

Societās Quālitātis

Vol 1 May 1987

Union of Japanese Scientists and Engineers

5-10-11 Sendagaya, Shibuya-ku, Tokyo 151 JAPAN

GROWING IMPORTANCE OF QC CIRCLE

By Naoto SASAKI, Professor, Sophia University

After World War II in the effort of Japanese industries to introduce and digest the methods of quality control developed in the U.S. the quality control circle (QCC) was born in 1962. Since then it was diffused throughout Japan in the 1960s to the 1970s and throughout the world in the 1970s to the 1980s.

But there is a striking difference between the QCCs in Japan and the QCCs abroad. A speech made by Mr. Bill Jordan, Divisional Organizer of the Amalgamated Union of Engineering Workers, Birmingham, U.K., on 31 January 1985 beautifully describes the difference. On that morning, as an invited speaker of the Engineering Employers' West Midlands Association, I talked about "the Employers and Employees Relation in Japan." Then on the afternoon Mr. Jordan spoke as follows.

"Last year I was sent by the British government to Japan to see how her workers were working and how they were engaged in quality control. If I take the letter 'E' from the Employers and the Employees whom Professor Sasaki talked about and put it at the head of a word 'quality,' that makes what I saw there."

Employers
|
→ E + Quality = Equality
|
Employees

Namely, Mr. Jordan meant that in Japan employers (or managers) and employees (or workers) were equally engaged in making quality.

Certainly in Japan it is believed that the QCC should be an organic part of the total quality control system. That sub-organizational activity has to be in harmony with the total organizational activity. If there is any organizational discontinuity in terms of, say, information, promotion, and

so forth, growth of the QCC activities will encounter a great difficulty.

Among various types of discontinuity the most serious one comes from the thought that workers are "doers" whereas managers are "thinkers." There E · Quality will not be born.



This equality, however, may violate the "sanctuary" that the QCC activities must be voluntary. But it is unnatural to regard the QCC activities as something different from management activities. Activities of managers are not completely voluntary either, but they are more or less bounded. So bounded are the activities of workers. In terms of this bounded voluntarism managers and workers do not have any qualitative difference. Both are decision makers though the scope of their decisions differs. If managers and workers do not constitute a qualitative continuum, the QCC does not function properly.

In the total quality control (TQC) system, firstly REQUIRED QUALITY required by the customers has to be defined. Then this quality is expected to take shape in DESIGNED QUALITY. This designed quality is put into a production process. Accordingly PRODUCT QUALITY is dependent on PROCESS QUALITY. Of course, the QCC constitutes an important part of this process quality. On the way to the customers SALES QUALITY can amplify or diminish the product quality. Because at the time of purchase the customers buy not only the product quality itself but also the quality of the sales service. And then what the customers will get is PERCEIVED QUALITY for which after-sales services play an important role. What the customers buy is the sales service and the usage or utility of the product. This perceived quality is grasped by market researches to yield REQUIRED QUALITY.

In this chain of TQC recognition of quality at all stages should not have discontinuity. The activities of the QCC must be developed on a continuum of information, understanding and authority delegation. Today, when industries are striving to change from quantity business to quality business, the role of the QCC is becoming even more important for their activation.

CONTENTS

Foreward: GROWING IMPORTANCE OF QC CIRCLE . . .	1
25 YEARS OF THE QC CIRCLE ACTIVITIES	2, 3
QC CIRCLE ACTIVITIES MINI NEWS	4, 5
SOME BRIEF OBSERVATION OF QC CIRCLE IN FOREIGN COUNTRIES'	6
QC CIRCLES IN THE WEST	7
ICQC '87 TOKYO	8

Q25 years of the QC Circle Activities

BASIC IDEA BEHIND QC CIRCLE

- I. Contribute to the improvement and development of the enterprise.
- II. Respect humanity and build a happy bright workshop which is meaningful to work in.
- III. Display human capabilities fully and eventually draw out infinite possibilities.

BIRTH AND BACKGROUND

With the industrialization of advance technologies such as high polymer chemistry, electronics and nuclear energy, companies invested heavily in modernizing production facilities, expansion and in new product development.

