

Field Reports

TQC: Komatsu's Weapon

Interview with Komatsu Ltd.
President Shoji Nogawa
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The factor which gives Japanese products their competitive edge in the international market is quality, and many countries are greatly interested in learning how that quality has been attained. The quality circle (QC) boom now sweeping Europe and the United States is a dramatic expression of this interest.

In recent years, Japanese industry has vigorously promoted not only the QC movement but also Total Quality Control (TQC), an expanded drive for quality control on a company-wide basis.

One of the most successful examples of the TQC movement is Komatsu Ltd., a leading manufacturer of construction machinery.

Komatsu, with 1982 consolidated sales of ¥810 billion, 58% of it based on exports, received the Deming Prize for outstanding quality control some 20 years ago and, in 1981, received the Japan Quality Control Medal. (Companies which have won the Deming Prize become eligible for the Japan Quality Control Medal, which is the highest QC award in Japan.)

The success achieved by Komatsu Ltd. has been due to management's forceful leadership and the cooperation of highly loyal employees. This is a pattern common to many successful Japanese enterprises. Komatsu's special strength lies in the fact that forceful management and employee cooperation are backed up by the scientific TQC approach.

Unlike other companies that have hopped aboard the TQC bandwagon, Komatsu has digested and absorbed the TQC concept and modified it to suit the company's own character.

President Shoji Nogawa was a manager in charge of quality assurance at the company's main Awazu Plant when Komatsu began its quality control movement. Nogawa has climbed to the top of the corporate ladder in pace with the progress of the company's TQC activities.



Komatsu Ltd. President Shoji Nogawa describes the TQC movement during the interview.

Q: *Whenever TQC comes up for discussion, your company is invariably mentioned as an outstanding example of this movement. Moreover, you have always been in the vanguard of the movement, almost its pilot. What motivated your company to undertake the TQC movement, and how did you carry it out?*

A: Back in the early 1960s, when Japan began to liberalize capital transactions, the world's biggest construction machinery manufacturer decided to enter the Japanese market by establishing a joint venture with one of the largest heavy industrial companies in Japan. In those days, our own company depended almost totally on the domestic market. The coming of a foreign giant was a crisis of the first order that threatened our very existence. It was a matter of utmost urgency for us to manufacture products whose quality would be in no way inferior to those of this giant invader.

As an immediate measure, we started in 1961 the **Ⓐ** (Circle A) project on a com-

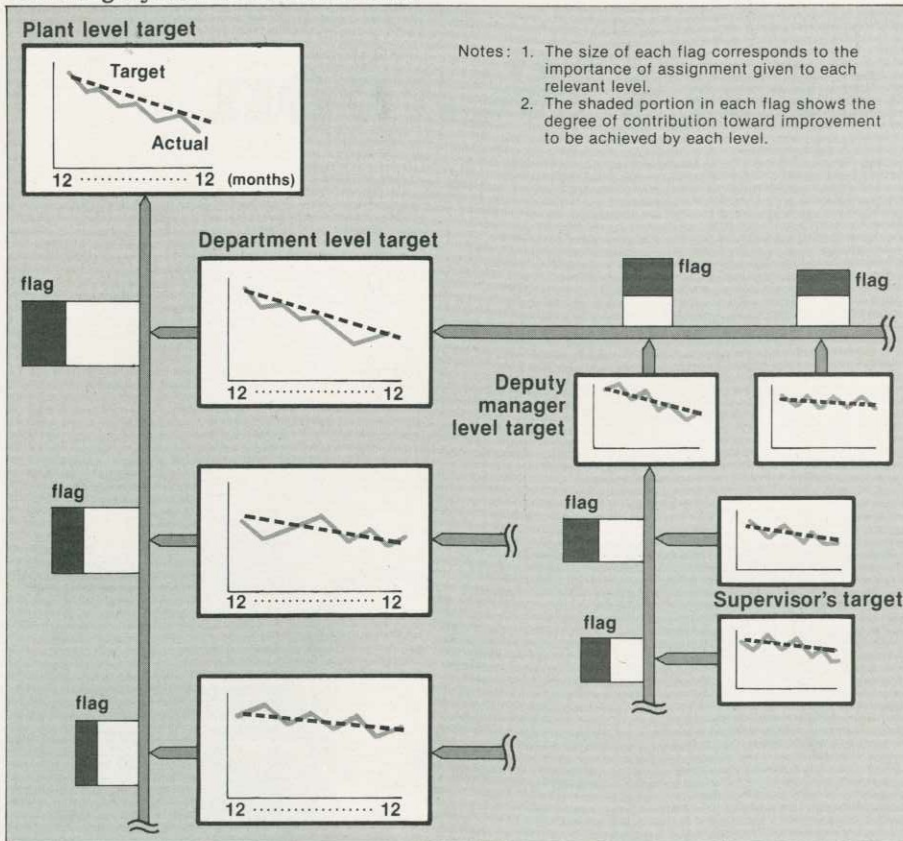
pany-wide basis. Our goal was to improve the quality of our medium-sized bulldozers. Three years later, our target was achieved. Moreover, in the course of implementing this project we tremendously strengthened our corporate constitution. Our achievement was recognized, and we received the Deming Prize in 1964.

