

# Societas Quālitātis

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### INTERNATIONAL OPERATIONS THAT HAVE THE LARGEST MARKET SHARE



*from "Total Quality Control," Vol. 45, No. 4 (August 1994) JUSE*

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It is my belief that the high-purity silicon wafer business consists of supplying top-quality products. Our company's silicon wafer products can boast of holding a twenty-five to twenty-six percent share of the global market.

The main reason that our firm, which is small compared with others in the same line of endeavor worldwide, has commanded such a large market share internationally is that our customers acknowledge us as a "corporation which supplies products of stable high quality." But there is another reason too: Our company has always made it a point to take the initiative in meeting whatever the trends in market demand throughout the world.

We call our firm's international operations the "quadrupolar system worldwide." Observing it, we manufacture and sell our products at four regional bases: Japan, the United States, Europe and Asia. This quartet of operational bases enables our customers in Japan who intend to expand their business to other countries, or our customers abroad who plan to build factories in Japan, to procure our products with ease anywhere in the world.

Maintaining this kind of international production and distribution network represents an ideal, but to date we have not been fully satisfied with it. Thus we are working to further promote quality control activities as a means to reduce even more any discrepancies that may appear in the caliber of our products manufactured at our four bases.

Other concerns may be undergoing difficulties in the wake of yen appreciation as viewed in recent years. But we, at least so far, have managed to avoid such

problems inasmuch as we launched international operations earlier than most. In particular we never expected the Asian market to develop to the extent currently seen.

At our headquarters we have an organizational unit called the Quality Management Department, and at our Isobe plant we have another called the Quality Design Department. The latter furnishes technical advice to our sales personnel with respect to identifying the needs of our clientele and determining the kind of merchandise we must supply to them, and writing the required specifications. For example, should a buyer complain about our products, an apology on the order of, "We're very sorry, sir," is definitely not the answer. We cannot satisfactorily respond to our customers unless we identify the cause of their dissatisfaction and provide a remedy through quality control activities. This is what we emphasize most.

In 1985 we built a factory in the United States, and there we introduced and deployed the statistical process control (SPC) developed by Motorola, Inc. In Malaysia we applied the Crosby system after the fashion of NEC Corp. and deployed quality control activities at all levels of the organization. QC circles were established independently at our four regional factories worldwide, and the circle that wins the competition among them is invited to the international convention we host annually at the Tokyo Bay Hilton located at Urayasu.

Quality control activities such as that have allowed us to develop a corporate constitution making it possible to supply products of stable high quality and make the profits we do today. ★



# FUTURE ISSUES IN CUSTOMER SATISFACTION AND TQC: TQC IN A NEW ENVIRONMENT

*From "Total Quality Control," Vol. 45, No. 7 (July 1994) JUSE*



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## 1. Introduction

It is said that the recent economic depression in Japan is structural and the country's economy can no longer be expected to grow so steadily as it had done until several years ago. It has also been questioned in many ways how Japanese models of management should be, and there has been a pressing need for a review of total quality control (TQC) on which such models are based.

## 2. Future questions concerning customer satisfaction

### 2.1 Customer satisfaction based on safety and reliability

On April 26, 1994, more than 200 lives were lost in the wake of a China Airlines jetliner crash which occurred at the Nagoya airport.

Technology is a means whereby natural environment or resources are converted into artificial products with the aim of making the living environment of human beings safer, more comfortable and convenient.

The witnessing of these accidents reminds us that we are paying enormous costs while technology has made our life more affluent.

### 2.2 Customer satisfaction via earth-friendly approaches

It has been a long time since misgivings started to be entertained about the problems in which artificial products brought about by innovative technologies have adverse effects on the environment on a global scale.

For example, car manufacturers have made efforts to develop technologies to purify exhaust gas and automobiles with high fuel efficiency. Moreover, in recent years, they have carried out new environment protection activities by recovering waste materials and developing technologies with a view to using recyclable resources and by applying production technologies to prevent environmental pollution. Examples of such technologies include the abolition of specific chlorofluorocarbons (CFCs) in production processes, identifying marks placed on plastic parts for the purpose of recovering and recycling.

