

THE ORIGIN OF QUALITY CONTROL IN JAPAN THE BIRTH OF TQC

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1. The Origin of TQC

When discussing the origin of TQC it should first be made clear what TQC is. TQC as a term was born in the United States during the late 1950s^(*), but it has un-

dergone changes according to the respective states of affairs and historical background of the countries in which it has been adopted. In this special series TQC is used as TQC in the Japanese sense, so hereinafter we shall refer to it as "Japanese TQC."

The author^o regards company-wide, comprehensive quality control that meets the following four conditions as true Japanese TQC:

1. To provide what has quality equaling the needs of the consumer—products, services, information or anything else that can be marketed—by always bearing in mind customer orientation and quality assurance;
2. To encourage all corporate personnel, from management down to labor at the jobsite to unite in maximizing efforts to realize the objective given in (Condition 1) above under the powerful leadership of the company president;
3. To develop and make the most of scientific methods, including those statistical, in order to ensure that quality control activities are conducted rationally and effectively; and
4. To establish and operate various administrative systems in which personal dignity and independence are respected so that quality control may be conducted efficiently and continuously.

In Japan, starting in 1960, it was customary to call company-wide quality control TQC^(*), based on the name of TQC that Dr. A. V. Feigenbaum advocated in his writings¹⁾²⁾. On the occasion of ICQC Tokyo '69 held in Tokyo during 1969,

though, it was agreed among those concerned that the English translation of company-wide quality control then in our Japanese vocabulary should be literally Company-Wide Quality Control (abbreviated as CWQC), instead of TQC, to prevent its confusion with the type of TQC used in the United States^(*). Again, the TQC addressed in this series means Japanese TQC, or CWQC.

Tracing the origin of TQC is not to give a historical description of when TQC was initiated by any specific company in Japan's industrial circles; rather it is to identify the dawn of a trend in which many firms came to regard TQC activities as the current of the times and accordingly set it in motion. In other words, it defines the period when not merely one company but a plurality of concerns launched TQC activities at a tolerable level. Moreover, if required condition of conducting TQC activities is to satisfy the abovementioned four requirements, the question remains as to when all four began to be adequately fulfilled. And there were variations among the four requisites in terms of the different times when they were met. For example, education courses for senior managements were carried out on the subject of Condition 2 from the very outset of QC. Then too, jobsite workers in Japan showed a pronounced difference in the extent of their participation with respect to the second condition after 1962, when QC Circle activities began, as compared to the situation prior to that time. In the early stages of TQC, however, jobsite worker participation was not limited to fully voluntary QC

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Circle activities, but included participation through a kind of hierarchical setting based on friendly communication. Therefore, it is reasonable, when tracing the origin of TQC, to regard the matter of jobsite workers in the second condition as having been fulfilled when it is observed that a tolerable number of them actually take part in TQC, if not in QC Circle activities per se.

In the following pages the author proceeds on that proposition. Thus, tracing the origin of TQC produces a question asking when all, or nearly all, of the four requisites started to be met among a plurality of firms.

The author believes it was around 1952, slightly before Dr. J. M. Juran lectured in 1954, (details of this given in the following section), when it all began. One issue of "TQC" (the magazine was first published in March 1950) tells us that in 1950, when Dr. W. E. Deming gave a lecture, a time when the periodical printed mainly articles related to what was called SQC (save those in which QC pioneers made special requests to management, or management admonished itself and expressed its future outlook), there were only several stories actually describing cases of applied SQC activities, including production processes management, and which collated problematic points in relation to conducting QC activities, QC-related education, etc. Such articles, describing cases of implementing SQC activities, showed that a few corporations has started to systematically promote company-wide SQC, which represented part of Condition 4, or one requirement for transition into TQC, in other words, there was an indication that TQC was beginning to move in Japan's industrial realm.

