JMC
JOURNAL OF MANAGEMENT CONSULTING

The Forum for Management Consultants Worldwide

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Implementing TQM on a Shoestring

Reprinted with permission from Volume 7, No. 4— Fall 2993

Implementing TQM on a Shoestring

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Total quality management (TQM) may be the most widely embraced new management approach in years. Corporate managers need help in getting started with TQM, and consultants are well placed to provide this help. Yet, the small client firm, which constitutes the bulk of this consulting market, typically has a meager consulting budget. In this article we explore TQM consulting, using for an example a small manufacturer that introduced a world-class TQM system on a shoestring.

A fertile field awaits the small or solo consulting firm: introducing Total Quality Management (TQM) to small businesses. Two experts describe a successful case history and offer a wide array of sources to guide consultants. They show that it doesn't cost extra to provide quality, as many believe, and that doing things right in the first place is actually less costly. So onward and upward with TQM!

The TQM Movement

The world is undergoing a quality revolution, driven in part by global competition, partly by Japanese successes, and also by new understandings of what constitutes quality. For example, we no longer believe it costs extra to provide quality; we know that doing things right the first time is actually less costly.

We're also seeing that quality isn't something that pertains only to the factory floor. To be effective it must pervade all parts of the business and apply even to those with no factories. Thus, we speak of total quality as a business-wide term and institute corporate programs of total quality management.

To improve industrial competitiveness, the U.S. government has instituted the Baldrige Quality Awards. Leading companies have won the award and their success has encouraged others to do likewise. Sometimes it's more than just encouragement; some companies require their suppliers to go through the demanding Baldrige Award application process just to show the supplier where to improve.

Apart from the Baldrige Award, many companies trying new manufacturing processes, such as just-in-time production, require their suppliers to start quality programs to ensure that parts are error-free, eliminating time-consuming inspections.

The pressure for a TQM program comes from Europe, too. The European Community has established regulations requiring any company—inside or outside of Europe—to comply with a complex TQM system called ISO-9000 if they want to sell their goods in Europe. The ISO-9000 requirement comes along just as economic pressures are encouraging U.S. companies to develop foreign markets. (See sidebar on page 12.)

Large companies have had corporate TQM programs for some years. Often their internal efforts have been bolstered by large consulting firms, which help to plan, implement, and assess TQM programs. Now the need for a TQM program is trickling down to the small companies, with fewer resources. The need is just as strong, and it's driven by the same factors. Yet it's not so clear to the small firm how to get started with TQM, nor is it so apparent to the consultant how to help implement TQM on a shoestring.

Many companies defer TQM projects because of their perceived high costs and time commitments. The manager's problem of wedging a quality-improvement project into an already

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Who Needs It?

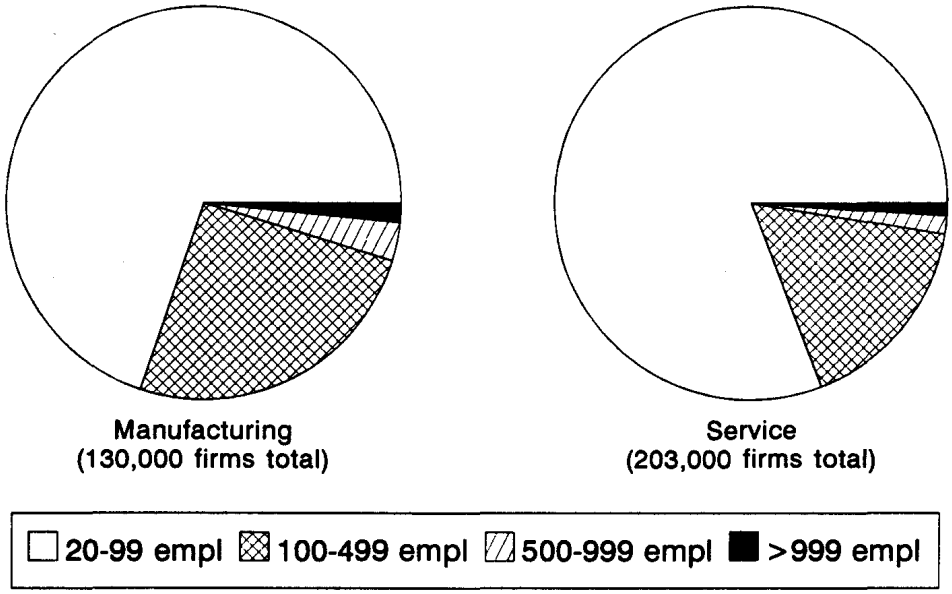
Certification for the ISO-9000 quality standard will eventually become a requirement for selling to the European Community, although it's not now a barrier. The certification comprises 20 standards to which business must be audited for compliance. The audits are heaviest in time and expense during first certification, with recurring costs to cover periodic requalification.

