TRIZ Forum: Conference Report (12)

Personal Report of The First TRIZ Symposium in Japan

Held by the Collaborative Board of TRIZ Promoters and Users in Japan on Sept. 1 - 3, 2005, at Shuzenji, Izu, Japan

Toru Nakagawa (Osaka Gakuin Univ., Japan),
Oct. 9, 2005
[Posted on Oct. 12, 2005]

TRIZ Home Page in Japan Jap.

Jap. buttons guides you to the Japanese pages.
Japanese translation of this page is not scheduled.

Editor's Note (Toru Nakagawa, Oct. 9, 2005)

We have just held the First TRIZ Symposium in Japan with over 100 participants. Here is a brief report of the Symposium for the purpose of introducing the TRIZ event in Japan to people over the world who are interested in TRIZ and its applications.

The facts and records of the Symposium Engl. Jap. are already posted in the Official Page of the 'Collaborative Board of TRIZ Promoters and Users in Japan' (or 'Japan TRIZ CB') Engl. Jap. , located currently within the 'TRIZ Home Page in Japan'.

The present report is written personally under a delicate balance between formal and informal; this is because there is no need to write a formal report (if you want it, you should just go to the Official Page) and I want to write just another 'Personal Report' of a big TRIZ conference as I did so far for TRIZCONs in the US Engl. and ETRIA TRIZ Future Conferences in Europe Engl.. It is certainly a role more suitable for me to introduce you the activities in Japan than to introduce those in the US and in Europe. However, since I have been responsible for the TRIZ Symposium in Japan as the Chairperson of its Program Committee, there is a natural border what I can write personally.

Anyway this report intends to introduce the current state of TRIZ activities in Japan to the global TRIZ community.

Contents:

Page top	1. Outline	2. Organization	3. Keynotes	4. Vendors' Session	5. Promotion in Industries	6. Methods
7. Case Studies	8. Closing Discussion	9. National AND International	Absracts of Presentations	First TRIZ Symposium	Japan TRIZ CB	Japanese page Jap.

1. Outline of the Symposium

Name of the conference:	The First TRIZ Symposium in Japan
Date:	Sept. 1, 2005 (Thu.) 14:00 -- Sept. 3, 2005 (Sat.) 15:00 (2 days and half)
Location:	Laforet Shuzenji, Shuzenji, Izu, Shizuoka, Japan (A resort training facility, located about 150 km southwest of Tokyo)
Held by:	Collaborative Board of TRIZ Promoters and Users in Japan (Abb. 'Japan TRIZ CB') (Chairperson: Toshihiro Hayashi (Hitachi Co.))
Participants:	104 in total (100 from all over Japan, and 4 from overseas)
Presentations:	2 Keynote Speeches, 15 Oral Presentations + 4 Poster Presentations

2. Organization of the Symposium (with some pre-history)

The Symposium was organized by '**Collaborative Board of TRIZ Promoters and Users in Japan** Engl. Jap.. Let me explain about the 'Collaborative Board' (or 'Japan TRIZ CB') first:

In the early days of introduction of TRIZ in Japan, TRIZ was promoted actively by a publisher (Nikkei BP) and by software tool vendor agencies (Mitsubishi Research Institute and SANNO Institute for Management). TRIZ promotion activities in Japan have had separated streams in reflection of the competition among US-based vendors. Industrial users have been trying to adopt multiple streams, willingly or unwillingly. There were many seminars and trainings conducted by these promoters, but the opportunities were rather limited for TRIZ users to present their experiences and to discuss on TRIZ. MRI has organized, since its start of promotion, Users' Study Group which meets monthly, and Users Group Meetings once every year. With getting better understanding of TRIZ, industrial users wanted to have a more unified TRIZ community in Japan.

In March 2004, an informal discussion meeting started and it grew up to form a voluntary organization 'Japan TRIZ CB' in February 2005. The name of the organization well reflects its intention: 'Collaborative Board of TRIZ Promoters and Users in Japan'. All the active TRIZ promoters in Japan have joined this CB, and representative TRIZ users (mostly industrial and some academic) have been working to lead the CB. Based on the preparatory discussions, in September 2004, MRI served to organize 'Knowledge Creation Symposium, Shuzenji 2004' (See MRI site Jap., Nakagawa's paper Jap.) as the first symposium open to public in place of its Users Group Meeting. Since then, Japan TRIZ CB, having about 20 voluntary members, made its utmost efforts for organizing the First TRIZ Symposium in Japan.

For the voluntary group, organizing an open symposium was a big job. The CB first set the **goals** of the Symposium as:
(1) to make the Symposium widely open to all the promoters and users of TRIZ in Japan,
(2) to make it the opportunity for sincere and frank presentations, discussions, and communications among the people,
(3) to encourage presentations of promoters' views, users' experiences of internal promotion, and users' case studies of applying TRIZ,
(4) to make it a start of forming a sound and unified TRIZ community in Japan.

With these goals in mind, the Symposium was prepared in the standard way of academic conferences: calling for presentations on the abstract basis, setting a tentative program after the review, calling for participation, and accepting the submission of presentations, etc. As the result, the Symposium received an adequate number of good presentations, and more than 100 participants.