The 1951 issues of "TQC" reported almost the same instance of corporations carrying out QC activities, mainly as SQC; and articles describing an increased number of such cases, although still carrying the title of SQC, referred to the organization or operation of the affected companies. It is considered that in 1951, when Dr. Deming held a seminar under the theme "Samplings for Marketing Research and Studies," mounting interest in MR provided one of the approaches toward satisfying the first of the four conditions. Thus there was a growing indication of TQC forthcoming, but as an effective industrial tool it was still prenatal. Whatever, the award ceremony of the first Deming Prize was held the same year.

1952 issues of "TQC" ran an increasing number of articles reporting cases of implementing QC activities, although mainly SQC, by emphasizing the expansion of QC activities beyond manufacturing to other corporate divisions such as sales and administration, and to the head office. According to the published articles, at least a few companies had made reports of QC activities considered as satisfying the four requirements in one way or another.

In 1953 evidently the situation surrounding instances of conducting QC activities had improved even more. In particular Dr. Kaoru Ishikawa⁴⁾ reported in the January issue of "TQC" the results of a questionnaire treating quality control in Japan in 1952; and in the September issue Mr. Yasuaki Hiratsuka,³⁾ General Manager, Standards, Agency of Industrial Science and Technology, based on a survey conducted in May of the same year, reported on the status of QC activities in factories permitted to display the JIS logo. These two

reports indicated that the majority of companies or factories—the latter report involved a survey of factories and firms from the standpoint of a system that permitted showing the logo—had already established QC policies and a form of advancing quality control systematically or on a company-wide basis.

But these studies did not represent the actual status of conducting QC activities throughout Japan's industrial world because the former surveyed only authors contributing to "TQC" and participants in JUSE—sponsored seminars related to quality control, with the answers being largely one-sided and favorable, while the latter polled only corporations and factories permitted to display the JIS logo. Nevertheless, in spite of the abovementioned facts, and if not placing too much credence in the results of the two studies, it may be inferred that around 1952 a substantial number of firms had started to conduct fairly inclusive QC activities at each corporate level in a systematic manner. But for our purposes here, in tracing the origin of TQC, or trying to identify the period in which a limited number of companies began to meet the four conditions of TQC to a certain extent, it can be said that the surveys proved effective.

Based on the results of the above surveys, but properly discounted, it may be considered that TQC found its way into Japan's industrial machine as a trends of the times during that period. Thus the author assumes that Japan's TQC dates from around 1952.

As may be seen from the circumstances described above, Japanese TQC started as SQC, that is to say the application of statistical methods in companies, particularly at sites of production, and has developed by systematically expanding it to a company-wide proposition. It should be stressed that SQC did not merely shift to TQC, with the "S" being replaced by "T"; rather it evolved into what was called TSQC (Total Statistical Quality Control), with scientific methods centering around the "S" (statistics) increasingly strengthened. Put another way, it should not be forgotten that SQC underwent a gradual change into TQC—strictly speaking, TSQC—and that it is clearly expressed in Condition 3 mentioned earlier.

2. The arrival of Dr. Juran

In July 1954 Dr. J. M. Juran came to Japan and, after inspecting six companies and factories, gave two-day special courses for presidents and executives and ten-day courses for managers and section chiefs. The courses were given in Tokyo and Osaka. Those for top management were attended by about 130 persons, and those for managers and chiefs had turnouts of about 300. The courses had a new and powerful impact on Japanese corporations that had initiated TQC around 1952.

The courses presented definitive answers to detailed questions posed by Japanese companies, then facing many and varied problems at a time when the framework of TQC was being established. They also gave direction to those concerned with QC in Japan, who had little concept of what to do at the managerial level. And groped blindly while convinced that, although quality control was a function of management, it was merely to study statistical methods for use as a tool, or perhaps it was that they preferred statistical methods.