Most larger companies, with existing international sales are actively pursuing adherence to the standard. But many smaller ones may be weighing the costs and benefits of compliance. Most small businesses—for whom audit costs can range between $10,000 and $30,000, with recurring lesser requalification costs—are regional and therefore don't feel the immediate threat to their revenue.

Some larger American companies require ISO-9000 certification as a precondition for business partnerships, but this isn't common. So, small business may fairly consider the costs of ISO-9000 certification to be greater than the benefits. Some firms have adopted a middle ground by embarking on internal compliance efforts for each of the 20 standards, while forgoing the formal audits. Their aim and public claim is to "operate in compliance of ISO-9000," rather than be certified.

The ISO-9000 standard itself is a commonsense quality system designed to interlink all internal business functions to ensure that the customer gets what's asked for. It's not a quality or productivity *improvement* system as such but a sound basis for continued development of TQM. Small-business consultants can best serve their clients by helping to assess the need for certification or compliance. Unlike continuous improvement, ISO-9000 certification cannot be done on a shoestring, and might be better deferred until TQM improvements are in place.

Figure 1. Distribution of Prospective Client Firms by Number of Employees.



Source: U.S. Bureau of the Census. 1992. *Statistical Abstract of the United States,* Table 839.

frantic business day is daunting. And gaining financial approval for external help is hardly in the cards during a recession.

But many companies face this same issue, so it can be a consulting opportunity, particularly for small or solo firms. Small companies have some clear advantages for small consulting firms. Large consultancies are generally geared up to serve larger client firms, so they're at a disadvantage with smaller clients, especially when cost is paramount. And there are far more small prospective clients than large ones. As Figure 1 shows, for every U.S. manufacturing company with 500 or more employees, there are 20 manufacturers with 20 to 499 employees. For service companies, the ratio is 40 to 1.

What is TQM? The only agreement seemed to be that total quality was rarely total.

The pressures are such that small companies will adopt TQM, and many small ones are or will be trying to. How do we serve such clients? We offer some suggestions, but first let's get an idea of the questions these prospective clients ask about TQM and how consultants can answer.

Client's Questions About TQM

Since winning the Shingo Prize for Manufacturing Excellence, United

TQM ON A SHOESTRING

Electric[1] has been visited by dozens of companies looking for information on how to establish a Total Quality and Productivity program. Some of the questions they ask most frequently are:

- What is TQM?
- How did United Electric begin its TQM process?
- How do we find time for quality improvement?
- How do we afford quality improvement?
- Who leads the quality improvement process?
- How do we get employees to participate?
- What are the biggest inhibitors to TQM?

Like many smaller manufacturers, United Electric (UE) has struggled with these questions in its efforts to revitalize its systems for quality and productivity. Faced with limited time and resources, the firm has fashioned a project for continuous improvement. It balances returns against investment through strategic use of reading, consultants, and public workshops. Here's UE's response to these questions, together with recommendations on where the consultant can best contribute to a small-business TQM program.

What is TQM?

