Creating a Pattern of Excellence

Robert W. Peach

In recent years industry has made impressive use of the "project" or "team" method of quality improvement. A structured process of problem identification is followed by assignment of trained teams from a cross-section of the workforce to identify root causes and follow through with correction. Crosby's Quality College, the "Juran on Quality Improvement" tape series, and other quality schools incorporate this approach. These methods, derived from the Japanese innovation of Quality Circles, are applied in a variety of ways throughout the industrialized world.

Many companies have had spectacular results from the project method of continuous improvement. Others adopting quality techniques and the "project method" have been comparatively ineffective. Training has not led to substantial deployment of actual practice and enjoyment of tangible benefits.

But more specifically, these companies seem to have prematurely used effective methods of quality improvement before establishing an effective overall quality system to guide the sustained use of the methods.

Many of the least successful entrants to quality award processes seem to have an inadequate grasp of the significance of the standards by which they will be measured. If measurements of customer requirements are insufficient, specifications poorly defined, and process control ineffective, then quality practice is mediocre. Energy is consumed trying to improve the same old pattern of activity. Problems are identified and short-term benefits realized, but the existing quality system is no road map guiding the journey.

For instance, a pharmaceutical company eager to make quality improvements actually found itself embarrassed by a reprimand from the FDA (Food and Drug Administration) because of numerous exceptions noted on batch process tickets coming from production. The actual quality system did not maintain discipline to follow procedures while departments "ex-

A veteran from international standards committees describes why we should pay attention to quality standards and awards: ISO 9000, Baldrige, and Deming.
Stages in the Evolution of Quality Management in the United States

<table>
<thead>
<tr>
<th>Stage</th>
<th>Top Quality Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection</td>
<td>Chief Inspector</td>
</tr>
<tr>
<td>SQC</td>
<td>Manager of Quality Control</td>
</tr>
<tr>
<td>Quality Assurance</td>
<td>Director of Quality Assurance</td>
</tr>
<tr>
<td>Strategic Quality</td>
<td>Chief Quality Officer</td>
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Full benefits of improvement may be lost if no system of standardization retains them, or if no overall guidance pattern directs attention to new areas of opportunity. A company may nibble away on improving production of old product designs, but never get around to designing new products to please customers, or to addressing administrative issues in addition to technical ones.

In contrast, highly successful companies build their quality practices and procedures on fundamentals; 1) definitive quality standards, 2) effective process control techniques, and 3) excellent customer-oriented measures of quality. In particular, a sound quality system drives good quality assurance practice further toward its limit. It provides a specific vision. It suggests measurements, or at least areas in which measurements should be made. It harnesses individual efforts in a common direction. It assists the cultural change, converting the attitudes of the entire workforce from top management down, to concentrate on continual customer satisfaction and quality improvement.

The project method may sometimes lead to quality system improvements. However, a more efficient approach is to first establish an effective quality system as a foundation, then achieve permanent quality improvement through the project method.

What is a Quality System?

A quality system is embedded in every other system of an operating company, whether it is realized or not. The quality system is the philosophy and procedures by which an organization conducts itself to satisfy customers and to comply with all other necessary requirements of the operations. A quality system represents the level of standards an organization actually employs to guide and regulate all its activities.

Quality Systems are Not Equal

Formal quality systems began with the use of quality standards to evaluate the extent and content of quality practice. Widespread use of quality standards began with the Department of Defense Standards MIL-Q-9858A and MIL-I-45208 in the 1950s. Later, many specific industry standards were developed, for example, NQA-1 (Quality Assurance Program Requirements for Nuclear Power Plants), and Good Manufacturing Practice in the medical equipment field.

The standards evolved with time. Those developed by Ford, General Motors, and Chrysler graduated through phases from basic inspection standards to their overall business excellence standards of today. The changes in the well-known standards parallel the evolution of the stages in quality management shown in Figure 1.

However, different standards also have different purposes. The Malcolm Baldrige National Quality Award criteria are an example of a consensus guideline on quality practice all across an enterprise. More specific standards are narrower in scope.

