

The Quality Management FORUM

Summer 2006
Volume 32, Number 3



www.asq-qmd.org

A Peer-Reviewed Publication of the Quality Management Division of the American Society for Quality

Inside This Issue

Acquiring and Sustaining Business Relationships	1
From the Chairman	2
Call for Papers	3
Human Error Management—Quality Drives Economic Value	4
Expanding Your Horizons Beyond Typical Quality Management Thinking Part 2	6
19th Quality Management Conference	9
Profiling Today's Certified Manager of Quality/Organizational Excellence and Should You Be One?	10
Call for Papers: Share your expertise with our readers	13
QMD Volunteer Opportunities	14

ACQUIRING AND SUSTAINING BUSINESS RELATIONSHIPS

Successful performance in the new economy requires complex skills and extensive relationships that no individual performer can master alone. So why do so many executives and companies spend so little time learning how to best build and utilize their networks?

By Jim Caruso, Gregory Collier, and Jill Padwa Revenue Catalysts, Inc.

*As part of its Economics of Quality initiative, the Quality Management Division seeks partnerships with other ASQ divisions that help demonstrate the impact Quality methods have on the financial success of organizations. The "people" piece of Quality can be the most important, and as the following article explains, relationship building is fundamental to organizational success. This article is reprinted from the Winter edition of, *The Human Element, a publication of the Human Development and Leadership Division. The Quality Management Division welcomes a continuing partnership with HD&L.**

It's all in a day's work. A COO has been challenged to move his services operation from the US to Asia. The executive recruiter's new objective is to identify and build a leadership team to run a new corporate division. A CIO needs to work with her division presidents to deliver services that meet their business needs. A sales executive is given a new territory to penetrate. The brand manager must develop a new advertising campaign promoting new products and services. Every functional challenge is different, yet each of these individual's objectives has a common solution; they all need to utilize their business relationships in order to get the job done.

As the US economy continues to steamroll down the services path, business professionals

have become increasingly dependent on their personal and business relationships in order to perform. Integrated business processes across organizational boundaries, the speed of technological change, globalization, and new business models have introduced a level of complexity that no individual performer can master alone.

Based on these challenges, what could be more vital to any business professional than a well developed pool of relationships that are personally invested in your success? Yet, while most people maintain multiple databases of contacts, an alarming number of executives fail spectacularly in deriving value from this network. Current technology has only helped automate the chaos. Multiple lists of contacts and relationships can be found in email address books, scraps of paper, cell phones, and PDAs. None of these sources can tell you the nature of your relationship with that contact, and how that contact may be able to help you.

Recently, social networking software has emerged to try to bring order to this chaos. This software solution allows communities with common interests to develop, attempts to quantify the quality of relationships within an individual network, and acts as a search engine to identify and provide access to potential new contacts across other networks. Although this software can help identify potential valuable business relationships, determining if these

Articles published in *The Quality Management Forum* may not be reproduced without consent of the author(s).



Message from the Chair

By G. Dennis Beecroft

Last month, in the interim between breaking my wrist on a Monday night and having surgery on the following Saturday, I presented to the ASQ Hamilton Section at their monthly dinner meeting. You may remember from my earlier messages that one of my objectives as the chair of your ASQ Quality Management Division is to speak to as many sections as possible.

Although they asked me to talk about quality costs, they warned me that they had “heard it all before.” When I suggested an alternate topic, they still chose to stay with the original program. In the end, I decided to present – *Quality Costs: Misused and Abused* (like my wrist).

After defining quality costs (*the total amount of money an organization spends to prevent poor quality and to ensure that the quality requirements are met, plus any costs incurred by the organization as a result of poor quality being produced*), I reminded them of the four elements of quality costs: **prevention**, **appraisal**, **internal failure** and **external failure** costs.

Prevention costs are *planned* costs incurred by an organization to *ensure that errors are not made* at any of the various stages during the delivery process of that product or service to a customer. *Appraisal* costs are the *costs of checking or evaluating a product or service* throughout various stages of the delivery process to the customer to ensure that the product or service meets established criteria. While these definitions have been used in various versions for many years, my experience based on observations at numerous organizations, is that they are not understood.

David Garvin, in his book, *Managing Quality* (1988), states that the focus of quality has progressed through four eras. The first era was one of inspection where quality was built into the product after it had been produced. This was very costly and ineffective. This era led to the use of statistical techniques and sampling whereby the costs could be reduced with similar levels of poor quality. However, both of these approaches (*appraisal*) were too late in addressing the product quality as the product had already been produced. Era three introduced the notion of *prevention* by focusing on the process and methods used to produce the product or service to ensure that it is being made or delivered correctly. This *prevention* approach is not only more effective but much less costly than trying to detect

defective product once it has been produced, the approach in the earlier two eras. Garvin’s era four is Strategic Quality Management with customers now playing a key role in the overall supply chain. While there are some excellent examples in some areas in many organizations, most of the quality focus today is still inspection/appraisal.

Some might argue that the concept of process focus (*prevention*) was introduced by ISO 9001:2000. Actually, it was presented by Dr. Joseph Juran, Dr. Edwards Deming and others back in the early 1900’s.

Dr. Joseph Juran’s Quality Trilogy demonstrates this approach:

- **Quality planning** – Developing products and processes required to meet customers’ needs
- **Quality control** – Evaluating actual performance, comparing to goal and acting on differences
- **Quality improvement** – Raising the performance to unprecedented levels (breakthrough)

One of Dr. Edwards Deming’s **Fourteen Points – Point 3** reminds us that *prevention* should be practiced rather than the less efficient and effective *appraisal* approach:

“Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.”

When the automotive sector introduced their Quality Systems Requirements – QS-9000 in 1994, the process approach (*prevention*) was reinforced by suppliers having to include both product and process characteristics in their control plans. However, most of the control plans that are being used have few process characteristics.

The automotive sector (AIAG – Automotive Industry Action Group) has produced several manuals and guides to assist organizations in implementing effective quality management systems. The Statistical Process Control Reference Manual (1992) states:

“... SPC stands for statistical process control. It is unfortunate that in North America statistical methods are so routinely applied to parts, rather than processes. Application of statistical

techniques to control output (such as parts) should be only the first step.

Until the processes which generate the output become the focus of our efforts, the full power of these methods to improve quality, increase productivity and reduce cost cannot be realized."

Even with all these reminders and expert suggestions, *appraisal* is much more frequently practiced than *prevention*!

Now to the last two elements of quality costs: **Internal & External Failure Costs.** *Internal (failure)* costs are all costs incurred by the organization resulting from failures found **before** the product or service reaches the customer. *External failure* costs include all the costs to the organization resulting when the customer **finds** a failure.

The external failure costs are more critical to the supplying organization as they can impact the future buying decision of the customer.

The solution to all problems is universal – change the way we are doing things today. The scientist Albert Einstein found the following to be absurd: to continue doing things the same way that they have always been done, yet expecting the results to be different!

How many times has one seen the corrective action of "retraining the operator?" If training did not work the first time, how can we possibly expect the same training to work the second time? Another common solution to problem solving is to add the defect to a check list (*inspection*). The problem still remains with the organization being content to detect rather than eliminate it.

Problem solving is very time consuming. It is extremely difficult to assign the time and resources necessary for resolution. However, solved problems never reoccur.

In conclusion, effective problem solving requires a step by step disciplined approach

of: first identifying the problem, determining root cause(s), selecting a solution to eliminate root cause (*prevention*) if possible, implementing the solution and finally, verifying the solution.

