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# JAPANESE EXPERIENCES ON QUALITY

## ICQC '87 Tokyo—Best Opportunity to Know

**Hajime Karatsu,** Professor, Tokai University

In March 1986 I was invited by the U.S. Department of Defense to give my views on the revitalization of the semiconductor industry. At the committee hearing I presented a table.

It was a data sheet which listed the results of the accelerated life test on standard type of ICs made by the manufacturers. The result showed a wide discrepancy among them.

A certain manufacturer had two product failures at the start of the test with many more being added on to the failure list as the test proceeded. After 4,000 hours there was few products left that the test was discontinued. Another manufacturer had made such fine products so that even after 10,000 hours of test there was no trouble.

Pointing to the table I said that the production facilities were little different from one manufacturer to another. The silicon wafers used in the process were supplied from more or less the same sources as the supply was limited worldwide. As the production facilities were the same so were the patterns printed on the wafers. There were little differences among the capabilities of the operators. What then made the difference? I volunteered that the difference lay in control management, particularly the quality control (QC).

Manufacturing is a daily battle with error. Materials supplied may be slightly different from those ordered. Production machines behave slightly different from day to day. Operators do not report to work as expected and must be replaced by others. Some times the design has to be altered because of customer complaint. Endless unexpected happenings take place and this is what manufacturing is all about. The problems have to be resolved one by one every day at the work place. Without the effective trouble shooting the factory will come to a halt.

Under this circumstances it is wrong to leave the problems of quality exclusively to the experts. Each and every one must get involved in trouble shooting and reducing the error. Without the commitment of every person no perfect product can be produced.

Quality control (QC) means encouraging each member of the team to score full marks. If the whole team scores 100 with the exception of one who scores 99, the efforts of all the others may be reduced to nile. This is the philosophy behind total quality control (TQC).

Japanese companies succeeded in controlling quality not at a percentile level but at parts per million (ppm).

You may then ask will this not raise the cost. It is an understandable question because we have been trained to think that good things are expensive. The answer is no. When the number of defective products is reduced the cost is also reduced. This is logical. Semi-conductor, for example, is made by printing patterns on the surface of the silicon board. The game here is to make as many good boards from a single piece of wafer. There will be a large cost differential between making 400 or 200 units from the same piece of wafer. A high rate of defective products also means a high potential for mal-function during use. So that the cost during use will also go up.

The truth is better products are cheaper! This is why Japanese products are bought and accepted worldwide. The forthcoming ICQC '87 Tokyo will provide an excellent opportunity for all of us to learn from the Japanese experience.

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Phone: 03-352-2231 Fax: 03-356-1798 Telex: 02322485 JUSE J

# "FEATURES OF COMPANY-WIDE QUALITY CONTROL IN JAPAN"
## — Report of 44th QC Symposium —

**Tatsuo IKEZAWA, Yoshio KONDO, Akira HARADA, Takanori YONEYAMA**
**Organizing Committee**
**Quality Control Symposium, JUSE**

*This article is a summary of a paper to be presented at the International Conference on Quality Control 1987, Tokyo (ICQC '87).*

### 1. INTRODUCTION

The 44th quality control symposium was held on June 5 and 6, 1987 at the Hotel Kowakien in Hakone. As will be discussed in more detail later, quality control symposiums (QCS) have been held on numerous occasions, each time taking up a theme relevant to the times as the keynote subject. At the 44th QCS, the "Features and Problem Issues of QC in Japan" were discussed.

It was 18 years ago that the first "Quality Control International Conference" was held in Tokyo. In June of 1969, the topic happened to be the same as the focus of this year's conference: "Features and Problem Issues of QC in Japan." Opinions expressed by the participants were then summarized into "Six Feature Items of Quality Control in Japan," in the form of a symposium resolution.

Since then, Japanese QC has come to enjoy widening scope of application, and the basic concepts of its promotion as well as its systems, techniques, and other aspects have been refined. In such a climate we were motivated to restudy the objective conditions of QC in Japan today and accumulate detailed material for future work at the 44th QCS, making use of the opportunity presented by another "Quality Control International Conference" in Tokyo. We also felt that such material should not only be helpful in making presentations to overseas QC specialists visiting Japan and attending international conferences in the future, but be useful for overseas public relations and consultation as well.

