Contributed Articles for
the Augmented Edition of the Reminiscences
Kaoru Ishikawa: The Man and Quality Control

Dr. Tsutau Hanada was my greatest teacher in QC and the greatness of Dr. Kaoru Ishikawa

Hideo Iwasaki

My greatest teacher in quality control (QC) was Dr. Tsutau Hanada. I received guidance from him on my graduation thesis in Osaka Institute of Technology. When I was in my junior year of Osaka Institute of Technology, I selected QC and used *Elementary Quality Control Textbook* (published in 1956, JUSE) as a textbook. This was the first time I came to know the name of Dr. Kaoru Ishikawa, who was an author of this textbook. Although Dr. Ishikawa's name was sometimes mentioned when I received guidance on my graduation thesis from Dr. T. Hanada, I was not familiar with Dr. K. Ishikawa at all.

Probably, no active QC teachers knows the name of Tsutau Hanada. Dr. T. Hanada majored in mathematics, and his specialty was Operational Research (OR) at Kyoto University. I remember having heard from Dr. T. Hanada himself that he had been in charge of calculating accuracy of anti-aircraft guns for pursuing B-25s and B-29s at an anti-aircraft gun unit located in Tennoji in Osaka during a World War II.

According to the 50-year history of the Union of Japanese Scientists and Engineers (JUSE), Dr. T. Hanada seemed to have been a member of the JUSE QC Research Group (from November 1948). The members of the QC Research Group were in charge of the lecturers of a JUSE seminar, the second "Quality Control Basic Course (BC)" (1950). As a member of the group, Dr. T. Hanada seemed to serve as a lecturer together with Dr. K. Ishikawa. In the seminar lectured by Dr. W. E. Deming, an Eight-Day Course on Quality Control (July 1950), it seemed that Dr. K. Ishikawa gave a supplementary lecture on the seminar and Dr. T. Hanada was a coordinator of the seminar and created a transcript of the lecture together with Dr. Masao Kogure, Dr. Ikurou Kusaba, and other doctors.

In addition, Dr. T. Hanada served as a lecturer together with Dr. Eizaburo Nishibori, Dr. Jiro Yamauchi, Dr. Masao Goto, and other doctors in the Quality Control Seminar, which was first held in Osaka in September 1950 and co-hosted by three organizations (Kansai Economic Federation, Kansai Chemical Industry Association, and JUSE). After that, he seemed to make an effort to popularize QC by guiding companies and serving

as a seminar lecturer centering on the Kansai area.

Records of Dr. T. Hanada's activities in QC in Japan unfortunately disappeared around this time. The reason seemed to be that he went away from activities in QC in Japan to teach QC in Southeast Asian countries, mainly India, for about 10 years. He might have started to work on developing Statistical Quality Control (SQC), which was beginning to succeed in Japan, to India and other Southeast Asian countries [1]-[4]. It seems that a recommendation from an influential person in QC at that time was the reason why Dr. T. Hanada started to work on SQC.

Dr. Tsutau Hanada came back to Japan around 1962. I imagine that the state of his mind immediately after returning to Japan was like that of Urashima Taro, because of a blank period for about 10 years. After returning to Japan, he received requests from the Asian Productivity Organization (APO) to write several books for Southeast Asia in order to popularize QC. From around this time, I started to receive guidance from Dr. T. Hanada.

During summer vacations in my senior year of Osaka Institute of Technology, I went to the Dr. T. Hanada's house in Kyoto almost every day to help him write the above-mentioned books (drawing control charts, histograms, scatter diagrams, and other diagrams). When Dr. T. Hanada went to manufacturers in Kyoto and Osaka for consultation, I accompanied him as a private secretary and I had a chance to see many sites. On the way back from the manufacturers, he always took me out for a meal. Although he himself did not drink at all, he offered me a beer and even poured the beer for me. Looking back now, I must ask his forgiveness for this.

In 1967, the Department of Industrial Management was newly established in Kinki University, Faculty of Science and Engineering. Before the establishment, Dr. T. Hanada said that he had heard that the new department was recruiting an assistant and he encouraged me to apply. My life would have been completely different without this encouragement.

In my second year serving as the assistant, I had an opportunity to take part in the 33BCO (from April to September, 1968) as a transcript of the lecture, by the recommendation of Dr. T. Hanada. At that time, I took Dr. K. Ishikawa's lecture on sampling. I do not remember anything about the contents of the lecture; I just remember that the textbook for the lecture was so thick.

After that, I saw the face of Dr. K. Ishikawa from a distance at the Japanese Society for Quality Control, the Deming Prize Committee, and other occasions; however, I am afraid I never personally and directly received guidance or lessons from Dr. K. Ishikawa. Although I give lectures and provide guidance on Total Quality

Management (TQM) at not only JUSE but also many organizations and companies, I of course know that my personal ability and efforts are of little value. Any value I provide is thanks to the guidance and observations by many superiors and leaders. In consideration of this idea, I turn out to have received an enormous amount of benefits from Dr. K. Ishikawa in spite of not having been directly guided by him. I am deeply grateful to him.

One of the achievements of Dr. Kaoru Ishikawa was the launch of the QC Circle and efforts in developing the QC Circle. For this reason, he is called the Father of the QC Circle. I was not much interested in the QC Circle during my active career as Kinki University teacher, because I selfishly interpreted that I could not find any theme leading to an academic paper even if I had been interested in the QC Circle. I had served as a Director of the QC Circle of the Kinki Regional Chapter one year prior to my mandatory retirement age, which was the time when I started to see the end of my University life. As a Director, I had been involved in events together with managers of the chapter for four years. To my surprise, I found at this time that the basis of QC in Japan; that is, the basics of establishing product quality, was the QC Circle. Who establishes quality? The answer is human beings. To this end, humanity having independence must be respected. The QC Circle exactly and largely contributes to development of this kind of humanity. During four years as a Director, I was impressed by the fact that the QC Circle substantially contributes to developing human resources on *Genba*, an actual work place. I therefore published a Monthly Quality Textbook in 2015 titled "Ten Energies from QC Circle Activities" (No. 412), whose author is listed as the Kinki Regional Chapter. This textbook summarizes how the QC Circle plays a large role in cultivating human resources on *Genba*, an actual work place. I would be very much encouraged if Dr. K. Ishikawa commented on whether the contents of this textbook reflect the intention of establishing the QC Circle. I feel regret that I cannot fulfill my wish. (Professor Emeritus of Kinki University).

[1] Tsutau Hanada (1953): "Overseas QC news (India)," *Hinshitsu Kanri* (Statistical Quality Control)*, 3, 384.

[2] Tsutau Hanada (1954): "From the diary of quality control instruction," *Hinshitsu Kanri* (Statistical Quality Control)*, 5, 199.

[3] Tsutau Hanada (1954): "The fruits of the quality control in the India spinning factory," *Hinshitsu Kanri* (Statistical Quality Control)*, 5, 731.

[4] Tsutau Hanada (1955): "News from India," *Hinshitsu Kanri* (Statistical Quality Control)*, 6, 45.

Role of Prof. Kaoru Ishikawa in the Quality Renaissance in India

Dr. V. Krishnamurthy

My interaction with Prof. Kaoru Ishikawa has been limited to two days when he presented a keynote address at the first National Conference of Total Quality Management in India organized by Association of Indian Engineering Industries (AIEI) now known as Confederation of Indian Industry (CII) on April 29 and 30, 1986. As conference Chairman I had a good interaction with Prof. Ishikawa over 2 days and it was enlightening to learn from him practical ways how he and his colleagues helped Japan to transform its business from making cheap products to world class products within a short span of 15 to 20 years.

His guidance and views helped us to shape the quality movement in India. While we were working towards improving quality of products and services being offered in India in a competitive environment emerging since 1983 through our effort using various approaches we were struggling to integrate it. I was personally involved as Chairman of Maruti Udyog Ltd. a joint venture with Suzuki Motor Corporation of Japan to start its business in India in 1982 and we were trying to implement many innovative approaches for quality learning from Suzuki. In Nashik - Western India 11 companies got together to learn from literature from JUSE and find ways to improve quality. Book used was *Guide to Quality Control* by Prof. Kaoru Ishikawa.

