" from "The 40 Principles" of TRIZ, It is for not a radical improvement which needs the large-scale idea but can realize the idea creation which was excellent for a short time by narrowing down to "improvement and an improvement" of the existing system currently faced on daily business. The thinking process of the 12 Principles consists of "a problem setup", "goal setting", "investigation of a cause", "creation of an idea", and "combination of an idea, evaluation and selection". Work in each stage was shown using problem solving of "It is not injured although people are inserted by an automatic pivoted door" as an example.

#37

Idea Process using only 12 Principles Function Components Deployment and Find Primary Cause

Creativity Study Group
Hiroshi Kamijyo (Iteq International Co./ IWEL Co.),
Nobuhide Matsuda (Matsushita Electric Industrial Co., Ltd.),
Hiroto Hayashi (IWEL Co./ Iteq International Co.)

The idea creation can be performed by utilizing effectively the "Invention principle" of TRIZ which is one of the creative techniques in the thinking process of invention. The thinking process of TRIZ consists of "a problem setup", "goal setting", "investigation of a cause", "creation of an idea", and "combination of an idea, evaluation and selection". Work in each stage was shown using problem solving of "It is not injured although people are inserted by an automatic pivoted door" as an example.

In order to realize that this announcement can create the idea which was excellent in "improvement and an improvement" of the existing system with narrowing down and a short time, the method for narrowing down the cause used as the starting point for solving and the method of discovering goal setting and the primary cause are described.

#38

How to Use TRIZ Quickly and Effectively in Small Companies

Miyagi TRIZ Study Group:
Rikie ISHII (Dunamis Co., Ltd.)

Miyagi TRIZ Study Group has made a questionnaire survey in regional companies for monitoring their recognition of technological problems and technological trends. In the questionnaire we used the TRIZ concepts for making the survey convey general meanings: technological problems are expressed in terms of the 39 parameters of Contradiction Matrix, and the technological trends in terms of 31 Trends of Evolution of Technical Systems. We sent the questionnaire to 1167 companies, and obtained 68 replies. The results after some analysis will be reported in the presentation. This gives us a suggestion for companies to use TRIZ quickly and effectively.

#39

Introduction to ISW (Idea Search Working) Activities: Learning, Applying and Penetrating TRIZ

Fumiko Kikuchi and Akio Fukushima (Pioneer Corp.)

Three years ago, we built a basic plan of making TRIZ learned, applied, and penetrated among the researchers/engineers in the R&D Division of Pioneer Corp. In the initial stage we got TRIZ consulting by IDEA, Inc., attended at 2-Day USIT Training Seminar, attended at Systematic Innovation Seminar by SKI, and so forth. By learning TRIZ in these various activities/opportunities outside our company, we have been trying to understand the essence of TRIZ and to applying TRIZ to real problems in our company. We have first organized and facilitated “TRIZ Half-A-Day Workshop” with 11 sections in our R & D group respectively. Then we have used TRIZ in the meetings to find patent possibilities. This year we started our new program, Idea Search Working (ISW), for supporting researchers' activities in solving problems, finding research tasks, and generating solution ideas. In this paper we are going to report some history, contents, and future plan of our TRIZ promotion programs,

#40

Practices of Applying TRIZ/USIT in Konica Minolta Technology Center, Inc.

Noritaka Nakayama, Takashi Syakuno

(Konica Minolta Technology Center, Inc.)

As a step for promoting TRIZ/USIT in Konica Minolta Technology Center, Inc., we have introduced a new approach in the education to the freshmen joining our company in 2007. We usually give to freshmen 'basic educational program' just after joining and then area-dependent 'technical program' after being assigned to their sections. In addition to these basic training-programs, we have introduced a new course of 'on-the-job training' of the three development methods, i.e. QFD, TRIZ (especially USIT), and TM (CAE). For the purpose of making the education useful in their real practice, we gave Workshops to freshmen and their mentors together. For the part of USIT, the course contains a lecture and half-day Workshop, individual theme-consulting meetings, and individual follow-up supports. We will report some effects and problems as the results of this educational training program.

#41

A Study on IT Trends by Using Future Technology Predicting Method, TRIZ-DE

Toru Shonai and Junji Shigeta

(Central Research Laboratory, Hitachi Co., Ltd.)

In order to improve future information technology predicting abilities, we made examples in IT for each technology evolution patterns of TRIZ-DE (Directed Evolution), and we tried to apply them to trends of information systems and servers. We found that these patterns are applicable to IT area and that there are particularly many instances of “system parts completeness law”, which says that each parts of a system evolves for completeness independently while the system evolves as a total system and that each parts of the system evolves asynchronously with alternation of balances and imbalances among parts. The instances include open systems, Linux, ASPs (application service providers) and SaaS (software as a service). Because it often happens in IT area that some characteristics of a system in the next generation become lower than those in the previous generation by this law, we should make greater considerations for those characteristics.