By presenting these old ideas in a new context, I hope I have challenged you to consider how you can apply them in your daily work environment. I look forward to receiving your suggestions and comments.

*My email address is:
Dennis@g-dennis-beecroft.ca*

Call for Papers:

Share your expertise with our readers.

We know our membership has a wealth of experience, expertise and inspiration to share with others in the industry. And the *QMD Forum* provides just the place to share that knowledge.

We're looking for papers that will help further our goal to bring information to our members. If you would like to submit a paper, please follow the manuscript guidelines at www.asq-qmd.org (click Articles & Papers).

Potential topic areas include:

- Advanced Manufacturing (Lean and Lean Sigma)
- Customer Focus
- International Quality
- ISO/QS/AS 9000/14000
- Organizational Learning and Development
- Process Management
- Quality Awards (Baldrige, Deming, specific State, etc.)
- Six Sigma
- Strategic Quality Planning
- Supply Chain Management
- Teams and Team Dynamics
- Training and Development
- TS 16949

The deadline for the Winter 2006 issue of *Forum* is November 1, 2007. E-mail your submissions to H. Fred Walker, Vice Chair, Print Initiatives, at hfwalker@usm.maine.edu.

Human Error Management— Quality Drives Economic Value

By Larry Tew

Introduction

Current research shows that Cost of Quality (COQ) can range from 15 to 40% of business costs. Even with the varying COQ ranges, there is no disagreement that the cost of quality is large and significantly impacts bottom line profitability. Phillip B. Crosby popularized COQ in his book *Quality is Free* referring to COQ as “the price of conformance.” To meet basic objectives, an organization must focus on increasing profits by reducing the costs of quality through a variety of methods, including the reduction of errors and the elimination of non-value-added activities and waste.

Additional research shows that human error is responsible for 35 to 70% of accidents, incidents, and non-conformances and generally holds true in all industries. Error is usually defined as a deviation from accuracy or completeness. More specifically, the medical community defines an error of execution as, “the failure of a planned action to be completed as intended” (Institute of Medicine 2000). Crosby also acknowledged the significance of human error when he stated, “Most human error is caused by a lack of attention rather than a lack of knowledge.”

Although Cicero (200 BC) coined the phrase, “to err is human...,” human error didn’t really get major attention until the mid-1970s when the National Aeronautics and Space Administration (NASA), and subsequently the Federal Aviation Administration (FAA), became significantly involved in human error because of concern over the increasing number of accidents (Helmreich, Merrit, Wilhelm 1999). A study examined voice and data recorder information (black boxes) obtained from aircraft accident scenes and determined that cockpit crews were not performing in the professional manner their training was expected to provide. The study concluded that the human element in the cockpit was an initiating factor in many of the accidents. Inappropriate decisions and reactions to common flight conditions by pilots in command actually created tragic accidents.

In response to the lack of performance by cockpit teams, special Crew Resource Management (CRM) training was created. CRM focuses on training individuals and teams to identify “Mind Traps” affecting normal operations that set up error opportunities. It also provides “Tools” including communication approaches to improve the combined knowledge and interaction of the entire crew to

detect and avoid errors. With the University of Texas, Department of Psychology, Aerospace Crew Research Project assistance, CRM has evolved into an awareness and acceptance of human fallibility and limitations that can result in errors. Due to the successes in aviation and the recognition that human elements are the initiating factor in almost every organizational accident, incident, and error, a number of industries are adapting the CRM training approach to their specific needs.

Synergy of COQ and Human Error Management

Most quality cost models are based on a PAF classification (Punkett and Dale 1987). The basic categories of the **PAF** Model were identified by Armand Feigenbaum (1956) and are described as: 1) **Prevention**—Actions taken to ensure that a process provides quality products and services, 2) **Appraisal**—Actions designed to measure levels of achieved quality, 3) **Failure**—Actions taken to correct quality in internal (within the organization) and external (after delivery to the customer) products or services.

The ultimate goal in reducing COQ is to eliminate failures and to sustain a quality system through continuous prevention efforts with minimal appraisal activities. Human error management techniques use the data from appraisal and failure activities to assist in establishing and sustaining a preventive culture. Again, since human error has been cited as causing up to 70% of non-conformances, reducing human error can have a major impact on reducing failures that result in decreased COQ and major improvements to the bottom line.

An example of Crew Resource Management training being successfully applied in other industries is the benchmark study by the Institute of Medicine (2000) which showed between 44,000 to 98,000 deaths occurred each year due to human error. The study recommended that the medical industry adapt the proven techniques of Crew Resource Management. Since that time, fire departments have also recognized the value of CRM and have created a major effort to adapt these same techniques to the Fire Service. Gary Briese, Executive Director of International Association of Fire Chiefs, put the importance of their efforts in perspective when he stated, “In the 10 years it will take CRM to be introduced nationally, we will attend 1,000 firefighter funerals... I can’t get that out of my mind.”

Methods and Approaches

The University of Texas’ Aerospace Crew Research Project recognizes the fact that errors can not be totally prevented and therefore must be managed. Their definition of Error Management is, “...using all available data to understand the causes of errors and taking appropriate actions, including changing policy, procedures, and special training to reduce their incidence of error and minimize the consequences of those that do occur.”

The special training focuses employees of all levels on the awareness of human “Mind Traps” that cause errors and through the application of error management “Tools,” human error can be detected, avoided, mitigated, and precluded from recurrence. In his book, *Human Error*, James Reason notes that human psychology cannot be ignored. Error management adaptations of CRM include addressing a number of error management areas as shown in figure 1.

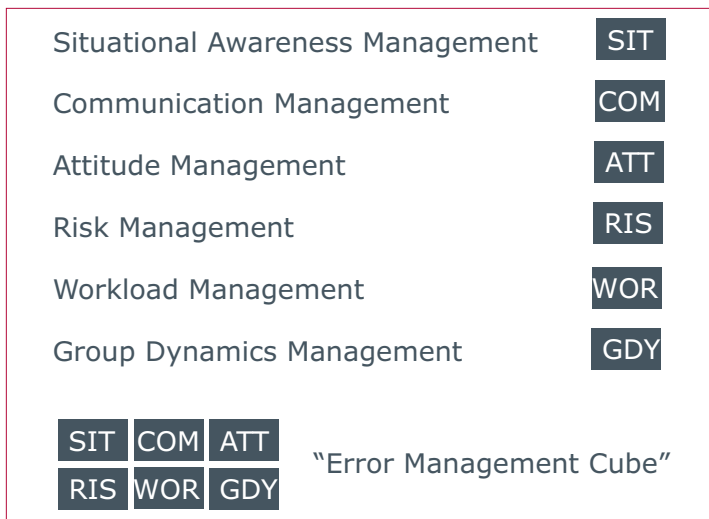


Figure 1 Error Management Areas, the “Error Management Cube”

The number of management areas and training emphasis in each area depends on the specific industry or occupation being trained. For example, in law enforcement the number one fatal error by police officers is the “Mind Trap” of a risky attitude, (e.g. trying to be a hero rather than understanding reality, impulsivity). In training of police officers, emphasis is placed on understanding Attitude Mind Traps and the error management Risky Attitude Antidote Tools (e.g. “It could happen to me,” “Taking a chance is foolish”).

In his book, *Managing the Risks of Organizational Accidents*, James Reason created what he referred to as the Swiss Cheese Model, which graphically displays lines of defense an organization creates in an attempt to engineer out the possibility of human error. The Swiss Cheese Model has been adapted in figure 2 to illustrate how the pieces of technical, cultural, organizational, and individual are defenses against error opportunity. Identifying the individual as “the last line of defense” has been attributed to Dr. Edwards Deming.