Prof. Ishikawa's guidance during his visit resulted in the formation of National Committee on Quality under the aegis of CII with many business leaders as members and I had the privilege of chairing this committee. This was the start of a national campaign for quality with the formation of 4 Panels in each of the four regions of India. This was a very important event to engage the business leaders to assume responsibility for quality. This became one of the key factors in molding the quality movement in India at an early stage.

It can be said Prof. Ishikawa played an important role in the quality renaissance in India. He also inspired many other Japanese quality experts to provide guidance to organizations in India.

(Former Chairman and Managing Director of Bharat Heavy Electricals Ltd.,
Maruti Udyog Ltd. and Steel Authority of India Ltd)

The older I grew, the greater influence by Professor Ishikawa I recognized. More Impact on Me as I Get Older by Prof. Ishikawa

Kensaku Maruyama

It was half a century ago. I was taught by Professor Kaoru Ishikawa for four years from 1963 when I was a junior at the University of Tokyo to 1969 when I finished the master course. Master's thesis was regarding Bayesian probability. Its objective was comparison and discussion on Bayesian probability and normal frequency probability. Although I chose the theme just because of my curiosity, he agreed to my theme. I understand that he respected willingness of his students.

Those days I needed high-performance computer for my research. Quite unlike now, the computer was not popular. Professor Ishikawa arranged for me to use the computer of NKK Corporation and I could start my research.

At that time, I had to program and debug by myself, so huge amount of work and time was needed to complete my research. All the struggles seem to be a good memory now.

I dedicated myself to the athletic activities as well as the research. During the undergraduate course, I was a member of the Wonder Vogel Club. Wonder Vogel Club of the day was famous for extremely hard exercise. At graduate school, I belonged to Alpine Club JMCC that is one of the hardest alpine clubs for working people and was addicted to rock climbing. Current my healthy condition thanks to the intense training at that time.

I had trouble deciding which job I would work in such as (1) QC-related fields or (2) chemicals.

After all, I selected chemical related job and joined Mitsui Toatsu Chemicals (now Mitsui Chemicals).

At the time, there were still a lot of exciting projects due to the late period of high economic growth in Japan. Very fortunately I could complete several commercialization projects for commodity of chemicals and electronics materials. Just 2 months before NY terrorist attacks in2011, I was transferred to NY as the president of Mitsui Chemicals America. Until my retirement at the age of 63 in 2006, I enjoyed many kinds of valuable experiences in the United States.

Immediately after the retirement, I got the job from industrial gas company Air Water Inc. Although recognition of the name is low, the performance of this company was fairly good under the excellent management by Chairman Hiroshi Aoki and his management team. I was in charge of the expansion strategy planning and execution of the electronic materials business. In 2010, I was appointed to the president of Inoueki Co., Ltd. It was a long standing trading company, headquartered at Fukuoka city, which was acquired by Air Water Inc. I will retire in the end of June, 2015, since I was over 70 years old.

Recently I had many opportunities to talk with Asian executives. When I talked about the good points of Japanese companies with them, everybody said, "The strong points of Japanese company are fundamental technology and high quality. Weak point is high price." Mr. Charles O. Holiday, Jr., DuPont's former chairman also said, "The technology and quality of Japanese companies are great, however in-house development policy may become a hindrance to the growth."

In such a case, I thought of Professor Ishikawa every time. Actually, he led and established Quality Control and Management System in Japanese industry. Not only in the past, but also in the future, QC and its system will continue to contribute for Japanese industries. I think Professor Ishikawa was, is, and will be really great.

When I re-organized the old files and documents the other day, I found a paperboard with autograph and short message from Professor Ishikawa. His message to me was "Be careful on your health and please work hard. Please take advantage of the QC sense in your work. From Ishikawa." Immediately after graduation, I did not have a particularly impression on this word.

But now at half a century after graduation, I really understand the essential meaning of his message when I look back on all the work I have done. His message remains in my heart. My job had nothing to do with QC, however I took advantage of QC sense consciously or/and unconsciously in every project. I believe that I was able to spend a fulfilling long work life.

After July of this year, I'm going to start a new company named GoodFutureUs Corporation which provides a social or BOP business alike

From now on, I will obey Professor Ishikawa's message written on paperboard and hopefully do a good thing to society, even if it is small.

(President, GoodFutureUs Corpration)

Dr. Kaoru Ishikawa and his influence in promotion of quality around the world and more particularly India

– My personal experience –

Janak Mehta

I first learnt about Prof. Kaoru Ishikawa in 1982 through an article I read in an Indian magazine on "Deming's 14 principles" where Dr. Deming referred to outstanding work on quality control being done by Union of Japanese Scientists and Engineers (JUSE) and Dr. Kaoru Ishikawa. I was working as General Manager for Carbon Corporation Ltd. in Nashik and we used to buy electrodes from Showa Denko, Japan. During my visit to Japan on official work in October 1982 I took the opportunity to visit JUSE office in Tokyo. I purchased one copy each of all the publications available in English language. Many of these were edited by Prof. Kaoru Ishikawa. This literature covered a few catalogues on various training programs and one was a book titled 'Guide to Quality Control' by Prof. Ishikawa. This book gave detailed guidelines on how to study this book and then apply in daily work. One of the approaches recommended was a Group Study approach for learning. I was using similar Group Study approach in another context and found it effective. I started experiments in such Group Study. In August 1983 as honorary Chairman of Nashik Zonal Committee of Association of Indian Engineering Industries (AIEI) now known as Confederation of India Industry (CII) I invited Business Heads of 20 organizations to share this approach and encouraged them to join in this experiment. Eleven member organizations including some multinationals came forward under the aegis of CII to form one study group each. Some of the executives were trained and one facilitator was assigned to each Study Group to encourage self-study followed by Group Study. Study Groups met once a week and tried to solve one important but simple problem using the guidance in the book following QC Story approach and appropriate seven QC tools. Once a month all eleven groups got together to share their experience and learn from each other.

This approach created great excitement amongst the members as they were able to find solutions to some of the chronic problems. Gradually some other organizations including the Government departments joined in this approach. This experiment caught

the imagination of many business leaders within CII. In 1984 I was invited to become the honorary Chairman of the National Engineering Services Committee of CII for promoting quality through such Group activities as a means for self-development amongst the members of CII all over India. Prof. Ishikawa's approach was helping industries in different parts of India. Building on this momentum we planned first National Conference on Total Quality Management (TQM) primarily focused on the top management and senior executives on April 29 & 30, 1986. This conference was planned under the Chairmanship of Dr. V. Krishnamurthy who was then Chairman and Managing Director of the Steel Authority of India (SAIL) and Chairman of Maruti Udyog Ltd. (collaboration with Suzuki Motor Corporation, Japan) and most respected business leader in India. He has subsequently been honored with Padam Vibhuhan (India) & The Order of the Rising Sun - Grand Cordon, Japan. He was Chairman of National Competitive Council of India until May 2014 in the rank of Cabinet Minister.

We chose the term Total Quality Management instead of Total Quality Control (TQC) because in India with the legacy of British influence term "Control" has a narrow connotation of controlling something that is "do and check" while "Management" has a wider context of planning, organizing, leading and controlling. Therefore talking about quality in the language of management and emphasizing the quality management principles in the context of Indian philosophy caught the imagination of business leaders who became key driver of quality movement in India.

We invited Dr. W. E. Deming, Dr. Joseph Juran and Prof. Kaoru Ishikawa for sharing their experience with and advice to Indian business leaders to enhance their commitment to quality by taking the leadership role. Only Prof. Ishikawa then President of Musashi Institute of Technology responded and came to Delhi for 3 days inspite of his very busy schedule. It was indeed gracious of him not to charge any fee. In addition he brought with him Mr. Kazutoshi Matsuda, Deputy General Works Manager of Nippon Kokan K.K. to share his practical experience through his presentation on "Actual Systems Organization and Quality Control Practices at NKK." Title of Dr. Kaoru Ishikawa's presentation was "How to Apply Company Wide Quality Control in Foreign Countries." He was provided considerable time for interaction with the participants.

