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TQM at the XYZ Corporation New Jersey site:

A case Study

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Abstract

This case study examines the quality management at the XYZ Company New Jersey manufacturing site. It attempts to assess the overall impact of quality on the site operations from the employees' point of view. Interviews with site managers, supervisors, and employees support the claim that some organizations use Total Quality Management to legitimize their organizations (Moss-Kanter, Stein & Jick, 1992; Zbaracki, 1994).

Total Quality Management (TQM) at the New Jersey site of the XYZ Corp.

Introduction

For many managers, the concept of quality is difficult to grasp. Often they view quality as satisfying external customer requirements, even if the requirement is to meet minimum specifications. Quality, however, is more than external customer requirements; it is an operating philosophy that reduces process variability and cost (Aguayo, 1990). It also increases employee satisfaction and participation in the decision-making process and enhances the process of learning to learn. For W. Edward Deming, the "father" of the quality movement, quality results from the interaction of the product, customer training, and the way the customer uses the product (Anderson, Rungtusanatham, & Schroeder, 1994). Many organizations, however, do not view quality as a philosophy that strives for continuous improvement. Rather they view quality as a set of standards or as a way to legitimize their processes (Zbaracki, 1998).

Organizations that view quality from a quantity viewpoint, or for legitimization, purposes are unlikely to achieve continuous improvement or reduce their cost structure (Moss-Kanter et al., 1992). Additionally, they will not meet the needs of their internal customers.

This paper examines the New Jersey site of XYZ Corporation to determine if their quality management is effective, particularly from the employees' point of view.

Their quality management, although well documented, appears to be for legitimization purposes, particularly to achieve and maintain ISO certification.

Definition of Terms

Brainstorming is a group problem-solving technique that involves the spontaneous contribution of ideas from all members of the group (Merriam-Webster's Collegiate Dictionary).

Collaboration is the process through which parties who see differently can constructively explore their differences and search for solutions that surpass their limited vision of what is possible (Kotter, 1996).

Continuous improvement is a company-wide process focused on incremental, as well as a breakthrough, improvement (Bessant, Caffyn, Harding, and Webb, 1994). For Deming, it means better and better quality, less and less variation (Anderson et al., 1994).

Core values pertain to deeply held beliefs about people and processes determining who we are and what we do—the guiding principles of all we do and choose not to do (Zanfren, 1999).

An external customer is whoever is paying for the product or service (Dobyns & Crawford-Mason, 1994).

An internal customer is whoever in the organization that depends on the work of other organizational members (Dobyns & Crawford-Mason, 1994).

ISO is the International Organization for Standardization. The ISO 9000 series is a quality management and assurance standard (Higginson & Waxler, 1994).

Kaizen is a Japanese word for continuous improvement (Terziovski & Samson, 1999) and gradual improvement (Winston, 1999).

Kinesics is the study of body movement, including facial, eye, stance, sitting, and other related body movements (Dodd, 1998).

Legitimacy is the organizational process of conforming to institutionalized beliefs about how they ought to be constructed; it creates structural similarities between organizations (Moss-Kanter et al., 1992).

Quality Circles are small, diverse groups or project teams formed to develop solutions to perceived, or identified, problems (Winston, 1999)

TQM is total quality management, which is a management system consisting of values, techniques, and tools (Hellsten & Klefsjo, 2000).

Trust is a habit that forms over time between people (Putman, 1993).

Literature Review

TQM is a tool to implement organizational change by engaging and increasing employees' commitment. TQM approaches typically involve continuous team problem-solving activities, statistical control and measurement of quality, identification of internal and external customers, and extensive training (Kirk, 2000; Duffin, 1995). It is, therefore, a relationship between an organization's culture and its customers. Additionally, it empowers and assigns value to employees (Wesbrook, 1993). Thus, TQM integrates strategy, management practice, and organizational outcome to create an organization that continuously improves and sustains performance (Hellsten & Klefsjo, 2000; Terziovski and Samson, 1999). It consists of core values, the basis for organizational culture; techniques, which are ways to work within the organization to achieve the values; and tools that support and facilitate the decision-making process and may have a statistical basis (Hellsten & Klefsjo, 2000).

