TRIZ シンポジウム 2007
The Third TRIZ Symposium in Japan

TRIZ Collaborative Board of Promoters and Users in Japan 日本 TRIZ 協議会

Abstracts of Invited/Contributed Papers of The Third TRIZ Symposium in Japan, 2007

(In the order of submission)

August 2, 2007 (Compiled by Y. Konishi)

Part I. Invited Papers

I01 Keynote Lecture 1

Hierarchical TRIZ Algorithms

Larry Ball (Honeywell, USA)

This paper highlights some of the main topics covered in the book "Hierarchical TRIZ Algorithms". It discusses the genesis of the tool groupings and their order of use. An alternative to ARIZ is presented which employs extensive causal analysis. As an aid to this method, five more Separation Principles are discussed along with sub-principles and an algorithm for more directed use. Finally, a general invitation to participate in a collaborative book is presented.

I02 Keynote Lecture 2

Variation of System Properties for New or Improved Function

Simon Dewulf (CREAX, Belgium)

CREAX is proposing a performing, reliable, easy and efficient application of the TRIZ methodology. The **performance** gain is rooted in the translation of the TRIZ tools into *property-function* connections. This translation brings an entrée for the non-mechanical domains to benefit from the TRIZ-based methodology. The access of the philosophy is therefore more transferable and more complete. Since the translation to *property-function* connection is closer to engineering terms than the sometimes confusing TRIZ jargon, the completeness of the research in patent and knowledge resources becomes more **reliable**. As the *property-function* relation is closer to an engineering education, its usage is **easier** and allows the engineer to be trained, rather than educated. As the *property-function* relations are easily accessible and well described in various knowledge resources, the *computer aided* idea generation tools bring a large difference in research **efficiency**.

I03 Invited Paper 1

Design and Development Process Engineering Technologies and TRIZ – MOT for Design and Development Engineer –

Toshihiro Hayashi (T. Hayashi Professional Engineer Office)

In the recent era of quick change of market and diversification of values among the people, it is required to deliver, timely and speedily, highly customer-satisfied products to the market.

For this, it is important to capture requirements exactly, to design them rationally and leanly、and to implement quality products so as to prevent reworks in the later process or trouble after shipment. It is the important point how we can do them in front-loaded fashion in upper stream and/or in origin.

To realize this, it is necessary to recognize the design and development work, not as empirical skill and/or technological characteristics of the product but as engineering characteristics of each process, and to quantify, systematize and visualize each engineering process technology as sharable and transferable overt knowledge. These engineering process technologies have been developed individually and yielded prominent results at actual development site, so far. On the other hand, they were not necessarily effective in case of exceeding applicable condition or range.

Therefore, it becomes very important 1) to grasp tools, methods and methodologies, comprehensively and from point of bird's-eye views, that support engineering processes in design and development as the design and development engineering process technologies, 2) to apply some optimal method and/or tool in each engineering process stage and 3) to allow us to make clear decisions on engineering issues. This means that they give technological management methods for front-line engineers. So, I have called them another MOT (Management based *On* Technologies), compared with original MOT (Management *Of* Technology). In this lecture, I will offer commentary how we should grasp the design and development process engineering technologies and give place of TRIZ within it.

I04 Invited Paper 2

A New Intellectual Property Model for the Knowledge-based Society – A Brand Value Creation Model by the Intellectual Property –

Seiichiro Tamai, PhD (Matsushita Electric Industrial Co., Ltd., Japan)

Japan is promoting an intellectual-property (IP) based national plan which has proven to be effective in creation of and in protection of IP's to some extent.

However, there seems to remain serious issues such as practical utilization of IP's and lack of recognition for IP's by the people in this country.

As a result of having searched essence of this issue, the author reached a conclusion that this is a result of separation of products and IP's.

Then, a brand value creation model by intellectual properties (an intellectual property brand model) is proposed as a model that could resolve the above issues.

This model aims at value creation of the products and of the companies by positively disclosing the IP's used in the actual products and providing customer benefits. It also aims at formation of a barrier against the action of new participation into the occupied market. This is a model that integrates products and IP's; it enables one to sustain competitiveness and to form loyalty by receiving an intellectual property feedback from the market.