Dr. Juran had prepared two texts in advance: "Special Lecture for Company Executives" and "Planning and Practices in Quality Control," the former for presidents and executives, the latter for department managers and section chiefs. The contents of the lecture given to managers and chiefs included:

1. The Nature of Control
2. Division of the Subject
3. Economics of Quality
4. Specification of Quality
5. Manufacturing Planning for Quality
6. Production Department Quality Problems
7. Organization for Inspection
8. Measurement
9. Vendor Inspection
10. Process Inspection
11. Final Inspection and Test
12. The Staff Quality Functions
13. Defect Prevention
14. Quality Assurance
15. Training for Quality
16. Quality Mindedness
17. The Role Statistical Methods

Dr. Juran spoke almost in the above mentioned sequence, and he presented a variety of means and examples using graphs and illustrations as visual aids to supplement those included in the text. The lectures were the first of their kind in Japan, and all in attendance were deeply impressed, as his world gave a clear insight as regards how to effectively conduct quality control. Dr. Juran's lectures were unique in another way too, as they adopted the form of group discussion. During his ten-day course for managers and chiefs, lectures were given in the morning and the early part of the afternoon, with the latter part of the afternoon thrown open to group discussions in which six teams of managers, with each choosing its chairman, vice chairman and clerk, conducted discussion independently under themes proposed by Dr. Juran, then arranged their answers into one form or prepared questions to be asked during the lectures. In the morning of each successive day Dr. Juran opened by answering questions, and a representative of each group spoke at the lectern on a theme proposed by the doctor. This in turn was followed by a question and answer session involving other members, each of whom stood before the group. Always with a friendly smile, Dr. Juran spoke, listened attentively, while occasionally making appropriate comments, and presented actual cases focusing on experiences in the United States.

It was probably the first time that, apart from postgraduate education in Japan, this type of group discussion, as usually found in American seats of learning, was adopted in courses given outside corporate walls sponsored by professional organizations. After that, the method was adopted in JUSE's courses for managers and section chiefs as organized by their M Committee, and today it has emerged as an important means of instruction highly popular in the realm of management, software science, etc.

In his lectures Dr. Juran introduced ways of conducting quality control activities, for example, analyzing degrees of importance using Parato charts, the distinction between spo-

radic and chronic forms of inferiority, the selection of control points, and the like; and he presented concepts and tools as required for QC activities, such as the idea of what quality control organizations and QC committees should be, the concept of quality of design and quality of conformance, QC diagnosis, quality information systems and many other factors. These lectures led the audience, who, having fared almost completely in the dark, to feel that a boulevard to prosperity had suddenly opened in front of them, and fired them with ambition to try new approaches to developing effective means of Japanese TQC.

Dr. Juran's "Handbook on Quality Control" (First Edition)⁵⁾ was translated into Japanese and published in time for his series of lectures. Distributed among his audience as supplementary material, this book enabled a better understanding of the content of his lectures, and publication of the Japanese version of the handbook at the time (1954), afforded those who were unable to attend his lectures an opportunity to use it as a valuable reference on general quality management, their being precious few such books available in Japan, and clearly showed how to implement TQC in Japan. Thus I have added a few words of comment concerning the function of the first translation of the handbook which treated mainly matters related to management in quality control.

NOTES

(*1): The period when the term TQC was first used in Japan is presumed to be 1960 because of its first appearance in the issues of "TQC".

(*2): For its own reference, the secretariat of the Union of Japanese Science and Engineering solicited Dr. Juran's opinion concerning this matter.

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WHAT THE DIVISION OF PROMOTING TQC SHOULD BE

From "Total Quality Control", Vol.41, No.9, Sept.1990, JUSE, pp.6-9.

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1. Introduction

A certain company held a discussion about the word promotion, and it was concluded that promotion rightly and literally means pushing forward from behind, and that it was not appropriate to pull from the front.

One sometimes sees a child trying to pull a stray dog on a leash. The harder he pulls, the more resistant the mutt becomes, looking away and straining to go in a different direction. So it might be better to follow the dog when leading it by a leash.

It is not desirable that TQC pulls from the front highhandedly and becomes compulsory. But the division of promoting TQC does not deserve its name when, merely following from behind, it becomes an encumbrance.

When following, it sometimes becomes necessary to give the person ahead a slight push to make sure he keeps going, and on occasion it might even demand giving him a vigorous shove.