This innovative production system required an appropriately new management organization and administration. This meant a "management innovation departing drastically from the traditional type of management but the companies were willing to try new ways.

As various management knowhow and techniques were introduced, quality control was adopted in the production process and achieving great success and became widely accepted by the industries.

In the process of ambitious new product development, new work standards were set while the old ones were being revised and in such an environment a small error of a production operator could increase the number of rejects. The need to nurture the sense of quality in workman and the role of the foreman were given fresh attention. Large companies began by educating the foreman in quality control.

JUSE responded to the evolving need of the industry and published in April 1962 a magazine "GENBA TO QC (QC for the Foreman)," which is presently known as "FQC." In its first issue Professor Kaoru Ishikawa, the Editor in Chief of the magazine appealed;

"We all know that QC cannot be achieved by one person no matter how hard he tried. Why not organize "QC Circle" in your shop with the foreman and everybody participating at this opportunity of the publication of the magazine? You can use your QC Circle to read the magazine together and at the same time help each other learn and improve on quality."

And this was how the QC Circle was born.



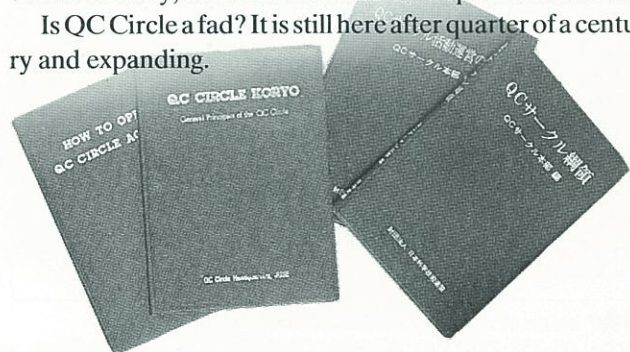
PRESENT SITUATION

In March 1987 QC Circle movement marked its 25th birthday. In March the number of QC Circles registered at the Headquarters reached 250,000, having added 10,000 circles per year on the average. The circle members registered 2,027,367 persons accounting on the average 8.1 persons per Circle. Perhaps there are no circles which has existed over 20 years. But registration is voluntary and there are at any given time quite a number of circles which remain unregistered. It is estimated that there are three times as many unregistered circles as there are registered ones and at times even five times. The unregistered circles want to feel quite confident of their activities before they decide to register. The QC Circles which began in the large manufacturing companies proliferated in the small and medium sized manufacturing firms having filtered down through the business affiliations. Following the two oil crises the Circles found their ways rapidly in the construction and services industries. Of the most recent 5,000 registrations, 22 per cent were from the services. Over the years this trend has been increasingly clear.

The QC Circle Conferences, where the members share their experience with persons outside their company, are a good indicator of judging the viability and activeness of the QC Circles in Japan. (See graphs on page 3.) In 1986 there were a total of 167 Conferences, at which 3,652 Case reports were presented and 139,716 persons participated. 167 Conferences a year means that every 2.2 days there was a QC Circle Conference somewhere in Japan.

Today in 53 countries there are QC Circles or activities based on the idea of QC Circles. "7-Tools" and "Control Cycle (PDCA Cycle)" are some examples. Many countries have translated "QC Circle Koryo (General Principles of the QC Circles)" and/or "How to Operate QC Circle Activities" in their own languages. While the structure and operation of the QC Circles are slightly different depending on the country, all share the basic concepts listed above.

Is QC Circle a fad? It is still here after quarter of a century and expanding.



EVOLUTION OF QC CIRCLE ACTIVITIES (shown in the bar graphs)

The activities of QC circles in Japan during the latest quarter of a century may be divided into three phases.

