



**CENTER FOR
QUALITY OF MANAGEMENT
JOURNAL**

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From the Chairman of the Editorial Committee

Page 2

David Walden, Senior Vice President, Bolt Beranek and Newman Inc.

What is the Center for Quality Management?

Page 3

Tom Lee, President, Center for Quality Management
and David Walden, Senior Vice President, Bolt Beranek and Newman Inc.

**Goal Deployment at Varian Crossed Field
and Receiver Protector Products**

Page 9

Dennis Gleason, Vice President and General Manager,
Crossed Field & Receiver Protector Products Business Unit, Varian Associates

JIT II: A New Approach to Supply Management

Page 15

Lance Dixon, Director of Purchasing and Logistics, Bose Corporation

BBN's 7-Steps Implementation

Page 19

Cliff Scott, Senior Consultant, Bolt Beranek and Newman Inc.

7-Steps to Reducing New Product Time-to-Market

Page 28

Dennis Buss, Vice President of Technology, Analog Devices Inc.

Operationally Defining Metrics

Page 34

for the Product Development Process

Metrics Subcommittee of the Center for Quality Management

Other CQM Research on the Product Development Process

Page 47

Volume 1, Number 1

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What is the Center for Quality Management?

The Center for Quality Management was created by companies who concluded they had to learn together to cope with a rapidly changing world. This is the story of its first two years of existence.

Tom Lee and David Walden

In the fall of 1989, seven companies in the greater Boston area (Figure 1) decided to organize a Center for Quality Management (CQM). Their goal was to facilitate mutual learning of Total Quality Management (TQM) in order to accelerate its implementation.

Analog Devices, Incorporated
Bolt Beranek and Newman Inc.
Bose Corporation
Digital Equipment Corporation
GE Aircraft Engine
Polaroid Corporation
Teradyne Incorporated

Figure 1: CQM Founding Companies

Companies that decide to implement TQM typically are suffering from, or anticipate, a business crisis. It is difficult for them to find the motivation to make the changes required by TQM if everything is going well. Also, the CEO typically has some knowledge of TQM, usually from sources outside the company, such as communication with other CEOs and personal experiences.

The companies that formed the Center for Quality Management had these typical characteristics. With perhaps a couple of exceptions, they were suffering from the slowdown of the economy that began in the late 1980s. Also, several of their CEOs had personal experience with Japan and had observed its business practices. At least one had lived in Japan, most had divisions in Japan and traveled there with some regularity, and some had studied Japan's business practices through trade associations, such as the Massachusetts High Technology Council and the American Electronics Association.

These CEOs avoided the temptation to dismiss Japan's business success over the past several decades as the result of domestic or unfair trade practices—a lower cost of capital resulting

from Japanese government policies that discourage consumption and encourage savings, cooperation between the Japanese government and industry, or pricing based on what the Japanese call "lifetime product volumes" which we in the U.S. often call "dumping." The CEOs believed that, whatever unfortunate business practices might exist, something might also be learned from Japanese management methods.

Thus, business crisis and information about Total Quality Management as practiced in Japan motivated these CEOs to involvement with TQM.

In November of 1989, Professor Shoji Shiba of Tsukuba University, which is north of Tokyo, gave a seminar at MIT that several of the CEOs attended. In the 1980s, Professor Shiba had been a colleague of the senior author, Tom Lee, at the International Institute for Applied Systems Analysis in Vienna when Lee was director there. Professor Lee arranged the seminar at MIT and invited the CEOs.

The seminar had a strong effect. For instance, Steve Levy, the CEO of Bolt Beranek and Newman, requested that all the senior managers rearrange their schedules so they could meet with Professor Shiba later that week.

In the weeks that followed, Tom Lee visited Japan to study the Union of Japanese Scientists and Engineers' methods for promoting quality, and he arranged additional meetings between the CEOs and Professor Shiba to discuss how to improve quality practices here.

What is Total Quality Management?

Total Quality Management is an evolving set of concepts and practices for creating higher quality products and services and increasing customer satisfaction. Our old management methods worked well in a stable world where customers didn't demand many choices, and there were long product life-cycles. They don't work as well in today's rapidly changing world, however. Our highly structured, functionally divided organizations just don't know how to change fast enough to meet the rapidly changing demands of today's world.



Photo 1: Representatives of founding companies at the public announcement of the formation of the CQM. Seated: Tom Lee, President, Center for Quality Management; Frank Voehl, then-Vice President of Quality Services at Qualtec, Inc., and a speaker at the inaugural meeting; Ray Stata, Chairman, Analog Devices Inc.; and Stephen Levy, Chairman and CEO, Bolt Beranek and Newman Inc. Standing, from left: Ron Dias, Vice President, Personnel, Teradyne, Inc.; John Petrolini, Total Quality Management Manager, Teradyne, Inc.; Frank McCabe, then-Vice President, Corporate Quality and Technology, Digital Equipment Corp.; Art Schneiderman, Vice President, Quality and Productivity Improvement, Analog Devices Inc.; Dick Bellotti, Director of Corporate Quality Assurance, Bose Corporation; and Robert Conway, Total Quality Advisor, GE Aircraft Engines.