Some of the **decisions chosen** by the CB are mentioned here:
(a) Participants were expected to be mostly staff of TRIZ promoting organizations and internal

promoters and users of TRIZ in industries (and some in academia), hence mostly having some experiences in TRIZ -- in contrast to many novices in TRIZ.
(b) A resort training facility was chosen as the site, for the purpose of making intensive discussions in an intimate atmosphere. -- in contrast to a meeting hall or hotel in a big city.
(c) Three days from Thursday to Saturday were chosen -- in contrast to three weekdays (e.g. Wednesday to Friday).
(d) Single track of presentation was chosen for the purpose of presentation to and discussion among all the participants -- in contrast to double tracks.
(e) A slot of presentation was typically set 30 minutes of presentation plus 10 minutes of discussion -- in contrast to shorter (e.g. 20 + 5 minutes, like in ETRIA TFC 2004) or longer (e.g. total 60 minutes, like in TRIZCON2005).
(f) Promoter organizations were invited/encouraged to present their position papers and to make demonstrations of software tools, etc. -- in contrast to limit their presentations and partly-commercial activities.
(g) A session of poster presentations was arranged for parallel presentations to smaller-sized groups (and a short oral session was carried out for introducing all the posters briefly (in 5 minutes each) -- in contrast to either squeezing them into the oral presentations or else rejecting them.
(h) In the Proceedings, one-page abstract (with extended explanation) and presentation slides were published for each presentation (with an optional full paper), for the purpose of reducing the burden of preparation -- in contrast to requesting a short abstract and a full paper for the publication.
(i) Presentations in English were invited/accepted in a relatively small scale -- in contrast to no invitation or larger-scale invitation with simultaneous interpreter support. This point will be discussed later.

The Agenda Engl. Jap. and the Abstracts of Presentations Engl. Jap. are already posted in the CB's Official Page in English. Two Keynote Speeches are also posted in this Web site both in English and in Japanese. All other presentations are going to be posted in this Web site in their original language (i.e. mostly in Japanese only).

3. Keynote Speeches

The first Keynote Speaker was myself. (It is an unusual case that the Chairman of Program Committee gives a Keynote Speech. But in fact, I was requested by the CB to give a Keynote Speech first and then also to serve as the Program Committee Chairman.)

Toru Nakagawa (Osaka Gakuin Univ.) Engl. Jap. gave a Keynote Speech at the beginning of the Symposium with the title of 'A New Generation of TRIZ'. It says (as quoted from my brief introduction in the 'New Information' page of this site):

> Along the progress in penetration and understanding of TRIZ, it has become clear that the confusing situation of TRIZ overall procedure and the missing in establishing the overall structure of TRIZ are the root causes for the obscurity in TRIZ for novices. It is necessary to extract the essences of TRIZ, unify and integrate them, and re-structure them in a way easy to understand and effective to apply. This is the process for creating a new generation of TRIZ. The present author believes that USIT has been developed towards this goal. In particular, the Six-Box Scheme in USIT provides a new paradigm for creative problem solving.

Darrell Mann (Systematic Innovation, UK) Engl. Jap. gave the second Keynote Speech in the second-day morning. His title was 'TRIZ Critical SWOT: Systematic Innovation Today and Tomorrow'. Please read his own abstracts and the whole slide presentation posted in a separate page. For brevity, here shows my summary of his talk:

> TRIZ is approaching a critical point in its history, either becoming widely adapted in the world or shrinking into cult-like obscurity. Thus, in this presentation, the strengths, weaknesses, opportunities, and threats of TRIZ are examined. The biggest threats for TRIZ is that the people who follow the tradition of TRIZ would not help make TRIZ adaptable to the world. The isolation of TRIZ from academia and from policy making must

be overcome. On the other hand, many big (technical) problems for the human kind are waiting to be solved; these are the big opportunities for TRIZ.

It is remarkable that Darrell Mann shows his strong feeling of crisis of TRIZ. He writes in his abstract as:

> "... The presentation will also explore the dangers and pitfalls of case studies, why people don't buy into change, and why those most knowledgeable about the method are probably the least well suited to help promote it. ..."

I share his feeling. I remember Victor Fey's very controversial Keynote Speech given at ETRIA TFC2004 Engl, saying "Don't Touch TRIZ!". After Fey's speech I wrote my TRIZCON2005 paper on 'Overall Structure of TRIZ/USIT' Engl and extended the thought further for giving the Keynote Speech in this Symposium.

Probably, the TRIZ community in Japan seems to have established the position which have already adopted various streams of TRIZ in the world and yet try to extend TRIZ further to adapt it to the real industrial needs. This position was obtained partly because TRIZ has been introduced mostly through written articles and occasional personal communications and without cases of immigration/hiring Russian TRIZ experts. This style of introduction took longer time to learn TRIZ but gave us freer position in thinking and using TRIZ. You will see theses points later in this report of the Symposium.

The isolation of TRIZ from academia and from policy making is a rather serious problem in Japan. European universities seem to work more actively in collaboration with industries and in EU/nation-budgeted projects. The weakness to the link to academia may be seen that we had only two participants coming from academia except SANNO and OGU.