Subsequently, in order to cope with changing market needs and to solidify the company's foundation for promoting exports, it became necessary to improve the quality of our large bulldozers. In 1972 we launched a drive to do this, which we brought to a successful conclusion in 1975.

Q: *To have a successful TQC movement you need to have top management's policy thoroughly understood and implemented by all divisions and all levels of company employees. How did Komatsu achieve this?*

A: While carrying out the **Ⓐ** project, we developed the concept of the "Flag System." This is a rather complicated concept but I'll try to explain it simply.

The Flag System at Komatsu Ltd.



Take the case of an entire plant grappling with the problem of eliminating defective products. First, the plant manager indicates the target to the managers of all departments concerned in concrete terms and figures. Each department manager—say, for instance, the production manager—analyzes every conceivable cause of defect as the first step in achieving the target assigned to him. He then assigns his deputy managers the task of working out specific measures to eliminate each cause that falls within their respective jurisdictions. The deputy managers, in turn, assign to supervisors and staff the concrete tasks they are to undertake.

In this manner, top management's policy is handed down in concrete terms and figures from top to bottom, from one level to the next, in the company organization. In the course of this process, full discussions are held to establish smooth mutual communication. Then the tasks assigned to the staff at each level of the corporate organization are entered on a big chart. Because this chart resembled a flag in shape, we nicknamed the movement the "Flag System."

This system is actually a combination of the Pareto diagram and the cause and effect diagram used by quality control experts. Specific persons are put in charge of solving the problems extracted from the cause and effect diagram. The Pareto diagram is used to study the degree to which each factor is responsible for

defects and to set priorities.

In this manner, top management's policy is conveyed concretely and quantitatively to all members of the company, and can be translated into steps for eliminating defective products. Each member of the staff can understand at a glance from this flag-shaped chart the task he has, and how it relates to the target indicated by the plant manager.

The Flag System began to be used extensively in our company around 1963. The concept was applied as a matter of course not only in plants but also in the execution of other top management policies. We call this "Management by Policy."

Q: What were the benefits you derived from the TQC movement?

A: Needless to say, we've reaped a harvest of direct gains, such as improved product quality and a consequent improvement in our corporate earnings. But I think the intangible results have been more important.

First, our employees at all levels, from the very top to workers at the lowest levels, have improved their ability to grasp problems and understand tasks scientifically and quantitatively in line with management targets and policies. They have learned to carry out on an organizational basis the activities necessary for solving problems and making improvements.

Secondly, employees have become more aware that they are participating in management. They find their work more ful-

filling, and are strongly motivated.

Still another merit has been that a customer-first philosophy now permeates not only our sales personnel but all our staff, including engineers and production line workers. As a result, they are dedicated to manufacturing and marketing products which will satisfy the needs of our customers.

Q: What kind of training are you giving your engineers in order to boost your company's technical capability to overcome the worsening economic environment? And how are you training new production line workers to prepare them for the increasing use of electronics in your plants?

A: We offer training in mechatronics, EDP (electronics data processing) applications like CAD/CAM, and general education concerning reliability, VE (value engineering) and OR (operations research), in accordance with the specialties and professional levels of the workers. The instructors are either in-company or outside experts.

I think other companies are also giving their employees this kind of training, though the intensity may differ. I think on-the-job training is very important for technical workers.

We have passed from the era of trying to catch up with European and American technologies to a new era of trying to surpass them. This new age demands creative ability.

In order to develop creative ability, we have to set targets for ourselves at the most advanced technological level and work out ways to reach them. Let me explain in more detail.

In order to attain a target at the leading edge of a given technology, you have to pinpoint the problems which cannot be solved with the technical ability on hand. These are your "technical bottlenecks." It is necessary first to systematically pinpoint and list these bottlenecks. Then the staff can study how best to overcome them. The best possible training is to pinpoint the technical bottlenecks and to have trainees come up with solutions.

Take our company, for example. We engage in the small-lot manufacture of a great variety of items, a production pattern that cannot be easily automated. However, automation based on an entirely new concept may be applied. This is FMS, for flexible manufacturing system. FMS makes it possible to put a great variety of parts into a single processing group, which is advantageous inasmuch as it is desirable to operate the processing group automatically for as many hours as possible.

The most effective training at our firm is thus to indicate a specific target and to train our engineers through actual practice on the job to work out methods for attaining it.