TQM emphasizes four major areas of activity. Professor Shiba sometimes calls them "Four Revolutions in Management Thinking."

1. **Customer Focus:** We must identify changes in customers' needs quickly and allocate resources for satisfying them.
2. **Continuous Improvement:** We must improve everything in the organization continuously, studying the facts and validating what we do by experiment, in order to achieve ever-higher levels of quality and shorter times to market.
3. **Total Participation:** We must focus everyone in the company on identifying customers' needs and improving the way their jobs are done.
4. **Societal Learning:** We must encourage constant interaction among people in every kind of organization in society to create a culture where all support rapid and effective learning and improvement of quality.

The belief in societal learning was central to

the founding of the CQM. TQM is not today a theory that can be learned from a book. It is an ongoing societal and organizational experiment. It is too inefficient, however, to have each company carry out its own experiment. A company may waste a lot of time reinventing the wheel. Worse yet, it may invent a square wheel. Also, each company can only afford to carry out a limited number of experiments. Many companies working together can avoid wasteful experimentation and go faster.

Professor Shiba pointed out to us that the U.S. needs more organized and disciplined ways for organizations to learn from each other, as they do in Japan through organizations like JUSE (Japanese Union of Scientists and Engineers). The CQM was founded to help fill that gap, at least for the New England region. Tom Lee became President. Ray Stata, CEO of Analog Devices, who had helped Tom Lee arrange the various seminars between the area CEOs and Professor Shiba, became Chairman of the Board of the CQM.

Photo 1 shows representatives of the founding companies at the public announcement of the formation of the CQM, together with the invited speaker Frank Voehl of Florida Power & Light,

Dr. Tom Lee organized and became president of the Center for Quality Management in 1989. From 1950 through 1980 he worked with General Electric. He was responsible for all major R&D activities for transmission and distribution and later served as chief planner for GE's energy and power business. In 1980, he became professor of electrical engineering at M.I.T.

the first company outside of Japan ever to win the prestigious Deming Prize.

Figure 2 shows the mission statement of the CQM.

The mission of the Center for Quality Management is to accelerate understanding and implementation of quality management concepts and methods by creating a network of like-minded organizations to share knowledge and experience. This will require a common language and a shared understanding of the basic methodologies to define problems and design solutions. In the broadest sense, the long-term objective of the Center is to promote organizational and societal learning about how to improve the performance of human systems.

Figure 2: CQM Mission Statement

The Design Team

Having decided to form the CQM, the founding companies next needed a specific plan for what the CQM would do and how it would function. Ten executives from the founding companies and three members of the MIT faculty and staff spent five weeks together conducting a design study under the guidance of Professor Shiba. The group became the Design Team. It learned about TQM and

applied TQM tools to plan the Center.

The design study followed TQM's methods of continuous improvement, including the PDCA (Plan, Do, Check, Act) cycle.

- Plan—We built teamwork, got some basic education in TQM, and prepared to visit companies successfully practicing TQM to learn about how they practiced it.
- Do—We visited companies and institutions in Japan and the U.S. that were experts in the practice of TQM.
- Check—We consolidated the facts we had learned, identified what constituted a successful TQM implementation, checked our conclusions against the Deming and Baldrige prize criteria, identified how to implement TQM successfully, analyzed our companies' business needs, calculated which aspects of TQM would have the greatest impact on our companies' needs, and decided how the Center for Quality Management could help best.
- Act—We developed the first-year plan



Photo 2: The group learning process on a high-speed train near Tokyo—the group is applying one of the seven management tools to identify what was learned after a visit to a Hitachi plant.

David Walden is Senior Vice President and Corporate Quality Officer of Bolt Beranek and Newman Inc. He serves as BBN's representative to the Operating Committee of the Center for Quality Management and is Chairman of the Editorial Board of the Center for Quality Management Journal.