### 2. AN OUTLINE OF QUALITY CONTROL SYMPOSIUM (QCS)

In June 1965, Union of Japanese Scientists and Engineers (JUSE) held the first QCS which aimed at the development of quality control in Japan and the furthering of its market penetration and progress. Since then, the symposium has been held semi-annually. In 22 years, 44 symposiums have been held, making it exceptionally venerable symposium at the international level.

Initially, all discussion took place between panelists only, but in response to request for the participation of non-panelists, a supporting membership (requiring payment of a participation fee) was established beginning with the 3rd QCS in 1966.

The subject (theme) of a symposium has always been selected to reflect current topics of interest, but the scope of discussion has regarded quality control in its widest sense, including statistical mathematics at one time and enterprise management another, as well as the tasks of the front-line work floor at times and the issues of concern to owners or managers at others.

The basic symposium proceedings generally take the form of an initial presentation of papers and their discussion, followed by group discussions by participants, and finally an open discussion in which everyone takes part.

Papers are usually requested of four or five invitees, who present their research results in areas of sub-themes related to the main symposium theme. Attendees then split into groups, each group discuss a paper with the author during the evening. The following day, the group discussions are summarized and subjected to open discussion.

Planning and management of symposiums are entrusted to an organizing committee, which functions to provide services ranging from selection of a theme, speakers, and invitees, to moderation of discussions, summarizing of outcomes, etc. Naturally, committee members must be replaced from time to time, and presently there are four members in charge of planning and managing the symposium. Past committee members serve as consultants provide suggestions and assistance in planning conferences.

### 3. 44TH QUALITY CONTROL SYMPOSIUM

The 44th QCS was held on June 5 and 6, 1987 at the Hotel Kowakien in Hakone with the theme: "Features and Problem Issues of QC in Japan." The participants consisted of 68 invitees, including the organizing committee members, and 45 supporting members.

An outline of the presentations and discussions follows:

(1) Research Presentations

1) Policy Management and Daily Management (including the TQC concept and its variations)
   Katsuya HOSOTANI
   (President, Quality Control Research Institute Inc.)
2) Progress in Statistical Techniques and Their Utilization

Chuichi OKUNO
(Professor, Tokyo College of Sciences)

3) New Product Development and Quality Assurance — as viewed from Quality Implementation and Reliability Standpoints —
Yoji AKAO
(Professor, Tamagawa University)

4) QC and QA in Service Industries
Horiaki KARINO
(Professor, Tokyo College of Sciences)

5) Progress and Problem Issues of QC Circle Activities
Kaoru FUJITA
(Executive Director, Fujita Management Research Institute)

(2) Group Discussions
All the participants were divided into five groups, each engaging in its own discussions mediated by an assigned group leader.
The discussions focused on the "Features and Problem Issues of QC in Japan" with due reference to the research papers presented, and in the end, each group selected its own list of "10 feature items of QC in Japan," ranking items in order of importance from No. 1 to No. 10.

(3) Open Discussions
After the group discussions, participants again congregated and engaged in an open discussion, with organizing committee members serving as moderator. First, each group leader summarized the content of his group's discussion and presented the list of 10 items, together with a rationale for the selection as well as supplementary key words.
As was expected, some of the 10 items proposed by each group (for a total of 50 items) were duplicated by other groups, or had a very similar concept expressed in somewhat different terms. Accordingly, the phrasing of the items was examined with close attention to their underlying concepts, and 50 items were consolidated into 18 items.
The 10 most important items from these 18 were determined by the vote of all the participants. As a result, 8 items were dropped, and a review was made to include them as supplementary comments to the 10 selected items. The final expressions of the 10 items and organization of the supplementary comments were entrusted to the organizing committee because of the limited time available, and all discussion was then closed.