Unlike the conventional compound technologies which have advanced by pursuing convenience, recycling demands the reverse way of thinking and developing technologies

and entails many difficulties. This is a question which concerns not only the automobile industry but all other manufacturing industries as well, and also a problem which should be overcome by all of us who have indulged in a civilization where things are easily disposed of.

There is a physical phenomenon where one particle generates two particles which in turn produce new and more particles in power series, resulting in catastrophic destruction. This kind of change may possibly happen to the environmental problems.

Considering the need for customer satisfaction in coming generations, it is high time we worked to reform social systems and revise the awareness of people everywhere. I think it entirely possible to apply TQC method to a large extent in the protection of our global environment.

### 2.3 Customer satisfaction via people-friendly approaches

The development and progress of technologies have helped spread merchandise that makes our life comfortable and convenient; typical examples are air-conditioners, color television sets, and cars. In this way, technological advancement has made our life affluent.

Excessive pursuit of easiness-to-use and convenience for the sake of consumers has flooded the marketplace with merchandise that may not necessarily satisfy users, such as complex merchandise with many functions, high-technology merchandise that lack consideration to the users, etc. Such excessiveness can be witnessed by the fact that microwave oven are bought only to warm food, and that only youths manage to use VTR's difficult function of setting the time for recording in advance.

Future merchandise should be required to have the value that is measured by a new set of criteria. By using these new criteria, customers will be able to determine whether merchandise is valuable or not, or whether it is needed to make their life human and relaxing. The point is that customers expect manufacturers to manufacture things in a people-friendly manner.

For example, in the forthcoming aging society, there



will be a demand for merchandise and services that suit the physical functions of the aged. Meanwhile, in view of an increasing number of working women, various time-saving services will be needed.

In advocating the concept of prosumers (producer-consumers), the American futurist, Alvin Toffler, proposed that manufacturers manufacture things with the support of consumers. Likewise, in the future, manufacturers are expected more than ever to develop merchandise from the standpoint of consumers.

## 2.4 Customer satisfaction guaranteed by cost-performance ratio

Discount stores located in the suburbs specializing in men's suits are performing well by giving consumers the impression that they offer less expensive merchandise. Conversely, consumers will not buy high-definition television sets with clearer pictures if they still consider them expensive. Prices greatly influence the final decision of whether consumers purchase merchandise or not.

Mr. Toshiyuki Mochimoto defined customer satisfaction as "a consumer's state of mind in which he or she feel that he or she has received a sufficient or insufficient benefit (compensation or reward) for the cost which he or she paid." He also expressed it in the following formula:

$$V = Q/C$$

V: Degree of customer satisfaction

Q: Value of the benefit that a customer obtained

C: Value of the cost that a customer paid

Consumers will never choose merchandise whose price far exceeds the value obtained from it as happened during the bubble economy or, in contrast with this, merchandise which is of no value to them even if it is less expensive.

It is, therefore, necessary to develop merchandise by ascertaining the degree of customer satisfaction quantitatively through the thoroughgoing analysis of quality (value) and cost based on the method of quality function deployment and other methods.

## 2.5 Customer satisfaction achieved systematically

A great many people have visited Tokyo Disneyland more than once. What is the secret that makes people return to the theme park repeatedly?

The secret lies in Walt Disney's ongoing concept of providing a place where persons of all ages can find dreams and love, and planning and technologies for attractions that realize and produce this concept. The highly safe and efficient restaurants and their services, and instruction and training programs that enable the

entire cast (employees) to entertain guests (visiting customers) in a very friendly manner also constitute a vital contributing factor. All these distinctive features combine to attract people to motivate additional visits.