A concise definition for TQM, however, is elusive, primarily because its foundation is philosophical. Thus, customer satisfaction, which varies, often define quality (Anderson et al., 1994; Becker, 1993). Therefore, for some customers, minimum standards satisfy their approach to TQM. Nevertheless, the consensus definition adopted in the 1992 Procter & Gamble sponsored Report to the Total Quality Leadership and Steering Committee and Workshop Councils is that TQM focuses on people and a continual increase in customer satisfaction at ever-lower cost (Becker, 1993). The report also defines TQM as a total system approach, an integral part of a high-level strategy.

Moreover, it works horizontally across functions and departments; it includes all employees, top to bottom, and extends backward and forward to include supplier and customer chains. It stresses learning and adaptation to change as a key to organizational success (Becker). Additionally, it also stresses interrelationship between the organization's culture, the use of organizational teams for problem-solving, and Shewhart's wheel – plan, do, check, act (Westbrook, 1993; Becker, 1993; Anderson et al., 1994).

Deming, however, defines quality as the pride of workmanship (Aguayo, 1990), and he never used the term TQM. He also stated that quality has no meaning except as defined by the desires and needs of customers (Dobyns & Crawford-Mason, 1994; Gabor, 1990). Thus, according to Deming, there is no such thing as TQM; it is a meaningless buzzword (Hellsten & Klefsjo, 2000; Higginson and Waxler, 1994; Zbaracki 1998). Also, others have expressed similar views. For instance, Joseph Juran is critical of how the TQM concept is tossed around without defining what it means (Hellsten & Klefsjo, 2000).

Regardless of how people define TQM, organizational leaders are key to the success of TQM, because they are responsible for creating and communicating the vision to move the organization toward continuous improvement. They are also responsible for providing formal and informal support to enable the creation and sustenance of an organizational system receptive to process management practices (Anderson et al., 1994). Thus, they, as well as others in the organization, need to learn to be innovative and efficient. Hence, for TQM to succeed, leaders must establish a climate that fosters learning and cooperation (Anderson et al.). Many leaders, however, use TQM to legitimize their organizations (Moss-Kanter et al., 1992; Zbaracki, 1998), rather than to improve processes by continuously minimizing errors and rework.

When leaders use TQM to gain legitimacy without affecting the socio-technical aspects of the organization, it becomes meaningless to the employees (Zbaracki, 1998). However, how do people determine when leaders are using TQM appropriately? Organizations can make that determination by examining the core values, techniques, and quality tools they use in their organizations (Zbaracki, 1998). For instance, organizations engaged in TQM will use flow charts, scatter plots, histograms, Pareto analyses, cause-and-effect diagrams, and specification charts with upper and lower control limits (Winston, 1997; Dervitsiotis, 1998). These organizations will also engage in frequent brainstorming sessions with organizational participants familiar with the relevant processes under consideration. Additionally, as quality improves, they exhibit a lower cost structure (Aguayo, 1990; Kondo, 2000). Moreover, Dervitsiotis (1998) and Becker (1993) point to management tools of quality, such as affinity, matrix, and tree diagrams, as well as product planning tools, such as group interviews, questionnaire surveys, etc.

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The concept of quality management does not include technology. It involves thought (Dobyns & Crawford-Mason, 1994). Nevertheless, to improve thought, leaders must improve the quality of information about the realities of customers' and employees' needs (Moss-Kanter et al., 1992). Every aspect of organizational functioning depends on information processing of one form or another; thus, organizations are information, communication, and decision-making systems (Morgan, 1997). Consequently, Morgan points to Herbert Simon's argument that organizations are not perfectly rational because their members have limited processing capability.

Nevertheless, leaders generate and control most of the information that determines production outputs and employees' remuneration. Dervitsiotis (1998), in quoting Konda, indicates that managers determine 70 percent of the value-added in products and services for internal and external customers in the planning phase. Thus, their information base and thought processes exert a crucial influence on the organization's operation.

People improve their thought processes through learning. However, conventional management approaches prevent the natural development and growth of adult individuals, work teams, and organizations by creating environments that impede learning (Dervitsiotis 1998; Morgan, 1997). Nevertheless, how can employees adapt to rapidly changing environments without sufficient learning?