(4) "10 Feature Items of TQC in Japan" as condensed by Organizing Committee
The organizing committee carefully followed the ongoing open discussion and also checked the content of group discussions. It referenced the results of an advance survey of knowledgeable people in the QC industry.
Ten definitive items were eventually produced in this way; each item is accompanied by 3 to 6 items of supplementary comments. These final results are given in the attached list of "Features of TQC in Japan."

## FEATURES OF COMPANY-WIDE QUALITY CONTROL (TQC) IN JAPAN

Note:
1. The title originally selected was "Features of TQC in Japan," in which TQC had been meant to stand for company-wide quality control. All 10 items represent the features of QC activities in Japan.
2. The sequence of listing individual items does not necessarily signify the order of their importance.
3. In the items below, "quality control" will be abbreviated to "QC."

**(1) President-led QC Activities in which All Departments and All Personnel participate**
- The QC activities of many enterprises have been taken place under the leadership of their president (top executive).
- "Quality" is sometimes construed to have a broad meaning that includes "costs," "deliveries," and even "job qualities" or the equivalent.
- Group-wide activities have been initiated in subsidiary, associated, and cooperative companies in conjunction with their parent enterprise.
- Although willing to be guided by knowledgeable outsiders, many enterprises encourage their own QC activities.

**(2) Top Priority consistently assigned to Quality by Management**
- In the management of enterprises, it is generally accepted that the consistent support of such concepts as "top priority to quality" and "quality first" eventually assures long range profits.
- The importance of top management's utmost concern for quality has been widely recognized.
- Many believe that QC activities are effectively expanded if "costs," "deliveries," and "job qualities" are included.

**(3) Policy Dissemination and Control by Delegation**
- Presidential policy has often been disseminated by delegating its implementation to individual departments and other hierarchical levels.
- This method of management is not applicable to only quality but management in general.
- The accurate PDCA cycling has been understood as essential for successful policy implementation.
- Specific implementation systems have been established and given various names—"management by policy," "daily management," etc.

**(4) QC Audits and their Implementation**

- The process of auditing the QC implementation progress status and using the audit findings in future enhancement strategies has gained popularity.
- Normally, the top executive participates in auditing activities.
- Besides intra-company audits, examination by a neutral organization (such as Deming awards, JIS plant awards, etc.) have also contributed to the QC promotion of enterprises by virtue of their widely acknowledged authority.
- Cases have also been encountered where consumer audits, international listing organizations, and other third-party audits carry weight.

**(5) Quality Assurance Activities ranging from Planning and Development to Sales and Servicing**

- Integrated quality assurance activities have frequently been engaged in which cross intra-company boundaries. "QA organizational charts" stipulating the role of each individual department have proven to be helpful.
- Particular emphasis has been placed on the "quality implementation" and "design reviews" at developmental and designing stages.
- At each of these stages, the process of building in quality is viewed to be important.
- In some industries, quality assurance is implemented on the order of PPMs (parts per million).

**(6) QC Circle Activities**

- QC circle activities are engaged in as a segment of TQC.
- "QC circle regulations" and "basic management of QC circle activities" have been established as the basic concept for QC circle activities, and particular emphasis placed on a humanity affirming philosophy.
- QC circle centers, branches, and the like have been formed into a number of nationwide promotion organizations that are managed autonomously through the support of academic and industrial societies. Promotion support organizations have also been formed within some enterprises and manned by company management, managers, and staff.
- In numerous enterprises, QC circle activities have been incorporated in the education and training courses for front-line employees.

**(7) QC Education and Training**

- Education and training of all the personnel ranging from the top management down to front-line employees is carried out in accordance with their professional level and function.
- The education and training curricula supplements lectures and lessons with case studies and actual problem solving sessions.
- Physical and group discussions are often part of education and training to cultivate habits for independent learning.
- Intra-company courses, extra-company educational courses, correspondence courses, ocean seminars, etc. are all systematically employed.

**(8) Development and Implementation of QC Techniques**

- QC techniques based on statistical processing are extensively employed.
- The extended scope of QC applications has fostered the use of reliability and operations research, computerized multi-variable analysis, and other sophisticated techniques.
- Unique techniques have been developed and employed for the development of new products and the assurance of quality.
- Simple and easy-to-perform techniques are being effectively employed as major tools for QC circle activities.
- Academic and industrial societies have cooperated to make major contributions in the development and implementation of QC techniques.