Phase I: First ten years from the inception; 1962 to 1972;

Phase II: Between the two oil crises; 1973 to 1979;

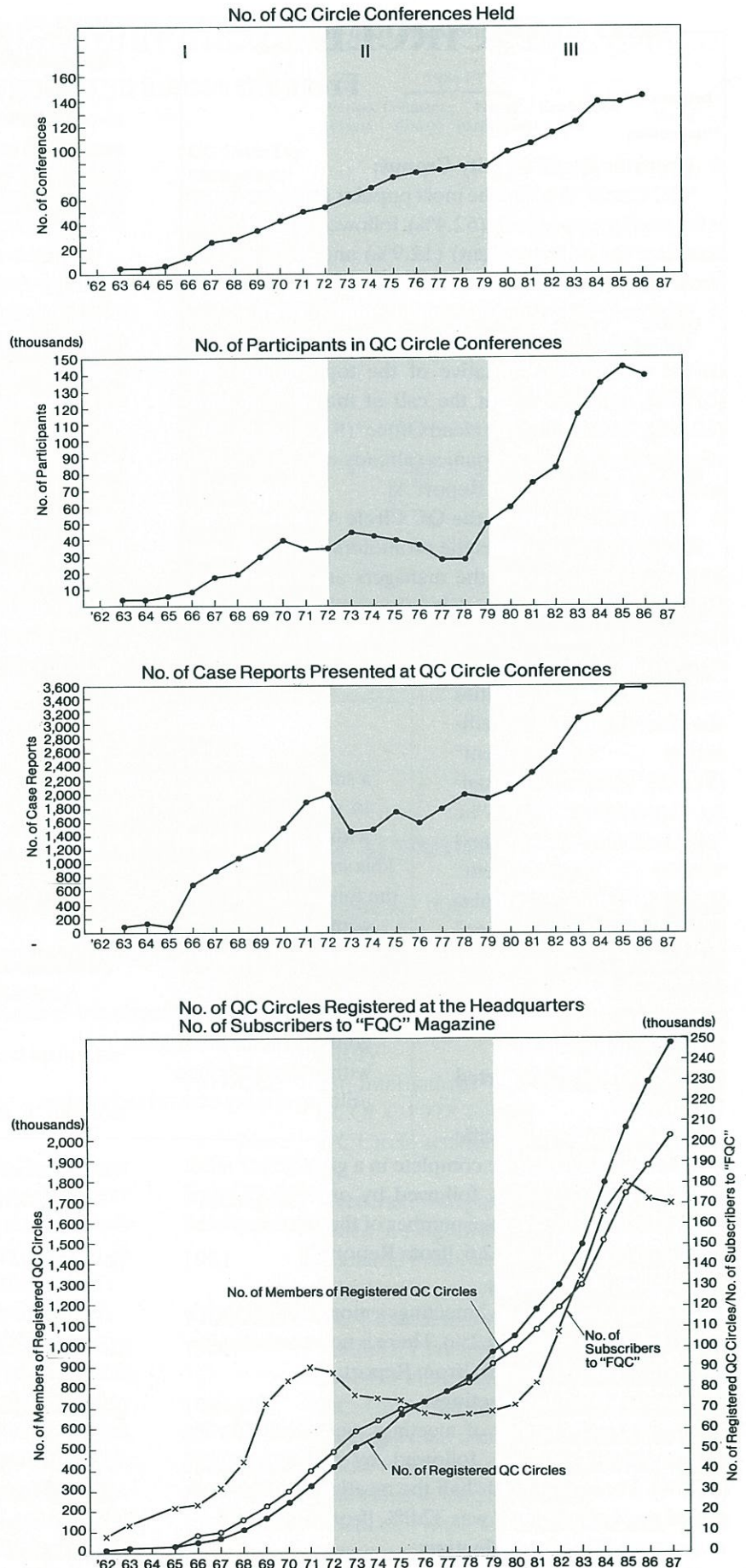
Phase III: After 1980 to the present.

Phase I represented the rising period for the QC circle activities, when the movement diffused at an amazing speed among major corporations in the manufacturing industries and others. Particularly, in the second half of the 1960s the fortune of the movement seemed well represented in the rapid growth of the number of case reports made at the QC Circle Conferences. At the same time subscription to "FQC" Magazine took a phenomenal growth.