At a recent meeting of 50 New England manufacturing vice presidents, TQM case studies of three companies were presented. The first focused on "just-in-time" methods, another on listening to the customer, and a third suggested that TQM was just common sense and needed no specific program or structure. A polling of manufacturing executives in attendance produced still more definitions of TQM. The only agreement seemed to be that total quality was rarely total. Usually leadership and participation was confined to production. It appeared that many companies have not adequately defined what they're trying to do. When companies visit United Electric, often the first question asked is "How do you define TQM?"

At UE, we use the expression "continuous improvement" to describe TQM. Based on ideas from the Toyota Production System (TPS), as described by Shigeo Shingo and Taichi Ohno, continuous improvement was first applied only to production. Later, thanks to a fortunate association with Ryuji Fukuda,[2] the improvement process broadened to cover all functions companywide. Fukuda's process for improving is a simple three-step model:

- Identifying reliable methods. A reliable method is any process that will consistently improve quality and productivity.
- Creating an environment that supports these new methods. This environment requires continuous learning of reliable methods and also the freedom to practice them.
- Keeping all employees practiced in the reliable methods. UE began with several key reliable methods learned from the TPS: waste identification, kanban, and mistake-proofing.

Later, through additional study, UE added the 5S process and many problem-solving methods, such as cause-and-effect diagrams with the addition of cards (CEDAC) and Jidoka (see box on page 14). Each year UE's list of reliable methods has grown, and it now covers more than three dozen key strategies. The process has extended beyond production to involve engineering, finance, and sales-marketing. One lesson learned is that if the "favorable environment" is provided, the learning process grows in both breadth and depth of understanding. No single book or method does the trick; there is always something new to be learned. Some time ago UE allowed a competitor to tour its factory. When asked what literature he used in his company's improvement process, he said, "Oh, I read some book, can't remember the name. They're all the same anyway . . ." Now, years later that competitor's static approach to TQM continues to falter.

The consultant can first help these clients by defining TQM as a tool for continuous improvement that both improves quality and reduces costs. A TQM program that focuses mainly on defect reduction covers only one of the seven wastes identified by Toyota. It might generate more early costs than returns. At United Electric, focusing first on the waste of overproduction saved the firm over $1 million in inventory costs in the first year alone. By focusing first on cash generation, UE made enough gains to finance later improvements. The TPS model is ideally suited to both the small business and the small-business consultant because its concepts are simple and require little or no investment. By focusing on the Toyota model for lean production, the consultant maximizes opportunities for early gains in productivity and quality.

TQM ON A SHOESTRING

Reliable Methods of the Toyota Production System

Along with the shift from large-lot to small-lot production comes a whole new language and set of acronyms. Understanding them will be critical to helping your clients make the best choices. Below are explanations of lean production terminology.

TPS. The Toyota Production System encompasses a broad range of proven techniques to reduce costs by eliminating waste in production. "Lean production" itself is an American synonym for TPS, made popular in the book *The Machine that Changed the World*. The TPS system is often described pictorially as a house with a TQM foundation, a floor of Production Smoothing, and pillars of JIT and Jidoka.

TQM. Total Quality Management describes an active, companywide quality system. Inspection of products is largely replaced by thoughtful planning, control, and continuous improvement of processes. Employees in all functions are educated and empowered to identify and eliminate wastes.

JIT. "Just in Time" means produce only what is needed, when needed, and in the amount needed using a minimum of materials, equipment, labor, and space. A wide range of JIT techniques can achieve this goal, and some are described below.

Waste Identification. This is the keystone of TPS because it requires that management and workers see their workplace in an entirely different way. It's the essence of the shift manufacturers must embrace for any part of lean production. Toyota describes seven wastes that must be eliminated in production. These are overproduction, waiting, transportation, processing, storage, motion, and defects. Many books on JIT describe these wastes in detail, but an easily readable source is *Kanban Just-in-Time at Toyota*.