It is necessary that the concept of merchandise or services should be accepted by the customers of that period, and also that merchandise or services should be equipped with both hardware-element and software-element functions. Such merchandise or services will achieve customer satisfaction systematically.

Moreover, I expect that human-oriented systems which encourage customers to participate will eventually make customer satisfaction evolve into customer delight. To that end, it is necessary to approach QC with a clear image of objectives and further pursue QC in services (software).

## 3. In order to enhance customer satisfaction

Improvements aimed at enhancing customer satisfaction start with the provider of merchandise or services grasping and evaluating the needs of customers accurately.

A wide variety of means may be suggested to make such improvements. For example, one means, though unrefined, is to collect first-hand opinions and data on satisfaction or dissatisfaction with merchandise or services from a number of customers on a daily basis in order to control such data using *p* chart. Another means is to conduct surveys of customers using questionnaires in order to gather a huge amount of data, stratify such data and process them through computers. In an age when the needs of customers become diversified and rapid changes occur in the socioeconomic environment, it is urgently necessary to obtain accurate information quickly and take actions that will lead to customer satisfaction. Kao Corp.'s "Echo System" shows an example of an ideal system in which the opinions of customers are reflected on the development and improvement of its merchandise and services.

In the United States, information on the evaluations of merchandise is made available to customers widely and fairly as found in the instances like the evaluations of customer satisfaction published by JD Power, Inc., magazines containing reports on the evaluations of all kinds of merchandise conducted by consumers, etc. Moreover, as the Malcolm Baldrige National Quality Award allocates 30% of marks to evaluation of customer satisfaction in its review of applicants, companies are expected to conduct consumer-oriented activities from a social viewpoint. ★



# QUALITY ASSURANCE IN OVERSEAS MANUFACTURING: TQC IN A NEW ENVIRONMENT



from "Total Quality Control," Vol. 45, No. 7 (July 1994) JUSE

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## 1 Introduction

The increasing value of yen and the prevailing economic recession have combined to alter the needs of consumers, trigger the collapse of costs, and plunge manufacturing concerns into a severe environment.

It has become necessary not merely to seek ways to weather the crisis but to consider how manufacturing in Japan is changing on a long-term basis. It is also essential for corporate leaders to devise forms of management strategy that call for the transfer of production and technology to NIES and other global areas in their perspective, as well as reevaluate managerial resources and promote strategic restructuring.

It is my belief that personnel (TQC) + systems (ISO) + information (SIS) = management structure capable of properly responding to whatever the changes.

I consider it high time for corporate management to recognize the bloated structures that have resulted from rapid economic growth during the past years and reform them, also to proceed in a new direction by presenting a vision of the future formulated under a new environment and clearly indicating the course we should take.

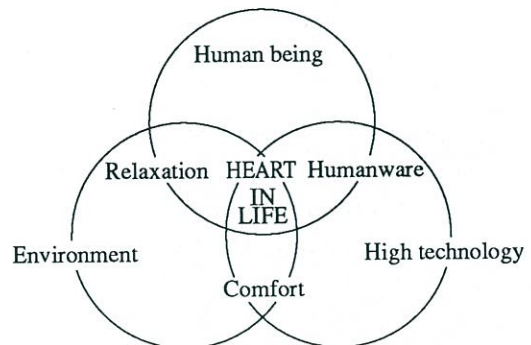
In this context I would like to introduce part of our own approach to the issue by describing how we shifted to and manage overseas production.

## 2 Basics of manufacturing and our future vision at Aiphone

- (a) Aiphone's basic policies in manufacturing are to ensure quality in the early stages of production and manufacture safe, durable goods that satisfy the consumer by applying the business philosophy (quality policy) that we assume full responsibility for our work and do not trouble others. In order to realize this objective we conform to, maintain and improve quality manuals (Japanese way of TQC) based on ISO9001: Quality System Models.
- (b) The vision for the future proclaimed by our firm's second president calls for "Heart in Life by Communication" and aims at manufacturing products in a people-friendly manner to bring hearts together.