Darrell Mann listed several contradictions which TRIZ is facing with. Above all, the most important contradiction for TRIZ is 'Simple AND Complex'. Though Darrell did not show how to solve it, Nakagawa's Keynote is directed to the solution of this contradiction in TRIZ.

4. Special Session of Presentations by Four TRIZ Vendors/Promoters

One of the most important features of this Symposium was that all the currently active TRIZ promoters in Japan joined together. Thus we organized a special session by the four (commercial) promoters, i.e. MRI Systems, SANNO Institute of Management, Sozo Kaihatsu Initiative (SKI), and IDEA.

At the initial stage of setting up this special session, the promoters did not like to give presentations in a parallel manner because they think they are different from one another and are not competing in the same field, they say. However, it has been a big desire of industrial users to learn the differences among the promoters and to get information which promoter(s) are most suitable for their own company. In 1990s we had agencies (and their dealers) of TRIZ software vendors, but recently TRIZ consulting firms have played important roles. Thus we asked the four TRIZ promoters (or TRIZ service providors) to talk about their philosophy, their activities, and their strong points, as frankly as possible. So, in the Symposium, the four promoters gave their presentations for 30 minutes each (including 5 minutes of Q&A) and then we had a general Q&A session of 30 minutes.

The four promoters gave their presentations with the following title:

(1) **Yoshihisa Konishi (MRI Systems** (i.e. a subsidiary of MRI)): Approach of MRI/MSYS for Introducing and Disseminating TRIZ: ITD (Innovative Technology of Design) and IMC Software Tools

(2) **Manabu Sawaguchi (The SANNO Institute of Management)**: Study of TRIZ Techniques at SANNO: TRIZ Thinking Used as the Core of a Engineer Education Program

(3) **Masatoshi Hotta (Sozo Kaihatsu Initiative)**: SKI's Approach for Penetrating TRIZ:

Mann's Systematic Innovation Method and CREAX Software Tools

(4) **Mamoru Zenko (IDEA, Inc.)** : What do you want to do with TRIZ?

See their Abstracts Engl in the Official Page.

Nakagawa coordinated this special session; and in the final Q&A session he showed the following table and asked the four promoters to give summary talks of their activities in these categories.

Table. TRIZ Service Vendors: Vendors' Activities and Users' Needs

	MRI Sys	SANNO	SKI	IDEA	Others
Scope (TRIZ and relevant area)					
Providing or recommending TRIZ methods					
Providing or recommending TRIZ software tools: features and characteristics of the tools, Japanese editions, pre- and post-services					
Promotion activities to users: Web site, News Letters, Announcements, sales activities, users organizations, study group meetings, conferences					
Activities for penetration of TRIZ (Open/closed/in-house): Seminars, trainings, courses					
Consulting (coaching/promotion/contract research)					
Publishing (textbooks, etc.), Journals,					
Alliance/partnership organization					
Any other, what users want					
number of active staff, staff education					

It is tempting to fill in this table according to my understanding, but we should better wait for the promoters to write a summary of their own activities.

In the 'Others' column we wanted to have 'Nikkei BP'. In 1990s the publisher played a very important role to introduce TRIZ through their monthly journal ('Nikkei Mechanical'), textbook series, and open seminars. But for these four years, after Mr. Tsukasa Shinohara moved to other position in the company, the journal have published very few articles on TRIZ. It is a pity that Nikkei BP did not take part in the CB and in the Symposium. Probably, "TRIZ Home Page in Japan" should also be listed in the 'Others' column in order to make this table represent the current promotion activities in Japan.

At the session of **Closing Discussion**, the biggest topic requested by the participants through inquiry sheets was 'Why the TRIZ software tools are so expensive?'. MRI Systems (as the agency of IMC) and SANNO (as the partner of III) responded the question (but I dare not to write a summary of their answers here). (It should be noted that TechOptimizer and IWB software tools were converted into Japanese in 1999 and in 2000, respectively.) SKI (as the agency of CREAX) also answered, but mentioned that the conversion of CREAX software tool into Japanese is not undertaken yet.

5. Introducing and Promoting TRIZ within Industries (See Abstracts in Engl. Jap.)

Presentation by **Koichi Kumagai (Matsushita Electric Industrial Co.)** was very frank and impressive on this topic. Their promotion activities may be summarized as:

> Matsushita Electric Industrial (MEI) Group companies have been promoting QSD (i.e. adapted version of Taguchi Method) since 1989, forming the basis of introducing TRIZ, TRIZ-DE, and QFD more recently since 1999 - 2001. A subsidiary company, Panasonic Communication Co. (PCC), started their very active promotion of these four methods (in a step-wise manner of introduction) around 2001 (See Jap.), and now serves as the pioneer organization for spreading TRIZ (and other methods). Production Process Innovation Center, i.e. Kumagai' group, works to coordinate a large number of branch offices working for the promotion of these four methods in each business unit.
>
> In the whole MEI Group companies, TRIZ were taught to about 3000 engineers, and were applied to about 1000 projects resulting about 3000 inventions during the period from 2002 to July 2005. MEI group has already established many engineers who are working full time as in-house TRIZ consultants/instructors, over 40 in PCC and over 10 in other parts of MEI.
>
> We teach TRIZ to our engineers and researchers in the TRIZ Practice Schools, having 5 to 7 full-days spread over about 2 months for solving their own problems in groups of about 4 members each under the Instructors' guidance. The emphasis is placed on the understanding of the root causes and mechanisms of the problem and on generating a wide variety of ideas using TRIZ tools. For conducting such activities, the promoters/instructors must be able not only to explain the methods but also to solve various problems for themselves. Thus we are running meetings of TRIZ study among the promoters/instructors.
>
> We are also working onto engineering managers and executive managers in the forms of managers trainings and seminars. Recognition and understanding of TRIZ and its merit by these managers are essential for the penetration of TRIZ. Company-wide Forums are also held to present the results of the projects and to have discussions and communications across divisions.

Promotion activities of TRIZ in various companies are mentioned as parts of the following presentations:

> **Hitachi Co.** (by **Setsuo Arita et al.** and by **Fuminobu Takahashi**): In the company-wide movement 'Hi-Speed 21' (1999-2002) and 'Hi-Speed Next' (2003-), TRIZ (as well as QFD, Taguchi Method, and Digital Engineering) have been promoted in the top-down style. The TRIZ trainings and applications to projects have been done in the scale even slightly larger than the Matsushita MEI Group. Most of the promoters of TRIZ inside Hitachi are working on TRIZ half-time, having their own engineering/managing jobs.
>
> **Matsushita Electric Works** (by **Koji Tsuji et al.**) [not counted as a MEI Group company]: During 2000-2002, TRIZ was introduced in a research division mostly using TRIZ software tools but faded. Since 2004, USIT in-house training has been tried three times to learn it by solving real problems. IP and R&D management departments are now promoting USIT training by in-house instructors. (See their earlier presentation in Feb. 2005 Jap., as breifly introduced in Nakagawa's TII Seminar report Jap.)
>
> **NISSAN Motors Co.** (by **Kimio Nishimura**): TRIZ (and USIT) have been promoted in NISSAN with the leadership of Intellectual Property Division. In an engineering department of the author, TRIZ/USIT has been applied in regular meetings of Patent-Net Construction to examine the current states of technologies and to generate many new ideas. All the 200 engineers of the department are already taught on TRIZ/USIT in its essence to have a common language in such activities.

Kawasaki Heavy Industrial Co. (by Makoto Unno): With the leadership of the VM (Value Management, or VE) team, TRIZ has been promoted in KHI since 2001. TRIZ (in the form integrated in VM) has been applied to over 10 real projects, and basic TRIZ training course have been taught 2-3 times a year with their own course materials. Activities of **TRIZ Study Group in Kansai Branch of Japan VE Association** have been helpful since 2003 for the promotion of TRIZ in about 20 member companies.

6. Methods of Applying TRIZ (See Abstracts in Engl. Jap.)

Several presentations have their most emphasis on the methods of TRIZ:

Setsuo Arita et al. (Hitachi Co.) investigated in the usage of TRIZ Contradiction Matrix, particularly in the comparison between the Classical Matrix and the new Matrix 2003. They have applied the two matrices to problems in seven different fields, i.e., industrial system, traffic system, IT system, materials problem, optical device, business database, and simulation software (where 2 of them are unsolved real problems, while 5 are trials afterwards). They have concluded that Matrix 2003 is easier to use, especially in identifying the parameters, and more effective in recommending appropriate Inventive Principles.

Masahiro Kuwahara (IDEA), an active TRIZ consultant, presented their method of applying TRIZ to real projects, with an example of 'grass mower problem'. They put much emphasis on the function/attribute analysis and on identification of root causes. On such a basis, they encourage the project members to generate a large number of ideas (such as 500 ideas), by using the approaches through Technical Contradictions, Harmful/Insufficient functions, and Physical Contradictions. Then they try to combine those ideas to build up effective conceptual solutions for various subsystems and then for the whole system. After reviewing and evaluating the ideas and solutions, they finally select the conceptual solutions for 1 , 3, and 5 years in future. This is the scheme of applying TRIZ to real industrial problems, and has been proven strong and effective in a number of customer companies, they say.

Toshio Takahara (an engineer retired from Fujitsu) gave a theoretical paper on the Objects; in addition to substances and information, he regards 'processes' as a kind of Objects. This makes the understanding of time-dependent phenomena easier, he says. He is interested in the framework of TRIZ, USIT, and ASIT.

