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THE NEED FOR TOTAL QUALITY CONTROL

from "Total Quality Control", Vol. 43, No.5 (May 1992)

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After all the years I've been engaged in corporate management, I've finally reached the conclusion that Total Quality Control (TQC) is the only effective way to run a company.

After practicing TQC for more than five years, we're now ready to try for the Japan Quality Control Medal. What remains for me is to let my successor carry on our program of TQC into the next generation.

During those five years, though, fully a fourth of the employees I started to work with when I joined the company have retired, and they were replaced by younger men. Since many of the people who worked so hard to win the Deming Prize are now gone, I feel it's about time to renovate our TQC efforts.

In this respect I have instructed our various departments to review their training budgets for the latter half of the fiscal year to see if it's possible to effect an increase.

Also, I've been working mainly with our directors on structuring a management plan for the coming fiscal year. And our efforts to renovate our TQC system will be based on this management plan.

But TQC should not be restricted to a person's workplace. In fact, we urge our employees to carry TQC into their home and private life by observing the management cycle PDCA, or "plan, do, check, action". Last year we introduced a policy commend employees who produced outstanding results in quality control.

I believe that a corporation will most certainly develop

itself so long as management acquires the habit of faithfully observing the PDCA cycle, regardless of the type of operational strategy it assumes, the area of business activities to which it is committed, the kind of building and facility investments it makes, or even if management is unaware of TQC.

In the renewed deployment of TQC, I have selected three key elements: The first is to strengthen the company's growth by improving its design technology and manufacturing technology. The second is to cultivate new markets and new products with the focus on medium and long term development. The third - and the one I consider the most important - is to remove any and all barriers that departments have built around themselves through the promotion of function-oriented activities.

The reason I stress function-oriented activities is that, at our company anyway, activities were mostly department-centered, which sharply impeded inter-departmental exchange.

During the period when we were preparing for a try at the Deming Prize we made an agreement. And that was, whenever a difference of opinion arose between a director representing a certain function and a director representing a certain department, the function representing director's opinion would prevail.

My emphasizing the third element is based on a supposition that the significance of this agreement may have begun to fade from our minds.

Other than what I've just told you, I stress to our employees that they should make definite plans for whatever their tasks and that, so long as it is possible, their plans should take on concrete form.

★

HOW TO TEACH NEW EMPLOYEES QC MANNERS

— THE TWO-BIRDS-WITH-ONE-STONE SOLUTION —

from "Total Quality Control", Vol.43, No.4 (April 1992)

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Introduction

A substantial amount of time has passed since the importance of quality was advocated in the software industry. In spite of this awareness and that the principal factor affecting quality in software is the human element, leaders of the industry have paid pitifully little attention to education in matters of quality...this when it has been greatly stressed in practically all other forms of industry.

Essentially there are three reasons why education in quality has been treated so lightly in the software industry. One is the difficulty in developing proper methods of instruction, since the study of software does not occupy such a clear-cut position as among other academic sciences. Another is that training in programming for immediate use has been given priority so as to cope with the voluminous requirements of software development. The third reason is that a systematic organization of departments for the purpose of supervising software quality has yet to be established within the industry.

In 1981 the Communication Software Section of Fujitsu, Ltd., formed its QC Staff Section, which specializes in software quality control.

Three years later a campaign was launched for groupwide study and education in quality control. Since then this campaign has been waged periodically as a major corporate event. The objective of the campaign was to motivate Fujitsu's busy software engineers to learn the real techniques of quality control through practical application.

During the campaign periods our engineers conducted group studies focusing on specific themes and keywords. To date these campaigns have been held thirteen times and represent one of the major periodic functions of our division.

These highly worthwhile campaigns have taught us the urgency of teaching our engineers QC techniques, which we now recognize as a basic procedure to be observed by them. In developing software "basic procedure" means that they take their date, analyze it correctly, then feed the information back to the next step. The ability - and willingness - to follow this procedure repeatedly as a matter of course forms the essence of QC techniques, or manners, in the software industry. Curiously,

though, it is far from easy to convince them of the need for such simple manners.

We at Fujitsu have buckled down to this difficult task by integrating education in QC conduct with training in programming for new employees: two birds with one stone. And the results have been admirable. So that others within the industry may profit from our experience, we wish to spell out clearly our QC education program, its content and how it has been recognized.