A World Full of Standards and ISO 9000

A large number of quality standards exist worldwide, most having somewhat different purposes. Their proliferation is a cause of confusion. There is the Canadian Standard Z-299, and the original British Standard BS-5750-1979. NATO has used "AQAP" quality system standards modeled after American military standards.

To address the situation, the International Standards Organization (ISO) established Technical Committee TC/176, Quality Assurance. This committee reviewed the existing standards and merged the content of several existing standards into the Quality Systems Standards series ISO 9000, published in 1987.
While the ISO 9000 series is often regarded as the "European" standard, it has been adopted as the national standard by most industrialized nations, including the United States, and it is recognized in Standard Z-299 by Canada. Since then, many North American companies have structured their quality systems around the ISO 9000 Standard.

There are many good commercial reasons to do this. The U.S. Department of Defense has announced its intention to use the ISO 9000 Standard as the foundation for replacing MIL-Q-9858A. Similarly, NATO also plans to base its AQAP standards on ISO 9000. Conforming to ISO 9000 is the way to become accepted as a supplier within many countries and organizations around the world.

In three years, the ISO 9000 Standards have become the universally recognized international quality system standards. A company can compare its own quality system to those standards to be sure that its quality practice clears the major hurdles required to have entree into large markets. ISO 9000 Standards are readily available, and most companies in international business are busy making sure that their internal quality systems meet those standards.

Quality Award Criteria

Another stimulus to quality improvement has been the establishment in several countries of quality awards built around criteria that recognize outstanding quality practice. The first major national quality recognition plan was Japan's Deming Prize, begun in 1951. The United States established the Malcolm Baldrige National Quality Award, now in its third year of operation. Canada and Australia currently have national quality awards, and several other countries, in Europe and elsewhere, are planning similar recognition processes.

Many American enterprises making quality improvement intend to apply for the Malcolm Baldrige National Quality Award, but far more are using the award criteria as a guide for improvement. In 1990, only 97 companies applied for the Baldrige Award, but over 125,000 copies of the Application Guidelines were distributed.

The Malcolm Baldrige National Quality Award criteria are fast becoming a national consensus definition of quality. Companies are following the Baldrige criteria in their internal quality systems and practice, and some are encouraging their suppliers to do the same. A number of organizations, including AME ("Using the Malcolm Baldrige Award Criteria to Achieve Competitive Advantage," February 28-March 1, 1991, Southern California), are starting to sponsor seminars describing how to self-assess your company according to the Baldrige guidelines.

Deming Prize versus Baldrige Award

The Deming Prize and Baldrige Award are actually structured quite differently. The Deming Prize is not a contest with winners and losers. Deming Prize awardees must meet a standard; therefore any number of organizations or individuals may receive it. The Baldrige Award is limited to six companies each year. The losers do not walk away empty-handed, however, because the feedback to each one is a valuable prize in itself.

Figure 2 discloses all ten items (categories) with the "particulars" that constitute the Deming Prize Checklist. No further description of Deming Prize criteria is made available; Deming examiners interpret the checklist as befits each case. For reference, Figure 3 is a seven-category, 33-item outline of the 23 pages of 1990 Baldrige Award criteria. Figure 5 contrasts the Deming Prize and Baldrige Award processes.

While the Deming checklist does not emphasize customer satisfaction to the same extent as the Baldrige criteria, it is generally recognized that the examination for the Deming Prize more rigorously tests whether a company deploys statistical approaches and excellent problem-solving methodologies in practice.

How do Baldrige Criteria Compare with ISO 9000?