I05 Tutorial 1

Procedure of TRIZ and actual problem solving method

Narumi Nagase (Panasonic Communications, Japan)

TRIZ is "Theory of Inventive Problem Solving".

Mr. G. Altshuller originated and established the methodology since 1946 in the former USSR.

This basic tutorial is assumed for the following person.

・Person being interested in TRIZ

・Person of about one year after it begins to promote TRIZ

We introduce the basis of TRIZ and the case with use.

In addition, it introduces an important point on actual problem solving.

Moreover, it introduces a soft tool that helps the use of TRIZ.

I06 Tutorial 2

Future-Generation Product Planning Activities Based on “the Patterns of Technical Evolution” – Implement Innovation Activities –

Manabu Sawaguchi (The SANNO Institute of Management, Japan)

In this tutorial, I would like to introduce “The Method for Planning the Future Generation Product Concepts” based on “the Patterns of Technical Evolution” organized as one of TRIZ techniques. Generally speaking, a series of TRIZ techniques developed by Altshuller, who is founder of TRIZ, during the age of former Soviet Union, is called “Classical TRIZ”. On the other hand, after the collapse of Soviet Union, “Applied TRIZ techniques” sophisticated in Western countries (some European countries, the United States, Japan and Korea etc.) for real projects are called “Contemporary TRIZ”.

In addition, we are able to classify a series of TRIZ techniques into “TRIZ for Problem-Solving” and “TRIZ for Future Prediction”. Defining the purpose of this tutorial from the point of view in above-mentioned categorization, we’ll be able to define it as “the Introduction about one of Contemporary TRIZ techniques focusing on Future Prediction”, which is highly-valued method at a practical level, based on “the Patterns of Technical Evolution”.

Anyway, this method I’m going to refer to is the one developed and restructured by SANNO (mainly me), using examples from DE (Directed Evolution) developed

by Ideation, to optimize for TRIZ practitioners in Japan. In the latter half of it, I would like to introduce the features of this Method (it's called "TRIZ-DE" in Japan), referring to some similar methods introduced in foreign countries.

Finally, I'm going to emphasize that TRIZ-DE is expected to be utilized in the real field as one of highly-valued methods in Innovation Management Activities.

I07 Invited Paper 3

Introductory Review of Innovation Activities in Toshiba

Application of various tools in Toshiba; Six σ, Taguchi Method, QFD, TRIZ and so on

Naoaki Okuzumi (Toshiba Co., Japan)

Toshiba began to introduce Six σ in 1999 and has carried it out company-wide. This activity, Mi-Activity (Management Innovation Activity) we named, is not mere quality improvement activity of product but management-quality improvement activity of the whole company.

We introduced and applied BCM (Combination of BSC and CTQ drill-down), DMAIC, DFACE (DFSS modified by Toshiba), Taguchi Method as tools.

We added "i-cube program" in 2005 and integrated all these tools and programs into one entity of Toshiba Innovation Activity.

We keep looking for new methods to apply at Toshiba, and studying TRIZ and other methods.

In this presentation, I will introduce a brief overview of Toshiba Innovation Activity and how to use those methods including TRIZ.

Part 2. Contributed Papers (Oral and Poster Presentations)

#01

Systematic Innovation for Business & Management: Experiences 1994-2007

Darrell Mann (Systematic Innovation Ltd, UK)

The Soviet-originated TRIZ methodology is best known for its application in the world of technology. The paper describes the creation of equivalent capabilities in and around the business and management domains. Tracing a history beginning with a previously untested belief that the underpinning big ideas of TRIZ were also relevant to business and 'people' type problems, and ending with the recent convergence with other methodologies like Spiral Dynamics and Neuro-Linguistic Programming, the paper records some of the key milestones in the journey.

Classical TRIZ is built on the study of technological breakthroughs. 'Someone, somewhere has already solved something like your problem' being both a key finding of the research and the basis upon which TRIZ is able to assist problem solvers in their bid to systematically create new breakthroughs in their domain. That same research philosophy lies at the foundation of a parallel programme of research to study what 'breakthrough' and 'success' looks like in the business and management contexts.