2. Conditions for Becoming a Loved Promoter

Generally, listing all the desirable characteristics of the ideal promoter often results in a figure not unlike a god, the sort of person one the author chooses to limit his eulogization of a promoter to simply "openheartedness" and someone "easy to scold." In particular, it is important not to excessively worry about being bawled out.

The author once heard a factory manager say that, after joining the firm as a young man and hearing his superior, an executive, tell him to become a man "easy to scold," that is someone who doesn't mind being rebuked once in a while, he worked for thirty years and found himself promoted to executive in charge of plant operations. It is not without reason that a person who required occasional upbraiding won promotion. When someone is difficult to scold - the type is usually reticent and well-guarded - his superiors often miss a chance to hear what he has to say. The man easy to scold often speaks his piece.

Sometimes a man might find himself berated for no reason at all, simply because the boss is in a bad mood. If scolding someone makes superiors regain their humor, then it equals a good dose of refrigerant. A person who can roll with the punches at times like is usually favored by the higher-ups, and his reward comes in the form of a promotion.

Put another way, men and women easy to scold are rather open-hearted and cheerful, and easy to speak to. Who else but such a person can become a promoter liked by everyone from his superiors down to his colleagues and subordinates, and have an understanding of what the workers of each department think and what their problems are?

In TQC a person's character is not everything, of course. No one doubts that, even if a person is a poor speaker but scrupulously honest, and he or she firmly believes in TQC, has a long-term vision thereof, and can persuade his or her superiors and chief of the line by explaining with tenacity of purpose, then that person can look forward to success as a promoter.

3. Attitude of Personnel Promoting TQC

3.1 Learn TQC at the earliest

Persons responsible for promoting TQC, in order to qualify as such, should be a step ahead of everyone else involved with TQC. In general, though, many corporate sections where TQC is being promoted, burdened by personnel taking charge of TQC for the first time, are not even half a step ahead. Thus it becomes essential to attend lectures on TQC given outside the company or read materials devoted to the subject as soon as possible in order to fully understand what TQC is. Moreover, the lectures attended by persons in charge of TQC should be orthodox, not easy or simple ones that merely skim the surface.

3.2 Plans needed for promoting TQC

In order to "push the company forward," the department or group responsible for promoting TQC needs a plan, or devices. Without a proper scenario, TQC cannot be satisfactorily promoted.

Each corporation is of course free to write its own TQC promotional scenario, but there are generally accepted methods involved in TQC, because it has been practiced for forty years since the end of World War II. So it may be safer to devise plans in accordance with the generally accepted methods, as described in the following.

3.3 Attitudes directly linked with groups on the line

The magazine TQC in its June 1976 issue published an article titled "Why Are the Activities of QC Personnel Not Disliked?" Selected staff members of various corporations contributed papers to the article and some of their themes were:

- It is important not to be disliked on the job site.
- Never forget your obligation to production line activities.

- Become a behind-the-scenes force that supports production line activities.
- Give guidance that suits the level of the jobsite.
- Make efforts to resolve problems and improve quality at the jobsite.
- Hear true opinions from the jobsite by making frequent visits there.

The point common to all themes was that emphasis was placed on attitudes being directly linked with personnel on the line and the need to keep a watchful eye on them.

Without an attitude which will bring about a direct link with line personnel, QC promoters will disengage themselves from jobsite realities, and even if they preach long and eloquently on the subject of how QC-conscious persons should be, QC ultimately will find itself in jeopardy.

There are many promotional groups at the head office which, leaving TQC entirely to the promoters of each division, have disengaged themselves from job site reality. Much less can promotion staff members, being timid and weak, thrust themselves among line personnel or in any way integrate with them.

3.4 Use your superiors! Especially work on management!

The late Kaoru Ishikawa, Professor Emeritus of Tokyo University, had a habit of saying, "Those who cannot use their subordinates well are not worth half a man. A man becomes a man only when he can use his superiors." A man can court dismissal if he works at trying to wind his superiors around his little finger. In many cases, though, in subordinate positions know the actualities of work better than their bosses. Accordingly, those who enjoy the confidence of their superiors can make them accept their opinions and, in consequence, induce them to do things when required.