Kanban. This is the Japanese word for "sign," the kind that sits at a storefront to describe what is being made. Kanban is a simple inventory-control system that reintegrates information flow with material flow. A box of material of standard quantity is produced and stored in the producing work center along with its kanban, or card. Material is withdrawn by the consuming work center when it is needed; this is referred to a "pull system" (Taichi Ohno says he got the idea from visiting an American supermarket.) As the material is withdrawn, the kanban is returned to the producing work center as an order to produce. At United Electric, this technique was largely responsible for reducing excess inventories by $2 million in just one year.

SMED. Single Minute Exchange of Dies, a concept pioneered by Shigeo Shingo at Toyota, aims to reduce all factory set-ups by 59/60ths. In other words, a set-up of one hour should take one minute. This may sound like a bold claim, but it can be realized with surprising ease. Dr. Shingo's book *A Revolution in Manufacturing* is a must-read for anyone seriously considering TPS. The implications of SMED to the traditional large-lot production system are mind-boggling. Think about how your client's factories would change if the economic lot size for all parts could be reduced by 98 percent.

Poka-yoke. This means "mistake-proof" The concept, also from Shigeo Shingo, is perhaps the most underused technique from the TPS. In his book *Zero Quality Control*, Shingo describes devices and techniques that eliminate the need for human judgment in production, thus eliminating the human tendency to make mistakes. As production lot sizes are continually reduced, the need increases for defect-free parts. At United Electric, we have seen part yields in specific "problem" processes increase from 80 percent to 100 percent through the use of poka-yoke devices.

Production Smoothing. This concept, also referred to as "one-piece flow," requires aligning and balancing factory processes to minimize work going on between processes. It also requires that changeover from model to model be smoothed so that workers can produce many different models simultaneously.

5 S's. Each of the five S's is a Japanese word to describe the importance of good housekeeping. Most factories are junk repositories, with old benches, fixtures, cabinets, machines, inventory, and trash everywhere. Before beginning improvement, the TPS requires that you throw out these unneeded items (Seiri) and then organize those that are left (Seiton) in a visually clear manner. The factory should be spotless (Seiso) and all equipment maintained (Seiketsu). Finally, workers should follow existing rules and standards (Shitsuke). Toyota recommends the five S's as the first step to improvement. These no-risk actions bring surprising results. When United Electric began to identify unneeded equipment, we literally had enough excesses to set up another entire business. Once removed, a previously cluttered environment became open and visually easy to understand. A source-book for implementing this technique is *JIT Factory Revolution*, by Hiroyuki Hirano.

VCS. Use of Visual Control Systems in the factory is another no-risk way to improve. Too often people use visual-control devices only for emergency contingencies (e.g., an EXIT sign or a HAZARDOUS WASTE symbol). Use of VCS throughout the production process clarifies responsibilities and opens up communication. Michel Greif's book *The Visual Factory* is an excellent resource for making the best use of visual control to improve quality and productivity.

CEDAC. It means Cause and Effect Diagrams with the Addition of Cards. Use of CEDAC at United Electric enabled us to identify causes and cures for stickier problems, or problems that involved several different departments for solution. The technique is described in detail in Ryuji Fukuda's book *CEDAC*.

JIDOKA. This combines several elements that amplify worker productivity by transferring repetitive manual operations to a machine. The first element involves techniques to identify, measure, and separate human work from machine work. A second involves changing machines to shut down automatically when defects are detected. By transferring operations to machines and eliminating the need for a worker to "stand and watch," the worker gets time to handle multiple processes at the same time. For a more detailed explanation, read *JIT Factory Revolution*.

This is by no means a complete list of new terminology. But it's complete enough to save your client millions of dollars, as it has for United Electric.

Using Dr. Fukuda's model as a framework, the consultant can help clients identify and learn reliable methods, and create a workplace environment conducive to their practice. The role of coach may last well over two years as the breadth and depth of learning and participation grows.

How did UE begin its TQM process?

UE began with what Shigeo Shingo called "constructive dissatisfaction." Most of UE's performance and financial indicators needed improvement and tried-and-true production methods weren't working. So the employees started reading. Their first book, *The Goal,* a novelette about a manufacturer struggling with change, was distributed to every employee in the company. For many it was the first book they had read in years. Because it articulated the problems faced at UE, it created an excitement for change that got them started on continuous improvement. They followed up with workshops that brought the ideas from the book into the business.