Guided by this vision we are promoting TQC activities even more vigorously toward the twenty-first century, the intention being to create a brilliant, streamlined enterprise regarded as highly attractive by our clientele and employees alike (see Fig. 1).

### HEART IN LIFE BY COMMUNICATION



Our intention is to create relaxation, comfort and sensitivity by harmonizing the three basic elements: environment, technology and the human being.

Figure 1 : Vision of the future

## 3 Shifts in manufacturing and corporate reform in a new environment

The economic recession brought on by the collapse of Japan's "bubble" economy in league with the soaring value of yen continues. Consequently we find ourselves in the process of reviewing our working methods and improving our corporate structure in an effort to respond accurately to the new environment.

### 3.1 Recognizing our inflated corporate structure and reforming it to become powerful

- (a) The top-down approach
  - We intend to boost our profit and loss break-even point by five percent through reforms conducted from a long-term standpoint:
    - Activities necessary to cut by half the time required for developing new products
    - Improving even more our manufacturing systems, including at our overseas operations



- Total elimination of waste by implementing an efficient management information system
- (b) The bottom-up approach

We put into practice an annual action guiding which asks, "To whom is fifty percent of our waste imputed?"

We also conduct QC circle activities designed to help create both company and home capable of surviving in our increasingly severe world:

- Encouraging employees to submit one or more proposals for improving each month
- Holding two meetings per year for the presentation of results at which prizes are awarded

### 3.2 Introducing the Just-in-time (JIT) production method to speed up manufacturing and eliminate waste through the common use of data

With telephone terminals linking private enterprises, we too were faced with the crisis which had struck the entire telephone industry. Under our vision of the future which pointed to the new course our management would follow, we resolved to transform ourselves from a company that made interphones to an inclusive communications systems manufacturer of telephone, security and image-processing systems in addition to interphones.

After formulating a long-term five-year business plan aimed at shifting from an individually owned firm to a corporation listed in the Second Section of the Nagoya Stock Exchange, we strove to improve our structure by becoming strategic.

- (a) Building our Toyoda plant as a strategic operation

We established a system to develop new forms of technology so as not to suffer defeat by major electrical appliance manufacturers and introduced the JIT production method. The objective of this move was to attain flexibility, be exacting about details and reduce costs. We hope to overcome all remaining difficulties by pursuing these three goals to the maximum.

- Making qualitative improvements and advancing automation via a production system involving no screws or manual welding, no lead lines

- and the common use of module components.
- Shifting it toto to the JIT manufacturing method's vertical process production line based on multi-skilled employees and eliminating the former belt conveyor system.
- Structuring strategic information systems (SIS)

We also established distribution support systems which synchronize production and sales, with prompt decisions being made placing importance on our consumers, with the result that

- Production lead time was cut from 90 to 15~30 days,
- The number of units produced was set for 1~100, per day, and
- Manufacturing costs fell by 30 percent.

- (b) Promoting cost-reduction activities together with our cooperative enterprises

Based on contracts concerning quality, delivery and cost, representatives of our cooperative firms and Aiphone personnel in charge of purchasing set improvement goals and form QC teams to carry out our activities aimed at improvement. In our semiannual meetings at which the results of QC practices are presented, our associate companies are graded according to the extent of their cooperativeness and receive appropriate commendation.

At the same time we conduct companywide value engineering (VE) activities as part of our VEST-P program. The results, obtained partly through instruction by independent consultants outside the companies, are shared equally by Aiphone and its cooperative firms.

#### 4 Quality assurance in manufacturing overseas

Aiphone's quality assurance program represents practice of the quality policy set forth in our business philosophy, and our activities in this regard basically are planned to assure quality early in the production process.

We have been improving each manufacturing process by combining elements on the theme of quality control (see our new product development chart) which stresses the innovation of new products at the very start of our various manufacturing processes (see Fig. 2).