Persuasive power depends on one's intentions. Thus it is particularly important to have a strong motive and set a definite goal.

Moreover, personnel responsible for TQC promotion should have the wherewithal to persuade line superiors. To that end, they should always retain with them a relationship of mutual confidence. Especially, the chief of the group charged with promoting TQC should be a person who can overshadow management and get results, above all, the president.

3.5 Devise confidential promotion plans that zero in on particular persons

It is vital that the TQC promotional group identifies anti-TQC cliques or individuals and works out a plan to convert them. Anti-QC personnel think of and demand certain things. It is best to have an attitude of respecting one's fellow man, based on the idea that human nature is fundamentally good.

For this purpose it is essential to formulate confidential promotion plans while keeping in touch with guiding lectures outside the corporation.

4. Advancing Promotion Plans by Stages

4.1 The introductory stage

Procedure 1: Staff members research instances of TQC success as achieved by other companies and tell the

president about them.

Procedure 2: Management participates in meetings on quality control and takes proper action.

Procedure 3: An executive in charge of promoting TQC is appointed.

Procedure 4: A TQC promotional headquarters is set up.

Procedure 5: TQC guidance lectures given outside the company are selected.

Procedure 6: Management gets together for training as a means to unify their thoughts and ideas.

Note: It is important that management come to an agreement regarding their thoughts and ideas on TQC. In the service industry is it particularly vital for management to start out in one and the same direction by unifying their thoughts concerning the quality of service provided, TQC, etc. It is also desirable that, if at all possible, guiding lecturers take part in the training.

Procedure 7: The president conducts a "medical examination."

Note: Why "medical examination" instead of "medical checkup"? Generally speaking one undergoes a medical checkup on the assumption he or she is not ill. In a medical examination a person, being conscious of illness, consults a doctor seeking medical advice.

In other words, prior to the president's medical examination, each department manager makes each of his section chiefs report on the actual situation of and problems existing in his own section, sorts out the results of question and answer sessions, and presents the whole thing to all the executives in attendance at the president's "medical examination" for twenty minutes. That accomplished, the executives can grasp the problematic points of their own company via question and answer sessions.

Procedure 8: The president declares introduction of TQC.

Procedure 9: The president announces the start of QC Circleactivities.

4.2 The stage of promotion

Procedure 1: Plans for promoting TQC are formulated and clearly stated by the president.

Procedure 2: Based on TQC education plans, corporate personnel are sent to attend educational courses outside the company, and educational courses are held within the company.

Procedure 3: Important questions are raised and resolved.

Procedure 4: Guidance meetings are held, with invited TQC experts as lecturers.

Procedure 5: Everyday management is made thoroughly aware of TQC in one's own department.

Procedure 6: Policy management is introduced.

Procedure 7: Diagnosis of QC is made by the president.

Procedure 8: Methods of policy management and the president's diagnosis are improved.

Note: The primary task of the promotional group is to improve policy management based on year-to-year reflections through the PDCA cycle, to devise promotional methods such as policy management, the president's diagnosis of QC, etc., and to study the

disgnosis made by the president each time one is completed and improve upon it via the PDCA cycle.

Procedure 9: Useful routine work for QC standardization is accumulated and utilized.

Procedure 10: Management according to function is introduced.

Procedure 11: Candidacy for the Deming Prize is declared.

4.3 The stage of development I (especially after the Deming Prize has been received)

Procedure 1: A shift from treating TQC as "preparing for an examination" to "creative TQC."

Procedure 2: The system of quality assurance is once again completed through the development of a new leader product.

Procedure 3: The Japan Quality Control Prize is challenged.

4.4 The stage of development II (becoming stereotyped without candidacy for the Deming Prize)

Procedure 1: Various events are planned in place of the Deming Prize.

Procedure 2: Firstly, the system of quality control is once again completed through development of a new leader product to be featured at promotional events.