Shigeo Shingo noted that most employees would eliminate waste, if they could only identify it.

Other books followed. Robert Hall's Zero *Inventories* and Richard Schonberger's *World-Class Manufacturing* were good primers for the methods of the Toyota Production System and served as the blueprint for UE's first improvement plan. They led also to more direct sources of the TPS: Shigeo Shingo and Taichi Ohno. From there on, UE established a still-growing library that now holds more than 300 books. (See sidebar for sources of these materials.)

Small-business consultants can leverage their involvement by careful selection of books for use in the TQM effort. UE's library for quality and productivity is a priceless resource with a moderate price tag. Advance study by the consultant can give the client a big head start. And the consultant can act to translate learning into action. In *The Goal,* for example, certain dice games played to demonstrate dependency and statistical variation can be replayed in a classroom setting. Later, the ideas translate more easily to the factory setting.

How do we find time for quality improvement?

The TPS concept of value-added manufacturing teaches that 95 percent of the elapsed time to build a product is wasted. Shigeo Shingo noted that most employees would eliminate waste, if they could only identify it. The key to making time for quality improvement is in learning to identify waste in production. Waste—anything that adds no value to the customer—could be found in any of seven forms: storage, transportation, overproduction, defects, inadequate processes, waiting, and motion. At UE, overproduction (producing for stock rather than customers) was so rampant that a modest first reduction in lot sizes created more than enough time for continuous improvement. We have seen the same situation occur at other companies.

On day one, before any improvements could be seen, someone at UE had to allow production employees the time to learn about TPS and the seven wastes, or nothing further could

Information on TQM: UE's 10 Best Sources

United Electric used many sources of information in implementing TQM:

1. **Productivity Press,** Cambridge, Mass. Publishes a library of dozens of the best books on continuous improvement, chiefly from Japan, induding the works of Shingo, Ohno, Fukuda, and Hirano. It conducts public workshops and seminars as well as study missions to Japan.
2. **Goal/QPC,** Methuen, Mass. A nonprofit quality organization and publisher of total quality materials, also conducts local and national workshops.
3. **Goldratt Institute.** Founded by Eli Goldratt, author of *The Goal*, this institute promotes Theory of Constraints, dealing with change management.
4. **American Society for Quality Control (ASQC).** Society for quality professionals, also publishes a large library of quality improvement texts.
5. **American Production and Inventory Control Society (APICS).** Society for materials professionals, publishes materials and holds workshops on JIT.
6. **Society of Manufacturing Engineers (SME).** Society for manufacturing professionals; also a publisher of TQM-related materials.
7. **Baldrige Award criteria**. These are free, from the National Institute of Standards and Technology, Washington, D.C. An excellent template to improve quality.
8. **Shingo Prize criteria**. Also free, from Utah State University, Ogden, Utah, administrator of the prize. Criteria for the prize follow the Toyota Production System, which UE used as its model for continuous improvement.
9. **Association for Manufacturing Excellence (AME).** A broad-based society for industry dedicated to American competitiveness and lean production systems.
10. **Local universities**. There are pockets of excellent research and resources at many universities.

have occurred. UE's president, Dave Reis, can be applauded for taking that leap of faith in 1987 when time spent away from production was recorded as "nonproductive." But once in progress, the TPS created time.

The consultant can help the small business two ways: first, he helps to identify the "low hanging fruit," waste that can be easily removed to create more time for improvement. At United Electric, an early analysis of flow distance for a major product reduced the distance from twelve miles to 40 feet, cutting time to produce from months to days and eliminating huge work-in-process inventories. By moving all operations to a single production cell, a no-risk improvement created time in a dozen departments that had previously been involved in production.

Second, the consultant can prepare the small-business CEO for the pattern of events that is likely to occur during the early stages of improvement. Negative effects are short-lived but can be harrowing. The consultant may be able to help the CEO to network with other executives who are further along in the TQM process.