The conference concluded with formation of National Committee on Quality (NCQ) consisting of many business leaders under the aegis of CII and an action plan to start an integrated approach of TQM across the country through 4 regional panels As honorary Secretary of the NCQ I was responsible for planning and promotion of TQM across India. It was a great opportunity for me to work under the guidance of Dr.

Krishnamurthy and promoting Japanese way of Company Wide Quality Control (CWQC) as propagated by Dr. Ishikawa.

Dr. Ishikawa's guidance helped in our work towards key aspects of CWQC i.e. involvement of people from business leaders to operatives; involvement of people from all functions of an organization and extending the concept through cooperation with suppliers and distributors. His counseling helped in obtaining personal participation of business leaders and chief executives of various organizations in India. It resulted in the formation of TQM Division within CII in 1988 with the involvement of 23 of the most prominent companies in India; membership soon crossed 100 to collectively work towards improving quality of products and services in India to make companies more competitive in the liberalized economic environment. I was given the responsibility to lead this initiative. Teachings from Dr. Ishikawa helped me immensely.

I was fortunate to spend one full day with Prof. Kaoru Ishikawa travelling to Agra for a visit to the famous monument Taj Mahal along with my family. This was probably the most profound learning experience I had in my carrier associated with quality management. It gave me an opportunity to talk with him the whole day in an informal setting. Some of the most important lessons I learnt during that conversation were as follows:

1. About a quarter of the companies attempting TQM implementation achieve the desired business results in true sense while others also gain in varying degree. Primary reason for inadequate result is the lack of felt need for TQM within the organization. If there is no compelling business need felt for TQM and an entity is doing TQM for the sake of TQM or because others are doing it the result will be suboptimal. Prof. Ishikawa added "the Need invariably exists but may not be felt." (Clarity of purpose and focus)
2. If a current standard has not changed for 6 months it is a sure sign of decay of an organization. (Respect for humanity; recognizing people potential to find a better way; involvement of everyone)
3. Focus your energy on guiding those organizations that are likely to have the most impact on the society. (Optimizing contribution with limited resource for the benefit of society.)

Prof. Ishikawa presented me a book authored by him titled *What is Total Quality Control The Japanese Way* in 1986. This book is like a treatise on quality control and its practical application with considerable guidance on human aspect. I have read this book many times and every time I find a new meaning.

I met Prof. Ishikawa second time in Tokyo when I attended the first JUSE seminar on Total Quality Control (TQC) in English in 1988 where he gave a lecture. Respect for him in Japan was evident. I briefed him on the progress of TQC in India since his visit in 1986 and invited him to visit again. He seemed willing but I was advised not to push him as he was not keeping good health.

It was sad to learn he passed away on April 19, 1989. Nevertheless his contribution to quality movement has been felt well beyond his life. Some of the Japanese consultants visiting India to guide various companies in Quality Management have mentioned to me that they are visiting India in spite of their busy schedule because their mentor Dr. Kaoru Ishikawa advised them to spend some time every year in those regions where the need for quality control is felt and impact could be high, even if they do not get adequate fee. It has been a privilege for me to have known and worked with such missionaries.

Little did I realize I will have the opportunity to work for an organization that was founded by Prof. Ishikawa amongst others in 1966 i.e. International Academy for Quality (IAQ). Prof. Ishikawa strongly believed in international cooperation in the field of quality management for mutual learning that could lead to rapid development of quality management theory and practice for the larger good of mankind. Later he became Chairman of the Academy in 1981 and then Honorary Member. It is my unique privilege as the current Chair of IAQ to have the opportunity to commemorate Dr. Kaoru Ishikawa's birth centenary celebrations in order to perpetuate his messages and legacy to future generations who otherwise may not have the opportunity to learn from his work.

It is not possible to write about all aspects of Dr. Ishikawa's contribution to quality promotion around the world in such a short note. Let me highlight a few aspects.

1. Dr. Ishikawa travelled around the world to various countries sharing his experience and learning from others. He was invited to many countries to advance their quality efforts, including the United States, Switzerland, Sweden, Taiwan, China, the United Kingdom, India and many others, where he introduced and instructed in the holistic way to apply Japanese TQM methods. He was on the Board of International Organization for Standardization (ISO) for many years and was also on various committees. He travelled frequently to contribute to the cause of developing International Standards as a means for harmonization of economic activities around the world.
2. Dr. Ishikawa made exceptional contribution in the management of Deming Prize that was established in 1951 to honor Dr. Deming's contribution to

promotion of quality in Japan. As Vice Chairman of Deming Application Prize Subcommittee from 1962 to 1985 he made effort to enhance the level of quality of Japanese companies through Deming Application Prize that was challenged by leading companies from Japan. Recognizing its impact and as a measure of his commitment to promote quality around the world in 1984 he was instrumental in opening the Deming Application Prize to be challenged by any organization from anywhere in the world. Since then 45 companies from USA, Taiwan, India, Thailand and Singapore have won Deming Prize and Deming Grand Prize. From India 31 companies have won these awards, the first company being Sundaram Clayton Ltd. in 1998. This provided tremendous motivation to other companies resulting in renewed enthusiasm for TQM in India. It will not be an exaggeration to say without the opportunity to challenge Deming Application Prize quality movement in India may not have become so strong. Deming Prize has become the benchmark for quality in India.

3. Dr. Kaoru Ishikawa is regarded as the Father of the Quality Control Circle (QCC) movement started in Japan in 1962 with the intent to harness the immense intellectual and emotional potential of first line operatives to contribute to the development of quality and organizational performance. QCC rapidly spread around the world and is growing strong even today. In India for sure at the annual conference of Quality Circle Forum of India (QCFI) typically three to four thousand people participate. QCC has become an integral part of the quality movement in India. Every year International Conference on Quality Control Circles (ICQCC) is held in different parts of the world providing opportunity to workmen to share experiences and be recognized. Dr. Ishikawa started this conference and nurtured it.
4. After the formation of IAQ in 1966 Dr. Kaoru Ishikawa started a special initiative for the global exchange of quality methods, tools, and operating philosophies by promoting and organizing International Conference on Quality Control (ICQC), today called the (ICQ), a triennial global conference on quality starting from Tokyo in 1969. This conference is held once in three years in Japan, USA and Europe by rotation and serves as a global platform to exchange latest quality related theory and practices from different parts of the world.

I believe Dr. Kaoru Ishikawa has made a lasting and enduring contribution to the development of theory and practice of Total Quality or Business Excellence as we know today. His greatest contribution is in influencing the business leaders and the operatives

at the same time through simple to use and practical approaches that otherwise sounded difficult. He did so with humility, sincerity, generosity and exceptional hard work.

In India we are particularly indebted to Dr. Kaoru Ishikawa for his guidance during the difficult time of making a transition from regulated economy to free economy. I consider myself fortunate to have the opportunity to meet such a great person and to learn from him. In a way he contributed in molding my character.

I thank Union of Japanese Scientists and Engineers (JUSE), Prof. Hitoshi Kume and Prof. Noriaki Kano for sharing Dr. Kaoru Ishikawa's legacy with the rest of the world. My special thanks to Dr. Noriaki Kano, an exemplary disciple of Prof. Ishikawa, for providing opportunity to involve many quality professionals from India in this effort of centenary commemoration of Dr. Ishikawa's birth centenary.

(Chairman of International Academy for Quality (IAQ);
former Chairperson of Asian Network for Quality (ANQ);
Chairman of TQM International Pvt. Ltd.)

Follow the Path Laid by Professor Ishikawa and You Will Achieve the Best Quality in the World

Masahiro Ohnishi

1. Guidance on matters other than QC

I had a very lucky fortunate. When I was in charge of the Japanese Industrial Standardization related to QC at the Japanese Standards Association (JSA), I could receive the guidance from Prof. Ishikawa.

During NHK's TV program on QC, I talked about my appreciation to and my memories of Prof. Ishikawa. I wrote about this episode in *Kaoru Ishikawa, The Man and Quality Control* Section 9.3, the title "QC Courses on NHK Radio and TV," on p. 251.

In this section, I would like to mention that he extensively advised about my work.