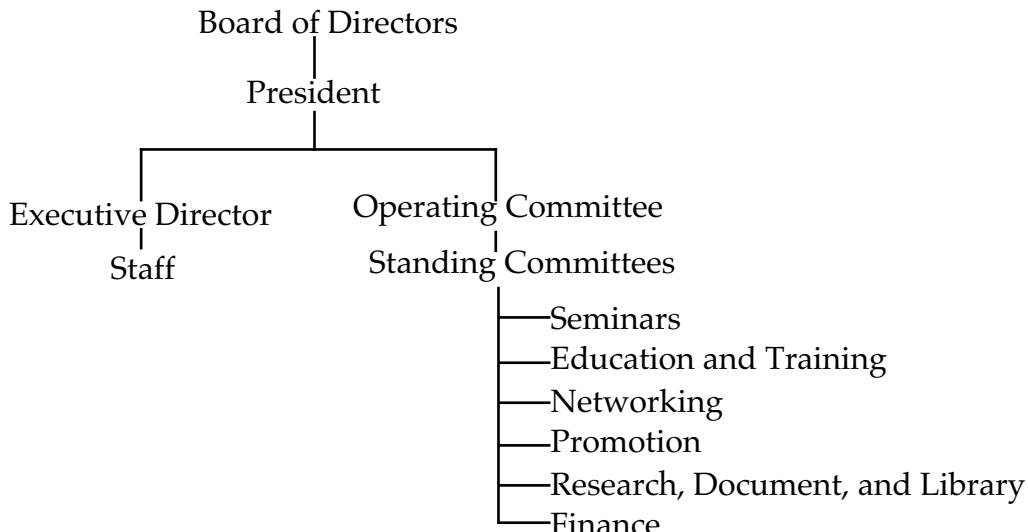


Figure 3: Recommended Committee Structure

and the plan for yearly PDCA, which would lead to the plans for succeeding years.

Photo 2 shows the group learning process aboard a high-speed train to Tokyo, applying one of the seven management tools to identify what was learned after a visit to a Hitachi plant.

The most important conclusions of the design study were:

- The active participation of the most senior executives (CEO or CEO-equivalent) is key to the success of TQM implementation.
- TQM is a thought revolution, as described by Kaoru Ishikawa.¹ It requires a culture change. The ability to plan and implement must reside in the organization itself. The organization cannot continually depend on consultants, in the traditional U.S. way.

To promote such cultural changes, the design team recommended a committee structure, as shown in Figure 3.

The 6-Day Course, Networking, and Visiting Companies

In 1990, Professor Shiba developed two courses for senior executives. The first was a one-day overview of Total Quality Management.

After the one-day course, a number of CEOs requested a more comprehensive course. Professor Shiba then developed a six-day course for senior

executives, with help from members of the CQM Design Team. Figure 4 shows the syllabus of the 6-Day Course.

- | | |
|-------|---|
| Day 1 | Evolution of Quality, Customer Focus, Improvement as a Problem Solving Process, the KJ Method |
| Day 2 | Reactive Improvement, 7 Steps, 7 QC Tools |
| Day 3 | Proactive Improvement, 7 Management and Planning Tools |
| Day 4 | Teams and Teamwork |
| Day 5 | CEO Involvement, Mobilization Infrastructure |
| Day 6 | Strategies for Phase-in, Managerial Development, Societal Learning |

Figure 4: 6-Day Course Syllabus

In 1990, 46 senior executives took the 6-Day Course led by Professor Shiba, which included much group work with TQM tools and a number of case studies presented by CEOs, senior managers, and members of the Design Team. A key concept of the course was "no delegation of improvement." Top executives have to participate in and coach improvement activities; they can't simply leave them to people under them. This concept was supported in many ways; for example, the CEOs themselves presented case studies at the 6-day Course.

Members from the CQM companies worked as facilitators, teaching assistants, and note takers,

¹What is Total Quality Control? The Japanese Way, Kaoru Ishikawa, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1985.

supporting the “transfer of technology” from Professor Shiba. Notes on the entire six days were converted into transparencies and draft text which could be used again.

In 1991 CQM offered the 6-Day Course three times, with most of the lectures given by senior executives of the member companies. By the end of October of 1991, exactly 125 senior executives had gone through the 6-Day Course. The instructors of the course have included:

Ray Stata, Chairman of Analog Devices and of the Center for Quality Management

Art Schneiderman, Vice President of Analog Devices

Steve Levy, CEO of Bolt Beranek and Newman

Mike LaVigna, President of Bolt Beranek and Newman

Dennis Gleason, Vice President and General Manager of Varian Associates

Most of the participants recognize the 6-Day Course as an excellent practical framework for planning and implementing TQM. It goes beyond the “what” and “why” of TQM to the “hows” that a senior manager has to address. Alex d’Arbeloff, chairman and president of Teradyne, said in a lecture: “This showed me how to do something. In the end, you have to do something!”

In 1992, the CQM Training and Education Committee organized eight sessions of the 6-Day Course, including one in Europe and one in California. The sessions outside New England were arranged at the request of both our member companies who have operations outside of Boston and other organizations in these regions who found such education urgently needed. The list of CQM company executives who taught days of the course increased to handle the expanded course schedule.