The need to teach new employees QC

It is comparatively simple to educate new employees to become satisfactory programmers within a short span of time. And regardless of how they develop them, their programs seem to work anyhow. Even if they make mistakes, they can easily detect and rectify them. This being the case, and since everything seems to proceed so well, they mistakenly believe they have become good programmers. In our opinion, the underlying fault behind this is the inadequate education policy of each form of enterprise.

Companies are eager to get employees who can make programs. So eager are they, in fact, that leaders of their programming departments hustle new employees through training merely so they can make programs and deny them education with respect to computer systems. This being the case, it is understandable that not so much as a hint of QC training be provided at the division or department levels.

The new employee spends month after month, year after year laboring under the delusion that his sole task is to make programs. Then all of a sudden he/she finds him/herself with the responsibility to take care of a new wave of employees. This happens every year when new employees are hired and within all divisions and departments, the result being that companies retain vast amounts of programs without reviewing them.

In the manufacturing and service industries, quality control education of new employees is enjoying wide-spread application. Special features - even special editions - treating this subject are often found among trade and industrial jour-

nals. But we have never seen so much as a single article about software engineers and their relationship with QC in any of these periodicals.

We have learned from other forms of industry, as well as from our campaigns, that the software industry too needs to instruct its new employees in the art of QC. In fact, new employees are the easiest to teach, since their young minds are the most receptive... it would be more germane to say it is better to strike while the iron is hot.

By contrast, engineers already in the grind and constantly faced with a deadline seem always too busy for anything else. They make programs using easy tried-and-proved methods to meet their deadlines. They lack the time to design better programs with an eye toward the future. Even though many of them try to change this situation - get out of their rut, so to speak - doing so is virtually impossible. Under these circumstances, none of them respond favorably to QC education, and many of them, who think they know it all already, will simply dismiss it as an apprentice trying to instruct a journeyman. To teach them would be like striking the iron after it has turned cold...and risk being struck back. New employees... they're the best; teach them before their noses get too high in the air.

Progress in QC education

In 1984 we initiated a program of group-wide education for the new employees assigned to our division, and the purpose of it was to teach programming skill. During the early stages we arranged lectures on the basics and classes in how to program; the students were separated into small groups while studying specific subjects to enable more effectively

working together. These groups also worked for data collection using the standard format. One day a new member of our QC staff section happened to use the data collected by our small study groups as a sample for analysis in a project he was working on. Since then we have periodically set up places of presentation of QC exercises and the results of analysis.

With reference to these analysis and reports made by new employees, we have worked to constantly improve the methods and organization of our teaching staff. Today we can boast of having a far better system for our QC education.

Figure 1 shows the progress we have made in educating our employees in QC manners.

As a point of reference, at this time we would like to explain something of the history of our educational program for QC manners.

1. The germination period (1988)

When young Mr. Watanabe, a new Fujitsu employee, was assigned to our QC section, its personnel were seeking the optimal method for statistical analysis of software development data, which constituted one of the major subjects of our "Ayumi" quality improvement campaign, that focused on subcontracted processing of software and got under way the preceding year. As part of his on-the-job-training, Mr. Watanabe was given the following tasks;

- Study of the statistical analyzing method using data collected by trainees undergoing program development practice, and
- Grasping the overall picture of software development through the foregoing analysis.

