The History of the Quality Circle

Its Japanese roots span three decades.

by
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ALTHOUGH THE TERM "QUALITY CIRCLE" originated in Japan in 1962, its history can be traced to the 1940s. Its evolution can be broken into three phases: studying statistical quality control techniques, adapting the techniques, and forming and registering quality circles.

Phase 1

Before World War II, quality control (QC) pioneers existed in Japanese companies such as Toshiba and NEC Corporation. For example, Yasushi Ishida, working for the Toshiba Corporation in the early 1930s, developed control charts for increasing the life span of light bulbs and reducing errors in their production. Unfortunately, because of the highly competitive nature of the business at that time, his charts were kept confidential. Even today, the details of his work are not widely known.

Although pioneers existed, there was no organization to promote QC and no incentive encouraging people to achieve it. In 1949, just after the war, the Union of Japanese Scientists and Engineers (JUSE) was established to educate people about QC. It conducted a class, called The Basic Course, which is still offered today. JUSE gradually increased the number of seminars it offered. The Japan Standard Association, which was established in 1945, also began promoting QC.

The concept of statistical quality control was introduced to Japan by foreign academic experts in the late 1940s and early 1950s. Just after World War II, staff members of the U.S. General Headquarters' Civil Communications Section (CCS) were stationed in Japan. They were amazed at the number of problems within the Japanese telephone network. One party was frequently unable to reach another.[1] The culprit was the poor quality of the vacuum bulbs, a necessary part of telephone transmission at the time.

Two staff members, Homer M. Sarasohn and Charles W. Protzman, were asked to give lectures to the companies manufacturing vacuum bulbs. Held in 1949, these seminars were limited to top managers. Later called the CCS Management Seminars, these lectures were the basis for Japanese statistical quality control.

On July 10, 1950, W. Edwards Deming started an eight-day seminar on the theory of statistical quality control. The audience for this seminar was much larger than that of the CCS Management Seminars (see Table 1). Deming discussed how to

Statistical Quality Control Teachings

	CCS Management Seminar	Deming's Lecture	The Basic Course (first time)
Date	Sept. 26 to Nov. 18, 1949 (Tokyo) Nov. 21, 1949 to Jan. 20, 1950 (Osaka)	July 10-18, 1950	Sept. 16, 1949-Aug. 17, 1950
Industry of attending audience and audience size	Vacuum tube, telephone, and radio manufacturers; about 20 people in both places (Tokyo and Osaka)	Various types of manufacturing companies; about 220 people	Chemical, iron, steel, and electric manufacturers; about 40 people
Lecturers	Homer M. Sarasohn Charles W. Protzman	W. Edwards Deming	Japanese satistician and people in JUSE who learned about statistical qualty control
Contents	Company policy, organization, control, and coordination. In the chapter regarding control, statistical quality control was taught. Lessons included the use of control charts and sampling inspection.	How to make control charts and how to perform sampling inspections.	Translation of the books written by Walter Shewhart and others. Research the QC department engineer's work in foreign countries.

Source: *Dr. W.E. Deming's Lectures on Statistical Control of Quality* (Tokyo: JUSE 1950), p. I; "JUSE to Hinshitsu Kanri" *Engineers*, November 1965, pp. 14-15; *Management Seminar*, Daiyamong-sha, 1952, Hinshitsu Kanri Seminar 1BC Getupo, JUSE, 1949-1950.

make control charts and how to sample and inspect products. This seminar, however, was for Japanese engineers; few workers from lower company ranks attended.

While Deming and the CCS staff taught many statistical quality control techniques to the Japanese, the idea of the quality circle was not presented in these seminars.

Deming's 1950 lecture was published as the book *Dr. W.E. Deming's Lectures on Statistical Control of Quality*.[2] The book was widely read at that time. Deming decided to donate all royalties from this book to JUSE. With those funds, JUSE established The Deming Prize, which has become the hallmark of good quality in Japan and a highly treasured award.

Clearly, the CCS Management Seminars, Deming's seminar, and lectures given by J.M. Juran were the basis for creating quality circles. Without this instruction, Japan might not have been able to improve the quality of its products. In addition, Deming's generosity enabled the highly coveted Deming Prize to be founded.