**(9) Extension of Applications from Manufacturing to Other Industries**

- The scope of QC applications has been extended from manufacturing industries and departments to office work, sales, and service industries.
- The industries of recent application include construction and banking, hotels, department stores, supermarkets, retail stores, hospitals, and so on.
- Although basic QC philosophy is applicable regardless of the industry techniques oriented to the uniqueness of individual industries have been devised.
- Techniques optimally suited to specific industries or fields have been developed and employed.

**(10) Nationwide QC Promotion Activities**

- Promotion activities at a national level have made permanent achievements, as evidenced by the designations of November as quality month and October as standardization month.
- With the Union of Japanese Scientists and Engineers and Standards Association playing the central role, various events are planned and held, and books and magazines published.
- The "quality control symposium" also is serving a special function in the promotion activities.
- QC circle centers, branches, and so forth have formed a number of nationwide promotion organizations.
- Those organizations mentioned above are private sector-intensive, but the government sector-intensive JIS generating and listing organizations also contribute significantly to QC promotion.
- The QC education of consumers is also being carried out with the support of governmental, academic, and industrial societies.

# POLICY MANAGEMENT
## An Essential Part of Japan's TQC

By Katsuya HOSOTANI, President, Quality Control Research Institute Inc.

**Introduction**

"Policy management" is an essential part of Japan's quality control program. The effective implementation of management requires a total commitment of the organization to an integrated thinking and scheme as well as an appropriate application, particularly, of the PDCA concept in planning and in the structure of the organization. The management objective is most effectively realized through an active promotion of policy management.

**Significance of the policy management**

For the business enterprise to continue to exist and to prosper it is essential that the whole organization unites and moves under the policy adopted by the top executive.

A successful TQC activity requires the total participation of all departments and people within the organization. And a total participation of everybody towards achieving one and the same objective depends on the successful communication within the organization of a "clear direction" of the top executive. In reality, however, the president's policy is often not understood nor communicated thoroughly to every level of the organization. In such cases the objective is compromised due to the miscommunication between the departments. The managers do not clearly delegate specific jobs to their subordinates.

Sometimes the organization fails to take stock of or analyze the problems of the previous year and starts a new year with an excessively ambitious objective which from the beginning cannot be realized. These then are the problems relating to policy management.

To manage a company it is necessary to develop and implement a business policy throughout the organization under an integrated thinking and scheme, to ensure the achievement of the objective by turning the PDCA cycle and to improve the job of the successive quarters by standardizing the work involved in the process. This is in short the significance of the policy management.

**Definition of policy management**

The terminology of policy management is new and is yet to be defined by the JIS Glossary of Terms Used in Quality Control and by the related societies.

While it is difficult to define the concept of policy management the following has been recommended by the Terminology Committee, QC Middle Management Course of JUSE.

"Policy management is the action taken by the whole business organization with the participation of everybody to realize the long (medium) term plan and the short term management goals based on the former."

Note: The policy as defined above means the basic policy for the realization of the management principle, the concrete management objectives (quality, cost, profit, production quantity, delivery date) and the means for achieving them.

The definition requires many more foot notes in addition to the above. Rather than committing the definition to a series of ambiguity by the use of long winding words, the attempt has been made to produce a short definition complemented by as many explanations as required.

**Effects of policy management**

Policy management is a management action which analyzes the obstacles, makes the necessary improvements and generates new and creative ways of achieving the stated objective.

What effects may then be expected from the policy management? The results of the questionnaire sent to the managers indicated that they expected the following from the policy management.

1. Effective communication of the management decision to every level of the organization.
2. Effective achievement of the management objective.
3. Improvement in both management and operation.
4. Strengthened corporate structure.
5. Defining clearly the position and the role of the specific job in relation to those of the whole organization.
6. Solution of important problems.
7. Appropriate and timely operation of business objectives.
8. Coordination of related TQC activities.
9. Participation of all.
10. Improvement in quality of communication.