Note: When planning "events" it is essential to start with the question of quality and "quality assurance," for instance by completing anew the corporate quality assurance system in conjunction with the development of new leader products for, say, protection of our global environment from warming owing to chloro-fluorocarbon, etc.

Procedure 3: To satisfy the question of delivery, new production management systems are completed through the introduction of FMS, FA, CIM, etc.

Procedure 4: A strategic information system (SIS) is structured.

Note: In TQC it is important to always advance Procedures 3 and 4 in a QC-oriented manner wherein "problems are solved," instead of promoting merely to "create advanced devices and system."

Procedure 5: Policy management is improved in accordance with improvement of routine management.

5. Conclusion

We are brought to realize that, when comparing the QC Circle with TQC, the greatest importance within the circle is placed on the human aspect, such as displaying personal ability, respect for our fellowman, cheerful places in which to work, etc., which TQC itself, even though addressing some of these human questions, is a world apart from the QC Circle.

In particular the matter of human relations requires a great deal of thought, because the duty of TQC promotional personnel is to advance quality control not only within their own department but among other departments as well. Obviously this remains as a TQC question to be resolved.



JAPAN'S QUALITY MONTH (November) 1990 "Quality First, A cheerful jobsite"

Oct.31 to Nov.1	The 6 th Quality Control Conference in Service Industry (Tokyo)
Nov.1	The 9 th Consumer Conference on Quality (Osaka)
Nov.2	The 22 nd Consumer Conference on Quality (Tokyo)
Nov.5	The 20 th All Japan QC Circle Convention (Tokyo)
Nov.6 to 8	The 29 th Quality Control Conference for Foremen (Tokyo)
Nov.7	The 28 th Top Management Quality Control Conference (Tokyo)
Nov.7	The 40 th The Deming Prize Celebration
Nov.13 to 16	The 40 th Quality Control Conference for Managers & Staffs (Tokyo)

LECTURE MEETING IN LOCAL CITIES
Matsue (11/2), Sapporo (11/8), Hiroshima (11/8)
Niigata (11/9), Matsuyama (11/9), Osaka (11/15)
Shizuoka (11/19), Morioka (11/22), Naha (11/22)
Ueda (11/26), Fukuoka (11/26), Nagoya (11/27)
Kobe (11/29), Toyama (11/30)

WORLD QUALITY DAY

November 8
has been agreed
for World Quality
Day 1990

by
European Organization
for Quality (EOQ)
member countries

International Convention on QC Circles 1990 (ICQCC'90-Tokyo) • Technical Session Program