Phase II represented a period of trial. The adverse effect of the oil crises was felt in the drop of subscription to "FQC" and in the number of case reports. Subscription fell by 20 to 30 percent reflecting the business down turn. It was at this difficult time that the organizers (QC Circle Headquarters and Regional Offices) increased, not decreased, the number of QC Circle Conferences in an effort to promote the movement. As the economy recovered the number of case reports gradually increased, but in contrast the number of participants to the conferences decreased. And it was only in 1979 when the number of participants to the conferences recorded a historical high. In the second half of the 1970s QC Circle activities were reactivated with particular strength in the construction sector but not as much as to have the results clearly visible in the bar graphs.

Phase III can be best described as a period of rapid development. The concept of QC Circle was accepted and firmly established among the small and medium sized businesses in the manufacturing, construction and service industries with particular emphasis in the services sector. As the graphs show, during this period dramatic increase was seen in the number of the newly registered circles, "FQC" subscribers, participants in QC Circle Conferences and the case reports at the Conferences.

The evolution and development of the QC Circle movement is soundly reflected in the bar graphs.



Based on data as of February of each year.

QC CIRCLE ACTIVITIES MINI NEWS

From the recent survey reports

☆ Name for Small Activity Groups:

"QC Circle" is by far the most popular name for the related small group activity (62.4%), followed by "JK" (Jishu Kanri or Self Management) (12.9%) and "ZD" (6.1%). [from Report A]

☆ Motive for Starting the Small Group Activities:

The most common motive for starting the QC Circle activities was "at the initiative of the top management" (51.3%), followed by "at the call of manager or staff" (13.8%), "at the call of the Head Office" (9.5%) and "under stimulus from other companies (already engaging in such activities)" (8.9%). [from Report A]

☆ Emphasis in Starting the QC Circle Activities:

In starting the activities the promoters put the greatest emphasis on "involving the managers and supervisors" (34.4%), followed by "involving the employees" (28.5%) and "training leaders" (24.3%). [from Report A]

☆ Current Activity Theme:

Among various activities the most popular was "efficiency improvement" (31.6%), followed by "quality up-grading" (16.4%), "cost reduction" (13.8%) and "facility improvement" (4.7%). Other popular themes included "morale enhancement", "service improvement", "safety enhancement" and "anti-pollution." [from Report B]

☆ Number of Completed Themes:

How many specific themes does a QC Circle complete in a given year? Most commonly two (37.8%), followed by one (22.7%) and three (16.5%). The average number of themes completed for the respondents was 2.6. [from Report B]

☆ Number of Meetings:

Most Circles held 1 to 2 meetings a month (68.3%), followed by once a week (20.2%). There is no correlation between the selected themes. [from Report A]

☆ Time Zone of the Meetings:

The greatest number of meetings were held "during work period" (30.5%), followed by "off-duty time" (26.0%). Those that hold "half the meetings during work period and half off duty" was 32.0%. [from Report A]

☆ Average Time for a Meeting:

How long is the meeting? Most meetings are "between half an hour and one hour" (49.3%) followed by "between

one and two hours" (24.2%) and "less than 30 minutes" (22.3%). [from Report B]

☆ Allowance for Off Duty Meetings:

Are there any allowances paid to those who come to the meetings during off-duty hours? Some receive "regular over-time pay" (37.1%) while others receive "allowance under different category" (25.0%) and some "so not receive any allowance" (25.3%) [from Report A]

☆ Contents of Leader Training:

Among the various requirements for leadership training the most popular theme is "QC methods" (25.2%), followed by "VE and IE and other problem solving techniques" (17.3%) and "leadership training" (14.2%). [from Report A]

☆ Obstacles:

What are the reasons for the infeasibility of the QC Circle activities? The biggest obstacle is the "lack of leadership capability" (24.9%), followed by "too busy with work" and

"difficulty in selecting an appropriate theme" both at (15.9%) and "members' lack of knowledge about QC" (14.4%). In the last survey the "managers' lack of understanding" was at the top of the list but this time it had been greatly reduced to 2.7%. [from Report B]

☆ Objectives of the QC Circle Activities:

According to the QC Circle leaders, the main objective of the activities are the "creation of a meaningful

workplace" (47.5%), followed by "growth and development of the company" (38.5%) and "personal growth and development of the members" (12.6%). [from Report B]

☆ QC Circle Activities at Small and Medium-sized Manufacturing Companies:

How active are the activities at small and medium-sized companies? Half the respondent companies admitted that the level was "ordinary," some said "active" (13.0%), but unfortunately many more said "inactive" (39.0%). This suggests that the smaller the size of the company, the Circles tended to be more "inactive."