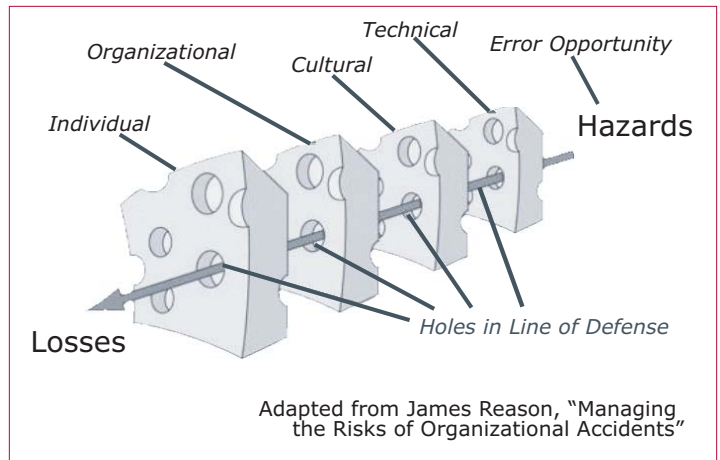


Figure 2 Adapted Swiss Cheese Model

Unfortunately, as Reason points out, many of these pieces of Swiss cheese can have the holes aligned allowing an error opportunity to penetrate all the defenses resulting in a loss. In addition, these defenses are not static. Depending on specific circumstances for each error opportunity they are changing all the time. Error management provides Tools whereby individuals and organizations can detect human “Mind Traps” and fill the holes that lead to human error.

After training, the implementation of basic techniques and an organizational commitment to vigorously pursuing the reduction of errors, an error management culture has been shown to mature into individual and group activities, significantly decreasing COQ and improving the bottom line. These activities include: 1) Focus on detection of latent errors, 2) Conducting thorough analysis of anomalies to determine systemic factors leading to errors, and 3) Open sharing of resulting information. Implementation has also resulted in important by-products including: improved communication, team building, and creation of an open atmosphere to speak up when things do not seem right. Error management should not be considered as a new program, but rather as an enhancement to existing activities. These techniques compliment and support ongoing activities in a variety of activities including risk management, environmental safety and health, quality management, safety, CMMI, Lean Thinking and Six-Sigma.

Conclusion

Because of the established high percentages of COQ related to sales and the significant percentages of errors attributed to human error, the application of error management concepts and techniques can make significant contributions to reducing the cost of quality and improving an organization’s bottom line. In their survey of models and best practices, Schiffauerova, and Thomson confirm that quality improvement and cost measurement processes bring about a huge reduction in an organization’s COQ. Error management activities can be correlated to the three elements of COQ and

Expanding Your Horizons Beyond Typical Quality Management Thinking

Part 2

Dr. Ronald Meier and Dr. Klaus Schmidt

Part 1 of “*Expanding Your Horizons Beyond Typical Quality Management Thinking*” examined the concepts of risk management and systems thinking. The purpose of that paper was to discuss how to integrate quality and project management practices with other emerging management strategies such as systems thinking and risk management to address and improve product and process quality. The purpose of this paper is to continue the previous discussion and focus on the concepts of knowledge and change management. Knowledge management has become one of the key factors for any successful organization. In times when employee turn-over is higher than ever before, the process of building and retaining knowledge inside the organization has become critical. In the “information age,” or more precisely the “knowledge age,” the rise and fall of an organization depends heavily on its employees, the bearers of knowledge. Any change in the organizational structure, the composition of the workforce, and a modification of the business strategy can affect competitiveness. Any line of attack that is not well founded in organizational knowledge can be the decisive factor for the fate of an organization and its employees.

Knowledge Management Concepts

Quality improvement activities often require the creation of new knowledge for people and their organization.¹ This new knowledge includes factors such as how quality should be planned, assured, controlled, and managed. Knowledge obtained throughout the organization related to quality planning is helpful, but not necessarily sufficient. Laying the foundation of knowledge management is not an easy task. Neither is knowledge management a brand new concept. In a way, knowledge management has existed since humans were starting to acquire, share, and utilize knowledge.

Knowledge acquisition, the process of creating and developing skills and insights, is the first major concept of knowledge management. Two types of knowledge that can be acquired are tacit knowledge, knowledge that is not easily codified and explainable, and explicit knowledge, knowledge that is palpable, describable, and identifiable. In an organization, employees acquire knowledge on an almost daily basis. Most of this knowledge is never stored or even documented, and yet becomes an essential ingredient for the knowledge mix and the successful flow of work.

Knowledge sharing, the second concept of knowledge management is in itself a major challenge since tacit knowledge, in particular, often tends to be camouflaged and not easily disseminated. Knowledge hoarding becomes one of the major challenges when attempting to create a successful knowledge management system. Explicit Knowledge, on the other hand, is easily transferred and communicated. Furthermore, explicit knowledge can be stored easily and, in times of change, retrieved. Without a well conceptualized knowledge management system, it will be nearly impossible to retrieve or access tacit knowledge. To fully integrate quality management practices, new knowledge will have to be created. We suggest that this process of creating new knowledge (learning) become an integral part of quality improvement projects. Fine’s analytical model, for example, outlined the relationship between conformance and failure costs. Fine stated that the optimal quality level increases over time due to learning.²

Knowledge utilization represents the ultimate goal of knowledge management and a successful knowledge management system. Applying explicit knowledge alone will not suffice to offer a competitive edge over organizations that do have the ability to utilize tacit knowledge. Integrating tacit knowledge into the organizations infrastructure, including intellectual property and organizational intelligence, will be imperative for a successful knowledge management system and consequently, the success and survival of the organization.

The following section will discuss some important constructs and definitions of change management. Change management has become one of the most widely discussed and applied approaches to implementing organizational change. The three major constructs of change management include the tasks of managing change, from a reactive or a proactive posture; the area of professional practice, with variation of competency and skill levels among practitioners; and a body of knowledge comprised of models, methods, techniques, and other tools.

Change Management Concepts

In a world that changes rapidly, resistance to change is detrimental. Both quality and project managers need to be aware of the constant challenges of change. Instead of applying only the essential

changes to improve a process, managers often exhibit the viewpoint of “if it ain’t broke, break it.”³ This overly aggressive means to change often leads to destructive outcomes as key employees resist change. Today’s quality managers must embrace a quality philosophy that is radically different from the traditionally bureaucratic approach of quality assurance.⁴ Today’s quality managers are also change managers and should not only address existing standards, but also question their relevance and importance to the customer.

Managing change has multiple meanings. One meaning refers to making changes in a planned or systematic fashion. The goal is to effectively implement new methods and systems. An example is the version control aspect of information system development projects. However, these internal changes may have been triggered by events that originated outside the organization itself. This leads to a second meaning of managing change, namely the handling and responding to change outside the dominion of the organizations, or more specifically, the changes that are pushed due to changes in the environment of which the organization itself has little or no control. Such environmental changes may include legislation, behaviors, competitors, and changes in the regional or national economy. Responses to these changes are commonly described as either “reactive” or “proactive” responses. An organization that is capable of being proactive in its responses to environmental changes, and that is anticipating such changes based on a solid knowledge of those environments, will succeed over organizations that do not have the capacity to respond proactively. A successful knowledge management system can contribute tremendously to the proactive way of responding to anticipated environmental changes.