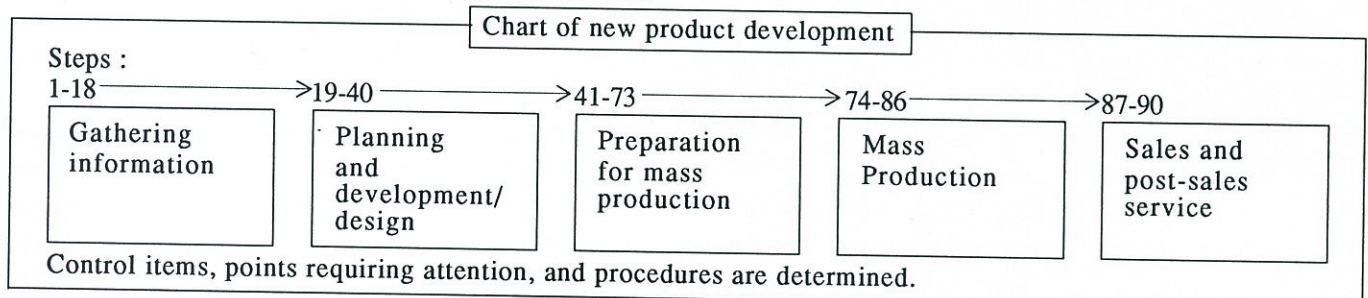


Figure 2



Whenever defective products appear, they are T-matrix stratified according to the process during which they were found, that where they should have been found, and that in which quality is assured. In this manner problems are narrowed down with their causes analyzed for the purpose of upgrading job quality as well as maintaining and improving product quality referring to the standards specified in ISO9001: Quality System Models.

#### 4.1 Quality assurance in manufacturing abroad

Essentially we make no distinction between domestic and foreign production in applying and conforming to quality control as stipulated in ISO9001. However, we do take into consideration locations when exacting quality standards and application procedures.

Our principal check items for quality requirements in our foreign manufacturing operations are:

##### 4.1.1 Management responsibilities

- A clear statement of management expressing enthusiasm toward quality and its policy regarding quality control
- Verification of its conducting TQM

##### 4.1.2 Responsibilities and forms of authority

- Evaluating the acumen and enthusiasm of persons charged with management
- Confirming that internal quality audits are being conducted and are firmly established
- Ascertaining that corrective actions are effective

##### 4.1.3 Review of the contents of contracts

Product planning and design must be conducted using technological prowess, with the process capabilities of cooperative enterprises taken into consideration.

- Discrepancies found in lead time and product quality

##### 4.1.4 Design control

Input to and output from design:

- Clarifying whether production takes place at home or abroad
- Ensuring that proper consideration is given to materials, production facilities, and locally available personnel when designing
- Clarifying the manner in which design drawings and specifications are prepared, the range of tolerance allowed, materials earmarked for use, the way surface treatment is verified, etc.