The list shown in Figure 4 is from the index of ISO 9001 (ASQC/ANSI91), the primary contractual standard in the ISO 9000 series. On first glance, the list suggests that ISO 9001 covers most of the items in the Baldrige criteria. Actu-
<table>
<thead>
<tr>
<th>Item</th>
<th>Particulars</th>
</tr>
</thead>
</table>
| 1. POLICY | (1) Policies pursued for management, quality, and quality control  
(2) Method of establishing policies  
(3) Justifiability and consistency of policies  
(4) Utilization of statistical methods  
(5) Transmission and diffusion of policies  
(6) Review of policies and the results achieved  
(7) Relationship between policies and long-and-short-term planning |
| 2. ORGANIZATION AND ITS MANAGEMENT | (1) Explicitness of the scopes of authority and responsibility  
(2) Appropriateness of delegations of authority  
(3) Interdivisional cooperation  
(4) Committees and their activities  
(5) Utilization of staff  
(6) Utilization of QC Circle activities  
(7) Quality control diagnosis |
| 3. EDUCATION AND DISSEMINATION | (1) Education programs and results  
(2) Quality-and-control-consciousness, degrees of understanding of quality control  
(3) Teaching of statistical concepts and methods, and the extent of their dissemination  
(4) Grasp of the effectiveness of quality control  
(5) Education of related company (particularly those in the same group, subcontractors, consignees, and distributors)  
(6) QC Circle activities  
(7) System of suggesting ways of improvements and its actual conditions |
| 4. COLLECTION, DISSEMINATION AND USE OF INFORMATION ON QUALITY | (1) Collection of external information  
(2) Transmission of information between divisions  
(3) Speed of information transmission (use of computers)  
(4) Data processing, statistical analysis of information and utilization of the results |
| 5. ANALYSIS | (1) Selection of key problems and themes  
(2) Propriety of the analytical approach  
(3) Utilization of statistical methods  
(4) Linkage with proper technology  
(5) Quality analysis, process analysis  
(6) Utilization of analytical results  
(7) Assertiveness of improvement suggestions |
| 6. STANDARDIZATION | (1) Systematization of standards  
(2) Method of establishing, revising, and abolishing standards  
(3) Outcome of the establishment, revision, or abolition of standards  
(4) Contents of the standards  
(5) Utilization of statistical methods  
(6) Accumulation of technology  
(7) Utilization of standards |
| 7. CONTROL | (1) Systems for the control of quality and such related matters as cost and quantity  
(2) Control items and control points  
(3) Utilization of such statistical control methods as control charts and other statistical concepts  
(4) Contribution to performance of QC Circle activities  
(5) Actual conditions of control activities  
(6) State of matters under control |
| 8. QUALITY ASSURANCE | (1) Procedure for the development of new products and services (analysis and upgrading of quality, checking of design, reliability, and other properties)  
(2) Safety and immunity from product liability  
(3) Process design, process analysis, and process control and improvement  
(4) Process capability  
(5) Instrumentation, gauging, testing, and inspecting  
(6) Equipment maintenance, and control of subcontracting, purchasing, and services  
(7) Quality assurance system and its audit  
(8) Utilization of statistical methods  
(9) Evaluation and audit of quality  
(10) Actual state of quality assurance |
| 9. RESULTS | (1) Measurement of results  
(2) Substantive results in quality, services, delivery, time, cost, profits, safety, environment, etc.  
(3) Intangible results  
(4) Measures for overcoming defects |
| 10. PLANNING FOR THE FUTURE | (1) Grasp of the present state of affairs and the concreteness of the plan  
(2) Measures for overcoming defects  
(3) Plans for further advances  
(4) Linkage with the long-term plans |
ally, the content is less comprehensive, so that meeting the standard is less demanding than the Baldrige Award.

ISO 9001 is more specific in procedural items covered in Categories 2 (Information and Analysis) and 5 (Quality Assurance of Products and Services) of the Baldrige Award. The ISO Standard makes some reference to most categories in the Baldrige Award, including leadership, quality planning, human resource utilization, and quality satisfaction.

Notably absent in the ISO Standard are specific references to quality results and customer satisfaction (Baldrige Award Categories 6 and 7). The ISO Standard specifies elements of a quality system, but does not discuss whether products resulting from that system actually meet customer requirements.