#42

An Application of TRIZ Way of Thinking and Its Tools To Develop a New Business Model

Business & Management TRIZ Application Sub-Team, Japan TRIZ Society: Ikuo Yoshizwa (The SANNO Institute of Management), Kazumasa Yokoyama (Toshiba Co), Kimihiko Hasegawa (Sano & Associates International Patent Firm), Akira Sato (Funai Zaisan Consultants Co., Ltd.), Shigeru Kuno (NKN Consulting Co., Ltd.), Toshihiko Takeda (Denso Co.), Yasuo Moriya (Fujitsu Advanced Technologies, Ltd.), Takuo Maeda (Takumi System Architects, Ltd.),Teruyuki Kamimura (Willfort International Patent Attorneys), Humiko Kikuchi (Pioneer Co.)

Most of reported TRIZ applications are for solving technological problems. One of the challenges for TRIZ to be deployed in much wider scale is to prove its capability to help solve business and management problems.
The B & M Application Sub-Team of the Japan TRIZ Society was organized two years ago to address this challenge. We plan to study methods how to apply TRIZ to tackle business and management problems through analysis of real life cases. We intend to make up a guidance for TRIZ application for the purpose. The present report is about our effort up to the present time and some of its results. The subject we choose is "TRIZ application for developing a new model of business that brings in the best economic performance for a given product. "
We divided the process of our study into following 5 phases;
1. Selection of the target. (A product or a field of business.)
2. Understanding the present situation (Interviews and analysis of available information)
3. Drawing a preliminary scheme.
4. Developing the business model based on the scheme.
5. Presentation of the model and the evaluation. (Presentation to subject matter experts and interviews.)
We choose as our first target "the Large-Screen Television System". The report shares our analysis of challenges confronting the business and the contradiction they include.

#43

Updating TRIZ: 2006-2007 Patent Research Findings

Darrell Mann (Systematic Innovation Ltd, UK)

A large part of the strength and power of TRIZ exists because the methodology was constructed on the substantial foundations provided by the analysis of a very large number of patents. Around 1985, however, this analysis was for the most part halted and the research focus was shifted to other important areas. In using some of the TRIZ tools on today's problems – in a world, for example, that has become much more electrical and software based in its outlook – it is evident that they are not providing users with as much assistance as they could. With this in mind, a large programme of patent analysis was instigated in 2000 with the aim of extending TRIZ to accommodate the changes brought about by the advances that have taken place in business and technology since 1985. This paper presents an update on the research, examining patents granted during the two year period 2006-2007. Around 100,000 patents from this period have been analysed and added to the TRIZ knowledge-base. The paper describes the form, focus and findings of some of the research. The paper includes the following sections:

- Level of Invention. All of the patents included in the analysis have been assessed in relation to the five levels of invention specified during the original TRIZ research. The paper reports the shifting dynamics of invention level that has taken place over the last 15 years and specifically the last 2 years.
- Trends of Evolution. In addition to uncovering a number of technology trends that have not previously been observed, the paper reports on the work done to evolve the concepts of evolutionary limits and evolutionary potential, and describes how evolutionary potential radar plots have been constructed for all of the patents analysed. The radar plots are shown to offer means of not only comparing similar patents, but also to present means of benchmarking technologies against a set of global datum points. The paper demonstrates how the resultant 'global

bench-marking' capability is affecting the way companies think about their intellectual property and long term business aims.

- Contradictions. In this section of the paper we update previously published articles comparing the accuracy of the classical TRIZ Contradiction Matrix and the 2003 updated version. We focus on random samples of patents granted in 2006 and 2007 and assess how well the contradiction-challenging strategies being used by inventors in these two years compare to the strategies that the two matrices would have recommended.

The paper ends with a short section examining the importance of maintaining an active programme of patent analysis, the need for customisation for different companies and industries, and finally a description of planned future work.

#44

On Patentability of Inventions Facilitated by TRIZ Methodology

Tzu-Chang CHEN (Taiwan Textile Research Institute, Taiwan)

This article aims to enclose the relationship between the inventiveness based on a systematic innovation approach (such as TRIZ) and the patentability based on patent examination procedure (such as MPEP), and will propose a feasible way to improve both inventions and their intellectual proprietary protection. A detailed examination of concepts generated by aid of TRIZ methodologies, their corresponding prior arts and prosecution history is performed. Some conclusions are drawn about the causes of rejection of inventions, and some suggestions are proposed as guideline for effective invention and patent application.

#45

Introduction of USIT in Japan
－A New Paradigm for Creative Problem Solving －

Toru Nakagawa (Osaka Gakuin University)

One of particular features in the TRIZ community in Japan in comparison to the World is its emphasis on easier and more unified way of studying and applying TRIZ. USIT (Unified Structured Inventive Thinking), originally developed by Ed Sickafus under the influence of SIT (in Israel) and TRIZ, has been introduced in Japan since 1999 and has been further improved and penetrated in Japan, as you see several USIT papers presented in Japan TRIZ Symposium last year and this year. USIT has been improved in Japan in the two principal aspects. First, all the TRIZ tools for solution generation, including 40 Inventive Principles, 76 Inventive Standards, Trends of Technical Evolution, etc., are reorganized into a system of USIT Operators, with 5 main methods and 32 sub-methods. Second, the dataflow representation of USIT has revealed a new paradigm of creative problem solving, which is named the 'Six-Box Scheme' in contrast to the conventional, widely-known 'Four-Box Scheme'. These improvements have provided a new solid basis of understanding, applying, and promoting TRIZ in an easier and unified way.