Practicing Change. A second construct of change management can be defined as an area of professional practice which helps organizations to implement planned change to respond to anticipated external or internal organizational or structural necessities. How will change be managed on a practical level, once the concept of change has been adopted and accepted within the organization? Change management experts are divided on their approach to practicing change. Some experts claim to help clients manage the changes they are directly confronted with. Other experts believe in enabling clients to make changes, not as a response, but rather as a proactive measure of improving the organizational and structural components of their organization. A third group of experts practice change management by seeing it as a task of simply dealing with and managing the most pressing and necessary changes, whether they are triggered by the environment or by the organization itself. No matter which of these approaches a change manager chooses, tacit knowledge of the individuals involved paired with explicit organizational knowledge and intelligence, will be of imperative importance for the individuals in charge of change management.

Knowing Change. The content of change management consists of a variety of models, methods, tools, and skill sets that, to a large extent, overlap with tools and strategies of knowledge management that facilitate the successful implementation of change management practices. A vast base of knowledge derived from areas such as sociology and psychology, but also from economics, engineering, and business administration contributes to the successful building of a body of knowledge. Neither change nor knowledge management can be regarded as stand alone entities. Rather, they ought to be understood and subsequently implemented as accumulations of structured or unstructured experiences of both individuals and organizational units within the business or company, and as a proactive response to circumstances derived from stipulations of environmental constituents. Building a body of knowledge as a base for change management therefore is in very close alignment with knowledge management as an organizational strategy and with the necessity to create a successful knowledge management system that includes both tacit and explicit knowledge.

Knowledge and the Process of Change

Many problems found in organizations going through organizational, structural, or strategic change, have both knowledge and process components. For example, one financial institution, that is functionally organized, introduces a new electronic payment processing system, while another institution, organized along product lines, may introduce a similar electronic payment system by disregarding organizational barriers and simply establishing a new product line without regard to the overall organizational structure. Both, knowledge and experience impact these financial institutions in different ways. Both process changes may be profitable, but they can only be successful if tacit and explicit knowledge is acquired, shared, and utilized to actively contribute to the processes necessary for the changes intended.

To further the idea of impacting change processes through knowledge management, the same intended change may be perceived completely differently when comparing two separate organizational entities and content areas. Then, the organizational culture comes into play even more strongly, along with values, belief systems, management styles, and business strategies. The problems a change manager faces then can be entirely poles apart, even though fundamental similarities exist in the change processes themselves.

The Process of Identifying and Solving Problems

Managing change can be seen as moving an organization, a system, or a business strategy from one state to another. While the original state is considered the problem state, the targeted state can be considered the solution or the solved state. Problem analysis is one of the most commonly used tools to diagnose a problem or to assess the current state of an organization. Successful problem analysis

(EXPANDING YOUR HORIZONS, continued from page 7)

can only be accomplished with a strong foundation of knowledge and organizational intelligence. Setting goals to achieve the desired solution will be very strongly influenced by organizational intelligence, and can be achieved at various levels and in various areas of an organization. In order to attain employee and managerial support on all levels, goals and the means to reach these goals, as well as a clearly structured plan of action, need to be developed and identified. Only then can a smooth transition from one state to the next be achieved.

Change Engagement

As discussed above, the change problem is a matter of moving from one state to another. On a practical level, quality/change managers need to find answers and solutions to three questions: Why do we need the changes? How can the change be implemented successfully? And what will the final state look like after the changes have been completed?

Why do we need change? Asking the “why” question is the first and one of the most important questions a change manager needs to ask. In an environment with a well functioning and well-developed knowledge management system, answers are more easily accessible than in “knowledge unfriendly” environments. In a “knowledge friendly” environment, access to tacit knowledge will be readily available, and tacit knowledge, in particular, is a key to identifying why changes may be necessary. Some of the questions that are helpful in seeking the right answers include, but are not limited to the following list:

1. Why do we have to change the way we’ve been doing things?
2. Why do we have to change our marketing strategy?
3. Why do we have to change the way we do business?
4. Why are our production costs climbing?
5. Why are our customers unhappy?

The first knowledge management concept “knowledge acquisition” will be most important to framing effective and efficient questions. These questions ought to be evocative. The following section will raise some “how” questions pertaining to the above “why” questions.

How can we change? We now can go one level deeper and identify the appropriate “how” questions. Knowledge management and organizational intelligence, paired with organizational experience, can advance and refine our plan of attack by identifying a clear flow of communication between the “owners” of tacit knowledge, and the change managers.

1. How can we convince employees to change the way they have been doing things?

2. How can we change our marketing strategy?
3. How can we change the way we do business?
4. How can we prevent our production costs from climbing?
5. How can we make our customers happier?

“How” questions require a tremendous amount of creativity. Thinking outside the box is essential to obtaining the best mix of creative and realistic responses. Sharing knowledge, based on the second concept of knowledge management discussed above, will become of paramount importance. Only with a knowledge management system in place, can a healthy combination of creative and sensible solutions be produced. Solutions will be obtained by asking the questions in the following section.

What will be the final state, after the change? “What,” questions allow us to describe the final state after changes have successfully been implemented. The attainment of answers for each “what” question will be addressed by the visionary capabilities of the organization’s leadership. The organization’s vision can come to fruition if, and only if, the third major concept of knowledge utilization is purposeful and well designed. Specific “what” questions include:

1. What will be the way employees behave and do things?
2. What will our marketing strategy look like?
3. What will our new business strategy look like?
4. What will be the result of reducing our production costs?
5. What will be the level of customer satisfaction?

Knowledge utilization can live up to its fullest potential when articulating this final state of change management. Applying both tacit and explicit knowledge to formulate the final goal, namely the implementation of the change, will be of tremendous help to change managers. Without the active support of employees and management, and their combined organizational intelligence, any change can cause major challenges for both operational and functional entities within the organization.

Conclusion

The three components of an effective knowledge management system include knowledge acquisition, knowledge sharing, and knowledge utilization. These components paired with important change management concepts and a set of strategic questions that include why, how, and what questions, can be meaningfully combined to manage necessary organizational, strategic, and other kinds of changes. Both aspects of organizational knowledge, such as tacit and explicit knowledge, can and will have to be applied in setting up appropriate questions and their subsequent potential solutions. Creativity, matched with and based on organizational knowledge substantiates a strong foundation for the new organizational vision and potential business strategy. In an increasingly competitive economy,

with ever-narrowing success margins and growing national and international pressures, a creative combination of knowledge management and change management strategies will become inseparable for continued and guaranteed success of an organization.

The intent of this paper was to expose quality managers to the final two emerging management strategies that can help piece together a comprehensive quality management plan. This paper discussed developing and integrating knowledge and change management into every day quality practices. The quality managers of the future need to be more than just experts in quality management. They need to be able to interject practices from systems thinking, enterprise risk management, knowledge, and change management into their quality practices.

References:

- 1 Linderman, K., Schroeder R. G., Zaheer, S., Liedtke, C., & Choo A. S. (2004). Integrating quality management practices with knowledge creation processes. *Journal of Operations Management* (22)6 589-607.
- 2 Fine, C. H. (1986). Quality improvement and learning in productive systems. *Management Science* (32) 10 1301-1315.
- 3 Karn, N., & Highfill, D. S. (2004). The dark side of change. *Across the Board*. March-April 2004.
- 4 McCabe, S., Rooke, J., Seymour D., and Brown, P. (1998). Quality managers, authority and leadership. *Construction Management and Economics* (16) 447-457.