The research – now totalling over 500 person years of input – thus far confirms the universal applicability of TRIZ pillars related to Functionality, Ideality, Use of Resources and, Contradiction. The identification and resolution of conflicts and contradictions in business and management, as in technology, is seen to be the core attribute of innovation and breakthrough. To this end, the paper describes the creation, population and ongoing updating of a new Contradiction Matrix tool aimed at classifying win-win conflict resolution strategies in the world of business.

Although the pillars of Classical TRIZ are now seen to form a necessary part of a systematic innovation capability in business and management, the research has shown that they are some way from being sufficient. Indeed, a frequent criticism from those who have tried to apply Classical TRIZ in business situations is that it is a somewhat crude and blunt instrument. The paper describes how the incorporation of concepts and ideas from complexity theory and elsewhere appear to have gone a considerable distance towards rectifying these criticisms. The emergence of tools to help manage people perceptions and to understand micro-personality and macro-behavioural phenomena are described in the paper through a series of abbreviated real-life case studies from industry.

While still inevitably early days in the development and dissemination of a business and management version of TRIZ, the paper closes with a SWOT analysis of likely future directions and possibilities.

#02

TRIZ Application for New Product Concept Development

Ik Cheol Kim (Korea TRIZ Association, Korea)

When introducing a new thing, there is always resistance. TRIZ is no exception. There are many anti-questions about TRIZ when we try to apply TRIZ. Main questions are five. First, TRIZ is the tool only for analyzing finished things. It can't be applied to new product development. Second, we can do R&D well without TRIZ. Third, if we regulate the problem like TRIZ, it restricts the creativity of researcher. Fourth, if TRIZ is so good, why people can't use if widely. Fifth, TRIZ is too hard to learn.

This paper is an answer to the first question. TRIZ can be applied not only for analyzing the result, but also for generating new product development. I have developed a new kind of ink jet printer head using the TRIZ effects tools.

#03

How to Apply TRIZ to the e-Learning from Invention and Patent to IP for SME

Gil Su Yoon (Pukyong National University, Korea),
Haruo Kodama (National Institute of Multimedia Education, Japan),
Young Won Park (University of Tokyo, Japan)

This paper suggested a method how to apply TRIZ to the e-learning for invent, patent and IP for small and medium enterprises. We reviewed briefly e-learning cyber universities in Korea at first. Secondly we presented an example of how we modified the lifting method of manganese nodules with TRIZ and ASIT. Thirdly we discussed how to apply the Korean patent with the experience of the process of PCT. It is important to teach from invention to IP for SME for our next generations and we propose a simple training method by way of e-learning education.

#06

Conception Method of the Next Generation System by Law of Engineering System Evolution

Masahiro Kuwahara (IDEA Co., Ltd, Japan)

The method for generating problem-solving concepts by use of "Laws of Evolution of Engineering Systems", one of the pillars of TRIZ, is an important tool worthy of mastering for engineers. The TRIZ finding that engineering systems evolve to delete harmful actions and to improve efficiency is not yet well applied by engineers to the actual concept generation towards next-generation systems. In this presentation we will introduce our new method which can be used widely and effectively for this purpose.

#07

Application of TRIZ Technology Evolution to Concept Mining
－For the Blue Ocean Creation－

Yoshiharu Isaka (IDEA Co., Ltd, Japan)

According to the product planning that considers the experience value, it is necessary to offer the commodity that can be said from the customer , saying that "To tell the truth, it wanted such a commodity". "Concept Mining" is proposed as how to advance the project for that. It is paid to attention as a sole method that can create a Blue Ocean. However, it is thought that a technical barrier for an easily similar concept to enable the other companies to enter is necessary to extend an original, high Blue Ocean and the period as much as possible. Therefore, it introduces the technique because it is thought that a strong Blue Ocean strategy can be constructed by applying technological of TRIZ evolution.