That omission is intentional. It exists in most, if not all, quality system standards devised for widespread compliance by large numbers of companies. Developers of standards for this purpose generally hold that judgment of resulting quality should be considered by producer and customer, but should not be codified by the elements of a quality system.

The ISO 9000 Standard also omits reference to continuous quality improvement. A company that adopts effective quality systems should see consequent improvements in product quality, but recommending continuous quality improvement goes beyond most quality systems standards. Continuous improvement invokes techniques similar to the project method of improvement.

Continuous improvement was intentionally excluded from the ISO 9000 Standard. The ISO TC/176 committee that developed the ISO 9000 Standards is preparing a separate standard on quality improvement. The committee judged it inappropriate to insert a contractual requirement for continuous quality improvement into a universal quality system standard, thus mandating it as a norm for industry worldwide. Their reasoning was that buyers and sellers should have the option of determining whether continuous improvement should be a prerequisite for their own business relationships.

It is quite possible that future revisions of

### Malcolm Baldrige National Quality Award Examination Categories, Items, and Point Values

<table>
<thead>
<tr>
<th>Examination Categories/Items</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership</strong></td>
<td>100</td>
</tr>
<tr>
<td>Senior Executive Leadership</td>
<td>30</td>
</tr>
<tr>
<td>Quality Values</td>
<td>20</td>
</tr>
<tr>
<td>Management for Quality</td>
<td>30</td>
</tr>
<tr>
<td>Public Responsibility</td>
<td>20</td>
</tr>
<tr>
<td><strong>Information and Analysis</strong></td>
<td>60</td>
</tr>
<tr>
<td>Scope and Management of Quality Data and Information</td>
<td>35</td>
</tr>
<tr>
<td>Analysis of Quality Data and Information</td>
<td>25</td>
</tr>
<tr>
<td><strong>Strategic Quality Planning</strong></td>
<td>90</td>
</tr>
<tr>
<td>Strategic Quality Planning Process</td>
<td>40</td>
</tr>
<tr>
<td>Quality Leadership Indicators in Planning</td>
<td>25</td>
</tr>
<tr>
<td>Quality Priorities</td>
<td>25</td>
</tr>
<tr>
<td><strong>Human Resource Utilization</strong></td>
<td>150</td>
</tr>
<tr>
<td>Human Resource Management</td>
<td>30</td>
</tr>
<tr>
<td>Employee Involvement</td>
<td>40</td>
</tr>
<tr>
<td>Quality Education and Training</td>
<td>40</td>
</tr>
<tr>
<td>Employee Recognition and Performance Measurement</td>
<td>20</td>
</tr>
<tr>
<td>Employee Well-Being and Morale</td>
<td>20</td>
</tr>
<tr>
<td><strong>Quality Assurance of Products and Services</strong></td>
<td>150</td>
</tr>
<tr>
<td>Design and Introduction of Quality Products and Services</td>
<td>30</td>
</tr>
<tr>
<td>Process and Quality Control</td>
<td>25</td>
</tr>
<tr>
<td>Continuous Improvement of Processes, Products, and Services</td>
<td>25</td>
</tr>
<tr>
<td>Quality Assessment</td>
<td>15</td>
</tr>
<tr>
<td>Documentation</td>
<td>10</td>
</tr>
<tr>
<td>Quality Assurance, Quality Assessment, and Quality Improvement of Support Services and Business Processes</td>
<td>25</td>
</tr>
<tr>
<td>Quality Assurance, Quality Assessment, and Quality Improvement of Suppliers</td>
<td>20</td>
</tr>
<tr>
<td><strong>Quality Results</strong></td>
<td>150</td>
</tr>
<tr>
<td>Quality of Products and Services</td>
<td>50</td>
</tr>
<tr>
<td>Comparison of Quality Results</td>
<td>35</td>
</tr>
<tr>
<td>Business Process, Operational and Support Service Quality Improvement</td>
<td>35</td>
</tr>
<tr>
<td>Supplier Quality Improvement</td>
<td>30</td>
</tr>
<tr>
<td><strong>Customer Satisfaction</strong></td>
<td>300</td>
</tr>
<tr>
<td>Knowledge of Customer Requirements and Expectations</td>
<td>50</td>
</tr>
<tr>
<td>Customer Relationship Management</td>
<td>30</td>
</tr>
<tr>
<td>Customer Service Standards</td>
<td>20</td>
</tr>
<tr>
<td>Commitment to Customers</td>
<td>20</td>
</tr>
<tr>
<td>Complaint Resolution for Quality Improvement</td>
<td>30</td>
</tr>
<tr>
<td>Customer Satisfaction Determination</td>
<td>50</td>
</tr>
<tr>
<td>Customer Satisfaction Results</td>
<td>50</td>
</tr>
<tr>
<td>Customer Satisfaction Comparison</td>
<td>50</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong></td>
<td>1000</td>
</tr>
</tbody>
</table>