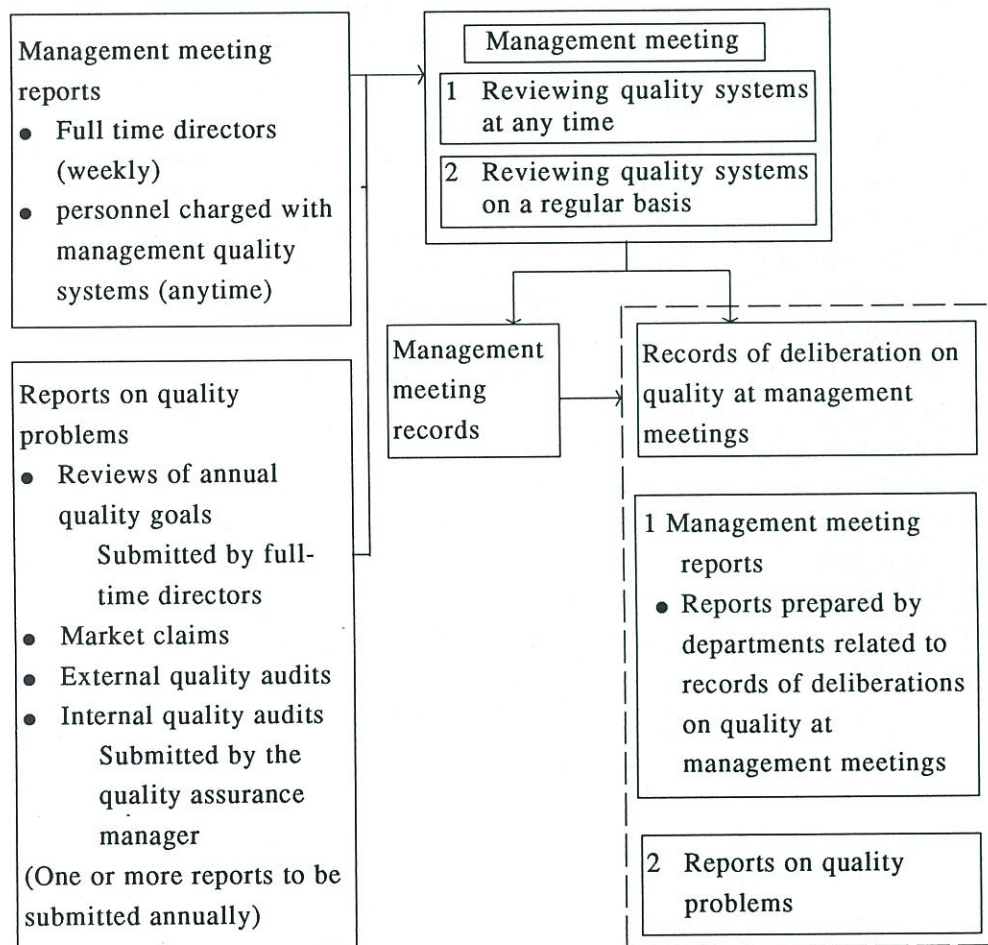


Figure 3: Plan for reviewing quality systems



## 4.1.5 Design change

It is essential to confirm the quality of design thoroughly as difficulties often lie in and around this stage of production.

## 4.1.6 Purchasing

- Clarifying how to select new subcontractors and maintain the quality of products and services they provide
- Verifying that purchased goods conform to requirements by making available written procedures specifying how to confirm that purchased articles in fact conform

## 4.1.7 Identification and traceability of products

- Determining in advance methods for identifying and tracing products

## 4.1.8 Process control

- Seeing to it that employees understand how to apply lot control sheets and operational standards

## 4.1.9 Recording inspections and tests

- Clarifying how to record and maintain tests and inspections
- Spelling out how to manage, calibrate and regularly check instruments used for inspections,

measurements and tests

## 4.2 Review of quality systems

Every year we review our quality systems in March according to the criteria for application. We also review them whenever a management meeting, based on reports, treats complaints about quality deemed to have potentially serious effects on our business operations (see Fig. 3).

## 5 Conclusion

This treatise, "Quality Assurance in Overseas Manufacturing: TQC in a New Environment," has described Aiphone's approach to the economic recession caused in part by the steadily rising value of yen by applying the tenets of ISO9001: Quality System Models.

At Aiphone, by thoroughly implementing the quality philosophy proclaimed in our business philosophy, we detect problematic points related to manufacturing, make our personnel responsible for management resolve problems by taking corrective measures on their own initiative, and confirm whether their actions aimed at rectification have proved to be effective. By incorporating the Japanese way of TQC into our quality assurance program, we intend to reform our company structure throughout our entire operation. ★

## Visitors from Abroad



International Seminar for Top Management  
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Abstracts (250 words) are requested in English covering problem solving implementation report at work and QC Circle implementation report and so on to be submitted with the application form not later than January 31, 1995, to ICQCC '95 Yokohama Secretariat.

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Further information: ICQCC '95-Yokohama Secretariat  
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