#08

TRIZ-fractality of knowledge

Victor Berdonosov (Komsomolsk-na-Amure State Technical University, Russia)

The offered material is the development of the idea to use TRIZ for the system education / TRIZ Future 2006, Japan TRIZ Symposium 2006/. The main contradiction within any educational system comes from the volume of delivered knowledge and time, required for its mastering. A method of innovation education is suggested, solving the contradiction by complex use of the following techniques: universality, preliminary action, self-service and others. The method is based on fractality, self-similarity of knowledge of both applied and fundamental sciences. Indeed, there are analogues in the development of traditional natural objects such as crystals, plants, animals, and knowledge. The assumption that knowledge is also fractal as everything in nature is proved. In that case, it is possible "to grow" knowledge as crystals, having “a seeding grain”, “the rules of construction” and “facility” (a constructional material). The seeding grain is the main, basic positions (the axioms) of the corresponding sciences. The rules of construction are TRIZ tools such as the ways of solving contradictions, Substance-Field (Su-Field) conversion, laws of systems development, etc. The resources are effects of corresponding field of knowledge. The method is illustrated by systematization of the development of dynamic type core storage.

#09

IQ Increase under the Influence of TRIZ

Victor Berdonosov, Boris Dolotov, Marina Dolotova

(Komsomolsk-na-Amure State Technical University, Russia)

The level of IQ increases after study of discipline "Development of the creative imagination" (one of the partitions TRIZ). Researches of estimation of TRIZ subject study influence in particular "Development of the creative imagination", (DCI) on students' intellect are being carried out in KnASTU. Estimation is performed with Ayzenk's IQ tests before and after studying of DCI Subject. Different variants of tests are used before and after this Subject study.
The first results were received in 2005/2006 academic year. The validity of results is defined by sample sufficiency (145 students were tested), and proximity of density of probability distribution to normal law. The average level of IQ increased on 15 values (about 30%) after study of DCI, which is a very good result. The students of the 1st – 4th years of the Machine-Building Faculty and Faculty of Computer Technology were tested.

#10

Practices of Applying TRIZ/USIT in Konica Minolta Business Technologies, Inc. (2)

Shoichi Tsuge, Osamu Yamada, Tateki Oka
(Konica Minolta Business Technologies, Inc., Japan)

As a step for applying TRIZ/USIT in product design and technical development practically, we have held in-house TRIZ workshops continuously. In the workshops, we have applied plural methods tentatively to our practical problems, and we have eventually concluded to use USIT method as a standard.

In the flow of USIT, we have executed the problem analysis by focusing on the space/time characteristics analysis in both the present system and the ideal system. Further, we have rearranged and simplified the USIT operators in our own way to improve efficiency of the solution generation.

#11

Application of TRIZ to Business & Management Field (The Activity Result of Knowledge Creation Research Group)

Hajime Kasai (IDEA, Inc., Japan), Masayuki Ishii (Sumitomo Electric Industries, Ltd., Japan), Eisaku Oshima (RCS Institute, Inc., Japan), Toshimitsu Kataoka (Patbrain, Co., Ltd, Japan), Fumiko Kikuchi (Pioneer Corporation, Japan), Osamu Kumasaka (Pioneer Corporation, Japan), Hironori Tsugane (Anritsu Corporation, Japan), Kimihiko Hasegawa (Sano & Associates International Patent Firm, Japan), Mikio Fukumura (Souzou Kaihatsu Initiative, Japan)

We built up a working group for the activity of the knowledge creation research group under MRA's sponsorship. Then, we've studied the application of TRIZ to business and management field, collected examples in those areas, and studied about its relationships with innovation. In advancing research, we referred to the trend described in the book, "Hands-On Systematic Innovation for Business & Management" (HOSI) by Darrell Mann, in order to check the pattern of the evolution

in this field. Moreover, we verified with the familiar examples, such as environmental business and cellular-phone business, etc. As a conclusion, we've created the intelligible template.

#12

Application of Contradiction Table to Computer Architecture – Sub-matrix and Invention Principles for Computer Problems –

Toru Shonai(Hitachi, Japan), Shun Kawabe (Meisei University, Japan), Naoki Hamanaka (Hitachi, Japan)

Effectiveness, limitations and difficulties of TRIZ contradiction table are discussed especially in the application field of computer architecture. Since current TRIZ inventive principles mostly came from the fields related to mechanics, structures, and physics, it is rather difficult for these principles to stimulate patentable ideas in the field of computer. Thus we first tried to compile new keywords in the field of computer architecture which can associate TRIZ principles with computer problems. Second we found it appropriate to reduce the size of current 39x39 contradiction table into much smaller 14x14 sub-matrix suitable for computer architecture/logic. Actual example addressing the problems of internet data centers is also described.