		P R O G R A M			
date	time	OPENING PLENARY SESSION M.C.: Dr. Ikuro Kusaba Welcome address by Mr. Kohei Suzue, President of J.U.S.E. Orientation of the Convention by Mr. Tatsuo Sugimoto, Senior Advisor, Daiwa Seiko Inc. Keynote Address: "QC Circle Activities in Japan-Today and Tomorrow" by Dr. Masumasa Imaizumi (Professor, Musashi Inst. of Technology) Special Lecture: "Worker Participation-Development in the USA" by Dr.J.M. Juran (Chairman Emeritus, Juran Institute Inc.) (break)			
		STREAM A (promotion in countries)	STREAM B (promotion in companies)	STREAM C (problem solving)	STREAM D (problem solving)
Oct.					
24					
(Wed.)	09:00-09:10	Moderators: Yoji Akao : Katsuyoshi Ishihara	Moderators: Seiji Hara : Tadashi Suglura	Moderators: Noriaki Kano : Akira Takayanagi	
	10:30-11:00	A-1-1 Kusaba, I. (Japan)	B-1-1 Aberin, V. P. (Philippines)	C-1-1 Changpradab, S. (Thailand)	
	11:00-11:30	A-1-2 Udpa, S. R. (India)	B-1-2 Kaneko, N. (Japan)	C-1-2 Lee, C.O. (Korea)	
	11:30-12:00	A-1-3 Ang, C. T. (Singapore)	B-1-3 Ma, L. (China)	C-1-3 Kita, C. (Japan)	
	13:30-14:00	Moderators: Katsuya Hosotani : Akira Murakami	Moderators: Takenori Takahashi : Saburo Sasaka	Moderators: Chihiro Hirotsu : Kelko Hasagawa	
	14:00-14:30	A-2-1 Pozo Pino, A. (Mexico)	B-2-1 Man, J. (Singapore)	C-2-1 Zhao, M. T. (China)	
	14:30-15:00	A-2-2 Petrick, A. (S. Africa)	B-2-2 Sutrave, G. (India)	C-2-2 Adonis Blue (Singapore)	
	15:00-15:20	A-2-3 Alvarez, H. (Spain)	B-2-3 Lecuyer, C. (France)	C-2-3 krisdiantha, etal (Indonesia)	
	15:20-15:50	A-3-1 Schalin, A. (Sweden)	B-3-1 Tsuchiya, K. (Japan)	C-3-1 Vismanathan, R. H.H. (India)	
	15:50-16:20	A-3-2 Lorleratna, T (Thailand)	B-3-2 Nava, E. (Mexico)	C-3-2 Tsaur, L. J. (Chinese Taipei)	
	16:20-16:50	A-3-3 Amsa, P. (India)	B-3-3 Yoon, S. W. (Korea)	C-3-3 Miura, Y. (Japan)	
	09:00-09:30	Moderators: Kazuhide Takaiishi : Kyoji Ichikawa	Moderators: Masataka Oishi : Koji Kusumoto	Moderators: Kamematsu Matsuda : Akira Harada	Moderators: Kozo Koura : Tadashi Yoshizawa
	09:30-10:00	A-4-1 Giani, G. S. (India)	B-4-1 Sato, A. (Japan)	B-8-1 Sudarjanto, I. G. (Indonesia)	D-1-1 Lin, Y. S. etal (Chinese Taipei)
	10:00-10:30	A-4-2 Hutchins, D. (U.K.)	B-4-2 Caneja, L. R. (Philippines)	B-8-2 Mohan, M. (India)	D-1-2 Mishima, K. (Japan)
	10:30-10:50	A-4-3 Roshdestwenski, V.L. (U.S.S.R.)	B-4-3 Tprecha, D. (Thailand)	B-8-3 Chiang, K. C. (Singapore)	D-1-3 Tiwari, V. K. (India)
	10:50-11:20	A-5-1 Galgano, A. (Italy)	B-5-1 Taryadi, A. (Indonesia)	C-4-1 Kantachan, S. (Thailand)	D-2-1 Boonthertup, C. (Thailand)
	11:20-11:50	A-5-2 Dikov, D. (Bulgaria)	B-5-2 Lim, S. C. (Singapore)	C-4-2 Supriyono (Indonesia)	D-2-2 Karino, H. (Japan)
	11:50-12:20	A-5-3 Bodor, P. (Hungary)	B-5-3 Wait, T. (Australia)	C-4-3 Harada, S. (Japan)	D-2-3 Hosoi, K. (Japan)
Oct.					
25					
(Thu.)	13:30-14:00	Moderators: Ikuro Kusaba : Takanori Yoneyama	Moderators: Hiroaki Nakazato : Tatsuo Sugimoto	Moderators: Kazuo Hirose : Moriiji Miyata	Moderators: Kenji Kurogane : Tadasu Fujita
	14:00-14:30	B-9-1 Osterhoff, R.J. (U.S.A.)	B-6-1 Takahashi, T. (Japan)	C-5-1 Lee, B. O. (Korea)	D-3-1 Yen, C.C. (Chinese Taipei)
	14:30-15:00	B-9-2 Espinosa-ruiz, L. (Mexico)	B-6-2 Lozano, G. J. (Mexico)	C-5-2 Luthra, S. P. (India)	D-3-2 Daimaru, N. (Japan)
	15:00-15:20	B-9-3 Tachiki, D. S. (Japan)	B-6-3 Teo, C. T. (Singapore)	C-5-3 Lin, Y. S. etal (Chinese Taipei)	D-3-3 Kim, H. S. (Korea)
	15:20-15:50	B-10-1 Ueoka, H. (Japan)	B-7-1 Wang, L. (China)	C-6-1 Zhou, N. (China)	D-4-1 Thorn, A. (Australia)
	15:50-16:20	B-10-2 Sutcliffe, G. (Australia)	B-7-2 Marquez, V. (Philippines)	C-6-2 Suwanprateep, S. (Thailand)	D-4-2 Champion, M. (U.S.A.)
	16:20-16:50	B-10-3 Musdiono, I. (Indonesia)	B-7-3 Bajaj, V.D. (India)	C-6-3 Yoshino, K. (Japan)	D-4-3 Sung, K. H. (Korea)
	16:50-17:10	CLOSING PLENARY SESSION M. C.: Dr. Masumasa Imaizumi			
	17:15-19:30	FAREWELL DINNER M. C.: Mr. Akira Harada, Mr. Takanori Yoneyama			