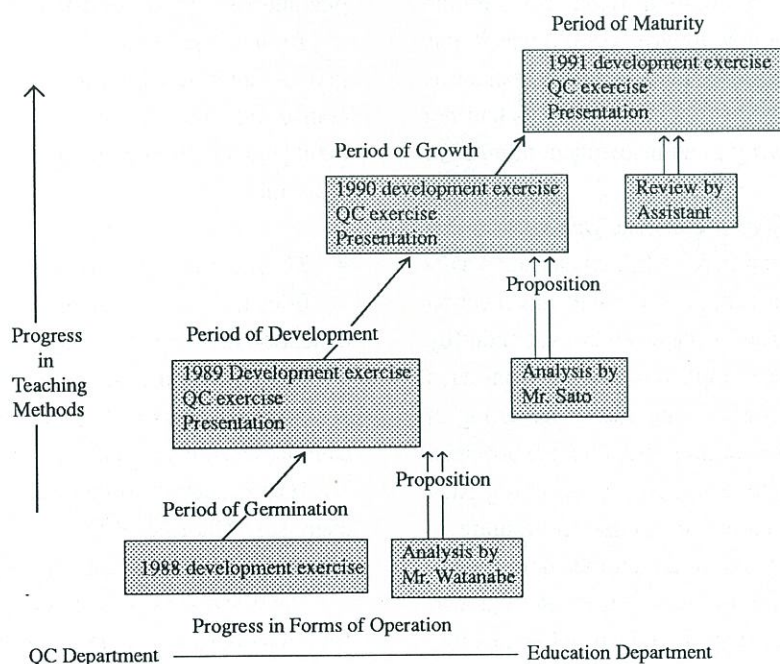


Figure 1 PROGRESS IN QC MANNER EDUCATION FOR NEW EMPLOYEES

On completion of his assignment, Mr. Watanabe submitted a report containing the following information:

- (a) He analyzed six among fourteen items presented. Of the eight items not researched, one consisted of data collected automatically via calculator. There were reasons why he could not complete the analysis: For one thing, he found that many vouchers lacked necessary records, or were unreliable owing to discrepancies of one kind or another. We found later that some groups had failed to submit vouchers at all. Then, too, around eighty-five percent of the QC practice groups had not yet finished their work.
- (b) He found differences among individuals with respect to the volume of programs completed, the numbers of bugs, and the fill-in ratio of vouchers.

Mr. Watanabe made the suggestion that new employees be taught how to write or use the necessary data for purposes of quality control when engaging in programming practice.

At a meeting for review of the on-the-job-training program for new employees, Mr. Watanabe presented his report under the title "Read Programming Practice for New Employees through Data". His work was well recognized by management. As a result, our education department stated that they would include the QC practice program in their curricula for the training of new employees.

2. *The development period (1989)*

Our QC exercise program got under way in 1989. Before actually starting it, though, we rearranged the content of our existing instruction on quality control for software so as to place greater importance on QC manners. It is significant here that Mr. Watanabe titled his presentation "Read Programming Practice..." and spoke about how to write data. It was in this year that Fujitsu supplied one computer terminal per person as a means to rectify the situation that many trainees had not completed their practice owing to an insufficient number of terminals.

The development practice, or exercise, was followed by two and a half days of instruction on data analysis and a half-day critique for review of the program. The half-day meeting took place under an informal atmosphere, and was attended by supervisors in charge of new employee training from each division and department. However, the class instructing in data analysis and the meeting for presentation were arranged by the QC section a month later, since they were not regarded as part of the regular curricula for new employee training.

During that year, young Mr. Sato, another new Fujitsu staff member, was assigned to the QC section, and like Mr. Watanabe the preceding year, he received a problem of study as part of his on-the-job-training. In Mr. Sato's case it was:

To confirm whether any substantially beneficial effects had been brought about by the various improvements made in

the QC programming exercises the preceding year.

His report as based on his research contained the following observations:

- (a) The amount of incomplete data and failure of submission was drastically reduced. But he found that the rule had not been strictly observed by some groups.
- (b) Some groups were too easily moving into the next process without first reviewing their currently working data.
- (c) It seemed to be quite difficult to probe the cause of bugs to their source. All attempts to find the cause of bugs were superficial.

Mr. Sato suggested that periodic meetings be held to show trainees the overall picture of data processing more clearly using actual control sheets, and to teach them how to review and evaluate their data.

3. *Period of growth (1990)*

During this period instruction in data analysis and the meeting for presentation were incorporated into the regular training program for new employees, and all textbooks for new employee education were reviewed with an eye toward improvement. Knowing that practical discussions during the exercise were important, we set up a class to teach how to manage group discussions. As a visual aid, a video tape originally prepared for middle level management, titled "How to Create Your Own Ideas, How to Draw Out Their Ideas", was presented.

We also established an assistant system to better educate new employees in development and QC. As an assistant for exercises, we assigned a young person from our quality guarantee section who had joined Fujitsu the preceding year.

At the close of the QC exercise class, the assistant would give us suggestions for preparing or revising manuals for the course and for the assigning of a proper middle-level management person of the development department as a QC exercise assistant.