#13

How to Prevent Unauthorized Persons from Entering the Auto-locking Door of Apartment Building: Applying TRIZ/USIT to A Social & Technical Problem

Toru Nakagawa and Arata Fujita (Osaka Gakuin University, Japan)

For securing the entrance of residential apartment buildings, the auto-locking door system is typically installed. Visitors without authorized keys have to communicate with the residents through the (video-)interphone to get the door unlocked. In reality, however, unauthorized persons can easily pass through the entrance door, simply by behaving just like a resident and following other residents. This problem is relevant more to psychology and social behavior of people than to technology. In the present case study, we analyzed the problem by using standard methods of TRIZ/USIT, represented the cause-effect relationship in the RCA+ method to find root contradictions, and generated various solutions. The solutions involve not only technical but also psychological and sociological aspects. The present study has demonstrated that TRIZ/USIT can be applied smoothly and effectively to non-technological problems.

#14

Study of the Development-Type TRIZ

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

Nobuhide Matsuda (Matsushita Electric Industrial Co., Ltd, Japan)
Makoto Unno (Kawasaki Heavy Industries, Ltd, Japan)
Kazuyasu Ikeda (Sekisui Engineering Co., Ltd, Japan), et al.

In Japan VE Association's Kansai Branch, we got interested in the TRIZ technique as a new means of value-adding creation within the VE procedure. Thus in 2003 we established "TRIZ Spreading/Use Study Group". With the aim at studying and penetrating the integrated use of VE and TRIZ, we have examined to perform various kinds of individual TRIZ tools. Starting in 2006, we have launched a case study project for the purpose of establishing and improving an efficient and integrated problem-solving procedure.

Product development generally involves three steps, i.e., product planning, development, and design. TRIZ has been recognized mostly as a problem-solving tool and to be effective for applying in the product design phase. Whereas manufacturer users want to apply it to the phases of product planning for new value-adding creation and of product development. Thus we have examined to apply TRIZ to the technical development phase, especially to try to construct an effective application flow in the development phase and to clarify the features of individual TRIZ tools. The Study Group is working under a three-year plan, from 2006 to 2008, with two main steps, i.e., problem analysis and idea creation. In the presentation, we will give an interim report of our progress in the first step, namely the problem analysis.

#15

Developing Highly Effective Engineers

Paul Filmore (University of Plymouth, UK)

Engineers are generally effective at problem solving but often do not look for the highly effective and creative solutions. This paper explores ways in which the constraining mindsets can be unlocked for breakthrough solutions, both at the personal and organizational level.

The paper shares experience and knowledge, which is based on seven years of 'teaching' systematic problem solving in the UK and the special place that TRIZ, has in this arena.

#16

Impressions of TRIZ

Yuichi Furukawa (Japan)

I am a system engineer and have got interested in TRIZ/USIT since several years ago. I have applied TRIZ/USIT to several real industrial problems successfully even in the fields out of my own expertise. In the presentation I am going to talk some of these experiences and my thoughts through such experiences, with the hope of some help to those who are considering introducing TRIZ.

#18

Practice of MONODUKURI Education Based on PBL by Comparison of Real and Digital Product

Masanori Igoshi (Tokyo Metropolitan University and ACP Laboratory, Japan)

In Precision Engineering Department of Engineering Faculty in the Tokyo Metropolitan Univ., the curriculum related to CAD is composed of to be consistent for 2 years period, and it has been practiced for these 5 years. In the later stage of 3rd grade of undergraduate school, the MONODUKURI (product design and manufacturing) education based on PBL is carried out.

This paper describes at first the brief background of PBL and engineering education, and next the content of the exercise and the practice experience for the 5 years. A CAD education system design was carried out with five policies in respect of the motivation and the engineering sense for MONODUKURI for the department students. The policies are team work, a couple of contests, software integration, comparison consideration between digital and real product, and constraint to use the learned subjects.