From this solid foundation, the Japanese gradually established QC departments in their companies. They endeavored to make control charts and perform sampling inspections in their shops. The knowledge of statistical QC spread quickly. The Japanese workers were pleasantly surprised at how well the techniques worked and increasingly tried to use them. They found, however, that some aspects had to be altered to fit the Japanese workplace. One of these alterations resulted in the formation of the quality circle.

Phase 2

Initially, the Japanese had to determine a way to teach statistical quality control to foremen and shop workers who were geographically widespread. Since there were few knowledgeable teachers available, the solution to this problem came in the form of radio seminars. JUSE and the Japan Standard Association broadcast 17 seminars over the Japan Short-Wave Broadcast Network and Nihon Hosō Kyokai (NHK) Radio (the Japan Broadcasting Corporation) between 1956 and 1962. The seminars included Basic Quality Control, Guidance to Productive Management, and Japan Industrial Standard.

NHK Radio published one of these seminars as the book *New Management and Quality Control*, which was widely sold.[3] In fact, it sold almost as many copies as the popular NHK Radio text teaching English conversation. Clearly, the radio seminars had made a strong impression on Japanese foremen and shop workers.

In July 1961, many Japanese foremen attended a quality symposium. During this symposium, they indicated that they would like to see a magazine on quality that their shop workers could easily understand and assimilate. Although JUSE published *Quality Control* magazine, the foremen believed it was too complex.

As soon as JUSE heard this request, it started designing a new magazine for shop workers. It redirected one-third of its editorial staff to begin work on the new project; the late Kaoru Ishikawa was on that staff.

When the editorial staff members of the new magazine met, they weren't sure whether it was possible for the foremen and shop workers to continue QC studies by themselves, even with the aid of a new magazine. They did know, however, how effective small gatherings at factories were in Japan, because they visited factories often. In these gatherings, workers studied and discussed QC.

For example, shop workers at the Naoetsu Factory, Shin-Etsu Chemical Co. Ltd., formed a small group in 1959. This group, called the QC investigation group, met weekly to discuss how to improve the quality of the shops.

Another example is Sumitomo Electric Industries Ltd., a company that started the "shop workers' confabulation" in 1960. During the meetings, which were held twice a month, workers talked about problems in their shops, how to clean the shops effectively, job safety, costs, quantity, and quality. They used such statistical quality control techniques as Pareto charts, cause-and-effect diagrams, and frequency distributions.

Komatsu Ltd., the largest manufacturer of bulldozers in Japan, also began a study group in its shops at the Awazu Factory. Other groups were also formed in the company. The groups compiled information and shared their findings with each other.

After seeing these groups' positive effects on their respective companies, the editorial staff members decided to promote and advocate such gatherings in the magazine. They also decided to refer to such groups as QC circles.

The new magazine, *Genba to QC*, debuted in April 1962. The first issue called for "the formation of quality circles by readers of this magazine." In conjunction with this release, the editorial committee organized JUSE's QC Circle Headquarters to register quality circles.

In 1973, the name of the magazine was changed to *FQC* and later to *QC Circle* in 1988. Despite the name changes, the magazine's initial mission remained unchanged and is still followed today:[4]

- This magazine should be easy to understand and should

Housewives Receive Deming Prize

Since 1971, Tokyo has been the site of The All-Japan QC Circle's Conference, held annually in November. On Nov. 10, 1992, 18 quality circles attended this conference, five of which were awarded gold medals for their outstanding achievements. The 1992 gold medalists included a group of six housewives who sold prepared entrees part-time. To improve the efficiency of their department, these six women took it upon themselves to form a quality circle.

First, they engineered a way to reduce the inventory of daily unsold goods, using graphs and charts to analyze which days' entrees sold well and which days required less inventory. After work, these six women met at different members' houses to study basic quality control techniques, such as the Pareto chart and the cause-and-effect diagram. The women's study was mainly guided by their section chief and *QC Circle* magazine. Through these studies, they discovered that Tuesday's sales were the lowest and that their meat entrees were too heavy and spicy. To resolve this problem, they prepared fewer entrees on Tuesdays, changed the taste of the meat, and added new dishes. At the conference, they reported their discoveries and solutions and were awarded a gold medal of excellence.