4. *The period of maturity (1991)*

Education in QC manners was entirely managed by the education department throughout the year. Taking advantage of the preceding assistant, someone from middle-level management was assigned to classes of development and QC exercises as the assistant.

The QC section arranged all necessary manuals for the QC exercises. The role of this section was basically limited to training instructors and assistants for the QC exercise classes.

The first review presentation was held at Okada Memorial Hall, which had a seating capacity of two hundred persons. It required a whole day to air all the presentations. And it took place in a most cheerful, sometimes even humorous mood. ★

REPORT ON THE 22ND SYMPOSIUM ON RELIABILITY AND MAINTAINABILITY

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Introduction

The Symposium on Reliability and Maintainability, organized by the Union of Japanese Scientists & Engineers (JUSE), was held in the JA Building, Ohtemachi, Tokyo, June 8 through 10. This year's symposium marks the twenty-second of the series.

The organizer reported the participation of 509 persons, 409 of whom represented the general public. This year's symposium theme was "International Expansion of Reliability Activities," which was treated in both the keynote lecture and panel discussion.

Altogether sixty presentations were made, including eight posters and three tutorials. The sessions took place in three rooms. Among them Room 1, where reliability examination and analyses of malfunctions were the main topics, was very well attended, as during previous symposia.

Content of the symposium

First of all, Prof. Hiroshi Shiomi of Chuo University, Chairman of the Organizing Committee, gave the keynote lecture, in which he said, "Comparing and examining opinions from Japan and abroad regarding the Japanese way of management shows that its effectiveness and flexibility are rather well appreciated. However, its 'fuzzy' policies should be corrected, as they are easily misunderstood by Occidentals. German type policies, focusing on self-control, could be a good model."

The panel discussion was coordinated by Prof. Hajime Karatsu of Tokai University. Members of the panel were Mr. Yuzuru Itoh, of Nippon Otis Elevator, Mr. Masayuki Shimodaira, of the National Space Development Agency of Japan, Mr. Kenji Horii, of Japanese Aero Engines Corporation, and Mr. Masaru Mitsuyama, of Mazda Motor Corp. As can be easily imagined by the names and firms represented in the panel, many interesting thoughts were presented, thus the subjects for debate often changed. Listening to the discussion, I became keenly interested in learning how it would end.

Regarding the principal subjects discussed, Prof. Karatsu

raised various issues related to reliability in view of expanding internationalization. He pointed out that certain components supplied from abroad in particular semiconductors and screws, are troublesome.

Mr. Ito presented his opinion that end users themselves should evaluate semiconductors and/or other electronic components, which would stimulate maker consciousness and eventually lead to improvements in quality.

On the other hand, Mr. Shimodaira stressed that consumers should supervise component suppliers and make sure they take the responsibility of assessing the quality of their own products. Suppliers should bear in mind that their customers are not buying only parts; they are also buying quality assurance.



Mr. Horii cited as an example that certain ordermade and nuts bolts supplied for use in aircraft construction and repair proved to be of substandard quality. He emphasized the importance of quality assurance in supplied parts.

Expressing a different viewpoint, Mr. Mitsuyama felt the need to build closer relationships with foreign makers from the very basic stage. He introduced the plan of communicating with suppliers to the extent of exchanging blueprints. Part of a firm's "design-in" activities is to reflect the requirements of users in the designing of products.

Prof. Karatsu concluded the discussion by encouraging the participants that Japan should take the lead in the world with respect to quality assurance. ★

INTERNATIONAL SEMINARS

TQC TOP MANAGEMENT SEMINARS IN SPANISH AND PORTUGUESE

This spring JUSE held a seminar for representatives of top management from Spanish and Portuguese speaking countries. The event got under way April 13 and ran for five days in the City of Sendai. The seminar was organized at the request of those nations to enable learning TQC (Total Quality Control) as part of their top management educational programs, which included case studies of Japanese corporations.

A total of sixty-eight participated from Brazil, Chile, Colombia, Ecuador and Spain. Following the seminar in Sendai, the delegates visited companies in Utsunomiya, Hitachi, Osaka, Nagoya and Tokyo, where they observed firsthand QC in actual practice. It has been decided that the seminar become an annual event to take place every April.