#19

Methodological Background of Effectiveness of TRIZ

Shinsuke Kurosawa (The SANNO Institute of Management, Japan)

If TRIZ has a unique effectiveness which all preceding methods lacked, there should be causes that result in the effectiveness. From a viewpoint of a practitioner that thinks it impossible to deny positive effect of TRIZ on problem solving, the paper tries to clarify the methodological background of the effect. It first defines TRIZ on the basis of an essay which Altshuller wrote in 1975. Secondly, it discusses TRIZ's methodological uniqueness in comparison with natural science, engineering, economics and psychology. Lastly, in order to find the interrelationship between the methodological uniqueness and the effect, it attempts to analyze the meanings of basic TRIZ concepts such as Technological System, Evolution, Ideality, Substance-Field Resources and Conflicts.

#20

Application of TRIZ to Manufacturing Phase

－Case Study of Eliminating Defects in Printer Assembly Process －

Yosuke Koga (Panasonic Communications Co., Japan)

Panasonic Communications Co. Ltd. has been promoting to use scientific techniques in the whole process of product development and manufacturing; they include (1) the QFD technique in the product planning stage, (2) the TRIZ method for solving technical problems in the product development and design stage, and (3) the Quality Engineering (i.e., the Taguchi Method) for setting and validating the design parameters in the design stage. We have been using these to develop new products which satisfy the requirements of Q(quality), C(cost), and D(delivery date) and to deliver merchandise of customer satisfaction.

The present paper reports a further extension of the TRIZ application fields, especially in the manufacturing process. This work was achieved together with the people in the manufacturing plant. More specifically, the assembly process of the printers has been improved by a project using various techniques; the problem of a kind of defects was left till recently and was finally solved by the application of TRIZ.

The case study will be reported to some detail.

#21

A Method of Resolving Differences Based on the Concepts of Functions and Process Objects: Part 2

Toshio Takahara (Japan)

This article improves the framework of the method of “resolving differences” which consists of problem solving, making new function and idealization based on the concepts of “function” and “process object”.

These three types of “resolving differences” have a unified input-output relation. We set the purpose in terms of Object. Then we find out input of object to get this purpose of object for every kind of logical types of “resolving differences” or changing Object.

#22

Technical Knowledge Transfer by USIT Application for Paper Handling Mechanism

Kunio Fukatsu (Toshiba Social Automation Systems, Japan)

Importance of the technical knowledge transfer is widely understood at present when technologies and technical talents are largely changing. This paper shows a possibility that USIT can be used as a methodology of the technical knowledge transfer, e.g., in the area of designing paper handling mechanisms.

The present author has been accumulating and releasing the technical knowledge about paper handling mechanisms in our intranet homepage. This information should be useful for the improvement of products, but on the other hand it might become the obstacle for the creation of new concepts, I am afraid. For transferring knowledge to

the engineers of next generation, transferring the methodology of technical idea creation must be more important than transferring technical knowledge itself.

We had applied our original methods of “vertical trial chain” and “destroy the concept” for our product development. As further extension towards the concept generation methodology, we have recently learned about TRIZ and USIT. In the Open Training Seminar of USIT, we applied USIT to the real problem of paper sacker. The case will be introduced as a model for transferring the methodology of creating technological concepts.

#23

Introducing USIT in Matsushita Electric Works

Eiji Yoshii, Jiro Hashizume (Matsushita Electric Works, Ltd., Japan)

USIT (Unified Structured Inventive Thinking), i.e. a simplified and integrated version of TRIZ, has been introduced in Matsushita Electric Works, with the aim of utilizing it for efficient R&D and patent application. The two corporate engineering departments, namely Intellectual Property Department and Technical Management Department, worked together for the promotion. USIT 2-Day Practice workshops (instructed by In-Company lecturer) were conducted, where USIT was applied in group practices to solve real problems on by one. We have solved with USIT 14 actual on-going problems in our Corporate Research Laboratories or business headquarters R&D. According to the participants' evaluation after the practice, USIT has been found effective to apply to the problems in the fields related to mechanics, information systems, and materials, and found well valid to these themes. In average, 27 ideas were created for each problem. We will further go ahead to settle the USIT practices in our company.