My main duty was to work for the JSA Quality Control Committee (QCC-JSA) at the JIS Drafting Secretariat. Prof. Ishikawa never missed the deadline for submitting the manuscript, which helped me a lot.

Professor Ishikawa took part in almost every meeting, including one of control charts, sampling tests, design of experiments, or random sampling methods. Since I was the only administrative staff of the Secretariat, I saw the Professor quite frequently.

Even though I graduated from the Department of Industrial Engineering and Management at Waseda University and had written my graduation thesis on QC, my important task as a freshman employee of the JIS Drafting Committee Secretariat was to take the minutes. I did not understand what the committee members were talking about, nor did I know how to spell the words in English.

Professor Ishikawa and Professor Sigeiti Moriguti were the two academics who were kind enough to teach me what I did not understand. Even now, I clearly remember that they explained to me the meaning and spelling of the term "pseudo random sample number" in detail during a discussion about random number tables.

Rather than forcing a particular way, Professor Ishikawa taught us how to approach to a problem. In accordance with his lesson, we choose the way how to tackle the problem by ourselves, and we try not to have any preferences.

Although I should have mentioned it in my first paragraph, a presenter or a

commentator has the responsibility for controlling the ending time of a live program on NHK TV. There are 15 seconds of leeway, so the theme song would be cut if the program got longer or some scenery would be broadcast if the airtime of remained. This was a major source of stress for me. When I told Prof. Ishikawa that NHK was unable to broadcast commercials, he suggested that the propaganda of the textbook for NHK TV Lessons would be good. Just as he says, I got OK from NHK right away.

Thereafter, I was able to present the program quite happily and tell people about a textbook and how to purchase it. At this time, I got the lesson that we should not put limitations on anything.

2. Professor Ishikawa was kind enough to invite me to join a new program proposed by the manager of the QC Department.

Even though there were more seniors at the JSA at the time, the Professor kindly nominated me to be a member of the group working on the new activity plan for the nationwide promotion and development of QC.I had a good opportunity to take part in the debate and learned a lot over there.

For example, I joined the preparatory committee for setting up the quality Month and deciding on activity method. In addition, I joined the group for establishing the Japanese Society for Quality Control since I had appealed the necessity of that. I had the opportunity to express my views on the role of the JSQC.

Furthermore, at the time, Professor Ishikawa emphasized the importance of quality standards while the academics who were involved in QC were focusing on activities relating to statistical techniques. Therefore he set up a product planning study group and published a book entitled *Seihin Kikaku no Arikata to Tsukurikata* (Product Planning: Approaches and Method). This book received the Standardization Literature Prize. I was among the member of the group and mainly worked in this group at the JSA.

3. Support from various professor

Especially in the era of the Sato Cabinet when just began a period of growth, many prefabricated houses lost their roofs due to typhoons. The matter of “the housing industry generated too many claims” had been debated in the Diet. The Minister of Construction and Minister of International Trade and Industry thought that the guidance on QC was urgently needed. With the request of the latter, I became a member of the Selection Committee for Industrial Production Housing Quality Control Superior Factory Certification Systems, and started QC guidance and inspection in the housing industry.

At the beginning, we promoted QC on the basis of the existing JIS Mark Permit system. However, the concept of QC was not established in the housing industry. Only I was an expert on QC, while the other members of the selection committee were representatives of prestigious supervisory bodies, government offices, research institutes, and consumers. I asked Professor Ishikawa for his advice, and he answered, "Why don't you ask young Kano? He's researching on quality control of prefabricated buildings." As a result, Professor Noriaki Kano joined that selection committee, helping rejuvenate the committee and strengthen its expertise in QC. We embarked on a plan to establish QC in the housing industry for prospects in the future.

Subsequently, Professor Kano became the chairman of the selection committee and we succeeded in establishing the concept of QC among senior managers of the housing industries by company's hearing about TQC.

I became the chairman of the Expert Committee for Factory Inspection, which focused on the housing member production factories all over the country. I decided to attend all of the factories inspections which were performed by National Competent Trade and Industry Inspector. I made an unspoken rule of that the chairman of the selection committee should be younger than I.

Professor Kano promoted from a committee member to the chairman. He knew around JIS Mark Permit System and actually used it. He almost completed the system. Thereafter, eminent academics such as Prof. Yoji Akao, Prof. Tadashi Yoshizawa, and Prof. Yasutoshi Washio were appointed to the chair of the selection committee, while Prof. Takeshi Nakajo devoted himself to work as a member of that.

The level of a government QC inspection committee was exceptionally high. Prof. Akao was also devoted to conducting research of the related corporation groups. He had made a tremendous contribution to implementing quality function deployment at companies. I attended his seminars and wrote about what I learned there in the book, *Ohanashi Komuten no TQC* (The Story of TQC at a Building Company). When the book was published, I presented a copy to Prof. Sigeichi Moriguchi. Then he said," It's easy to read, so I give a copy to the carpenter who's refurbishing my house now, and tell him to read it." He was also kind enough to compliment me and said, "You've done a good job of summarizing difficult QC concepts for constructors in order to make builders understand it easily."

After that, was nominated for and won the Nikkei Quality Control Literature Prize (FY1987). I subsequently became a member of the ISO 9001 quality screening committee. Most of the housing industry switches from the government's certification system to gaining ISO 9001 certification. Although no major problems have arisen in

the housing industry, there are no end to companies causing quality problem that might be a criminal act, even though they have gained ISO certification.

I sometimes wonder what Professor Ishikawa would say if he were still alive and saw this reality.

(Former director of the Japanese Standards Association;
former advisor to the Japan Testing Center for Construction Materials)

Prof. Ishikawa and History of Komatsu

Masahiro Sakane

The year of 1963 when I entered Komatsu, it was right in the middle of "Project A," which was a company-wide quality improvement project conducted in Komatsu. Since Komatsu was exposed to foreign competition in the 1960s, it started to manufacture bulldozers on the "Project A" in 1961 in order to get over this crisis. (Komatsu introduced TQC: Total Quality Control on this occasion.) Back then, there was a big difference in quality between made-in-Japan products and those manufactured out of Japan like Caterpillar Inc. To narrow the gap, in Komatsu, even new employees worked very hard by repeating a driving test of pilot model equipment on the Tedori riverside all day long. This was the start of my career. Looking back at those days, then President and CEO Yoshinari Kawai made clear that Komatsu's survival was at the stake due to foreign competition and our product quality had to become equivalent to or higher than that of foreign products. He subsequently launched and led the "Project A." Meanwhile, then senior executive director Ryoichi Kawai rushed to his old friend, Prof. Ishikawa to ask for his support with intent to introduce TQC as an effective mean to fight against the crisis. Prof. Ishikawa was quite busy with a full of schedule for the following six months, however, he accepted the request on the condition that the top management should accompany him and lead the project. This was how Komatsu made all-out efforts on TQC with top-down leadership. The top management frequently visited the worksites, obtained real information and directly understood what was going on. Thanks to these actions, top management learned how to make important management decisions and which directions to take. Thus, Komatsu intensified efforts on quality, reformed the corporate management style and overcame the crisis. TQC has now been our management foundation.

Under Prof. Ishikawa's instruction, Komatsu started various meetings on quality, such as the general "Project A" meeting (company-wide one), the "Project A" meeting (plant-wide one), QC instruction session (at HQ), etc. joined by Prof. Ishikawa, Prof. Asaka, Prof. Ikezawa and other people. Attending these meetings, managerial staff including top management realized how unscientific and irrational their ways of working were. Furthermore, Prof. Ishikawa pointed out that "Komatsu tries new things but gives them up easily. It must keep doing them more patiently and persistently." "Komatsu tends to be reliant, not independent at all." In the meantime, QC was

introduced and implemented at the plants. In order to facilitate QC, foremen and production line leaders took QC training programs lectured by professors invited from universities. Also, the employees eventually raised their awareness about quality by practicing seven QC tools, which resulted in product quality improvement.