TQC SEMINAR FOR BRAZIL TOP MANAGEMENT

Forty-four representatives of top corporate management from Brazil visited Japan for a ten-day seminar conducted by JUSE. The program got under way June 8, and for the first five days delegates attended lectures at a resort hotel in Oiso, from where the Pacific and Mt. Fuji could be viewed with ease. Later the group inspected five firms in Osaka and Nagoya and environs for observation of the latest in Japanese TQC activities.

It marked the third in a series of seminars jointly launched last year by the Christiano Ottoni Foundation of Federal University of Minas Gerais and JUSE.



Leading Missions visited JUSE, January - June, 1992:

- Jan. 24: CSQC TQC Study Mission from Taiwan with 29 members
Feb. 18: Italy Co-op TQC Study Mission with 11 members

- Mar. 9: TPA TQC Study Mission from Thailand with 16 members
Mar. 10, 25: Toyo Cement QC Circle Study Mission from Korea with 10, 14 members respectively
Mar. 30 - Apr. 6: Conference Board of Canada TQC Study Mission with 11 members

ORGANIZED BY JUSE

QC CIRCLE SEMINAR FOR BURKINA FASO

Quality Control Circle education for Burkina Faso, a country in Africa, began in 1990 at the request of the World Bank, and this year it entered its third period. As the initial project for 1992, twenty-four leaders visited Japan for two weeks starting May 18. After attending five days of lectures at JUSE, they visited five different companies where they studied the current status of QC Circles in Japan.

Ichiro Miyauchi and Noriharu Kaneko, Counselors of JUSE have visited Burkina Faso a number of times to provide instruction in QC Circle development and management. As a result, in line with the expectations of the World Bank, productivity awareness and labor consciousness in Burkina Faso have significantly improved. Appreciative of the good accomplished, World Bank leaders plan to nominate another two nations for instruction, and have asked JUSE for its continuing cooperation in this respect.



TQC SEMINAR FOR CHINA TOP MANAGEMENT

This June 22 JUSE welcomed forty-five representatives of top management from Chinese companies, who visited Japan for a twelve day study tour. The group attended five days of lectures at JUSE headquarters, after which they visited five corporations in and around Osaka and Nagoya to learn about the present status of Japan's famous TQC.

The participants hailed from the cities of Beijing, Tientsin and Shanghai, plus nine provinces out of China's twenty-seven. Chinese officials have requested JUSE to hold another seminar for top corporate management from the eighteen remaining provinces.



Apr. 3: CSD TQC Study Mission from Taiwan with 20 members
 Apr. 22, May 14, May 20: Gold Star Cable QC Circle Study Mission from Korea with 24, 16, 25 members respectively
 Apr. 24: Radio Vip TQC Study Mission from Mexico with 24 members

May 22: University of Southern Maine TQC Study Mission from U.S.A. with 15 members
 Jun. 2: The Kimpo Chamber of Commerce QC Study Mission from Korea with 10 members

JUSE INTERNATIONAL SEMINAR ON TQC FOR SENIOR MANAGEMENT

September 28 (Mon) to October 2 (Fri), 1992
at Hotel Kowaki-en, Hakone

The recommendable participant of this seminar are the persons who are working closely with the problems on implementing TQC in their company that can be expected to occur or actually facing with it now.

Seminar is consisted of 5 days lecture including a plant visit of half day for Case Study.
Group Discussion is scheduled for two days after dinner.

Participants must have a good command of English for discussion. Application will not be accepted to attend more than four participants from one establishment.

Hakone is one of the scenic spot in Japan where you can reach by 2-hour ride of vehicle from Shinjuku. Participants will move to Hakone on September 27 by a chartered bus.

FEE: Yen 548,000 / person

Above fee includes the following:

Lecture textbook & stationary goods, transportation fee for plant visits, accomodation fee for six nights (Single use only) from 27th Sunday to 2nd October Friday, meals and refreshments during the seminar days.

OPTIONAL TOUR

We have arranged optional tour after the seminar for one week which is from October 3 to 8. This tour gives you a chance to visit 4 companies in three big cities which are Kyoto, Osaka and Nagoya.

FEE: Yen 295,000 / person

Above fee includes the following:

Accomodation fee for post tour (6 nights), admission and guide fee, breakfast and lunch during the tour.

For more detailed information, please write to JUSE to obtain a leaflet of the seminar.

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