#24

Improvement of Material Properties of Printable Adhesive

Jae-Hoon Kim, Joon-mo Seo, Young-Ju Kang and Byoung-Un Kang (LS cable Ltd., Korea)

In order to print uniform pastes on PCB without clogging, bubble and bleeding-out problems, TRIZ and other field of related studies were applied to simulate the issue and suggest solutions. That is, the defects were analyzed by tools like Root & Cause, Structural Analysis, Knowledge Search, Inventive Principle, Patent Search and Technical & Scientific Effect. Thereby, effective solutions were derived for the defects, which were verified through the practical data from several experiments. Finally we could get enhanced ways to reduce the defects (approximately 0%), followed by high yield % in mass productions.

#25

Introduction of the Activity to Promote TRIZ for Engineers and Its Application Examples in Hitachi GST

Toshihiro Arisaka, Kazushi Tsuwako, Hiroyuki Suzuki

(Hitachi Global Storage Technologies Japan, Ltd., Japan)

The activities to promote TRIZ was started two years ago in Hitachi GST. Some seminars and events by the visiting lecturers were held for research/development engineers. Mainly we focused on Contradiction Matrix for the TRIZ beginners. And we found that almost all beginners had some trouble when they tried to translate their technical parameters in their field to the standard parameters of the Contradiction Matrix. Thus a table correlating technical parameters of our own field to the standard Contradiction Matrix parameters has been made to solve their problem.
In this paper, the activities to promote TRIZ for research/development engineers and their application examples are reported.

#26

Consideration of a Creative Intellectual Strategy Related to Capsule Endoscope Using TRIZ

Toshimitsu Kataoka (Patbrain Corporation, Japan)

Capsule-type endoscopes are innovations in scope-type endoscopes. I have reviewed this case of innovation from TRIZ viewpoints by using patent databases, which are nice records of innovations. I have found that, though as afterward reasoning, various TRIZ tools could be used for this case of innovation; they include Technical Contradiction, Physical Contradiction, Ideal Final Results, Patterns of Technical Evolution, Su-Field Analysis, Smart Little People, etc. It was also found that the companies involved in this specific innovation of capsule-type endoscope have shown different types of IP strategies.

#27

Educational Seminar Project 2007: Introduction to the Inventive/Creative Thinking System "To Instruct Students How to Invent Creatively"

Mitsuo Morihisa (Current: SKI, Previous: Kyoto University, Japan),
Hiroshi Kawakami, Osamu Katai, Takayuki Shiose (Kyoto University, Japan)

This research aims to find ways to instruct undergraduate students who are beginners of invention how to invent creatively. A seminar named "Introduction to the Inventive/Creative Thinking System" was commenced in 1998 applying TRIZ theory for the third year students in the department of engineering science, Kyoto University. After six year's practices, we decided to add "Patent Specification" exercises for the first time in our 2004 seminar. The main reason was that learning to write "Patent Specification" is very effective for practically understanding the consistent invention process from idea to realization. The year 2006 seminar started in mid-October last year was remarkably improved in seminar training hours (18 hours in total) and both "Invention Statement Draft" and "Patent Specification" trainings were practiced. Furthermore in 2006 "Inclusive Design" exercise was newly added. We learned that this UK born process fulfills possible wider user needs of manufacturing goods and/or services planned by designers. Our challenges for the year2007 are full use of TRIZ in

"Patent Specification" exercises and Inclusive Design thinking. The reason is that they are effective to improve both the contents of inventions and the TRIZ spread seminar itself as to fit to user needs.

#28

History of TRIZ Activities in Sekisui Chemical Group

Kazuyasu Ikeda (Sekisui Engineering Co., Ltd, Japan)

"TRIZ" activities in Sekisui started at 2 divisions independently for different purpose in 1999. Integrated Development Division applied TRIZ for technical problem solving, and Manufacturing Technology Division applied it as a part of a VE seminar for product planning. Currently, both activities were integrated to one by R&D division, and we have been promoting TRIZ training and practice support. The history of these activities will be shown in the presentation.

#29

Challenge to Increase TRIZ Users: Original Tool Development at Miyagi TRIZ Society

Rikie Ishii (Dunamis Co., Ltd. / NEDO, Japan),
Toshinori Ito (Industrial Technology Institute, Miyagi Prefectural Government, Japan)

After a TRIZ seminar, we have found that the seminar participants have met difficulties in explaining their fellows how TRIZ promote the idea creation work. Thus, we started to develop a tool which can be used to generate creative ideas in an easy and pleasant manner, just like playing a card game. We will report the contents of the tool and its effects.