Ik Cheol Kim (Tecinfo, Korea) wrote his paper in English and his slides in Japanese, and gave a talk in Japanese, to our surprise. His title is 'Understanding and Analysis of Problem'. He says that even though a large number of tools (including TRIZ) have been developed for solving problems, people make many mistakes and cannot use those tools properly because they fail in finding and defining problems. He showed various equipments in everyday life and asked the participants to 'find problems in them' (this was a very interesting exercise). Then he went on how to classify possible types of problems. He has reversed TRIZ Principles to find the types of problems they can be addressed to. For example, the Inventive Principles #1 Segmentation, #2 Taking out, and #3 Local Quality are all related to 'separate things to solve a problem', thus by reversing the logic they are going to handle problems of 'Concentration' (i.e. un-divided things), i.e. Problem type 13. In this manner, he has shown 31 types of problems classified by their real causes. They are:

> Lack of knowledge, Lack of resource, Psychological inertia, Error of recognition, Contradiction, Error of communication, Mis-choice of problem, Huge problem, Regulation, Change of rule, Error of system, Error of method, Concentration, Distribution, Low efficiency, Hard/soft, Hard to control, Hard to measure, Difference, Weakness, Harmful, Direct/indirect, Error of condition, Stable/unstable, Feedback, Efficiency of space, Balance/unbalance, Time, Shape, Over/lack of field, and Insufficient evolution (Ideality).

Hideaki Kosha (Fuji Photo Film Co.) also gave a presentation about the early stage of problem solving. He has been using USIT since 2000 and have applied it to solve the problems in over 40 projects in his company. During such practices he has found that many people feel difficulties in finding root causes of problems. The basic concept of Objects-Attributes-Functions in USIT need to be further combined with

the concepts of harmful effects and problems, he says. In a number of problems he encourages to analyze the time dependence of phenomena at the early stage of problem definition so as to find real mechanisms and root causes of the problems. He calls the process as Phenomena-Attribute Analysis.

Kimihiko Hasegawa (Sano & Associates International Patent Firm) proposed to write patent specification as a part of creative activities, in the sense that the patent writing clarifies and strengthens the creative problem solving. The logic requested in the patent application documents is essentially the same as that for completing and recording creative problem solving in R&D; thus the two kinds of work can support and enhance each other, he writes.

Toshimitsu Kataoka (Pat-Brain) also gave a presentation for integrating the patent writing with creative problem solving. He has reported about a university-industry partnership project for developing a language, named Patent Claim Markup Language (PCML), for describing the patent claims in a structured way.

Shinsuke Kurosawa (SANNO Institute of Management) gave a unique presentation 'TRIZ:Its Philosophy and the History' at the Poster Session. Since he has an experience of working in Moscow for six years during 1980s as a sales engineer of a Japanese manufacturing company, he can read and speak Russian fluently. Thus, studying the TRIZ classics directly in the Russian texts, he writes in his abstract as:

> In 1956 on No. 6 of "Issues of Psychology", G.S. Altshuller, together with R.B. Shapiro, published the paper "On Psychology of Invention", which can be regarded as the TRIZ Manifest. In 1986, to the end of his creative activities, Altshuller wrote another paper titled "The History of ARIZ Development" as a manuscript for his lecture, where he explains the steps of ARIZ development up to his last version ARIZ-85-C and directions of its further development. There is no reason that we should stick to his TRIZ idea. We believe, however, studying what the founder thought is helpful to understand the dynamism that is embedded in TRIZ as the system. It is also discussed where in the dynamism the TRIZ, that Sanno believes useful, is placed.

His presentation gave some vivid impression to many participants. We would like to read his full introductory paper on this topic in near future.

7. Case Studies Applying TRIZ to Real Industrial Problems (See Abstracts in Engl. Jap.)

In organizing the Symposium, the Program Committee (Nakagawa and Shigeru Kasuya (Fuji Xerox Co.)) placed much stress on case study reports. Some of the presentations which were mainly devoted for promotion activities or methods at first, were actually asked to include real case studies. Thus the following presentations describe real industrial case studies to some detail:

Setsuo Arita et al. (Hitachi Co.) describes a case study of devising a micro-reactor for evaluating the characteristics/performance of disposing radio-active wastes under the ground 300 m below. By the use of Contradiction Matrix they have obtained an idea of the device useful for various rock samples without leakage of radio-active water solutions.

Valery Krasnoslobodtsev and Richard Langevin (Technical Innovation Center, USA) gave a presentation with the title of 'TRIZ Application in Development of Climbing Robots'. This paper describes a real project of developing wall-climbing robots, carried out from 1986 to 1998 at St. Petersburg State Technical University (ex USSR and Russia). The basic devices of the robot are the feet with vacuum suction. The difficulty at the initial stage is to make the suction of the feet effective even for the walls or glasses with small cracks. It is very interesting that they solved the problem by dividing the foot into smaller suction cells having elastic diaphragms. They explain this idea of elastic diaphragm in terms of 'Smart Little People' (this idea of elastic diaphragm is so nice that it was not easy for me to understand at first). The evolution of their devices for 12 years of actual development is explained with TRIZ views. It is of particular interest that Valery describes his TRIZ-way of thinking process all through these development, just as he did in another case study presented in TRIZCON2005 (See Nakagawa's Personal Report Engl.).

Masahiro Kuwahara (IDEA) uses a case study of 'a hand-held grass mower problem' in explaining his method. The case was developed inside the consulting firm for the the purpose of demonstrating their method in various aspects.