The QC instruction sessions were continued in 1963 and 1964, attended by Prof. Ishikawa, Prof. Asaka, divisions at headquarters such as administration, sales and services and development, and managerial staff of the group companies like Komatsu Sales and Service Co., Ltd. At the sessions, three policies of the QC committee chair were strengthened and instructed: (1) Realize the crisis and commit to quality, (2) Win the Deming Prize with concerted efforts and (3) Resolve sales and service issues. Later in April 1964, the QC instruction session, joined by Prof. Ishikawa and the top management, decided that Komatsu would take on a challenge to win the Deming Prize. Prof. Ishikawa mainly stressed that "There should be connection between your daily operations and QC." "You must understand the real situation, how to reinforce your strong points and shore up your weak points." "You should keep working on TQC, not for winning the Deming Prize but for making your operations better." All these points are still applicable today. As a result, we could win the Deming Prize in the same year (1964), while we found remaining issues to solve at the same time. We determined to continue working on TQC to further improve our corporate management.

In 1977, the top management decided to continue promoting TQC in order to improve our level high enough to contest the Japan Quality Control Prize in three years. We asked for instruction and support from about 20 professors including Prof. Ishikawa and his top class students: Prof. Kume and Prof. Kano, with an aim to review and reinforce our corporate quality system. Around this time, I worked on new tasks, such as making specifications suitable for each different environment on a global basis aiming to enhance reliability, as a manager of the product planning section of the overseas marketing department where TQC was little known. Since I was assigned in the US at the time when Komatsu won the Japan Quality Control Prize, I could not directly involve myself in the TQC actions. However, I still remember that I then thoroughly learned that the concept of fact-finding or visualization was fundamental to everything, which has become my core stance as top management.

My career has been following a path of QC: "starting with QC and ending with QC," representing that the Deming Prize for Individuals that I received in 2008 and the Deming Prize that one of the Komatsu subsidiary companies in China won in 2013. Now I feel honored to write this short essay as the sequel to "Kaoru Ishikawa, The Man and Quality Control." I promise Prof. Ishikawa that I will continue my efforts for further

growth of Japanese industry.

(Former President and CEO, Komatsu Co. Ltd.;
Chairman, Union of Japanese Scientists and Engineers;
former Vice Chairman, KEIDANREN (Japan Business Federation))

Professor Kaoru Ishikawa Approaching the 100th Anniversary of His Birth: Reflections on Quality Control in the Future

Shinichi Sasaki

Exactly half a century has passed since Toyota Motor Corporation (Toyota) was awarded the Deming Prize in 1965. Five years after that, I entered Toyota in 1970. I was assigned to the inspection department at one of our plants and I still remember well the many control diagrams posted inside the plant. One of my first jobs was to help with a QC Circle activity. Applying QC approaches using graphs and cause-effect diagrams, I learned about methods used to solve problems at the work site.

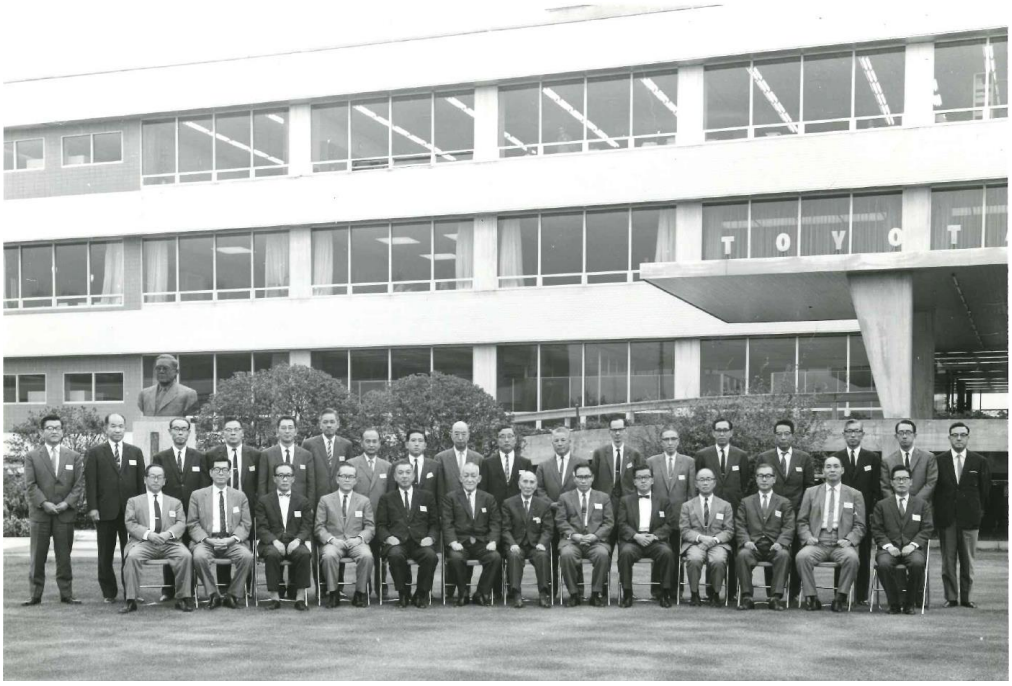
Although quite ordinary these days, the development and application of QC Circle activities and the seven QC tools was a new and exciting activity for us at the time. My boss told me many times how our quality level had improved markedly after receiving instruction in quality control and TQC from Professor Kaoru Ishikawa, Professor Tetsuichi Asaka, and many other professors as we strove to win the Deming Prize, so even for someone like me, who did not have an opportunity to receive instruction directly from these professors, I still keenly felt their influence. Later on, Toyota passed through a period of high economic growth and the company continues to grow as a global company today. Fifty years later, the teachings of these professors live on in a legacy passed on through generations working at Toyota and these ideas continue to support the growth of Toyota today.

In this year marking the 100th anniversary of Professor Ishikawa's birth, Shoichiro Toyoda, Honorary Chairman of Toyota, spoke of his memories of Professor Ishikawa in a special lecture he gave at the 100th Quality Control Symposium on June 5th, 2015.

In his lecture, Honorary Chairman Toyoda remarked, "I still clearly remember the TQC seminar held for Toyota Group executives when Professor Ishikawa was a lecturer and he asked us, 'On the page your textbook is opened to, how many times is the word 'of' written?' and only half of the people attending the lecture got it right."

Professor Ishikawa taught Toyota that humans make errors, so in order to make good products, just carrying out strict inspections is not a good answer; rather, it is important that each person involved take responsibility and build quality into the production process. The idea that "Good quality is built into the production process" became one of the most important basic philosophies followed by Toyota and Toyota Group companies, and it is still followed today.

Never before has Japan faced such an increasingly difficult business environment. As we tackle environmental and energy problems, the aging of society, and the introduction of new innovations, an even higher level of quality control is essential. It can be said that the Achilles heel of Japanese industry competitiveness lies in the delay in responding to these issues and, as has been pointed out many times, the inefficiency of the Japanese working style when it comes to the decision-making process within a worker's area of responsibility.



In recent years, Toyota too has experienced the diversification of customer needs, increasingly advanced and complex technology, and a rapid growth in business. This has resulted in a progressive specialization and segmentation of work, making work processes increasingly complicated. Added to this is the difficulty in keeping up with the accumulation of knowledge and knowhow accompanying the diversification of the work force and other factors. There were concerns that if we left things as they were, there would be a sharp increase in customer dissatisfaction, the need to repeat tasks, and other risks. As it would have been difficult to handle such issues by simply extending what we had been doing previously, improving work performance became an urgent task.

Thus, it was my judgment that we needed to promote the philosophy of built-in quality, not only on the manufacturing shop floors, but at all job sites. This movement was named *Ji Kotei-Kanketsu* (or JKK) and it was rolled out companywide in a more fully developed form. The purpose was for members to become capable of judging the quality of their own work on the spot. Doing this makes it is possible to deliver only good products or work to the customer (or following process) and because this eliminates mistakes and reworks, I strongly believe that it leads to a better quality of work.

In order for Japan to achieve sustainable growth, it is essential that strong industries be built. This refers to not only the manufacturing shop floor, but also to planning, development and other job sites, which also must become stronger. As times change, the business environment is also dramatically changing, but the concept that quality must be built into the production process must always support not only Toyota, but Japanese industry as well. I firmly believe that it is the job of those of us who are in charge of quality control and TQM to match the teachings of Professor Ishikawa to the needs of the times and by spiraling them up throughout the company, ensure that they are passed on to the next generation.