Figure 3.
ISO 9000 will address this issue. Should this come to pass, and depending on the strength of any continuous improvement elements that might enter ISO 9000, the world will have taken a big step toward requiring major manufacturers to practice what is today called “excellence.”

The broad distinction between the ISO 9000 Standards and the Baldrige criteria is that ISO 9000 sets a standard that most of the better manufacturers of the world can be expected to follow in practice. The Baldrige criteria represent world-class performance currently met by a few companies.

**Developing Your Own Quality System Standards**

A company should draw from ISO 9000 Standards, the Baldrige criteria, and the Deming checklist to construct an internal quality system standard that fits the particular needs of its business. Most of the elements will probably come from Baldrige and ISO 9000. Roughly, the process is:

- Become familiar with the content of the ISO Standards and the Malcolm Baldrige Award.
- Select appropriate elements and prepare a composite standard appropriate to your company's products and services.
- Assess your company's own quality practice using the composite standard.
- Prepare a quality manual and procedures documentation based on the composite standard.
- Take action to improve quality practice by effectively meeting the requirements specified in your standard and quality manual.
- Review the functions and revise actual quality practice based on the workings of the improvement process.

With an effective quality system in place, a manufacturer can safely build a quality improvement program around sound practice, and aim at becoming world-class in its capabilities.

**Selecting Elements of Your Quality System**

The design of a quality system substantially affects the practices and aspirations of
those who live by the system. Some further comparisons of ISO 9000 elements with Baldrige criteria may help to think through how advanced your company's next quality system needs to be.

In the Leadership category, the management of an organization which conforms to the ISO 9000 Standard will have identified specific responsibilities of management and will be able to demonstrate that management has defined and authorized a total quality system. The top management of a winning Baldrige Award recipient will be visibly involved in providing continuous, active leadership to the quality effort of the company.

ISO 9000 requires the maintenance of quality information and records to demonstrate that the desired level of quality has been achieved, and that the operation of the quality system is effective. Malcolm Baldrige Award recipients demonstrate pro-active information management, not only tracking data to measure quality at key points throughout the organization, but also using quality data to identify areas of improvement. They make use of this input to take preventive measures to avoid recurrence of problems.

ISO 9000 requires a quality plan that addresses elements of the quality system. Malcolm Baldrige Award criteria explicitly require that the Strategic Quality Planning process be documented. Baldrige Award recipients not only have a comprehensive quality plan, but they can demonstrate its effectiveness — show how current quality results relate to execution of the plan.

In Human Resource Utilization, Baldrige criteria are much broader than the requirements of the ISO 9000 Standard. ISO 9000 merely calls for training personnel in activities affecting quality. Baldrige Award recipients demonstrate total organizational involvement in the quality process. The effort is reinforced not only with education and training, but with recognition programs and a full range of activity affecting employee well-being and morale. Baldrige recipients demonstrate a positive quality culture that harnesses the energies of the entire organization to continually improve quality.

Considerable commonality exists in content between ISO 9000 and Baldrige criteria in Quality Assurance of Products and Services. Both require evidence that a Total Quality System is operational and fully deployed. Baldrige criteria strongly emphasize the prevention of quality problems and their identification and solution. Baldrige recipients must also demonstrate that their quality practices fully extend into non-manufacturing areas of their business, a point not emphasized in ISO 9000.