Without the ability to learn, employees and organizations will find it difficult to adjust to rapidly changing environments. Organizations, therefore, must engage in the process of self-regulating behavior, whereby leaders use "negative feedback" from organizational members to detect and correct errors (Morgan, 1997).

<u>Negative Feedback</u>

Negative feedback is a fundamental TQM concept. For instance, management uses SPC charts to detect movements beyond specified limits and then move in the opposite direction to maintain the desired course of action. Likewise, leaders can regulate behavior by scanning negative feedback that results from managerial policies. Thus, they can use negative feedback to eliminate errors and misunderstandings (Morgan, 1997). The principle of negative feedback is inherent in the common house thermostat. Negative feedback, however, is a maintenance process; it merely returns the system to the standards guiding it (Morgan).

Thus, there is a distinction between the process of learning and the process of learning to learn. The former does not question the appropriateness of adjustment (Morgan, 1997). However, the process of learning to learn questions, and can detect and correct errors in the operating norms and influence the standards that guide their detailed operations (Morgan).

Negative feedback is single-loop learning, and learning to learn is double-loop learning (Morgan, 1997). Budgets, TQM, and other management controls often maintain single-loop learning by monitoring variances to ensure that organizational activities remain within prescribed limits (Morgan). However, many organizations are incapable of maintaining single-loop discipline because of incorrectly specified controlling parameters. For instance, often, leaders develop budgets below historical norms, underfund projects, or under staff departments. Consequently, their organizations consistently operate outside the operating norms.

On the other hand, double-loop learning is far more elusive, because managers often perceive employees' questioning of policies, operating standards, and initiatives as insubordination (Morgan). Employees are usually encouraged to occupy and keep a predefined place within the organization, and managers reward or punish them for doing so (Morgan). Therefore, employees recognize that leaders often only want information that validates the leader's choices. Hence, many leaders only hear what they want to hear, and learning to learn does not occur.

<u>Who is responsible for quality?</u>

More often than not, managers assign the responsibility of quality to the employees. Nevertheless, employees seldom determine the layout of the facilities, the environmental temperature, research funding, investment in capital assets, tools, or raw materials, nor do they develop the organization's reward system (Aguayo, 1990). Aguayo also notes that management determines over 90 percent of the things responsible for product quality. It is, therefore, management's responsibility to improve quality to enhance the employees' pride in their workmanship, and they must take the leadership role for product and process quality (Anderson et al., 1994; Dervitsiotis, 1998; Duffin, 2000). Management creates and communicates the vision to move the organization toward continuous improvement (Anderson et al., 1994; Deming's Point 1). For Deming, quality management is the understanding of the power and pervasiveness of variation and how it affects the process, the delicate interaction of people, machines, materials, and the environment (Gabor, 1990). Variability is inherent to all phenomena (Anderson et al., 1994).

Quality, however, is not managed by visible numbers. The visible numbers approach implicitly assumes that people create quality from their desks or in the production facility (Aguayo, 1990). This is a myopic view since quality requires an integrated approach, rather than a discrete approach. Here again, only management can institute a new philosophy that can affect the entire structure of the organization and the reward system to encourage collaborative approaches to solving organizational problems (Aguayo). Without an integrated approach, organizations can optimize one sector of the organization while de-optimizing other sectors. Likewise, in any quality program, collaboration is a requirement (Dobyns & Crawford-Mason, 1994). Additionally, employees must be able to see a future for themselves within the enterprise (Carson, Lanier, & Carson, 2000). Otherwise, it is unlikely that they will exhibit the collaborative spirit needed to achieve corporate goals.

Persuading management to change from a quantity to a quality view is a difficult task, mainly because beliefs about bottom-line numbers are hard to change (Dobyns & Crawford-Mason, 1994). Dobyns & Crawford-Mason indicate that employees who work with quality companies are happier and more dedicated. Deming believes that the traditional financial mentality is the greatest impediment for quality management in the United States (Gabor, 1990). According to Gabor, for Deming, numbers are virtually useless when it comes to satisfying the customer. For instance, he states that if people run an organization on numbers alone, it will not be productive, because the most important figures are unknown or unknowable (Gabor). In essence, leaders cannot measure hidden costs from indices or bottom-line figures.