(Senior Advisor to the Board, Senior Technical Executive, Toyota Motor Corporation;
President and CEO, Union of Japanese Scientists and Engineers;
Chairman, Central Japan Quality Control Association)

Learning from *Kaoru Ishikawa, The Man and Quality Control*

Kazuyuki Suzuki

I served as the leader of English translation of *Kaoru Ishikawa, The man and Quality Control*, for 8 months from the end of last year to July 13, 2015, the centenary of Prof. Kaoru Ishikawa's birth. I learned a lot through this translation such as his philosophy, way of thinking, and methods. I would like to write especially what impressed me.

1. Philosophy of Professor Ishikawa

His philosophy was based on respect for humanity, therefore he aimed for a human-centered management. Whenever he thought about QC, he thought of human being as well.

1. "The primary purpose for management is based on respect for humanity against QCD which is the second one for management. Humanistic management respects for spontaneity and intention of employees. They consider deeply and act on their own. In other words, the primary goal of a company is to develop employee's infinite ability." [60]
2. "In Japan, we always speak about education and training as a set, while in the Europe and the United States, they only use the word training as 'industrial training,' not using the word education. I suppose they want to improve their skills by training rather than by education. I personally think we need to sharpen our brain and change our ways of thinking not only by training but also by education." [B9]
3. "Quality control starts and ends with education." [22]
4. "With prayer for QC Circle Activity to be further activated, each and every Japanese should exercise human capabilities for a meaningful and lively workplace. Let Japan and Japanese companies get further developed, Japanese mental and physical standard of living be improved, and bring happiness for all human kind." [B15]

From the above, I understand his humanistic philosophy. He never thought about TQC separately from humanity. His philosophy was developed apart from Maslow's

hierarchy of needs (1943). He spread his own idea that QC should be carried out by all. He surely accomplished inseparable matter, theory and practice.

2. Way of Thinking

He created the basic idea for today's QC from 1950s, such as respecting the customer's intention or performing QC with not only experts but also all employees. He always had worked thinking about what should we do in order to realize welfare and happiness for not only for Japanese but also all mankind all over the world.

5. "What we need to focus on is the quality that customers really want. —We call it a true quality, a true performance—and the first step of quality control is to find it. On the other hand, purity or tensile strength, for example, is just a factor or a cause to get the performance, which we call a substitute quality characteristic." [B5]
6. He advanced the idea of the "QC by QC department" to "QC by the entire company, involving all departments and all employees."
7. 10 Principles for Both Buyers and Sellers [350] is still a great guiding principle. His philosophy like mutual confidence, coexistence idea, social responsibility, humanity, and consumer-oriented services is shown in it.
8. He strongly asserted that it is essential to proceed thinking about both quality control and reliability comprehensively, not separately. The theme of the seventh QCS in 1968 was "Quality Assurance and Reliability." At that time, he stated," Some people even in Japan mistake to understand that Quality Control, Quality Assurance, and Reliability are separate things, however, we should consider them as a whole. The reason is because Reliability is a part of Quality Assurance and Quality Assurance is a major goal of Quality Control." He contributed to the dissemination and enlightenment of Reliability as a representative to the executive committee of Reliability and Maintainability Symposium (the first and the second) and its vice-chairperson (from the third to the 18th of his death).

3. Methods

The proposal of the origin of today's PDCA in 1954, Three Steps of Quality Assurance (emphasized inspection, process control, and new product development (NPD)) in 1958, and Sampling Methods by Prof. Ishikawa contributed to the Japanese economy not only theory but also practice.

4. The activity of dissemination and enlightenment

He was greatly involved in and started most of the QC activities such as various event in the today's QC world inside and outside the country, international standardization, seminars, cooperation for developing countries, and development of young generation, etc.

I genuinely pray that there will be a lot of people to learn his great achievements and utilize his teachings in an actual practice.

(Professor of University of Electro-Communications, Tokyo;
former President of Japanese Society for Quality Control)

A Sequence of Study– Exercise in Life-and-Death Problems – Actual Play

Takenori Takahashi

It is an episode of a chat after the TQM consultation at a certain company one day in the 1980s. Professor Ishikawa said to the top management of the company, "It is reckless to do something without knowledge, but nothing can be mastered if knowledge is not put into practice." In those days, knowledge acquisition was considered more important than practice in that company. At that time, I recalled one foreword in Prof. Ishikawa's book that I had read during my school days.

The theory that I was strongly interested in during the 1970s when I was an undergraduate student was the Experimental Design. I read Prof. Ishikawa's trilogy for my self-study, *Introduction to Analysis of Variance*, *Textbook for the Basic Design of Experiments*, and *Design of Experiment for Chemists and Chemical Engineers*. The above message came from the preface of the second book as follows:

> "Just like people who are unwilling to play unless they study all of the standard tactics of Go (oriental board game: territory acquirement game using black and white stones) will never improve, you will never develop your ability if you conceive the ridiculous notion of studying every single statistical method and experimental design method before practice. It is important to have the manner, such as learning some standard tactics, having the exercise in life-and-death problems, applying them in matches (actual cases), and then going back to learn the standard tactics when you come across some problems. You can develop ability and make progress by repeating this process."

After that, I got a position to teach students statistical methods and experimental design. Prof. Ishikawa's message as described above became the foundation in my teaching. On the contrary, there was only a chip experiment that we could put the things we learned, theories, ideas, and data processing, into practice as teaching materials in our class. We could not say it an ideal practical material even though it was effective for understanding theories. It was just a numerical simulation by human hands. Meanwhile, we could not conduct real manufacturing in the classroom. Therefore, I carried out practical exercises by developing some learning materials with simulated experiences. I single-handedly developed "paper gliders" and "coin shooting," and also developed

"twin-rotor paper helicopters" evolved from paper helicopters that had been popular at that time.

These teaching materials are not perfect as they are handmade things, by an amateur. However, I understand that those materials help the students improve comprehension and cultivate ability. It is useful to repeat "a sequence of study – exercise in life-and-death problems – actual play – a sequence of study again..."

"It is reckless to do something without knowledge, but nothing can be mastered if knowledge is not put into practice." I understand that this is the essence of education. I learned how to teach and nurture students from Prof. Ishikawa.

(Professor of Mejiro University;
Visiting Professor of Keio University)

Great Benefits of Dr. Ishikawa's Achievements to a Thai Conglomerate

Kan Trakulhoon

This article is dedicated to Dr. Kaoru Ishikawa who is one of the pioneers in leading the dissemination and promotion of quality activities, a steadfast leader in the establishment and development of Japanese way of Total Quality Management (TQM), and a great inventor of QC methods such as the Cause & Effect Diagram.

SCG (Siam Cement Group) is one of Thailand's most recognized industrial conglomerates. Established in 1913, the group commenced as the first cement manufacturer in Thailand, which later on helped form the country's foundation for the subsequent developments. Since its founding, SCG has grown continually and diversified into three core businesses, namely SCG Cement-Building Materials, SCG Packaging and SCG Chemicals. Throughout the past 100 years, SCG has been relentless in organizational and employee development which helps drive innovation in products, services, processes, and business models to create higher value and address the needs of all parties concerned. Moreover, the Group is committed to contributing to the sustainable progress of the communities where SCG operates and pledges to become ASEAN's business leader as well as a role model in corporate governance and sustainable development.

On behalf of SCG, although I am not personally acquainted with Dr. Ishikawa himself, nevertheless, I could say that his achievements and legacy have had an extraordinary impact on how SCG has evolved and has been one of the renowned conglomerates in the region. Accordingly, I would like to take this opportunity to share my views and experiences about the three significant quality initiatives / methodologies related to Dr. Ishikawa i.e. QC Circle, TQM and Deming Prize, which SCG has adopted along our operational excellence journey.