Dr. Klaus Schmidt is an Associate Professor in the Department of Technology at Illinois State University. He holds a Ph.D. from the University of Missouri-Columbia. He is the coordinator of the Industrial Computer Systems area and teaches courses in Database Management, Computer Programming and Web Development. His research interests include eLearning, eCommerce, Systems Thinking, Knowledge Management, and Six Sigma project planning. Email him at kschmid@ilstu.edu

Dr. Ronald Meier is a Professor in the Department of Technology at Illinois State University. He holds a Ph.D. from the University of Missouri-Columbia. Dr. Meier teaches courses in design of experiments, quality management, project initiation and planning, and project risk management. Dr. Meier leads the graduate program project management sequence at Illinois State University. Email him at rlmeier@ilstu.edu.



19th QUALITY MANAGEMENT CONFERENCE

March 1 – 2, 2007
Dallas Texas

Presented by
ASQ/Quality Management Division
ESSENTIALS FOR EXCELLENCE

The 19th Quality Management Conference will provide attendees with essential “ready now” tools and strategies for excelling in today’s dynamic and challenging environment.

Register in advance at a very special price.
Take advantage of the Advanced Purchase Option
by October 1, 2006 and pay \$49 below the
early-bird discounted price.

REGISTER NOW AND SAVE!
for information and registration, visit
WWW.ASQ.ORG/QM/CONFERENCES.

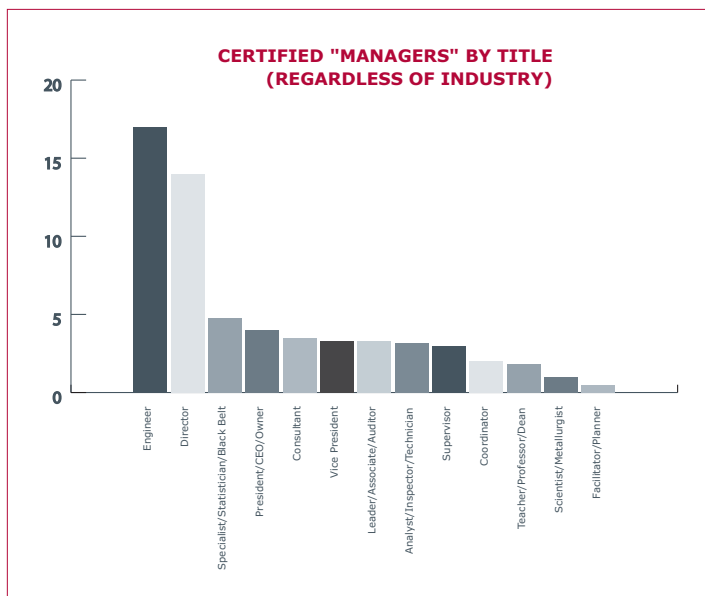
PROFILING TODAY'S CERTIFIED MANAGER OF QUALITY/ORGANIZATIONAL EXCELLENCE AND SHOULD YOU BE ONE?

By Jd Marhevko, Vice Chair Operations

Since the Certified Quality Manager has now evolved into the Certified Manager of Quality/Organizational Excellence (CMQ/OE), I'd like to share some of the logic used to grow the certification scope from that of a "Quality Manager" to include "Organizational Excellence."

Data analysis was performed on a large pool of Certified Quality Manager information (about 5000 professionals). Within this pool of data, there were managers from every state in the union as well as Puerto Rico and Washington D.C., where 95% of the managers were from the United States, and 5% were from Canada. Of these managers, 77% were male, and 23% were female.

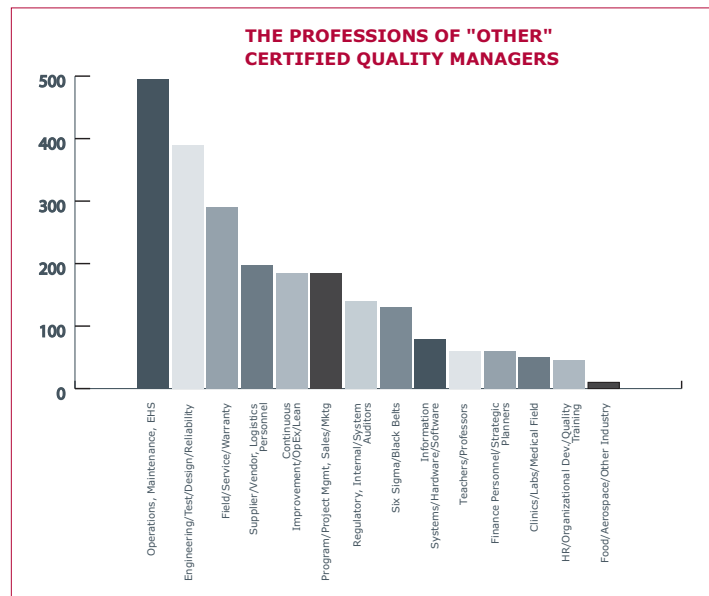
As we reviewed the data, less than half of these certified managers (about 46%) were actually titled managers. If you'll look at the graph below, the remaining certified managers evolved into a spectrum of engineers, directors, specialists, presidents and business owners. This spread was present regardless of industry and cut broadly across many types of organizations throughout the United States and Canada.



It is noteworthy to see that professionals who now hold this certification span broadly across the typical levels of an organization – hence the evolving of the certification title to include the name of "Organization." The breadth of these titles also indicates that these professionals are not just in quality functions any more.

As we start to review the composition of the organization types within this manager pool, the general professions of these personnel also begin to stratify from a pure quality focused stream. Within this pool, just over half (54%) hold the title of quality director, manager, engineer, etc.

After those professional titles are considered, "non-Quality Manager" titles are emerging. By looking at the graph below, the first group to appear is that of professionals in the operations, business and/or manufacturing areas. This is likely due to the relentless pressure and increasing responsibility that is being placed on these personnel to continuously improve their performance in both process and product quality.



Engineering, test and design personnel are the next group of professionals to emerge as "Quality" Managers. By attaining this certification, these professionals are growing their personal tool kits to increase their effectiveness.

Field, service and warranty personnel are the next group of professionals attaining this certification. They seem to be using the Body of Knowledge (BoK) to grow their skills in corrective and preventive action areas.

The next prevalent group is that of supplier and vendor professionals. After that is the widely emerging trend for continuous improvement, Lean Six Sigma and/or operational excellence professionals.

In all, the manager exam has grown beyond its original scope. Professionals using this Body of Knowledge (BoK) range from facilitators, to team leaders, to engineers and professors, and then on to presidents and business owners. The enhanced BoK for the CMQ/OE grows upon the existing manager platform and encompasses additional organizational knowledge to help the professional grow his current toolkit.

The role isn't just about quality anymore. It's about improving all aspects of the organization – hence the organizational excellence focus. This type of focused improvement is being required of almost every professional in almost any position within almost any type of organization. If you are not currently a Certified Manager, consider the personal growth and professional accreditation that you could achieve upon attaining your CMQ/OE.

If you are interested in finding out more, data can be obtained on the <http://www.asq.org/certification> website.

If you are currently a Certified Quality Manager, (or a new CMQ/OE) and are able to help as a Subject Matter Expert (SME), please e-mail your contact information to MMartin@ASQ.org. Two (2) CEU Credits are given for participation in our workshop sessions and can be used towards your certification renewal as a CMQ/OE. Travel and expense costs are reimbursed.

(HUMAN ERROR, continued from page 5)

the PAF model: prevention, appraisal, and failures. Error management training fits solidly into the prevention element. Since error management uses data from all sources, inputs from both appraisal and failure elements of the PAF model provide key information for adapting, implementing, and sustaining error management methodologies throughout an organization.