According to Deming, when managers lose touch with the process, they also risk losing touch with their internal and external customers. Besides, they often advocate impossibilities in the name of quality, such as "zero defects," because they do not understand the difference between product quality and process quality (Gabor, 1990). Gabor points out that the existence of variation excludes the possibility of zero defects over time in mass production processes. Quality in the product is impossible without quality in the process, and quality in the process depends on the right organizations, and the right organization depends on the right leadership (Creech, 1994).

<u>Systems Thinking</u>

Why is it important? It is important because people improve quality by improving the system as a whole (Dobyns & Crawford-Mason, 1994). Systems are interconnected parts in space and time, and each part influences the others in hidden ways; thus, intervention on one part of the system has unforeseen effects on the other parts (Dervitsiotis 1998; Littlejohn, 1999). However, differentiation of functions and lines of business often increases the difficulty of acting with a common purpose, thus creating "sub-optimization" (Moss-Kanter et al., 1992). Moss-Kanter et al. define sub-optimization as the tendency of sub-units to commit to differing sets of goals and standards, which are more important to them than the objectives of the entire organization.

According to Senge (1990), successful leaders are often systems thinkers; they focus on underlying trends and forces of change. Moreover, he asserts that the consequences of leaders lacking system-thinking skills can be devastating. Therefore, leaders must create a climate where organizational members can freely challenge how they see and think about organizational reality, using different templates and mental

frames (Morgan, 1997). For instance, organizations can use brainstorming sessions to enhance communication, the transfer of information, and hence learning. TQM and continuous work improvement (Kaizen), when correctly applied, institutionalize the practice of challenging taken-for-granted norms and practices at the operational practices (Morgan). Unfortunately, many leaders continue to exhibit defensive mechanisms when change threatens the status quo, and others trap themselves in the single-loop learning stage.

The power of TQM and Kaizen rests on the fact that they encourage double-loop learning:

- Managers ask employees to dig beneath the surface of recurring problems and uncover the forces that are producing them.

- They encouraged them to examine existing modes of practice and find better ones.

- They encourage them to create "languages," mindsets, and values that make learning and change a major priority (Morgan, 1997).

Deming's concept of profound knowledge requires leaders to think about and observe behavioral phenomenons in a global view: leaders must consider systems thinking, common and special variation, how people learn, and the psychology of humans (Winston, 1997).

<u>Education and Skills Training</u>

"In a global economy, education is just like quality; it's a matter of continuous improvement throughout life" (Dobyns & Crawford-Mason, 1994, p. 21). Two of Deming's 14 Points deal with training for job skills and education. Dobyns and Crawford-Mason

indicate that for Deming, the two were not the same; skills training includes those things that people need to do their jobs to the best of their ability and is finite. Education, on the other hand, is continual and has little or nothing to do with a person's job (Dobyns & Crawford-Mason). Accordingly, even unrelated areas of study create different mental frames, which leads employees to think of their old jobs in new ways that can create new solutions. However, many organizational leaders do not envision employee training and education as a quality issue.

Nevertheless, how do they integrate knowledge in their organizations? For instance, often, employees learn their job from another worker who was never properly trained (Winston, 1997; Dobyns and Crawford-Mason, 1994; Anderson et al., 1994). Winston points to Deming's concept of training the trainers and making sure that each employee knows how to do their job well, and that training is an ongoing process.

Therefore, if leaders believe that education and training are unimportant, they will not have a viable management philosophy to integrate knowledge into their organizations. Thus, to change the philosophy and culture of an organization, it is necessary to change the opinions and vision of the top leaders (Winston, 1997).

According to Anderson et al. (1994), learning is a source of innovation, and good management helps the nurturing process of their employees.