In 1978, QC Circle, invented by Dr. Ishikawa, was firstly introduced and implemented in one of SCG's former subsidiaries, Siam Nawaloha Co., Ltd. with the objective to encourage systematic work improvement at the shop-floor level. SCG's top management at that time had seen QC Circle as an excellent initiative which would help develop SCG employees' knowledge and skills. Additionally, QC Circle provides the opportunity for SCG employees to release their potential with their own improvement ideas and suggestions which get along well with one of SCG's four core values, "Belief

in the value of the individual." As a result, a few years later QC Circle had been widely recognized and implemented in other companies in SCG i.e. Siam Iron and Steel Co., Ltd., Siam Cement Co., Ltd., Siam Cement Trading Co., Ltd., and Siam Fiber-Cement Co., Ltd. As for my own experience, when I was a production engineer at Siam Cement Co., Ltd. in 1981, I was directly involved in QC Circle activity myself starting from self-studying the concepts, providing in-house training for shop-floor operators and facilitating QC groups to run the QC Circle successfully. From my viewpoint, QC Circle can be considered as one of the fundamental elements which provide countless benefits to SCG in terms of productivity and quality improvement ever since.

In 1992, Total Quality Management (TQM), formerly known as Total Quality Control (TQC), one of the great initiatives of Dr. Ishikawa, was officially introduced in SCG as one of top management insightful initiatives to create a competitive and sustainable business under the emerging trend of globalization. During the TQM introduction period, pilot TQM implementations at selected companies were initiated under regular guidance and consultation from the Japanese TQM expert team. Being the production department manager & plant manager of Siam Refractory Industry Co., Ltd. (SRIC), I took the key driving role in implementing TQM at SRIC, which was one of the 4 pilot companies during such period, and have gained a great deal of practical knowledge and in-depth understanding of fundamental TQM methodologies such as Problem Solving, Task Achieving, Daily Management, and Policy Management. These hands-on TQM experiences have greatly broadened both my perspective and those of my SCG colleagues on how to run business in a more systematic and effective manner.

Later on, after encountering the national economic crisis due to the drastic depreciation of Thai Baht in 1997, SCG top management was intensely motivated to break through international competitiveness by dramatically improving product and service quality, TQM implementation was remarkably and extensively promoted across SCG in a group-wide manner. More companies were implementing TQM in order to turn around businesses as well as to strive for business successes. As a consequence, although Thai economy was still in a recovery period, SCG had successfully achieved improved business results. Being the president of Cementhai Ceramics Co., Ltd during such difficult period, I also had a direct experience in rigorously applying TQM methodologies to turn-around Ceramics Business from a nearly-divested business to a core-business of SCG by successfully repositioning Ceramics Business from a commodity-product producer to a trend-setter producer.

More recently, with the vision to become an ASEAN sustainable business leader by 2015 and beyond, SCG has been attentively focusing on its two key strategies i.e. 1.

Expanding its businesses across ASEAN countries while sustaining the development of communities where it operates and 2.Creating high value-added products and services to customers. Behind these two business strategies and successful initiatives over the decades, “Operational Excellence driven by TQM” has consistently been SCG core foundation of every activity since 1992. SCG businesses have been continually able to maintain competitive cost while enhancing productivity and delivering consistent quality as well as to efficiently use all the available resources to run SCG operations under the considerations of social and environmental benefits. Nowadays, TQM has become the common language which embeds quality-concerned attitude to SCG people. Everyone, from top management level to operation level, has started thinking and working TQMly and can practically apply TQM into daily work. Such behavioral changes have gradually become major parts of SCG’s current and on-going working culture.

In 2002, as a result of continual promotion and comprehensive implementation of TQM in SCG, the first company in SCG, The Siam Cement (Thung Song) Co., Ltd., was awarded the prestigious Deming Prize which has been established since 1951

with Dr. Ishikawa being a founding member of the Deming Prize Committee. Applying for Deming Prize has proven to be an effective catalyst to excel business performance. Companies can utilize the TQM efforts during the award challenging journey to fill the business gaps and to grasp more opportunities. The benefit is not the award itself but what companies will get along the way to achieve the award. In order to further sustain SCG business competitiveness via increasing customer and stakeholder satisfactions, companies within SCG are encouraged by top management to continually improve the quality of their products & services and upgrade the international competitiveness of their businesses by challenging such world-class quality award. Currently, nine companies under SCG across various business units have successfully won the prestigious Deming Prize, and as a consequence, SCG is currently recognized among the top rank of group-company winners of the Deming Prize outside Japan.

On behalf of SCG, I would like to once again, express my sincere gratitude for all the great works and remarkable contributions which Dr. Ishikawa has done for both the Japanese and International quality society. I am confident that he must be very pleased to learn that a Thai conglomerate like SCG, has also gained great benefits through his exceptional dedications and achievements.

(President and CEO, Siam Cement Group(SCG))

Those I learned from Professor Kaoru Ishikawa

Hiroe Tsubaki

I first met Prof. Ishikawa when I explained the performance of proposed robust estimation methods of a draft international standard in 1980. Since then, Prof. Ishikawa had taught me essential statistical concepts implicitly such as problem finding by using Shewhart charts, variety of definition of variability.

He said to me "You should learn control charts rather than sampling inspection, Mr. Tsubaki." Finally I noticed that the objective of the Shewhart chart is to find assignable causes which can be clues for process improvement while the draft international standards on control charts proposed by Russia and England are based on statistical hypothesis testing.

Of course I also learned much from his text book on Quality Control in which Prof. Ishikawa wrote "Action is necessary particularly in Japan." Some famous Japanese professor recently said to me "I cannot understand the reason why Action was included in the PDCA cycle from the viewpoints of scientific approaches." However, I interpret that an implicit improvement cycle that is called the problem solving QC story in Japan is between Check and Action phases. Also I understand the problem solving QC story was proposed by Japanese TQC led by Prof. Ishikawa who is a pioneer of quality control in Japan. The role of "Check" should be to identify problems worth solving.

Although PDC cycle is that by Shewhart and Deming only implemented the Grammar of Science written by K. Pearson for production processes, however I believe the Grammar of Improvement, the systematic way for problem solving as basic statistical tools, was established by Prof. Ishikawa and his colleagues.

About 15 year ago I heard that causal analysis using the Ishikawa diagram was taught at some elementary schools in US from 1990s. Nowadays I certainly recognize that Prof. Ishikawa significantly impacts on not only quality management but all the scientific approaches for societies. In 2008, some Professors of Harvard University wrote that causal analyses for the public health management should be done by Ishikawa's methodology [1]. Moreover, in 2015, the President of International Statistical Institute said "the Deming and Ishikawa philosophies are the most significant contribution of statistics to industry" at the opening ceremony of the 60th World Statistics Congress.

I hope young people in Japan also learn from Prof. Ishikawa much more.

(President, the National Statistics Center;
President, Japanese Society for Quality Control (2015-2017))

Reference

[1] Hsiao, H., M. Roberts, M. Reich and Berman P. (2008): *Getting Health Reform Right, a Guide to Improving Performance and Equity*, Oxford University Press.

Like Father – Like Son: The Ishikawa Family Quality Heritage

Gregory H. Watson

Introduction

There is a special uniqueness in the contribution of the Ishikawa family legacy to the global quality movement. Kaoru Ishikawa (1915–1989) is universally known and revered by the quality community world-wide. Less visible is the significant influence his father, Ichiro Ishikawa (1885–1970), had in establishing the post-war Japanese quality movement. The influence of Ishikawa father and son stimulated creation of Japanese Total Quality Management (TQM).

The Ishikawa Family Legacy: Exceptional Father — Ichiro Ishikawa

The Ishikawa family roots were in Tokyo. Uichiro Ishikawa (1862–1919), the father of Ichiro Ishikawa, managed the Kanto Sanso (Kanto Acid and Soda) company in the capital. After Ichiro graduated from the Imperial University of Tokyo he taught applied chemistry for several years, and then joined his father's company to start his management career in the Japanese chemical industry, eventually becoming an industry leader just before the war. During the war years he was the President of Nissan Chemical Industries and Director of the Japanese Association for Chemical Industries. Afterwards he transitioned into cross-industry leadership as Chairman of the Japan Industrial Association (JIA) (1946) and then he was appointed the first President of the Keidanren (Japanese Federation of Economic Organizations (JFEO)), a position he held from 1948 until 1956.