Here it may be noted that even in companies which have adopted the TQC concept there were 30.8% "inactive." Parenthetically, the companies without the TQC had more "inactive" (44.2%).

Incidentally, two out of five small manufacturing com-

The QC Circle is

a small group to voluntarily perform quality control activities within the workshop to which they belong. This small group with every member participating to the full carries on continuously, as a part of company-wide quality control activities, self-development and mutual-development, control and improvement within the workshop utilizing quality control techniques.

panies have adopted the TQC (39.1%). This tendency is higher for the larger of the small businesses. For example, one out of every two companies with 200 or more employees have adopted the TQC. Breakdown by industry shows that the transportation equipment industry has the highest rate of adoption (58.5%), followed by pulp and paper, electric equipments, metal products and iron and steel and non-ferrous metals all of which exceed 50%.

[from Report C]

Note:

Report A: Sanno Institute of Business Administration; "Present Situation and Future Tasks of the Small Group Activities," September, 1986.

Report B: Union of Japanese Scientists and Engineers; "Facts on QC Circle Activities," November, 1987. (Survey was conducted in December, 1986).

Report C: Tokyo Chamber of Commerce and Industry; "Survey Report on the TQC Activities of the Small and Medium-sized Manufacturing Companies," March 1987.



Statistics of JUSE Courses on QC Circle

	Period (days)	1986 FY*		Established in	Accumulated No. of participants**
		Frequency (times)	No. of participants		
QC Circle Top Management Course	2	4	239	1973	2,022
QC Circle Instructor Course	6	20	2,088	1972	12,670
QC Circle Leader Course	3	39	4,888	1977	20,303
QC Circle Course for Clerical Work	6	9	883	1979	4,828
QC Circle Introduction Course	1	26	3,055	1980	22,890
QC Basic Course for Foreman	6	15	1,744	1967	26,341
QC Correspondence Course	6 (Months)	2	5,614	1971	78,423
*April 1, 1986 to March 31, 1987				**as of March 31, 1987	

CHRONOLOGICAL TABLE OF QC CIRCLE ACTIVITIES

1962 April:	JUSE publication of a quarterly magazine "QC for Foreman"	1973 Jan.:	Magazine "QC for Foreman" renamed "FQC"
May:	JUSE sets up "QC Circle Headquarters", JUSE establishes QC Circle Registry	1975 Jan.:	QC Circle activity starts in construction industry
1963 May:	1st QC Circle Conference	1977 April:	QC Circle activity starts in the banking industry
1964 Sept.:	QC Circle Regional Chapters set up in Kanto, Tokai and Kinki	1978 Oct.:	1st International QC Circle Conference (ICQCC 1978 Tokyo)
1965 Jan.:	"QC for Foreman" becomes a monthly magazine	Nov.:	QC Circle activity starts in the hotel industry
	"FQC Prize" established to award best report published in "QC for Foreman"	1980 April:	"General Principles of The QC Circle" published in English (JUSE)
1966 Nov.:	"QC Circle Song" announced	1981	"General Principles of the QC Circle" published in French (AFNOR-AFCIQ France)
1968 April:	JUSE sends 1st "QC Circle Overseas Study Team" to the US	1982 Feb.:	QC Circle activity starts in supermarkets
1969 July:	1st QC Circle Symposium	1983	"General Principles of the QC Circle" published in Indonesian (PPM, Indonesia)
1970 Nov.:	Publication of "General Principles of the QC Circle"	1984 Feb.	QC Circle Okinawa Branch established making a total number of branches to nine
1971 June:	JUSE organizes 1st "QC Circle Cruising Seminar"	1985 May:	"How to Manage the QC Circle Activities" Published in English (JUSE)
June:	"QC Circle Diary 1972" made		"General Principles of the QC Circle" published in Portuguese (IMC, Brasil)
Oct.:	Publication of "How to Operate QC Circles" (QC Circles Headquarters)	1986 April:	"General Principles of the QC Circle" published in Spanish (ASCAL, Chile)
Nov.:	1st "All Japan QC Circle Conference"		
	Presentation of best report awarded "QC Circle Headquarters Award"		