How could we afford quality improvement?

UE's investment in education is about $5,000 a year for books and about the same for public workshops. UE's association with consultants has been mainly through public workshops or as coaches, enabling the company to learn from the best, yet maintain a modest budget. United Electric doesn't account for the time employees spend on continuous improvement, but it's probably about an hour a day per employee This is a part of the time employees have gained through elimination of wastes. Although there has been investment in mistake-proof and quick-change fixturing, these costs have paid for themselves a hundredfold. Inventory reduction alone saved $1 million in 1988 and $2 million in 1989. Inventory has decreased by 70 percent since the TQM project began. Lead times to customers have been reduced from two months to two days. The added revenue this has produced has increased shipments per employee by 40 percent.

TPS can be started on a shoestring, for the cost of a dozen books, and it's best implemented internally with the consultant as coach.

In retrospect, the answer to "How can we afford quality improvement?" is easy. But too often, small companies forgo TQM until they can afford to "buy it." TPS can be started on a shoestring, for the cost of a dozen books, and it's best implemented internally with the consultant as coach. Once under way, it pays for itself and more.

The consultant can help create the vision for improvement that favorably demonstrates the costs and returns. Once again, by focusing on identifying and eliminating non-value-added wastes, the consultant and client can effect early returns of both time and cash.

Who leads the quality-improvement process?

The answer depends on where you stand in the life of the improvement process. Someone has to be first to suggest a quality-improvement process. This may be the president, but it is more likely to be the chief of operations or someone in his organization. It could also be a customer or a supplier—even a consultant. But after the first spark, the leadership must pass to someone with enough authority to "let" things happen.

The ideas spawned in the Toyota Production System deal with removing the waste from making something. They aren't so much in the domain of marketing or engineering or financial people. Typically only someone in manufacturing knows how a product is made. So leadership is probably best placed in operations. Often, operations or manufacturing managers complain that they can't introduce total quality because their boss isn't involved, or because other departments—sales or engineering—won't participate These managers should focus on what they can do, not what they can't do. In the beginning phases of a TQM project, production can lead, and other departments can follow if they see it to be in their interest. Ultimately, if a TQM program succeeds, it must be embraced by management and the entire corporation. But it's not realistic that every improvement should begin that way. Over time, a TQM project should have many leaders.

The consultant's job is to recognize at each phase who the real leaders are and to focus resources and attention in that direction. These leaders may be managers or straw bosses. They're the ones having what Shingo called "constructive dissatisfaction."

How do we get employees to participate?

Ryuji Fukuda recommends that managers identify reliable methods for continuous improvement and then create a favorable environment to learn and practice these methods. At UE, key elements include perseverance, patience, and a commitment to employee education. It educates them primarily through individual and group reading, and through UE's small-group improvement activities—Action Centers. Employees who become expert in a particular reliable method are, in effect, UE's internal consultants. Since 1988 United Electric has established a total employee involvement program that recognizes and rewards individual and group participation. Employees earn chances toward monthly, quarterly, and annual drawings with prizes ranging from tickets to sporting events to getaway weekends to all-expense-paid cruises. Current participation is at 90 percent.

Bringing compensation and reward systems into alignment with TQM can be a key contribution of the small-business consultant. In most small companies, pay administration hasn't changed in decades and doesn't reflect the new contributions expected of employees. The question of fair compensation for new roles may arise early or late in TQM, but it's wise to be prepared early.

What are the biggest inhibitors to TQM?

John Milliken, CEO of Milliken Corp., a Baldrige Award winner, said the three biggest inhibitors to improvement are "top management, middle management, and first-line supervision," To the extent that these people must enforce corporate policy, they're usually more accomplices than ring leaders. The real culprits are the policies—cost accounting, salary administration, pricing—by which day-to-day decisions are made. These are mostly out of sync with new strategies for quality and productivity, and they're rarely questioned by anyone empowered to change them.

If there is one single role that only top management can play, it is revising obsolete policy.