QC Circle has been in existence since the early 1960s, when its subscribers were mainly manufacturing companies and full-time employees. Quality circle activities today, however, are widespread in Japan and include all industries and even part-time employees whose only incentive is to improve the efficiency of their jobs.

facilitate the education, training, and propagation of QC techniques and help first-line supervisors and foremen upgrade their control and improvement abilities.

- The price of the magazine should be set low so that each foreman and worker can subscribe on his or her own initiative.
- The magazine should encourage readers to organize, at the workshop level, a small group called the "QC circle," headed by the foreman and participated in by subordinate workers and should encourage them to study QC techniques using this magazine as a textbook among the groups.

To understand why such gatherings were promoted, certain contributing factors must be mentioned. At the time, foreign countries were putting pressure on Japan to liberalize imports. In June 1960, the list of liberalized products was announced. On this list were tires, wool, synthetic fibers, tractors, bulldozers, and automobiles. Due to this liberalization, Japanese companies had to make products whose quality was equal to that of their competitors. Japanese workers on all levels, from the chief executive officer to the shop worker, had to make a concerted effort to improve the quality of their products. As a result of this liberalization, one company improved its quality so much that it won a Deming Prize (see the sidebar "Bulldozer Manufacturer Makes the Grade").

Phase 3

From the first quality circles formed, two different types emerged in the early 1960s. The first type is those groups that formed before *Genba to QC* was published and later became registered as quality circles. The second type is those groups that read *Genba to QC*'s call for quality circles and decided to answer that call.

For example, Iwau Manabe, the head of the machinery section at NTT Corporation, discovered *Genba to QC* at a bookstore in Matsuyama City. (This would rarely happen today, since the magazine's subscribers receive it directly from JUSE; but in the early 1960s, this was not the case.) Manabe's section at NTT belonged to the Department of Communication, which supervised telephone relays. After reading the magazine, he gathered six staff members and formed a quality circle. Manabe registered his quality circle in May 1962, one month after the first issue of *Genba to QC* was published.

That group became the first registered quality circle in Japan. Manabe and his colleagues met once a week to read the magazine and analyze the breakdown of telephones caused by bad connections. Within a year, defects were reduced by one-third in his section.[5] The effectiveness of this first quality circle prompted others on Manabe's staff to join the group.

Manabe retired from NTT in 1980 and established Matuyama Software Co. In an interview, he revealed: "I didn't know until 1981 that my circle was actually the first one registered. I found out through a newspaper article about Kaoru Ishikawa."[6] As far as the motive for creating his ground-breaking circle, Manabe said: "I was worried that quality control was not a key priority for my shop workers in the early 1960s. Then, I happened to find the magazine. I collected six workers, all of whom were familiar with one another, and each of us had a goal to reduce defects in our department."

Circles reflect pioneers' efforts

After investigating the history of the quality circle, three phases are evident. The first phase occurred when Japanese managers and shop workers studied statistical quality control techniques. The second phase was a period of trial and error, when the Japanese adapted the foreign techniques to better suit their group-oriented culture. The final phase was the actual formation and registration of quality circles.

The spirit of the quality circle is embodied in the efforts of all those pioneers, including Manabe, who recognized the need for improvement and acted on his desire for quality. Indeed, that type of high standard still thrives today among members of quality circles.

Bulldozer Manufacturer Makes the Grade

In the 1960s, a company called Komatsu Ltd. did everything in its power to improve the quality of its midsize bulldozers because America's largest bulldozer manufacturer, the Caterpillar Tractor Co., announced it would enter the Japanese market. This American competitor was so famous that Komatsu Ltd. took notice immediately. The president of Komatsu Ltd. made a decision to improve the quality of midsize bulldozers and invited Kaoru Ishikawa to be a consultant to the company. The president warned his employees that, if they could not manufacture high-quality products comparable to those of the Caterpillar Tractor Co., the company would go bankrupt.

Top, middle, and lower managers attended quality control seminars given by the Union of Japanese Scientists and Engineers and the Japan Standard Association. They shared what they had learned with all the departments in the company. Small quality control circles were then formed.

To prove how much its quality had improved, Komatsu Ltd. applied for the Deming Prize. The company won the award in 1964. After receiving it, the workers at Komatsu Ltd. felt justifiably proud of the quality of their products.

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