Some Brief Observation of QC Circle in Foreign Countries

Ichiro Miyauchi, Counselor, JUSE

1. Preface

An international implementation status of QC Circle concept is revealing quite steady progress in various countries in last 10 years. Although some QC Circles are successfully ongoing with good achievement, others are struggling with problems such as peter-out, turn-out or phase-out Circle activities. Such problems studying reveal the following stated commonalized observations in each country's implementation.

- A) Contradictions human-resource management concepts by top-executives
- B) Insufficient educations and trainings for QC Circle installation and sustaining processes
- C) Poor sustaining process and procedure program
- D) Low enthusiasm for QC Circle concept implementation by middle management.
- E) Unqualified facilitators assignment
- F) Poor functioning of QC Circle promotion office

2. Contradictions human-resource management concepts by top-executives

The present Western top executives are contradictions torn in between (X-Assumption + Taylor's theory) and (Y-Assumption + QC Circle concepts).

Under "X-Assumption + Taylor's theory" implication some top executives are blindly handling with blue-collars as "disbelief in employee" concept that their participation effectiveness are completely slipping out of their minds. On the contrary, "Y-Assumption + QC Circle concept" are so widely known as their contribution and collaborations that the same top executives are now beginning to implement QC Circle activity into own organization without much hopes. However, once the blue-workers are displaying their worthy contributions, the same top executives are surprisingly changing into "belief in employees" concept still with uncertainty of QC Circle implementation. That's the reason they have contradicted minds in their human resources management concepts that the top executives are chasing ironical result without any confidence to employees.

3. Insufficient education and training for QC Circle installation and sustaining process

The first observation is that clear distinction between education and training are not defined for QC Circle implementation program, and accordingly training is their main-stream such as how to install, how to organize meeting or how to use QC 7 tools, which is only furnished 2~3 hours at the very beginning stage and no more progressive ones. As for education concerns, people-building philosophy which is the primary objectives of QC Circle concept

are not emphasized nor instructed at all such as why people-building is necessary, how to accomplish people-building etc.

4. Poor sustaining awareness

It is said that QC Circle installation is very easy work, but how to be continuing on QC Circle activity is another matter to consider and take action. However, the responsibility of sustaining process are not understood by every personnel related with, such as;

<i>Top executives and middle management</i>	<ul style="list-style-type: none"> not organized long-range education and training program which are very important for people-building. not participated case-presentation meeting with their warm and patient hearts not appreciated intangible achievement, but only for tangibles not established suitable recognition system
<i>Facilitators</i>	<ul style="list-style-type: none"> not have enough training how to sustain QC Circle <ul style="list-style-type: none"> through mental oriented ways through methodology oriented ways not familiarized with in-house operations nor employees
<i>QC Circle promotion office</i>	<ul style="list-style-type: none"> not have definite sustaining program not study themselves how to sustain or how to prevent from peter-out, turn-out or phase-out of QC Circle activity

5. Less middle-management support

The most critical area observed are, without exception in every country, less support of middle management for QC Circle activity. There may be many sources for such incidents, such as,

- A) not correctly interpreted the top executives commitment of QC Circle implementation-people-building concept.
- B) accordingly, only asking tangible effectiveness.
- C) not fair recognition for accomplishment
- D) conflicts with facilitators for sustaining procedures

6. Unqualified or unexperienced facilitator assignment

Most of facilitators are not fairly trained before assignment that not only "how to install" technique but sustaining ones are so poor, further any of progressive training program are not organized for facilitators after the first ones. They could not handle any counselling type of supports during sustenance phase for QC Circles activity, eventually circle leader and member are not count on these personnel for their development of circle activity.