References

Committee on Quality of Health Care in American, Institute of Medicine (2000), *To Err is Human: Building a Safer Health System*, Washington D.C. National Academy of Sciences

Crosby, P.B. (1979), *Quality is Free*, New York: McGraw Hill

Deming, Edward (1982), *Out of Crisis*, Cambridge Massachusetts, Massachusetts Institute of Technology

Feigenbaum, A.V. (1956), *Total Quality Control*, Harvard Business Review, Vol.34, No.6.p.93

Gladwell, Malcom, M. (2005), *Blink*, New York, Little, Brown and Company

Hart, C.A., *Global Aviation Information Network (GAIN)*, Presentation, Federal Aviation Administration (undated)

Helmreich, R.L. Merritt, A.C., & Wilhelm, J.A. (1999). *The Evolution of Crew Resource Management Training in Commercial Aviation*, *International Journal of Aviation Psychology*. 9(1), 19-32

Machowski, F. and Dale, B. G. (1978), *Quality Costing: An Examination of Knowledge, Attitudes and Perceptions*, *Quality Management Journal*, Vol.5. No.3, p.84

Nova Public Broadcasting Series program, *Why Planes Crash*

Okray R and Lubnau, T II, (2004), *Crew Resource Management for the Fire Service* Tulsa Oklahoma, PennWell Corporation

Plunkett, J.J. and Dale, B.G. (1987), *A Review of the Literature on Quality-Related Costs*, *International Journal of Quality & Reliability Management*, Vol. 4, No.1, p.40

Reason, J. (1990), *Human Error*. New York: Cambridge University Press

Reason J. (1997), *Managing the Risk of Organizational Accident*, Aldershop, United Kingdom: Ashgate

Sandoval-Chavez, D.A. and Beruvides, M.G. (1998), *Using Opportunity Costs to Determine the Cost of Quality: A case Study in a Continuous-Process Industry*, *Engineering Economist*, Vol.43, p.107

Schiffauerova, A. and Vince Thomson, V. *Cost of Quality: A Survey of Models and Best Practices*, *International Journal of Quality and Reliability Management*

Weick, K. and Sutcliffe, K. (2001), *Managing the Unexpected*, San Francisco, Jossey-Bass, John Wiley and Sons

Larry Tew, Co-Founder; The Center for Error Management has been actively involved as a trainer/facilitator and consultant in implementing and evaluating Error Management activities. As a certified instructor, Larry has provided Error Management Seminars, "Make it Happen Workshops" and consulting throughout the United States. Larry has been directly involved in tailoring and conducting Error Management training for administrative, technical, and management personnel at all levels within an organization. Information about The Center for Error Management is available at www.manageerror.com.

Prior to becoming a founder of The Center for Error Management, Larry was a Lockheed Martin nuclear engineer. While at Lockheed Martin, in addition to a number of positions as Program Manager, he was a Product Assurance/Mission Success Engineer, Systems Engineering Manager, Business Development Manager, and a Project Engineer. Before his career at Lockheed Martin, Larry was an Air Force Officer in research and development specializing in nuclear hardening of aircraft, missiles and spacecraft. In addition, he has been actively involved in a variety of training activities as a certified corporate facilitator for Tom Peters "Leadership Challenge," "Leadership is Everyone's Business" and "WOW Projects." Larry is also a certified instructor for Development Dimensions International and facilitates instruction in Management Fundamentals.

ISO 9001:2000

Successful companies know the value of implementing a Quality Management System.

Investing in a successful Quality Management System (QMS) leads to a variety of tangible benefits for your organization and ISO 9001:2000 sets out the requirements for a world class QMS.

ISO 9001:2000 registration brings you the following benefits:

- Greater responsibility and quality consciousness amongst staff
- Better use of time and resources
- Reduced wastage and product failure
- Greater consistency and traceability of products and services

BSI, as the leading ISO 9001:2000 registrar with years of experience and expertise, can help you on your way to implementing your own QMS by offering:

- Registration
- Training
- Email Update Service
- Free Guidance Documents
- Much More!!

To find out more about how you can invest in your company and how BSI can help, visit:
www.bsiamericas.com/investquality



BSI
Management Systems

BSI Management Systems
12110 Sunset Hills Rd.
Suite 200
Reston VA, 20190-5902

1 800 862 4977 • inquiry@bsiamericas.com

(SUSTAINING RELATIONSHIPS, continued from page 1)

contacts will be useful, or how they should be utilized, is left to you.

So why do so many people have a problem developing a functioning network? In this article, we will outline five rules for acquiring and sustaining business relationships that can work for you.

**Rule One:
Don't Start With Who You Know**

How many times were you given a new assignment, and the first thing you did was start calling for help? If you were lucky, you actually reached someone and then what? Were you really ready to have a discussion? Even if you were ready, was this the right person to talk to? Could she or he help deliver on your business objective?

The fundamental rule – the one on which all others depend – is “Don't Start with Who You Know.” The successful acquisition of relationships, and more importantly, the ability to sustain them, comes from knowing what you need the relationships to help you accomplish. *Before you can start talking with people, you need to identify several key factors to determine if you are ready.*

Start With Your Objective.

Spend time analyzing what needs to be accomplished, and determine if business relationships are required in order to get there. Some objectives are easy to assess. Sales quotas require external buyers. Others may not be so clear. If the objective is complex, if decisions regarding the utilization of resources are outside of your domain, or if special expertise is required, it is a good bet that you will need assistance.

Once you have established your relationship need, you must then identify where to go for help. Segment your need. Utilize categories such as expertise, industries, and geography in order to know

where to look. When this activity is completed, you should have a list of targeted relationships to work with.

You Must Spend Time Solidifying Your Message.

Can you convey your need with a concise statement of value? Test your message with trusted colleagues before using it with your targeted relationships. In order to ask for help, your objective must be specific and clear. By now you will have identified targeted relationships to pursue and a validated message to deliver.

**Rule Two:
Get Face-to-Face**

If you haven't figured this one out yet, it's time to face the facts: Leaving a voice-mail or an e-mail will not get you the responses you need. Many business objectives have gone undelivered while the owner was stuck in the “I haven't heard

understand the nature of each relationship in your network. These relationship attributes will be critical to understanding and measuring the quality of your relationships. Attributes can be simple such as job title and education, but should also contain more complex information. Knowing that the CIO of a company does not work well with his CFO is more valuable than what school they attended, especially if you need both to meet your objective.

Don't reach for the phone quite yet. Your initial efforts need to be based on a prioritization of whom you know. They should be the people in your network who are part of your target list, as well as those you have had successful interactions with; those who may understand your message, and point you to your target.

The easiest way to get face-to-face time with your targeted business relationships is

Successful Performance Requires Complex Skills and Relationships That No Individual Can master Alone

“An Alarming number of professionals fail at deriving value from their business relationships.”

Our Analysis suggests professionals do not know...

?

WHAT TO
ASK FOR

?

HOW TO NAVIGATE
THE NETWORK

?

HOW TO EXTRACT
VALUE FOR
FUTURE USE

back from them yet” career death spiral.

The magic in relationship building is not how many phone calls you make or e-mails you send, it is how many Face-to-Face conversations you can get. Business relationship building is not a mass-market task; it is an intimate, personal endeavor that requires time, care and attention.

It is time to reach out to your personal network. This is the network of colleagues whom you know. It is important that you

if you already know them. Unfortunately, this is rarely the case. Begin working with your prioritized list of relationships, using your validated message. Ask for feedback, but more importantly, continue reaching until you connect with a targeted business relationship that can impact your objective. Once you have made the connection, schedule a meeting and get face-to-face.