The intent of ISO 9000 is that a total quality system operationally assure that products conform to specified requirements and expectations. The standard does not explicitly require demonstration of high levels of quality. Actual comparison of quality results is left to buyer and seller. Thus, the ISO Standard stops with systems verification while the Baldrige Award criteria go beyond that to check how results compare with competitors and world-class organizations.

The Baldrige criteria emphasize the ability of the organization to demonstrate that results are obtained from the quality process. The Quality Results category looks for results measurable while product is under control of the organization, and the Customer Satisfaction category targets measures of quality based on customer and marketplace reaction.

The Continuum of Progress

In summary, ISO 9000 emphasizes existing quality practice, addresses process control and prevention, but places less emphasis on continual quality improvement and measurable results. Baldrige Award criteria stress continual quality improvement, a culture dedicating the entire organization to continuous improvement, and the attainment of defined quality goals. Baldrige Award winners must demonstrate results of their quality practice in all areas of the enterprise. Deming Prize recipients must show exceptionally strong fundamental quality practice.

Figure 6 portrays one group's interpretation of the relative positions of the current standards and award criteria. One that is "beyond the Deming" is the Japan Quality Control
<table>
<thead>
<tr>
<th>Meet Specs</th>
<th>ISO 9000 Standards</th>
<th>Malcolm Baldrige Award</th>
<th>Beyond Deming</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Quality System</td>
<td>Military Standard</td>
<td>ISO 9000 plus Deming</td>
<td>World-Class Quality System</td>
</tr>
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</table>

*Figure 6. Source: Engineering Department of the Quality Management and Technology Center of the DuPont Company.*

Prize given to a company that has already received the Deming Prize at least five years earlier and has demonstrated considerable improvement since then.

None of these quality touchstones is the ultimate standard of performance, if such an ultimate is possible. There are signs that the enthusiasm of the leading Japanese manufacturers to seek a Deming Prize has waned, and they seek broader, more comprehensive systems to guide their progress. However, every company must first start somewhere.

**Doing It Yourself**

Too often, quality systems are invoked upon suppliers by their industrial or commercial customers, and these systems are regarded by the suppliers as burdensome. Installing and administering quality system standards requires substantial personnel time to write quality procedures and manuals. More time is consumed if a customer's auditors visit and review quality practice in extreme detail. The risk is that the supplier company loses sight of the potential benefits, or worse, regards the whole exercise as just a big diversion from the main course of the business.

However, there should be no major differences in the frameworks required between different companies. Recent trends in industry are taking us toward a more uniform framework for quality systems. Companies such as AT&T are structuring their quality systems around the ISO standards, while looking to Baldrige as well. Motorola, a 1988 Baldrige winner, is freely disseminating its approach, and its practices are being adopted by a growing number of companies, even including Xerox, a 1989 Baldrige winner.

Powerful as these quality frameworks are, they can be misused, and often are. To be effective, people must desire to work toward the changes and improvements they represent.

To start a transformation of a company from top to bottom, however, the frameworks cannot merely be adopted. They must be adapted so that each company has its own pattern of excellence that will meet a test applied from any agency or customer.

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2Canada has modified Standard Z-299 to cover all elements of ISO 9001, ISO 9002, and ISO 9003 so that registration to the revised Z-299 is intended to provide the equivalent of ISO 9000 registration. The situation is too complex to describe in this article without substantial digression, but the practical effect in Canada is that manufacturers meeting the standards of ISO 9000 also qualify under Z-299.
3If any companies do not have copies of ISO 9000, they can be obtained from ANSI Headquarters in New York. ISO 9000 Standards have also been issued as national standards in the United States by the American Society for Quality Control as the ANSI/ASQC Q90 Series. They may be obtained from ASQC by calling 800-952-6587.
4An excellent comparison of these two awards, written by David Bush and Kevin Dooley, appeared in Quality Progress, January, 1989.