Consider an example of distribution policy. In a traditional large-lot production environment, finished goods inventories often are maintained as compensation for long production times. This is true at the factory and also throughout the network of independent distributors. The need to provide fast customer service encourages excessive shelf inventory. It's common for manufacturers to institutionalize this waste through policies that reward distributors for holding excessive stock. Such policies often allow distributors periodically to return a percentage of unsold inventory for rebate. Over time, large stocks of residual, slow-moving finished goods inventory build up at the factory. Cash flow of both the manufacturer and the distributor suffers because of overproduction, storage, and transportation.

When UE adopted small-lot, short-lead-time production and began eliminating finished goods stocks, the policy rewarding large distributor stocks became antagonistic to productivity and service. UE sales managers realized this and began easing off stock-quota guidelines. One distributor found it could hire an additional salesperson with money saved from excessive stocks.

If there is one single role that only top management can play, it is revising obsolete policy. Ultimately, management should be less concerned with trying to create a new culture and more concerned with changing old laws. No other venture costs so little and produces so great a return. The earlier that policy is questioned, the earlier the return. As an external observer, the consultant can play a valuable role in identifying policies due for change.

How the Consultant Adds Value

For each question just discussed, we have suggested how the consultant can help in dealing with it. But helping a small manufacturer begin TQM on a limited budget involves more than just these questions. Here we provide more general guidance on handling the engagement and working with the client.

The crucial issue in starting a TQM program is finding the time to do it. Much time ultimately will be needed, and the time demands will continue. Finding time is especially difficult at the outset, before any gains have created extra time to reinvest in TQM.

The client and the consultant must discuss at the very beginning who will invest the time. The easy answer is that the consultant's time will be spent, but for several reasons this is not advisable:

- The client needs to invest heavily to mold the program to his style and assume ownership

- Ultimately, the client will want to wean himself away from the consultant's help

- The consultant's time translates directly into client expense, and while staff time is precious in a small company, expense money tends to be even more precious

Thus, the right strategy for a small company is to shift the time burden as much as possible to the client and use the consultant's time in areas where it's far more effective than client time. This means the consultant operates in advisory, oversight, and monitoring roles rather than in hands-on work. A retired Navy captain explained how the Navy did it. To train midshipmen, a group of them would supervise a ship-cleaning operation, wearing white gloves. At the end of the day, the gloves were inspected, and the midshipman with the cleanest gloves was called the best delegator.

A large consulting firm often assigns a team of consultants to a project, headed by a team leader. If the team is large enough to support it, the leader takes the oversight role. With a company on a shoestring budget, the consultant acts in this team-leader role, keeping his gloves clean, and employees become "consultants." For this leveraged system to work, management must commit the time of selected employees and relieve them of other duties. Management thus signals its support of the TQM program, precisely as Dave Reis of UE did.

This role doesn't mean the consultant minimizes contact with the client. Such programs can lose momentum without frequent follow-up and feedback. The consultant must take responsibility for keeping on top of the project. The trick is to invest little of the consultant's time at each occasion. Quick visits and especially phone calls work well. An effective way to use modern technology is to have one party fax a diagram or an outline (not text or a report) to the other and then call to discuss it. Whichever medium is used, the key is to do it regularly, even if there appears to be nothing to discuss.

Identified change is the link that fertilizes the program and allows it to blossom.

The consultant should make a point of staying close to the CEO. The CEO is the company's nerve center, and his continuing support is essential to the success of a culture-change program like TQM. Fortunately, in a small company this isn't hard to do: although the CEO is busy doing many things, he generally makes tune to see the consultant. There is another reason for staying close to the CEO in a small company. Small companies often are privately held. Their CEOs can be isolated from outside advice, particularly if family members dominate the board of directors. In this situation, the CEO needs an outside viewpoint, especially with an unfamiliar program.