**How to apply policy management**

While there are still number of problems to be resolved in promoting policy management the result should be gratifying if the problems are overcome and the policy could be reasonably established, developed, implemented and the result reviewed and fedback for the next round of implementation.

There are ten points to be followed in effectively promoting policy management.

**Point 1:** Review and analyze the previous quarter for problems and possible improvement.

**Point 2:** Make the policies as specific as possible and avoid theoretical statements.

**Point 3:** Ensure coordination with the people in the organization both in the verticle and horizontal lines of communication.

**Point 4:** Set a long term objective in contrast to the immediate ones.

**Point 5:** Set appropriate control objectives to evaluate the degrees of achievement.

**Point 6:** Check progress monthly and apply PDCA scrupulously.

**Point 7:** Ensure close communication and coordination among and between the various departments to strengthen the cooperation within the organization.

**Point 8:** Diagnosis by the top executive to analyze difficulties and ensure uncompromising application of changes and improvements.

**Point 9:** Define essential management issues and apply QC problem solving technique.

**Point 10:** Apply checks and daily control and institutionalize the process into a clearly defined system.

— Excerpted from Statistical Quality Control, Vol. 38 No.7, July, 1987, JUSE pp.90—100.

## ICQC '87 TOKYO CONFERENCE HIGHLIGHTS

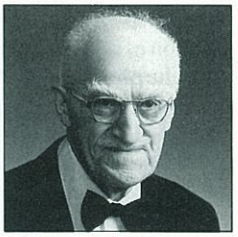
# KEYNOTE ADDRESS AND SPECIAL LECTURES BY DISTINGUISHED TOP MANAGEMENT AND EXPERTS

**Mr. Shoichiro KOBAYASHI,** Chairman, the Board of Directors, The Kansai Electric Power Co., Ltd. as the Speaker of the Keynote Address titled "Quality First — again and ever"

The company is a pioneer in electric utility which introduced Total Quality Control to this segment of the industry in 1981, and it made a first major breakthrough in the application of TQC.

**Dr. J. M. JURAN,** Chairman Emeritus, Juran Institute Inc. as the Guest Speaker of the Special Lecture [I] titled "Managing for Quality — the Critical Variable"

Human needs for quality go back to the dawn of history. What has varied is the means of attaining quality — the strategy of managing for quality. Variation in the strategy is an essential adaptation to changing technological, economic and social forces.

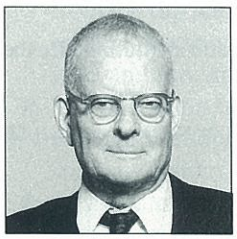


**Mr. Hajime KARATSU,** Professor, R & D Inst., Tokai University as the Guest Speaker of the Special Lecture [II] titled "How to Cope with Grey Part of Management"

We have never experienced a time when a new way for improving management activity is requested for the purpose of getting high productivity and quality of management. Basically, management is a battle against thousands of different possible breakdowns.

**Dr. A. V. FEIGENBAUM,** President, General Systems Co., Inc. as the Guest Speaker of the Special lecture [III] titled "Total Quality in the Future — a Global Review for the Next Decade"

Placed within a global perspective, it is clear that some of the world's most successful companies are now building their future growth around a powerful business strategy that fits the increasingly demanding world marketplace.



**Dr. W. E. DEMING,** Consultant in Statistical Studies as the Guest Speaker of the Special Lecture [IV] titled "Sources of Improvement of Quality and Productivity"

The purpose here is to learn that better quality is necessary for the survival of industry in the Western World: to learn also a few principles for improvement, and to study the cause of our decline.

## *ICQC '87 TOKYO CONFERENCE HIGHLIGHTS*

# INTERNATIONAL PANEL DISCUSSION ON MANAGING FOR QUALITY

**Presided by Dr. J. M. JURAN**

**Mr. John J. HUDIBURG**
Chairman of the Board and
Chief Executive Officer
FLORIDA POWER & LIGHT COMPANY

Corporate AMERICA is in the midst of a renaissance of quality intended to give renewed respect to the label, "Made in the U.S.A."