In mid-1946 the Union of Japanese Scientists and Engineers (JUSE) was established and the executive committee was organized with Yoshitomo Tatumi as its President. From the start it was the intention of JUSE to maintain a close relationship with industry by inviting a recognized leader to serve as its Chairman. JUSE management decided to invite Ichiro Ishikawa to serve as its Chairman and in July 1947, he met with the first Managing Director of JUSE Kenichi Koyanagi (1903–1965), and accepted this nomination. Since the installation of Ichiro Ishikawa as its first Chairman, JUSE has traditionally requested that the Keidanren Chairman serve concurrently as its Chairman based on this precedent.

During these pioneering years, Mr. Ishikawa played an important role in

convincing senior managers of major companies to apply quality to stimulate reconstruction of Japan's industry. In recognition of his lifetime contributions to the nation and its industry, Ichiro Ishikawa was decorated with the Grand Cordon of the Order of the Paulownia Flowers of the Rising Sun, Paulownia Flowers by the Emperor.

As JUSE Chairman until 1956 Ichiro Ishikawa held a position of exceptional responsibility. His job was to convince other Japanese business leaders of their obligation to pursue quality in their firms. I believe that Ichiro Ishikawa was a "*kuroko*," or black player in kabuki drama, the "invisible hand" who facilitates actions on stage by the principle actors who are the visible focus of the audience. I have deduced that he assumed this role through a logical examination of the records of the Deming Prize.

The effectiveness of his intervention and a measure of his influence is surmised as Ichiro Ishikawa served as Chairman of the Deming Prize Committee (established in early 1951) and at the first Deming Prize Award Ceremony held on 22 September 1951, the Deming Application Prize was awarded to four major companies: Fuji Iron & Steel Co., Ltd, Showa Denko K. K., Tanabe Seiyaku Co., Ltd., and Yawata Iron & Steel Co., Ltd. In the next year seven more companies received this award: Asahi Chemical Co., Ltd., Furukawa Electric Co., Ltd., Nippon Electric Co., Ltd., Shionogi Co., Ltd., Takeda Chemical Industries, Ltd., Toyo Spinning Co., Ltd., and Kyushu Cloth Industry Co., Ltd. During the remainder of the tenure of Ichiro Ishikawa as Chairman of JUSE each year 3–4 companies received this award. Upon inspection, it is also evident that many of these recipients came from the chemical industry; were major Japanese companies that one would expect to be active in the Keidanren; or were critical infrastructure industries that were necessary to the reconstruction of a broad-based manufacturing capability for rebuilding the post-war economy. In 1957 after his term as Chairman had expired and there were no Deming Prize winners. It appears to me that an "invisible hand" was operating behind the scenes to encourage these companies to pursue quality as a strategy for rejuvenation of Japanese industry.

Another quality deployment strategy was engagement of top-level executives to participate in education programs (externally through the lectures of W. Edwards Deming (1900–1993) and Joseph M. Juran (1904–2008)) and by developing internal JUSE quality experts to give council. Evidence of the strategy to develop Japanese thought leaders is also clear from examining the awardees of the Deming Prize for Individuals in 1952. Eight people who were members of the JUSE QC Research Group were recognized with this award: Shigeru Mizuno, Chair (1910–1984), Tetsuichi Asaka (1914–2012), Kaoru Ishikawa, Masao Kogure (1915–2000), Masao Goto (1913–2000), Hidehiko Higashi (1915 –), Shin Miura (1910–1996), and Eizo Watanabe (1814–2003).

Encouragement of these people, particularly Ichiro Ishikawa's son Kaoru, to dedicate their intellect and energy to developing quality in Japan was exceptionally significant as a strategy to rebuild the foundation of the industrial base by applying new, efficient management practices. While, my arm's length observation of the activities of this time may not be totally accurate, it seems to me that there is a strong argument that an executive leader of the stature of Ichiro Ishikawa was essential at this time to persuade industrial and academic leaders to support the fledgling quality movement. However, it is very clear that the father influenced his son to serve in this future capacity. Perhaps, in time, a young researcher will examine the JUSE archives to determine the validity of my beliefs.

The Ishikawa Family Legacy: Exceptional Son – Kaoru Ishikawa

I expressed my deep respect for the work of Dr. Ishikawa in an article that I wrote in Quality Progress ("The Legacy of Ishikawa," April 2004) where I explained how my initial introduction to quality came through the study of his approach to reviewing projects for quality improvement in videotapes that Hewlett-Packard recorded in the early 1980s. Although I never met him, Professor Ishikawa became a "virtual mentor" and I realized how profound his way of working was on formulating my own approach to consulting about quality matters. I believe it is fair to say, that my personal experience was greatly advanced by his teaching and that his guidance by example also shaped the modern development of quality and facilitated its transition across generations and cultures. Through development of a collective approach to quality, TQM the Japanese Way, he demonstrated an appreciation for the systemic effects of quality and its value by searching for "universal elements" which may be applied in any industry or culture. His life was dedicated to the development and guidance of the young Japanese quality movement and sharing with the rest of the world the lessons learned during the progress of its quality journey. Furthermore, through his writings, publications and research Professor Ishikawa assured that the learning from Japan would be transferred to the West. Japanese QC Research Committees of the 1980s translated their final reports into English to share with the rest of the world. While I hold him in the greatest respect, it is also clear that he was not alone in generating all of these results. Early development of quality in Japan was indeed a collaborative effort.

Collaborative Leadership in the Early Japanese Quality Movement

The founding generation of Japanese quality thought leaders included three men who were the prime movers in pioneering quality: Shigeru Mizuno, Tetsuichi Asaka,

and Kaoru Ishikawa. Shigeru Mizuno led the QC Research Group to uncover essential truths and interpret the words of Deming and Juran to structure a unique Japanese way called Company-wide Quality Control (CWQC) and TQM. Tetsuichi Asaka served as an internal consultant and quality coach to guide Japanese industry leaders and their companies in developing disciplined approaches to quality. Kaoru Ishikawa contributed to the development of quality methods and shaped the formal Japanese quality infrastructure through his leadership in JUSE, the Japanese Society for Quality Control and development of a national and global structure for promoting QC Circle activities. He also became a global ambassador of Japanese quality through his international activities in teaching the world about Japanese quality and serving as the interpreter of Japanese Total Quality philosophy, tools and methods as well as disseminator of its success stories and case studies. His success in global quality consulting, reinforced by the exceptional performance of Japanese companies, supported by his quality colleagues, created the enduring reputation for quality performance which Japan still enjoys as a nation today. This collaborative approach to quality has served Japan well and it is my opinion that the pivotal role in global dissemination of Japanese TQM was the vital personal contribution of Kaoru Ishikawa.

Conclusion — Implications of this Legacy for Japanese TQM

New science is built on the contributions of past scientists. The same is true for quality. What is the responsibility of one generation for the next? This question is characteristic of the Shinto faith. In this tradition, each person should leave the world a better place as a way of honoring the wisdom that has been gathered by our ancestors, passed on to us and preserved for future generations. Each living being contributes to the continual cultivation and nurturing of this knowledge to create an ever-more refined state of being improvement of the world is an imperative as an outcome of our human experience.

In this system, each generation is accountable for developing the capability in the next generation so it may fulfill its own responsibility and extend the tradition of learning and doing. This goal was accomplished by Kaoru Ishikawa as he mentored the next generation of Japanese quality thought leaders: Yoshio Kondo (1924–2011), Takanori Yoneyama (1929–2014), and Genichi Taguchi (1924–2012) and also the current generation: Hitoshi Kume, Noriaki Kano, Shoji Shiba, and Yoji Akao. From one generation to the next the influence of the Ishikawa family has enriched the global quality community and has increased the quality of life for humanity.

Exceptional father; exceptional son — the world of quality professionals remember

your contributions and thank you with deep gratitude for your gifts to our current knowledge and capability which would not have been achieved without your diligent efforts. In the words of Sir Isaac Newton, "If we have been able to see further, it is because we have stood on the shoulders of giants."

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