Welcome to
**INTERNATIONAL CONVENTION
 ON QC CIRCLES
 1990 TOKYO**

Convention Venue: Hotel Century Hyatt Tokyo
 2-7-2- Nishi-Shinjuku
 Shinjuku-ku Tokyo 160 Japan
 Tel: 03 (349) 0111 Fax: 03 (344) 5575

Data	Morning	Afternoon	Evening
Oct. 23 (Tue)	Pre-Convention Seminar on QC Circles (Optional) (Convention Registration)		Welcome Cooktail
	Opening Plenary Session	Technical Parallel Session (3 Streams)	
Oct. 24 (Wed)			
Oct. 25 (Thu)	Technical Parallel Session (4 Streams)		Closing Plenary Session & Dinner
Oct. 26 (Fri)	Industrial Visit in Tokyo Area		
Oct. 27 (Sat) to Nov. 2 (Fri)	Post-Convention Industrial Tour (Optional)		

LANGUAGE: The working languages of the convention are Japanese and English. The simultaneous translation between two languages is provided through the technical sessions.

PROCEEDINGS: All papers presented at the convention are printed in the proceedings in English.

INDUSTRIAL VISIT IN TOKYO AREA

Oct. 26, Friday Full-day

The participants from abroad can visit the Japanese companies to be divided into nine groups.

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|--|---|
| Group A: Nissan Motor Co.(Car) | Group E: Yaskawa Electric Mfg.Co.(Motor) |
| Group B: Hino Motors(Truck) | Group F: Fuji Xerox Corp.(Office Machine) |
| Group C: IBM Japan(Computer) | Group G: Kobayashi Kose Co.(Cosmetics) |
| Group D: Yokogawa Hewlett Packard
(Measurement Instruments) | Group H: Toto(Sanitary Ceramics) |
| | Group I: Ricoh Co.(Office Machine) |

PRE-CONVENTION SEMINAR ON QC CIRCLES

Oct. 23, Tuesday 9:00~17:20

This seminar is specially programmed for the participants from abroad to discuss and how to operate and activate the QC Circle in relation to the Total Quality Control. English-Japanese simultaneous translation is provided through the seminar.

POST-CONVENTION INDUSTRIAL TOUR

Oct. 27, Saturday~Nov. 2, Friday

The tour starts Saturday morning on October 27 leaving for Kyoto by bullet train "Shinkansen" and end with returning to Tokyo in the evening of November 2, Friday by chartered buso Brief schedule and the visiting plants are as follows.

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|---------|-----|--|
| Oct. 27 | Sat | Sight-seeing in Kyoto |
| Oct. 28 | Sun | Sight-seeing in Nara |
| Oct. 29 | Mon | Plant Visit: Matsushita Refrigeration Co. (refrigerator) |
| Oct. 30 | Tue | Plant Visit: Komatsu, Ltd. (Construction Machine) |
| Oct. 31 | Wed | Plant Visit: Toyota Motor Corp. (Automobile) |
| Nov. 1 | Thu | Plant Visit: Mitsubishi Heavy Industries, Ltd. (Air-conditioner) |
| Nov. 2 | Fri | Sight-seeing in Hakone |

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