#46

USIT Approach for Compact Umbrella

MPUF （Microsoft Project Users Forum） USIT／TRIZ SOCIETY:
Kouichi Nakamura (SONY Corporation), Etsuo Yamada (MPUF USIT/TRIZ WG),
Minoru Takimoto (Fuji Xerox Corporation), Hirofumi Hasaba (MPUF Secretariat),
Noritaka Nakayama (Konica Minolta Technology Center, Inc.),
Hirotake Makino (Yokogawa Electric Corporation), and
Yuji Mihara (Creative Technology Institute Co., Ltd.)

MPUF (Microsoft Users Forum) is a NPO aiming at improvement in the quality of Project Management. The number of study groups is launched in about 20, the USIT/TRIZ study group was launched in April, last year, and it has been one year (about 150 membership). Members aim at improvement through an event, a seminar, a community, a study group, etc. about various subjects related to project management,
The theme introduced this time introduces the three main results obtained through Working Group activity of a study group.
1. Some ideas and introduction of trial product to folding umbrella by approach of USIT.
2. Various devices to approach of USIT.
①The primary cause analysis by a TOC thinking process, ②practical use of QFD in quality change graph,
③ Personification for Object ④Approach, verification of the template creation
3.USIT technique of a procedure (other techniques -- comparison verification with TRIZ/TOC/VE)

#47

Function-Oriented Programming Language Education for Secondary School Students Interpreted by ARIZ

Jung Suk Hyun, Chan Jung Park (Cheju National University, Korea),

Algorithm of Inventive Problem Solving, shortly ARIZ, is a part of theory of TRIZ invented by Altshuller. In this paper, in order to find an efficient way to teach programming languages to secondary school students, we solve two contradictions of Software characteristics with ARIZ. The first contradiction occurs between readability and efficiency of Software. The other contradiction occurs in the use of GOTOs, ie., between flexibility in representation and readability of Software. By applying ARIZ, we find out that in order to solve two contradictions, we have to use functions. In the education aspects, instructors have to teach how to use functions and how important they are for implementing better programs.

#48

Combined Use of the KT Method in Functional Modelling and the TRIZ Method in Idea Generation

Satoshi Okada and Setsuo Arita (Hitachi Ltd.)

TRIZ is a powerful method for problem solving and contains the step of formulating the problem into a functional diagram for obtaining the clews to later idea generation. The functional formulation, however, needs a lot of experience and time for identifying the problem causes. For finding the causes of problems, on the other hand, the KT (Kepner-Tregoe) method has a useful tool called 'Comparison Analysis'. The system of the current problem is simply compared with a similar case which was successful in the past. This Comparison Analysis is much easier to find out the causes of the problem, even though the later process in the KT method requires expert knowledge for solving the problem. Thus, we propose here a process combining KT and TRIZ methods. In the framework of problem solving with TRIZ, the step of drawing functional diagram adopts the Comparison Analysis of KT while other steps, especially the idea generation step, are conducted with the TRIZ tools. This method was applied to a practical system and was confirmed to be effective.

#49

Tributes to the Work of Victor Schauberger (Austria 1885-1958) with the Eyes of TRIZ

Wolfgang Sallaberger (congelo, Austria)

Victor Schauberger was a forester in the Austrian mountains. He observed and studied nature a long time. He created the slogan ”understand and copy nature” (he used the word bio technique around 1920). The main part of his work was about Water. The work brings us to Helix of flow and Energy. Helixes are found in our DNS, in flowing rivers, in the air and in many other things of our environment. As Water is in nearly everything, even in a burning flame, and it covers around 70% of the Earth, everywhere we find Water we will find Helixes and their energy too. This paper should open the door to that knowledge of Schauberger about Water and its motion with the eyes of TRIZ (Talking about Water nearly means to talk about everything). Science/bionics lately found out that Shark Skin produces little Helixes and helps to save energy. Schauberger found out things like that much earlier than others did. He was a man of the Future, whose secret we can recognize only with the eyes of TRIZ.

#50

Extension of the S Curve Trends: Increasing Completeness as it applies to each chemical system componen

Stephen K Wagner (Intel Corporation, USA)

Looking at one of the system components of common engineering systems we find that the level of chemical completeness or the trend toward becoming inert in chemical reactivity is observable. An example of this is that of per-fluorinated polymers such as PTFE Teflon®. As plastics are continually being developed we find that the inertness increases over time until Teflon® like materials are included in the engineering system to prevent unwanted chemical reactions and interactions. Examples with metals exist in chosen engineering systems especially metals for use in semiconductor processing tools. We see the move from steels and simple alloys, to aluminium then to Iconel and Hastelloy in order to provide inert-ness or chemical completeness to better shield the tools from undesirable reactions i.e. corrosion, pitting, and micro-erosion.

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