Akihiko Noda et al. (Fuji Xerox Co.) reported a real case study of 'USIT Application in the Subject of the Relief Character Printing'. The eight co-authors seem to be the joint group of the members of 'TRIZ Study Group' and the engineers of the subject. The relief characters are printed with foaming toners on paper; they are strong against the pressing force in the vertical direction but weak in the horizontal direction to be scratched off easily. The problem situation was examined with electronic microscope. The problem was analyzed with the Particle Method in USIT and a large number of solution concepts were obtained. After the experiments, one of those solution concepts was found most effective to solve the problem. The problem solving with USIT was carried out with three meetings of 6 members for 2.5 hours each. The case was developed three years ago in the relatively simple way of applying USIT. Detailed description of a simple way of USIT application makes this case study useful for people who want to learn USIT. (Fuji Xerox has been active in publishing their TRIZ case studies, in 2001 Jap. and in 2003 Jap. .)

Fuminobu Takahashi (Hitachi Co.) gave an interesting presentation on 'Comparative Functional Test of TRIZ-AFD and KT-PA in Failure Analysis using Actual Product Accident Information'. He writes in the abstract as:

> Performance for investigation of the real accident cause has been comparatively examined by two different teams, one using TRIZ-AFD (Anticipatory Failure Determination) and the other using KT-PA (Problem Analysis). The two technical teams were composed of 3 researchers each. The KT-PA team began a discussion to select questions for a person who carried out an examination, in order to resolve the lack of information. The TRIZ-AFD team discussed the accident phenomena with poor information, but they could successfully construct a lucid genealogical diagram of the accident phenomena. Although they could not get the correct cause because they failed to delve into a significant guidance which would have given them access to it, only a three hour examination proved the usefulness of TRIZ-AFD for investigation of causes in real product accidents.

The author is a manager for handling various claims from customers and carried out this comparison test for introducing good techniques for failure analysis. The Kepner-Tregoe (KT) team contained two KT instructors while the TRIZ-AFD team had researchers just trained in the method, he says. The two teams were noticed beforehand about the aim of the comparative experiment and the intention of future publication of the results. The problem used is the electrical leakage at the connection of two high-voltage cables which were connected with a special device. The processes and results of the two teams were recorded well. Thus, this is a nice example of evaluating two methods in a real case.

Hideaki Kosha (Fuji Photo Film) demonstrated his USIT method with a case study of a problem in the photo-etching process. A layer of insoluble photosensitive polymer is irradiated with an IR laser in a specific pattern so as to make the irradiated/heated part soluble in an alkaline aqueous solution. When the layer is thick, the laser cannot reach the bottom of the layer and leaves partially insoluble. The micro-processes in this problem was analyzed in detail; and the problem was solved with the concept of using a special photo-sensitive polymer which becomes transparent when heated.

Makoto Unno (Kawasaki Heavy Industrial Co.) presented his VM-TRIZ method with a case applied to 'the development of the concentration equipment in a waste-water treatment plant'. First they analyze the historical evolution (for these 40 years) of the whole plant system and estimated various patterns of further evolution (with the use of Trends of Evolution) and get a number of ideas. Then they further analyzed the core device, i.e. the equipment for concentrating the sewage with a vacuum evaporation, to find its various aspects of the problem. In this analysis, they use a hierarchical diagram of undesirable effects and their causes, and regard each effect/cause as a problem to solve. Then they apply various TRIZ tools, such as Inventive Principles through Contradiction Matrix and Separation Principle through Physical Contradiction formulation, etc. They have found 70 ideas for improving the whole process and 60 ideas for the concentration equipment. This approach seems to be quite systematic to solve various aspects of the problem.

As described so far, several case studies were reported in some detail explaining the problem, the process of thinking, applied methods, ideas, and conceptual solutions. We should keep this kind of open attitude and make the presentations/discussions fruitful on the basis of give-and-take among the participants.

8. Closing Discussion and Miscellaneous Topics

At the end of the Symposium, **Shigeru Kasuya (Fuji Xerox Co.)** coordinated the Closing Discussion for 60 minutes. Every participant was handed an inquiry sheet at the start of the Symposium and was requested to write any topic to be discussed at the Closing Discussion. Kasuya summarized the answers from the participants and showed the topics of interests in the order of number of requiring participants. Discussions on such topics are briefly summarized here:

(a) TRIZ Software tools:

Q: TRIZ software tools are too expensive for many users. Is there any possibility/means to lower the prices? (Simpler and less expensive software tools are necessary.) -- from 20 participants

See Section 4 (Vendor Session) in this report.

(b) Application of TRIZ to software and IT systems:

Q: TRIZ seems not applicable to the fields of software and IT systems. How should we do to extend TRIZ to apply in such fields? -- from 6 participants

A (**Toru Nakagawa**): There are already a number of cases where TRIZ (and USIT) are successfully applied to real problems in software and IT field, but unfortunately they are rarely published yet in its detail due to companies' secrecy policies. See the reports by **Arita (Hitachi)** and **Tsuji (Matsushita Electric Works)** in this Symposium. I believe there are several more Japanese participants in this Symposium who have such experiences.