<u>Loyalty</u>

Loyal employees commit themselves to outstanding job performance and continuous improvement because they believe that the organization will reward them for their efforts in terms of employment and opportunities for skill development and promotions (Klein, 1994). Thus, employees' hope for a better future enhances their

performance (Carson et al., 2000). The personal relationship between an employee and his or her supervisor also leads to a higher level of commitment (Klein, 1994). However, according to Klein (1994), American employees do not believe that their organizations will look out for their interests. However, Creech (1994) believes that loyalty has many dimensions. He points to managers who frequently "carry" inept subordinate managers by rationalizing this forgiving approach as loyalty. He further states that when senior leaders create a culture where anything goes, the organization becomes a hotbed of alienation (Creech).

Organizations with quality management continually evaluate their policies and practices and take steps to ensure that the loyalty principle is operating in the right way (Creech, 1994). Otherwise, they will not be able to develop the right organization, and their policies will be replete with double standards. Nevertheless, if leaders treat their employees fairly and justly, they will respond positively (Creech). Therefore, leaders should pay attention to the internal customers (employees) satisfaction index (Creech).

Kouzes and Posner (1997) state that love is loyalty, it is teamwork, and it respects dignity of the individual. Furthermore, they believe that "leadership is an affair of the heart, not of the head (p. 305)." Moreover, they indicate that "social interaction increases people's commitment to the standards of the group and increases peer pressure for individuals to do their fair share and consensus about required action (p. 306)." In other words, it creates a workforce with an undivided heart. Also, Becker (1993) believes that "organizations earned the right to be loved through empowerment."

Boice (1996), who advocates upward rather than downward loyalty, puts another dimension of loyalty forth. He believes that subordinates should not try to outshine their

bosses; rather, they should try to get their bosses promoted. Thus, his premise is that subordinates should be subservient to the organizational hierarchical structure. This type of loyalty, however, may inhibit double-loop learning.

Is TQM another management fad?

Zbaracki (1998) believes that the term total quality management is counterproductive and that it stops people from thinking. Furthermore, he points to scholars, such as Hackman, who predicted the demise of TQM, and Lawler and Mohrman, who predicted the demise of quality circles. Harari (1993) notes that TQM programs require managers and non-managers to accentuate their internal focus when all the action is happening externally. He points to the preoccupation with internal performance measurements and that the TQM process often fails to integrate non-manufacturing and non-operation groups. However, Deming's system of profound knowledge requires people to think about and observe the behavioral phenomenon in a global view.

Zbaracki (1998) views TQM as a well-defined technical intervention, which has become ambiguous and dubious. However, for Deming, quality management is a philosophy. He, therefore, never used the term TQM because it implied that quality was a method when it is an outcome of a method (Hellsten & Klefsjo, 2000). Nevertheless, many managers indeed assume that TQM and other process redesign systems can be divorced from rethinking business strategies (Carpinetti, Gerolamo, & Dorta, 2000). Thus, they see TQM as a discrete entity. Hence, they vertically deploy it through the organization, divorcing it from the overall organizational strategy; horizontal deployment, however, accounts for interrelationships, and it is less prone to misalignments and encourages

local "feedback" (Carpinetti et al.). Moreover, often managers are not capable of assessing the performance of their departments, divisions, or organization. Thus, they misdiagnose the root causes of problems or weaknesses. Similarly, they are unaware of cause and effect diagrams, such as the fishbone diagram (Carpinetti et al.).

Applied TQM pays little attention to the organizational structure that enables employees to produce quality products (Cao, Clarke, & Lehaney, 2000). Likewise, managers seldom adjust the financial rewards to enhance collaboration; rather, they continue to distribute rewards on an individual, rather than on a team and individual basis.

The YXZ Company: The New Jersey Site

Background

The YXZ Corporation acquired the New Jersey site from ABC, Incorporated, a Chemical Company, in September 2000. A former chemical company that unsuccessfully attempted to transform itself into a bioengineering and pharmaceutical company spun off ABC, Incorporated in September 1997. The acquiring organization, based in Cleveland, Ohio, has made no significant changes, managerial or otherwise.

The facility began operations in 1961 and has since seen major expansions as well as contractions. It has experienced varying styles of management, locally and at the enterprise level. Local management is the Site Leaderships Team (SLT), which has considerable discretion in decisions affecting the site. The enterprise management is corporate management, and it deals with corporate policies, which generally affect all of XYZ's manufacturing sites.