We are proud to be among the leaders of American quality. We are very pleased with our efforts to date, especially because we are a service industry.

**Mr. Saburo OHNISHI**
Chairman of the Board of
Directors
NIPPON ZEON CO., LTD.

It was in 1981 that our company decided to completely apply the TQC concept. In 1985 we were awarded Deming Application Prize. Although we have been able to improve our business due to the TQC we still have failures and problems.

**Mr. Martin KUILMAN**
Vice-Chairman of the Board of
Management
N.V. PHILIPS GLOEILAM-
PENFABRIEKEN

We officially embarked on Company-Wide Quality Improvement towards the end of 1983.

Programes for improvement were, and continue to be, stimulated both by central inputs and by local creativity and initiative.

**Mr. Wolfgang SAUER**
President and Chief Executive
Officer AUTOLATINA
(newly founded holding of
FORD and VOLKSWAGEN)

Taking into consideration the Japanese and Western experience together we decided to introduce the Total Quality Assurance, based on Quality Circles, which we have pioneered since 1971 in Brazil and the Western world.

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# INDUSTRIAL STUDY VISIT IN TOKYO AREA

The final program of the conference presents you, the participants from abroad, an opportunity to visit the world's leading Japanese industries and observe the excellent Quality Control implementation with your own eyes. The outline of the program is as follows.

COURSE TO BE SELECTED:

- Group A. NEC CORPORATION Otsuki Plant (Optical Communications Systems)
- Group B. NISSAN MOTOR CO., LTD., Zama Plant (Passenger Car)
- Group C. BRIDGESTONE CORPORATION, Tokyo Plant (Tire)
- Group D. FUJI XEROX CO., LTD., Ebina Plant (Copy machine)
- Group E. KOBAYASHI KOSE CO., LTD., Sayama Manufacturing Division (Cosmetics)
- Group F. YOKOGAWA-HEWLETT PACKARD CO., LTD. (Computer and Electronic Measuring Instrument)
- Group G. ASAHI BREWERIES LTD., Tokyo Brewery (Beer)
- Group H. NIHON RADIATOR CO., LTD., Gunma Plant (Car-Airconditioner and Muffler)
- Group J. MITSUKOSHI LTD. (Department Store), YAMAGIWA CORPORATION (Wholesaler & Retailer of Home Electric Appliance)

# INTERNATIONAL CONFERENCE ON QUALITY CONTROL 1987 TOKYO

## October 20 to 23
## AT KEIO PLAZA INTER-CONTINENTAL HOTEL
## GENERAL PROGRAM

## "QUALITY FIRST — AGAIN AND EVER"

| | MORNING | AFTERNOON | EVENING |
|---|---|---|---|
| **October 19 Monday** | Registration | | Welcome Cocktail |
| **October 20 Tuesday** | Opening Session | Special Session | Tokyo Night Cruise |
| **October 21 Wednesday** | Technical Session | Technical Session | |
| **October 22 Thursday** | Technical Session | Closing Session | Farewell Dinner |
| **October 23 Friday** | PLANT VISITS In Tokyo Area | | |

**AT THE TECHNICAL SESSION:** A total of 180 papers from 38 countries, including 60 from Japan, will be presented at the Conference to be devided into 18 subjects.

### PRE-CONFERENCE SEMINAR "TQC IN JAPAN"
**Oct. 19**

### POST-CONFERENCE TOUR "ANCIENT AND MODERN JAPAN"
**Oct. 24 to 31**

### FAMILY PROGRAM
**Oct. 20, 21 & 22**

For application or information, please contact JUSE, the conference secretariat.

## LANGUAGES

The working languages of the conference are Japanese and English, and simultaneous interpretation between the two will be available at the Opening, Special, Closing and Technical sessions.
Interpreters will also be provided during the technical visits on the final day.

## PROCEEDINGS

All papers presented at the conference will be printed in English in the proceedings of about 1,000 pages, with one copy given to each participant. Additional copies will be available for purchase at the registration desk (¥10,000/copy).