It is now almost a common understanding among pioneering TRIZ consultants that software and IT problems can be solved with TRIZ (and USIT) in a very similar way to other hard-technology field. Information to be handled may be regarded as a kind of Objects and the software procedures as a kind of devices (or functions). In this sense, various analysis methods in software engineering are almost the same with the functional analysis in hard-technologies. Thus various TRIZ methods are applicable with very little barriers. (See also Nakagawa's paper on 'Software Engineering andTRIZ (1)' Jap. Engl.)

Darrell Mann is the top leader in this field as well. He has a lot of experiences of solving software-related problems, of analyzing a huge number of US patents in the software and IT fields, of developing the Contradiction Matrix customized for the filed of software development. He has written a textbook "TRIZ for Software Engineers" months (if not years) ago and is going to publish it in a month (or in several months?).

(c) Application of TRIZ to non-technology fields:

Q: We should try to apply TRIZ to non-technology fields such as business and management problems. How can we do? -- from 4 participants

A: **Atsuko Ishida (Hitachi Co.)** has submitted her paper on 'Comparative Study of Two Contradiction Matrices Using Business Model Creating Method' to the Poster Session of this Symposium, but is not able to attend here unfortunately. Her abstract is:

> In 2003, I tried to use 40 Inventive Principles and a Contradiction matrix of TRIZ, to create innovative business models and products. It consisted of 2 phases. In the first phase, we defined essential subjects and contradictions on business, and made a "Business idea database" using TRIZ. In the situation, we defined a "business/products strategy

classification" and an "information technology classification" which represented current and future business and technology. In the second phase, I proposed a process of conceiving innovative business models and products, using the "Business idea data bases" made in the first phase.

In this paper,I applied Matrix 2003 for making "Business idea database", and estimated quantity/quality of created ideas. With the result I also evaluated my methodology's dependence on contradiction matrix of TRIZ. As a result, it was found that Matrix 2003 could be more effective to create reasonable ideas for business solutions systematically, than using traditional one.

Darrell Mann has published a textbook: "Hands-On Systematic Innovation for Business and Management", IFR (2005).

(d) Penetration of TRIZ into Academia and into Education:

Q: What is the current situation of TRIZ with respect to the penetration into education, including in elementary schools and high-schools? Penetration of TRIZ into Academia should be necessary for TRIZ promotion. -- from 4 participants

A (Toru Nakagawa): As pointed out in Darrell Mann's Keynote Speech, link of TRIZ with academia and education is important but still very week today in Japan. Let me explain the current TRIZ situation in Japan from the higher education to the elementary education:

In the universities, TRIZ has been taught in Osaka Gakuin Univ., SANNO Institute of Management, The Univ. of Tokyo, Kanto Gakuin Univ., Shibaura Technical Univ., Yamaguchi Univ., etc. to some and different extents. The connection of TRIZ in professional academic societies is still quite weak and need to be improved.

I do not have chances of talking about TRIZ to high school students yet, and do not have opportunities of accessing to and from high school teachers in relation to TRIZ. Some other people may have such opportunities.
-- Akira Mochizuki (NISSAN Motors Co.) responded that he had a chance of giving a talk about TRIZ to students at the high school he graduated.

Concerning creativity education based on TRIZ, I posted a full course-ware of "Creative Imagination Development (CID) Based on TRIZ" for Children of the 1st to 3rd grades of elementary schools Engl. The 6 volumes of children's workbooks and teachers' guidebooks were written by Natalia Rubina, Petrozavotsk, Russia, and were translated into English by Irina Dolina, Tokyo, and were posted in English in "TRIZ Home Page in Japan". I had about 20 communications so far with respect to the possibility of publishing them in English or in other languages; but the publication has not been realized yet. I wish to publish them in Japanese translation as well, but do not have a concrete plan of doing so yet.

(e) Making TRIZ easier to understand and apply

Q: We think that it is essential to make TRIZ easier to understand and to apply. -- from 3 participants

Comment by Takeshi Takahashi (Hitachi): Darrell Mann pointed out the Contradiction of TRIZ as it must be 'Simple AND Complex' and mentioned the necessity of break-through in this regard. I understand that Toru Nakagawa is proposing USIT as such a case of break-through, am I right?

A (Toru Nakagawa): Yes, that is the point! Simplification by trimming is not the way of such a break-through. 'Simplification by unification and re-structuring' should be the way. I believe USIT has been developed in this direction.

(f) Certification in TRIZ

Q: What is the current situation/plan of giving authorized certification to some people in TRIZ? -- from 2 participants

A (Yoshihisa Konishi (MRI Systems)): In MRI Systems and its Users Study Group, we once surveyed and discussed such a topic. In the world, there are certifications as TRIZ Masters (authorized by Mr. Altshuller), TRIZ Specialists (approved by MATRIZ (i.e. International TRIZ Association, Russia)), TRIZ Specialists approved by Ideation International Inc., and Certification approved by Invention Machine Inc. Some discussions have been carried out in Altshuller Institute (USA) and in ETRIA (European TRIZ Association), but no definitive directions have been decided yet because there are a lot of delicate issues relevant to the certification.