Currently, three manufacturing units, at the New Jersey facility, produce intermediate chemicals for the merchant market. The facility is located on the 460-acre site and uses approximately 125 acres for production and storage facilities. In addition to the manufacturing units, facilities are also available for making and shipping various blends; storing and transshipping other related products; and supplying utilities and processing waste.

Approximately 150 employees operate the facility. Most are production operators, supplemented by utility operators, mechanics, engineers, managers, and contractors. Each of the manufacturing facilities operates independently. However, the support network, mechanics, utility operators, engineers, and site leadership staff provide services to all manufacturing units and support facilities at the site.

The structure is hierarchical, with a loose matrix relationship. However, at the top of the site pyramid is the site manager, and the hourly workforce is at the bottom, see Fig. 1. The site manager and superintendents, stationed outside the manufacturing facility, make up the SLT. Second and first-level supervisors, engineers, operators, mechanics, contractors, and other support employees work within the manufacturing facilities. A fence separates the manufacturing facility from the SLT building.
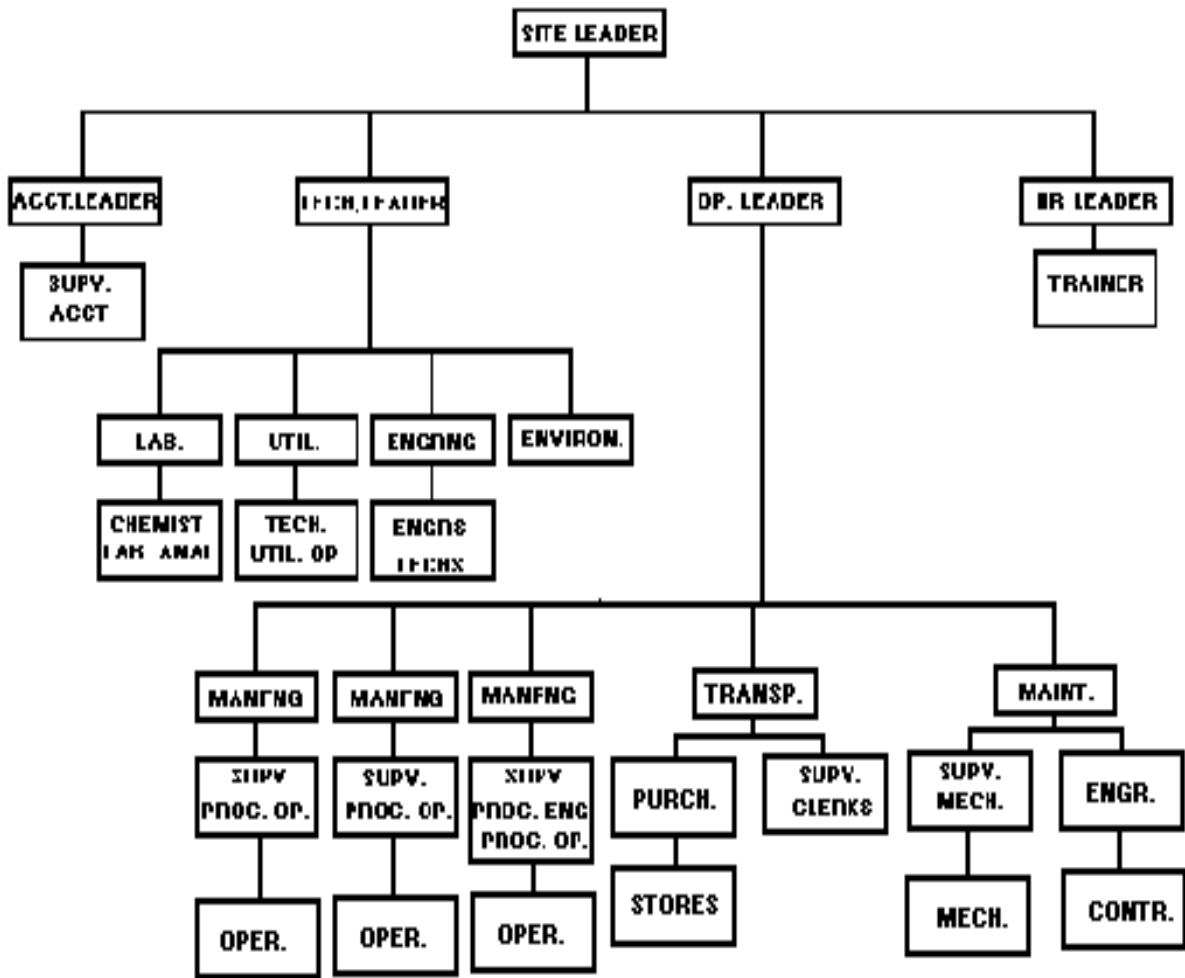
*Figure 1**. Organizational Chart**