QC CIRCLES IN THE WEST

by J. M. Juran

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What has impressed me the most about QC Circles has been the contrast — their development in Japan compared with the Western countries.

In Japan, starting in 1962, the growth in QC Circles has been extensive and continuing. Millions of improvement projects have been carried out. The companies have benefitted greatly from those projects and from the associated improved human relations. The employees have also gained greatly through their participation in the conduct of company affairs and through their own self-development.

In contrast, Western companies first embarked on QC Circles in the late 1970's. An explosive growth took place, followed by an extensive decline. At present we lack a clear understanding of the state of affairs — the necessary researches have not been made. However it seems clear that in the West the pattern has been one of rise and decline, rather than one of continuing growth.

It is interesting to speculate on the reasons for the remarkable differences in the results of the QC Circle movement in Japan versus the West. From my observations I would list the following as major contributing factors:

1. The conceptual approach. In Japan the QC Circle concept was viewed as an extension of the earlier efforts to improve quality by managerial means. These means had included sending teams abroad to learn from other countries; translating foreign literature into Japanese; inviting foreign lecturers; training managers and supervisors in how to manage for quality; use of management teams to carry out numerous quality improvement projects. By 1962 it seemed logical to extend QC training to the work force, and to use teams of workers to achieve further improvement, as well as to broaden the extent of worker participation in the affairs of the company.

In the West the QC Circle concept was not viewed as an extension of prior managerial activity. Instead, it was viewed as a separate entity with its own purposes. Two of those purposes were dominant:

- (a) To improve human relations by providing a new form of worker participation, and
- (b) To solve the companies' quality problems. (In those days many upper managers believed that the prime cause of poor quality was the workforce.)

The participation feature proved to be attractive to the media. They gave much publicity to the QC Circle concept, and this publicity then stimulated a rapid growth rate.

2. Prior training of managers. The Japanese quality crisis became evident in the late 1940's. There followed more than a decade of massive training of the Japanese management hierarchy in how to manage for quality. By 1962, when the QC Circle movement was launched, the Japanese managers and supervisors were qualified to direct the QC Circles into productive channels. They did not delegate

this direction to "facilitators" or outsiders.

In contrast most Western Companies were not faced with a quality crisis until the middle 1970's. At that time the Western managers had not yet undergone extensive training in managing for quality. Lacking such training, they were unsure of how to respond. The QC circle concept seemed attractive, so it was tested out. Since the managers and supervisors lacked the necessary training, the direction was delegated to facilitators and consultants. This delegation bypassed the supervisory structure, leading to much confusion and resentment.

3. Coordination and guidance. In Japan the QC Circle movement has been coordinated by JUSE. It was JUSE which prepared the training materials, provided the seed training courses, provided consulting assistance, organized conferences, published the leading papers, set up the award system, etc. Of course the bulk of the training and application took place within the companies. However, all those supporting activities provided by JUSE have contributed greatly to coordinating and guiding the movement into useful directions.

In Western countries there has been little of such central coordination and guidance. The recognized professional QC Societies largely ignored the movement during its formative years. The resulting vacuum was then filled by company enthusiasts, consultants, journalists, etc. Such a mixture of interests was unable to provide broad coordination and guidance to the QC Circle movement. The absence of such coordination and guidance no doubt contributed to the decline of the movement.

PROGNOSIS

The West has been facing a quality crisis for about a decade. The present trend is clearly to go into extensive training in how to manage for quality. It will take at least another decade for the managers in the company hierarchies to acquire this training and then to acquire experience in its use. As all this proceeds it is quite likely that there will emerge a revival of interest in QC Circles. It has been amply demonstrated that under proper conditions the QC Circle concept is applicable to Western culture. (In some companies the QC Circles continue to thrive.) It has also been demonstrated that the QC Circles can be beneficial to human relations, and cost-effective as well. So we should expect a revival before the end of the century.