With TQM, it's essential to identify and celebrate changes. Change is the desired output and also the required input to sustain the program. In other words, identified change is the link that fertilizes the program and allows it to blossom. The consultant can add great value here Often change isn't apparent to insiders, or they don't want to "toot their own horn." Sometimes, the change doesn't seem very radical, so people wait for something more miraculous to occur. If signs of change can inspire more of it, the consultant and client people all need to be watching for change and ensuring that it doesn't go unnoticed. The consultant is likely to handle this task better at the outset, and part of his job is to model for the client how success is identified and propagated.

Another strategy for the consultant working on a shoestring assignment is to stretch the client's expense funds as far as possible. He can use prepackaged materials—books, audio tapes, and videos—and avoid live training, short courses, and customized materials.

This doesn't mean one should always be sparing. Sometimes high-leverage special opportunities will more than pay for themselves, perhaps in motivation. If employees have gotten a great deal out of a certain book and the author is reasonably accessible, you might celebrate employees' studiousness by having the author come to lead a seminar.

Lastly, be careful about consultant travel expenses. The simplest way is to cultivate local TQM clients, so you can visit them frequently without incurring airfare expenses.

Suggestions on Tactics

Our experience with these programs leads us to offer several specific techniques that allow the consultant to leverage his value.

You'll depend greatly on employees to get the work done, so be definite about assigning project responsibilities and getting commitment on completion. If these commitments start to

slip, fix the problem. Make it clear to the client that the only way to succeed with this low-budget approach is by making it a priority.

Don't let your relationship with the client end when he can do TQM on his own. Keep in touch.

You will need early successes to feed further successes, so start doing some small experiments early. Try to identify those most willing to change, and start with them. It's alien in many cultures to try things before all the facts are in, so you may have to encourage the first attempts strongly. The very concept of experimentation by employees at all levels may need continual encouragement.

Suggest an ample library and promote its use. Books are one of the least expensive means available to develop skills—if the books are read. UE provides a comfortable library in a convenient location with multiple copies of books for the asking. Another firm published a catalog of its library holdings and kept the books in the mailroom for quick distribution to anyone wanting a copy.

Book-study groups work well. A half-dozen people read the book they have chosen, about a chapter a week, and meet weekly to discuss their findings and how they apply on the job. UE uses this approach effectively.

Many smaller companies start TQM at their customers' suggestion. Customers often have TQM materials and sources they're willing to share with suppliers. You might consider visiting customers and suppliers with TQM programs to see how they have done it.

Public sources of help are increasingly available to small companies. The National Institute of Standards and Technology has established regional Manufacturing Technology Centers to help small businesses with hard and soft technology. The Navy's Best Manufacturing Practices offers a computer network of TQM practices. The Department of Commerce and Bureau of Mines offer similar help. By serving as a clearinghouse for these programs, the consultant can multiply the resources at the client's disposal.

To use your consulting time most effectively, avoid written reports both ways between the client and the consultant. They take time and are often obsolete before they get read.

Try to quote these TQM projects on a retainer basis that fairly represents the time you spend. Then you can be generous about spending the many small bits of time with a client that such projects require. The retainer approach also puts you and the client at ease about the "ticking clock:' In any case, encourage client employees to call at any time if they have something interesting to report. This alerts you to potential problems before they get out of hand.

A success story is a good place to end. But don't let your relationship with the client end when he can do TQM on his own. Keep in touch. Success makes him a potential mentor to colleagues in other companies, and they can become salespeople for your services. Executives of small companies often have extensive networks. Encourage them to share what they have learned through public forums, and make it clear that your livelihood depends on referrals from people like them. ■

Notes

1. United Electric Controls Co., a 300-employee manufacturer of temperature and pressure sensors and controls, is in Watertown, Mass. It began its TQM program in 1987. The prize is named in honor of Shigeo Shingo, co-creator of the Toyota Production System, and is awarded annually to American companies whose manufacturing practices exemplify Shingo's high standards for quality and productivity improvement.
2. Ryuji Fukuda is a noted productivity and quality consultant and Deming Prize-winning author of *Managerial Engineering*. UE's association with Dr. Fukuda was through its participation in a public workshop on techniques for continuous improvement.

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