#30

Introduction of Idea-Marathon System (IMS)

To Establish

Creative Infrastructure of TRIZ

Takeo Higuchi (Idea Marathon Institute, Japan)

One of the major concerns of trainers or coaches for company staff training course, not only for TRIZ but also for any other creativity training course, is gradual decreasing of continuation rate after obtaining the course technology.

During the training course, for example, of TRIZ, almost all the participants are well studying, mastering and practicing the training curriculum, but after the training completion and after back in their original office and factory site, many of them stop using the obtained know-how nor will use the newly obtained know-how at their office at all.

As the training is too short, or the training cannot be completed from the manual, this phenomenon of gradual decreasing of continuation rate has been almost given up.

In the case of large scale enterprises, the abandoners will pull the leg of the real value and real use possibility of i.e. TRIZ as if TRIZ is of no significance compared to the cost of software and training course.

It seems that the conclusion of this decreasing phenomenon is due to:

(1) Individual difference of their aptitude or talent,

(2) Difference of their level of interest for creativity

(3) Degree of work condition

Therefore, to compensate the decreasing practicing person, training coach and trainers must recruit more new trainees but this will be more difficult each time because of the afore-going abandoners. And the training cost will be very expensive and ineffective.

I have been engaged in many company staff training course by Idea-Marathon System (IMS) with Follow-up e-Training course. And through my experience of IMS, I come to believe that one of the methods to solve this disconnection of practice of trained skill after the course is to establish the creative infrastructure of each participant prior to TRIZ training course for about 2 months based on keeping the same notebook use according to the simple rules of IMS.

IMS rule is very simple:

(1) Think something original at least one everyday whatever the categories are, or regardless of specialties.

(2) Simultaneously write down into the notebook as independent ideas with preferably drawings.

(3) After writing down your idea, talk to your colleagues.

If this is kept continued for at least 3 weeks, the effect of accumulation of ideas and confidence of idea creativity will make the TRIZ trainee easier to follow-up and continue to use the system after going back to their offices.

More details will be explained in the oral presentation of TRIZ seminars on 30th Aug, 2007.

As for Idea-Marathon System, please refer to the following Website:

http://www.idea-marathon.net/

#31

Identification of Engineering Problems That Correspond with the Corporate Business Strategy – Linking Logics of Business Strategy and Engineering Problem Solving Using TRIZ Concept of Conflict –

Takao Adachi (The SANNO Institute of Management)

All businesses wish that every problem-solving done at their R&D sites helps increase customers' satisfaction and improve their competitive edge and contributes to their business strategy. This study is an effort to bridge the gap between the problem situations at engineering work-sites and the business strategy. For this purpose, the author used situation description tools, some of which are made on TRIZ, in a unified fashion. These tools are used to clarify structures and functioning mechanisms of the business environment and that of

R&D problems which are assumed to be solved by the business. The results are, then, used to identify which problems have priority to be addressed to achieve the business targets. This improves efficiency of problem-solving works.

The focus of this study was put on disagreements between the business environment and efforts for solving engineering problems. In the author's understanding, these disagreements are expressions of conflicts caused by differences of evolution stages of the business environment and the corporate engineering achievements. The conflicts are resolved by improvement of the corporate R&D level through solving those problems that cause them (the conflicts). It is equal to the engineering problem solving that is required by the corporate business strategy.

#32

DPAM (Design Process Assessment and Improvement Model)

Kunichika Fukuoka
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In recent years, the Japanese manufacturing companies is facing fierce competition of product innovation. As a result, those companies are required to enhance their competitiveness by addressing the requirements of customers through agile development, cost-cutting effort. In addition, the high-tech products such as cell phone and digital appliance have become multi functional and complex design. Therefore it is imperative for Japanese manufacturing companies to establish the design process which has strong cooperation in a wide range of technology, machinery, electric technology and software (embedded software). The design process index standardization group of JEITA Standardization Committee has started to examine DPAM (Design Process Assessment and Improvement Model) in 2005. DPAM is the design process assessment model which is taking unique design process of Japanese manufacturing companies into account.
This presentation shows the basic concept of DPAM and the activities of the DPAM working group.