ICQC '87 Tokyo

INTERNATIONAL CONFERENCE ON QUALITY CONTROL 1987 TOKYO

"QUALITY FIRST — Again & Ever"

***** HIGHLIGHTS OF THE CONFERENCE *****

OPENING SESSION

Oct. 20, 9:20 ~ 12:40

OPENING & WELCOME ADDRESS

by Mr. Kohei SUZUE,
Chairman, the Organizing Committee
President, JUSE

CONGRATULATORY SPEECH

by Representatives from
IAQ, ASQC, EOQC and JSQC

KEYNOTE ADDRESS

by Mr. Shoichiro KOBAYASHI, Chairman,
The Kansai Electric Power Co., Inc.

SPECIAL LECTURE [I]

by Dr. Joseph M. JURAN, Chairman,
Juran Institute Inc.

SPECIAL LECTURE [II]

by Top Management from Abroad
(under negotiation)

SPECIAL SESSION

Oct. 20, 14:00 ~ 17:40

INTERNATIONAL PANEL DISCUSSION ON MANAGING FOR QUALITY

Dr. Joseph M. JURAN (Leader)

Mr. John J. HUDIBURG

Chairman and Chief Executive Officer,
Florida Power & Light Co.

USA

Mr. Martin KUILMAN

Vice Chairman, Board of Management,
N.V. Philips Gloeilampenfabrieken

THE NETHERLANDS

Mr. Wolfgang SAUER

President, Volkswagen do Brasil

BRAZIL

Mr. Saburo OHNISHI

President, Nippon Zeon Co., Ltd.

JAPAN

CLOSING SESSION

Oct. 22, 16:10 ~ 17:10

SPECIAL LECTURE [III]

"Total Quality in the Future — A Global Review for the
Next Decade"

by Dr. Armand V. FEIGENBAUM

President, General Systems Co., Inc.

SPECIAL LECTURE [IV]

"Source of Improvement of Quality and Productivity"

by Dr. W. Edwards DEMING

Consultant in Statistics

TECHNICAL SESSION Oct. 21, 22

SESSION TITLES

STREAM A

1. Development and Design of Quality Control Systems (17)
2. Company-wide Quality Control (12)

STREAM B

1. New Product Planning and Development (6)
2. Audit of Quality and Quality Control System (2)
3. Education and Training of Quality Control (8)
4. QC Circle Activities (6)
5. Human Aspects (6)

STREAM C

1. Quality and Economy (2)
2. Environmental Quality and Control (2)
3. Quality Assurance (4)
4. Reliability and Maintainability (8)
5. National Implementation (9)
6. Quality Control in Service Industries (5)

STREAM D

1. Application of Statistical Methods (25)
2. Quality and Process Analysis (4)

STREAM E (Poster Session)

- I. CWQC, QC Circle, Reliability and Others (20)
- II. Process Analysis, National Implementation (20)
- III. QC System and Quality Assurance (20)
- IV. Quality Control Techniques, Education & Training (20)

PLANT VISITS IN TOKYO AREA

Oct. 23, Friday 08:00 ~ 17:00

- A. NEC CORPORATION
- B. NISSAN MOTOR CO., LTD.
- C. BRIDGESTONE CORPORATION
- D. FUJI XEROX CO., LTD.
- E. KOBAYASHI KOSE CO., LTD.
- F. YOKOGAWA-HEWLETT PACKARD CO., LTD.
- G. ASAHI BREWERIES LTD.
- H. NIHON RADIATOR CO., LTD.
- J. MITSUKOSHI LTD. & YAMAGIWA CORPORATION

PRE-CONFERENCE ONE DAY SEMINAR

"TQC IN JAPAN"

Oct. 19 9:20 ~ 16:20

POST-CONFERENCE TOUR

"ANCIENT AND MODERN JAPAN"

Oct. 24 to 31

EXHIBITION Oct. 20 to 22

ICQC '87 Tokyo Quality Control Exhibition
(QUALCONTEX)

* To obtain more detailed information, please write to JUSE for the 3rd Circular.