**Rule Three:
It's Not Just Who You Know...**

It may be whom they know. When was the last time you had a complex problem to solve, and one person was able to make it happen for you? Although there are decision makers in every organization, often decisions are reviewed by committees that solicit opinions from peers and other groups. This is the time to leverage your targeted business relationship to gain sponsored access to everyone involved in influencing your ability to meet your objective. Keep your primary business relationship involved until a decision has been made. Regardless of the outcome, ask for referrals.

It is critical to expand your network with these new contacts. Not only will they be able to impact your current objective, but they will also be influential in helping you to achieve future goals. If you demonstrate focus on and pay attention to bringing value to your new relationships, others will be more than happy to do the same.

It is about this time that you realize there are many people whom you need to know. You also need to be assigning critical attributes, both quantitative and qualitative, to their profiles. Collecting and maintaining this information can be time consuming, and certainly doesn't get you any closer to your objective. However, it is a task that is crucial to perform in order to grow your business relationships. With technology you can perform this task more efficiently.

**Rule Four:
You Can't Keep in Touch With Everyone**

A good relationship picks up where it left off regardless of how much time has passed. Since it is difficult to keep in touch with everyone on a consistent basis, it is important to know how to prioritize your network. If you are not sure where to start, let your objectives be your guide.

While you are trying to achieve a specific objective, your priority relationships are the ones that can help you meet it. Your contacts will value you more when you go to them with something they need as opposed to a random contact with no clear purpose. However, you cannot ignore important relationships either. You need a contact plan to stay connected.

**Rule Five:
Measure Progress Regularly**

Establish metrics early and monitor them regularly. Obviously, the crucial measure is whether or not you met your business objective. However, this is a lagging indicator of performance. There are several other important areas to monitor along the way.

In order to understand how your personal network performs, you need to track process measures from beginning to end. These measures can include: understanding how many relationships you needed to connect with to achieve the objective, the length of time

it takes to connect to a targeted business relationship, the quality of relationships within your network, and the effectiveness of business referrals.

As you determine whether your relationships are working for you, a final question to ask is, "Did the relationship help you meet your objective?" Conversely, you must also ask if you were able to assist them in achieving their objective. Without this two-way interaction, or value dependency, the network is weak.

The process of acquiring and sustaining business relationships requires commitment and focus. From the identification of business objectives and relationship needs, through reaching out to your network and leveraging their connections, the process can be slow, but sure. You will continually be assessing your existing relationships, and expanding into new ones along the way. The result is a valuable, functioning network of colleagues that can help you get the job done.

Revenue Catalysts is a leading provider of solutions for leveraging relationships to meet business objectives. Revenue Catalysts has worked directly with many IT leaders, has co-authored several articles on Acquiring and Sustaining Business relationships, and is co-authoring a book titled Nobody Calls Back. For more information, please visit their website at www.revcat.com or call 401.454.8888.



**THE CERTIFIED MANAGER
OF QUALITY/ORGANIZATIONAL
EXCELLENCE HANDBOOK:
THIRD EDITION**

Russell T. Westcott, editor

672 pages. 7 x 10 Hardcover. 2006.

Item: H1264 **Member Price:** \$63.00

In addition to being a peerless reference on quality management, this book is the most comprehensive preparatory guide for the Certified Manager of Quality/Organizational Excellence Exam. The handbook is completely updated to reflect the changes in the 2006 Body of Knowledge (BoK), and the pertinent BoK requirements associated with good quality management practices are shown throughout each section. Included in appendices are the newly updated BoK, an extensive glossary of terms, a list of additional references for further study, and (on an accompanying CD-ROM) 150 sample multiple-choice questions and 7 sample essay questions, all similar to those on the actual exam.

QMD Volunteer Opportunities

Would you like to share your expertise, contribute to the advancement of quality management and organizational excellence initiatives, and hone your skills? If so, these QMD volunteer opportunities may be for you.

Quality Management Forum (QMF) Review Board Member

The QMF Reviewer has the responsibility of evaluating 3-4 papers per year for the Quality Management Division's publication, Quality Management Forum. This individual will assure that the QMF publishes papers of a consistent standard based on the Manager of Quality Body of Knowledge, the QMF Authors Guidelines, and the QMF Manuscript Evaluation Form.

QMD Sponsors & Partners Coordinator

The QMD Sponsors & Partners Coordinator works with the Vice-Chair, Marketing to identify, acquire, and sustain sponsors and partners to support various QMD initiatives (Face-to-Face, e-Based, Print). This individual will also assist the acquisition of exhibitors for the Quality Management Conference. Understanding or experience in marketing and/or customer relationship programs is required.