A (Shinsuke Kurosawa (SANNO)): As I talked in my Poster presentation, the philosophy and understanding of TRIZ itself has been evolving during the period of Mr. Altshuller and afterwards. In this relation, I think it not appropriate to try to fix TRIZ and to give certifications in such a fixed framework of TRIZ understanding.

(g) Cost of TRIZ consulting

Q: The cost of TRIZ consulting is rather high. Is there any possibility of reducing it, especially for academic users? -- from 2 participants. -- [No time for discussion]

(h) Real Strength of TRIZ

Q: What is the real strength of TRIZ? What are there that cannot be done without TRIZ? -- from 1 participant. -- [No time for discussion]

9. Nature of the Symposium: 'National OR International' or 'National AND International'

One of the most important issues in organizing the TRIZ Symposium in Japan is 'National OR International' and 'National AND International', and 'in Japanese AND in English'.

The principal aim of our Symposium is to promote TRIZ in Japan, which means 'National' and 'in Japanese' in the first approximation. But for promoting TRIZ in Japan it is nice to learn TRIZ in the world and to communicate directly/personally with researchers and practitioners from the world, which means 'International' and 'in English'.

Unfortunately, there are language barriers:
For Japanese people: Reading English is all right, listening English is OK for many but difficult for some, writing English is possible for some but needs a lot of work for many, speaking English is OK for nearly half and difficult for the other half.
For people from overseas: Reading/listening/writing/speaking Japanese is impossible for almost all; while reading/listening/writing/speaking English is OK for (almost) all.

A typical solution for an 'International' meeting to be held in Japan would be: English is chosen as the official language; papers, slides, presentations, and discussions are all done in English, and sometimes simultaneous translation of speech into Japanese is served to support Japanese participants. -- This solution is too much for Japanese (TRIZ) participants.

An ideal but very expensive solution for a 'National AND International' meeting would be: papers and slides are written in both languages, while presentations and discussions are simultaneously interpreted in both directions.

The choice we took in the 'First TRIZ Symposium in Japan' is to set both Japanese and English as the official language and characterized it as 'primarily National and slightly International'. The choice seems to be fairly good for Japanese participants but inadequate for overseas participants; we appreciate the patience of the four overseas participants (Darrell Mann, Valery Krasnoslobodtsev, Richard Langevin, and Ik Cheol Kim). Some trials we have made are:

Presentation by Japanese speakers (ordinary case, **J1**): Abstracts in Japanese and in English, Slides (and paper) in Japanese, Talk in Japanese (no interpretation).
Presentation by Japanese speakers (special case, **J2**): Abstracts in Japanese and in English, Slides (and paper) in Japanese and in English [projected onto two screens], Talk in Japanese (no interpretation).

Presentation by English speakers (ordinary case, **E1**): Abstracts in English, Slides (and paper) in English, Talk in English (no interpretation), Discussion in English (supporting Japanese people in translation when necessary).
Presentation by English speakers (special case, **E2**): Abstracts in English and in Japanese, Slides (and paper) in English and in Japanese [projected onto two screens], Talk in English (no interpretation), Discussion in English (supporting Japanese people in translation when necessary).

The special cases 'J2' and 'E2' in the above categories were carried out for the Keynote Speeches by Toru Nakagawa and by Darrell Mann and voluntarily for the presentation by Manabu Sawaguchi. According to responses from participants after the Symposium, these ways 'J2' and 'E2' seem to be nice to understand the work for both sides of people. For performing these ways, Japanese authors and Symposium organizers have to work harder just before the Symposium for translating the slides into English and into Japanese. (We did not choose sequential translation of speeches, so as not to waste time. And we did not choose simultaneous interpretation of speeches, because we cannot find good simultaneous interpreters who are familiar with TRIZ terminologies.)

In this manner, we would like to make our future 'TRIZ Symposium in Japan' to shift little by little from the current position of 'primarily National and slightly International' towards 'National AND International'.

We evaluate the 'First TRIZ Symposium in Japan' this year has achieved a lot for better understanding and application of TRIZ and for promoting TRIZ in Japan with much tighter and wider personal network. And we also hope that the publishing of presentations in the Symposium and of formal and informal reports of the Symposium help promote TRIZ in the World. We wish to meet some of you next year in our Second TRIZ Symposium in Japan!

Page top	1. Outline	2. Organization	3. Keynotes	4. Vendors' Session	5. Promotion in Industries	6. Methods
7. Case Studies	8. Closing Discussion	9. National AND International	Absracts of Presentations	First TRIZ Symposium	Japan TRIZ CB	Japanese page Jap.

General index	New Information	Introduction to TRIZ	TRIZ References	TRIZ Links	TRIZ News & Activities	TRIZ Software Tools	TRIZ Papers and Tech Reports	TRIZ Lectures	TRIZ Forum	General index Jap.
Home Page	New Information	Introduction to TRIZ	TRIZ References	TRIZ Links	TRIZ News & Activities	TRIZ Software Tools	TRIZ Papers and Tech Reports	TRIZ Lectures	TRIZ Forum	Home Page Jap.

Last updated on Oct. 12, 2005. Access point: Editor: nakagawa@utc.osaka-gu.ac.jp