In the second half of 1990, 17 new member companies joined the CQM. We quickly found, however, that to serve the member companies we needed more people from CQM companies knowledgeable in TQM. That was a constraint which led to the decision to cap the number of companies at 24 through 1991. (Figure 5 shows the list of members as of June 1992.) By 1992, because we now have enough graduates from the 6-Day Course, the Board of Directors decided to accept new members again.

Member Companies

Allegro Microsystems, Inc.

Analog Devices, Inc.

BALCO, Inc.

Bard (Cardiovascular)

Bolt Beranek and Newman Inc.

Bose Corporation

BTU International

Carrier Corporation

Conrail Corporation

Digital Equipment Corporation

GE Aircraft Engines

GenRad

Harvard Community Health Plan

Helix Technology

Hewlett-Packard Company

Ionics, Inc.

Keane, Inc.

Kollmorgen Corporation

Lily Transportation

Mercury Computer Systems

Naval Underwater Warfare Center

New England Electric System

Polaroid Corporation

Praxis International, Inc.

Sippican

SRI International, Inc.

Stratus Computer, Inc.

Sun Microsystems

Synetics

Teradyne, Inc.

Varian Associates

Whistler Corporation

Figure 5: List of Members as of June 1992

Shoji Shiba also introduced skill courses, such as the 7 Steps Method, in member companies, and these spread to other companies. When these companies give such courses for their own employees, they frequently reserve spaces for people from other companies to observe. When a member company has Quality Improvement Story days, other member companies may be invited to send observers. In these ways the companies facilitate shared learning.

Teaching courses is only one of the ways we encourage mutual learning. In 1991, a networking committee was organized to facilitate mutual learning among people with comparable responsibilities. CEO roundtable meetings are designed to help CEOs learn advanced topics in TQM. Networking meetings of Chief Quality Officers permit exchange of company needs and experiences. Networking activities for people in other functions are planned for 1992.

Visiting outstanding companies is another way of learning. In addition to the visit to Japan by the Design Team, a group of CEOs and senior executives visited NEC in Japan to understand their experience in applying TQM to technical work. We are planning other visits.

We believe that learning from other companies beyond the New England area is also important. We have a seminar committee for this purpose. We have heard from outstanding companies like Florida Power & Light, Xerox, Texas Instruments, Corning, Motorola, and others.

In 1991, we organized a research committee study so we could learn new TQM topics. This committee is translating important Japanese papers and doing research to advance the state of the art (e.g., developing process metrics for product design.)

In the formative stage of the CQM, the Board of Directors decided that the Center should develop a close relationship with academic institutions so that TQM would become an integral part of their education and research programs. In 1991, a special class of membership was established the University Affiliates. We now have seven members in that category (see Figure 6).

<i>University Affiliates</i>
Babson College
Bentley College
Lesley College
Boston College
Boston University
Massachusetts Institute of Technology
Tufts University
Wentworth Institute of Technology
Worcester Polytechnical Institute

Figure 6: CQM Member Companies and
University Affiliates

Summary and Future Challenges

In summary, the first year of the CQM, 1990, was a year of planning and organization. The second year, 1991, was a year of orientation deciding what was really important to do and getting it started. The third year, 1992, has been a year of expansion and consolidation. A number of new companies, large and small, service and manufacturing, joined the CQM (see Figure 5). Dan Dimancescu, a consultant and author,

was hired as Executive Director and he has undertaken to adapt the organization structure to the CQM's current needs for growth and active membership involvement.

The CQM has several long-term aspirations:

- Handle CQM company needs outside of New England, for example, in California, Europe, Japan.
- Participate in the development of a national quality culture in the U.S.
- If the CQM model works well, either expand it or help others copy the CQM methods.
- Develop improved, advanced methods of TQM, moving beyond what we copied from Japan.

The last point is particularly important. We copied Japan because it was efficient to do so. We have to adapt what we learned from Japan to our national and company cultures. We must continuously improve our TQM to address the changing world and its competitive pressures.***



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The Center for Quality of Management Journal is a forum for disseminating the experience of organizations learning to implement modern management practices. It seeks to capture experiences and ideas that may be useful to others working to create customer-driven, continuously improving organizations.

The CQM Journal is refereed. However, it is not an academic publication. Experiences and ideas will be published if they seem likely to be useful to others seeking to improve their organizations.

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If you have thoughts for a paper and you would like to discuss it with us, please write, call or submit an outline. We welcome your ideas.

Final Manuscript Requirements:

Entire manuscript should be double-spaced, including footnotes, references, etc. Text should include all the elements listed below. Generally, The CQM Journal follows the editorial principles of The Chicago Manual of Style. We strongly prefer submissions in electronic format for all text and as many of the figures as possible. IBM-based software (particularly Microsoft Word for Windows) is preferable to Macintosh-based software if you have a choice, but is by no means a requirement.

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