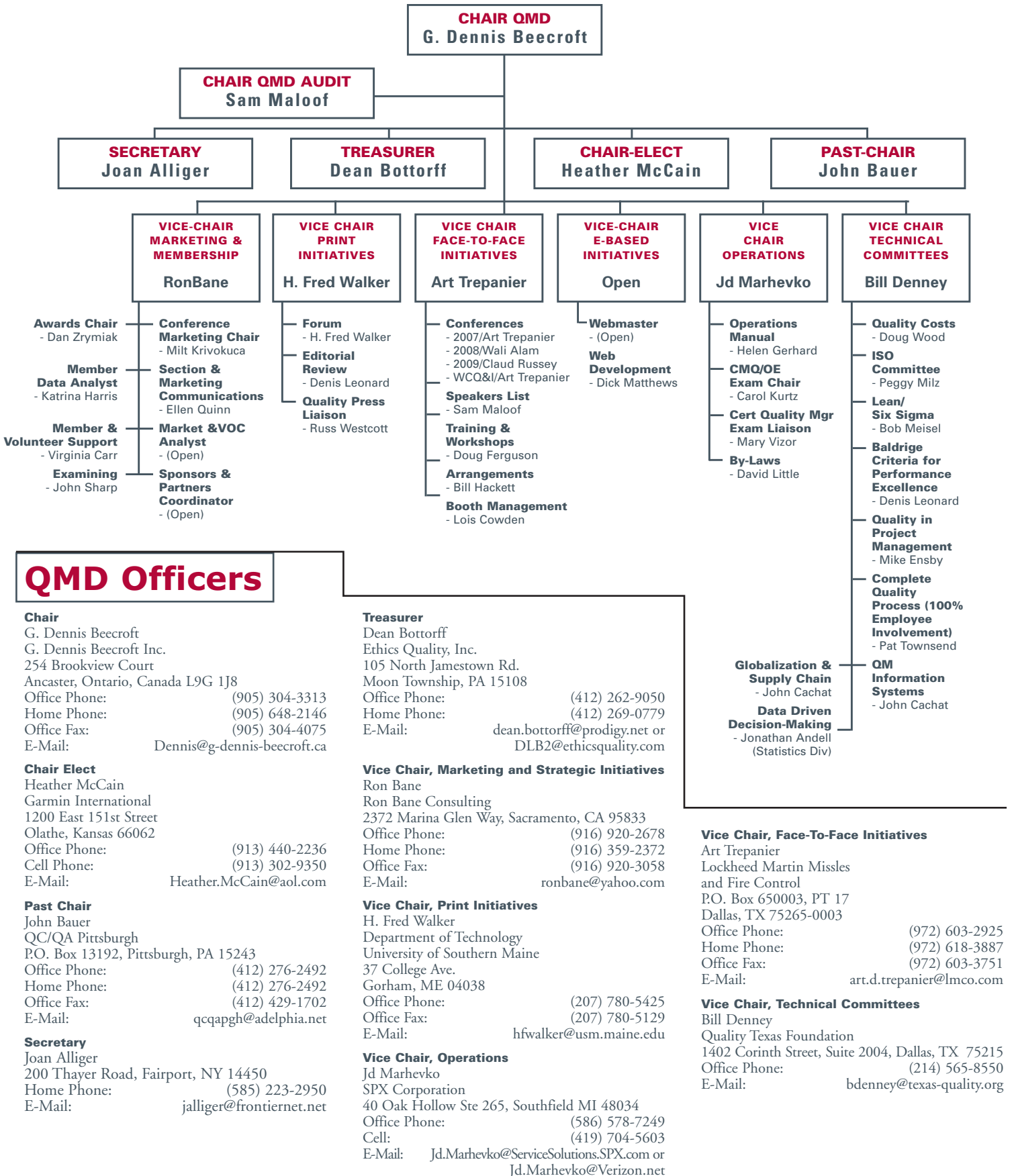
QMD Market/VOC Analyst

This individual will interpret QMD member and user voice of the customer (VOC) data. The individual will mine existing data sources, conduct special VOC efforts, and investigate best practices. This VOC interpretation will assist in the identification of improved/new QMD products and services. Prior data analyst or member/customer relationship experience is required.

Deputy Conference Marketing Chair

This individual will work closely with the Conference Marketing Chair to develop the brochure, ASQ & non-ASQ conference marketing materials, website notices, and Quality Management Conference marketing communications initiatives. Prior marketing or member/customer relationship experience is preferred.

If you are interested in the above positions or would like to discuss other volunteer opportunities, contact Virginia Carr at virginia.carr@totalsystemsdesign.com or call at **(484) 356-0288**.



QMD Officers

Chair
G. Dennis Beecroft
G. Dennis Beecroft Inc.
254 Brookview Court
Ancaster, Ontario, Canada L9G 1J8
Office Phone: (905) 304-3313
Home Phone: (905) 648-2146
Office Fax: (905) 304-4075
E-Mail: Dennis@g-dennis-beecroft.ca

Chair Elect
Heather McCain
Garmin International
1200 East 151st Street
Olathe, Kansas 66062
Office Phone: (913) 440-2236
Cell Phone: (913) 302-9350
E-Mail: Heather.McCain@aol.com

Past Chair
John Bauer
QC/QA Pittsburgh
P.O. Box 13192, Pittsburgh, PA 15243
Office Phone: (412) 276-2492
Home Phone: (412) 276-2492
Office Fax: (412) 429-1702
E-Mail: qcqapgh@adelphia.net

Secretary
Joan Alliger
200 Thayer Road, Fairport, NY 14450
Home Phone: (585) 223-2950
E-Mail: jalliger@frontiernet.net

Treasurer
Dean Bottorff
Ethics Quality, Inc.
105 North Jamestown Rd.
Moon Township, PA 15108
Office Phone: (412) 262-9050
Home Phone: (412) 269-0779
E-Mail: dean.bottorff@prodigy.net or DLB2@ethicsquality.com

VICE Chair, Marketing and Strategic Initiatives
Ron Bane
Ron Bane Consulting
2372 Marina Glen Way, Sacramento, CA 95833
Office Phone: (916) 920-2678
Home Phone: (916) 359-2372
Office Fax: (916) 920-3058
E-Mail: ronbane@yahoo.com

VICE Chair, Print Initiatives
H. Fred Walker
Department of Technology
University of Southern Maine
37 College Ave.
Gorham, ME 04038
Office Phone: (207) 780-5425
Office Fax: (207) 780-5129
E-Mail: hfwalker@usm.maine.edu

VICE Chair, Operations
Jd Marhevko
SPX Corporation
40 Oak Hollow Ste 265, Southfield MI 48034
Office Phone: (586) 578-7249
Cell: (419) 704-5603
E-Mail: Jd.Marhevko@ServiceSolutions.SPX.com or Jd.Marhevko@Verizon.net

VICE Chair, Face-To-Face Initiatives
Art Trepanier
Lockheed Martin Missles and Fire Control
P.O. Box 650003, PT 17
Dallas, TX 75265-0003
Office Phone: (972) 603-2925
Home Phone: (972) 618-3887
Office Fax: (972) 603-3751
E-Mail: art.d.trepanier@lmc.com

VICE Chair, Technical Committees
Bill Denney
Quality Texas Foundation
1402 Corinth Street, Suite 2004, Dallas, TX 75215
Office Phone: (214) 565-8550
E-Mail: bdenney@texas-quality.org

The Quality Management FORUM

Quality Management Division Print Initiatives Chair
H. Fred Walker, Ph.D.

Quality Management Forum Editor
H. Fred Walker, Ph.D.

Chair, Editorial Review Board
Denis Leonard, Veridian Homes

Editorial Review Board

Hank Campbell, Illinois State University, Emeritus
Eleanor Chilson, Pylon Manufacturing
Mary Ellen Costello, University of Southern Maine
William Denney, Quality Texas Foundation
Matthew S. Roe, Eaton Corporation Truck Components

The Quality Management Forum is a peer-reviewed publication of the Quality Management Division of the American Society for Quality. Published quarterly, it is QMD's primary channel for communicating quality management information and Division news to Quality Management Division members. The Quality Management Division of ASQ does not necessarily endorse opinions expressed in *The Quality Management Forum*. Articles, letters and advertisements are chosen for their general interest to Division members, but conclusions are those of the individual writers.

Address all communications regarding *The Quality Management Forum*, including article submissions, to:

H. Fred Walker, Ph.D.
Department of Technology
University of Southern Maine
37 College Ave.
Gorham, ME 04038
Office: (207) 780-5425
Fax: (207) 780-5129
E-Mail: hfwalker@usm.maine.edu

Address all communications regarding the Quality Management Division of ASQ to:

G. Dennis Beecroft
G. Dennis Beecroft Inc.
254 Brookview Court
Ancaster, Ontario, Canada L9G 1J8
Office Phone: (905) 304-3313
Home Phone: (905) 648-2146
Office Fax: (905) 304-4075
E-Mail: Dennis@g-dennis-beecroft.ca

Address all communications regarding QMD membership including change of address to:

American Society for Quality
Customer Service Center
P.O. Box 3005
Milwaukee, WI 53201-3005
1-800-248-1946 or (414) 272-8575

For more information on how to submit articles or advertise in *The Quality Management Forum* see the Quality Management Division Web site at www.asq-qmd.org. Articles must be received ten weeks prior to the publication date to be considered for that issue.

Contact the ASQ Customer Service Center at 1-800-248-1946 or (414) 272-8575 to replace issues lost or damaged in the mail.

Advertise in

The Quality Management Forum

If you provide products or services to the quality profession, *The Quality Management Forum* will help you reach your target market.



Every quarter, the *Forum* can convey your advertising message to nearly 20,000 Quality Management Division members. These members include many of ASQ's quality executives, managers, supervisors, and team and project managers. Most are decision makers or influencers for products and services such as:

- ✓ Consulting
- ✓ Training
- ✓ Publications
- ✓ ISO Registration
- ✓ Conferences
- ✓ Business Shows
- ✓ Software ... and more

For information on advertising in the *Forum*, contact
ProjectWest, 117 S. Spring St., Suite 201, Aspen, Colorado 81611
Phone 970.925.4234 x 17, Fax 970.925.4862 or E-mail info@projectwest.com.



American Society for Quality, Inc.
Customer Service Center
PO Box 3005
Milwaukee, WI 53201-3005

Non-Profit
Organization
U.S. Postage
PAID
Grand Jct, CO
Permit No. 134