The site leadership hierarchy is the site manager, superintendents, second-level supervisors, engineers, and first-level supervisors. However, the technical decision-making process does not necessarily follow the scalar structure. Rather, technical leadership is often a result of individual expertise, and policy leadership is often a result of corporate mandates.

The site's quality program

The site's quality program, established in 1993, is an umbrella document for area quality procedures, work instructions, other quality documents, and site-wide procedures. It describes procedures for manufacturing, purchasing, distribution, maintenance, and the laboratory. It consists of a quality system manual (Tier 1), area procedures manual (Tier 2), working instructions manual (Tier 3), and record keeping (Tier 4).

Tier 1 includes a sample of the process flow diagrams and a description of the process chemistry. It also includes process parameters, specific standards, measurement methods, sample size, control method, and instructions to reject. Tier 2 includes management responsibilities, document control; purchasing; sample identification and tractability; process control; inspection and testing; calibration; inspection and test status; non-conforming material; correct and prevention; handling, storage, packaging, preservation, and distribution; records; audits; training; and statistics. Tier 3 manuals include ISO-critical equipment and preventive maintenance work instructions. It provides the reason for criticality and procedures to prevent occurrence.

The three-paragraph quality policy of the site expresses the site's commitment to total quality. Accordingly, manufacturing and service areas should prominently display it and review it with incoming employees and yearly with existing employees.

The model for the quality system of the site is ISO-9002, which requires a management representative to implement and maintain the ISO standard. Additionally, the ISO standards provide a means for customers to train employees to measure success, keep records and other data, correct errors, etc. (Higginson & Waxler, 1994). The quality system manual calls for a periodic review of the quality program by the site managers. It, however, precludes the site Human Resources leader from being directly involved in the quality program. Thus, ISO does not incorporate a systems view; it pays little attention to the management of human resources.

The quality system manual is a description of the scope of ISO registration for the site's manufacturing units. The site targeted Tier 1 through Tier 4 to achieve and maintain ISO certification. ISO certification, however, is not sufficient to ensure quality at the XYZ site.

Terziovski and Samson (1999) found that ISO 9000 does not have a significant effect on organizational performance in the presence or absence of TQM. Furthermore, they do not believe that ISO 9000 is synonymous with quality.

The literature review indicates that quality is a philosophy that focuses on internal and external customer satisfaction. Additionally, it is a total system approach, an integral part of a high-level strategy, and it works horizontally across functions and departments. Moreover, quality management stresses learning and interrelationships between the organization's culture and the team concept.

This study attempts to ascertain if the quality program at the XYZ New Jersey site mirrors the available literature. Moreover, by identifying how quality becomes (or fails to become) institutionalized at the site, leaders at XYZ's New Jersey site can develop learning strategies for other XYZ's sites.

Research Study

The purpose of this research is to assess the influence of the New Jersey XYZ site quality management on the site's employees, including supervision. That is, how much do the employees understand the quality management of the site? Do employees, operators, in particular, perceive that managerial attitudes enhance their understanding of quality management? Do employees think that quality management is important, useful, or valid? Do they see quality management affecting the bottom line? Can they provide examples of decreased cost or enhanced productivity due to the management of quality?

I limited the study to a small but diverse sample of interviewees. However, because I wanted to obtain a view from top to bottom of the organization, informants included personnel at the top of the site hierarchy to the bottom. Thus, I was able to obtain a broad range of views and experiences of the quality management of the site. Making contact with the informants was not a problem since I work at the facility. Nevertheless, I met most of the informants at their workstations and others in hallways, conference rooms, over the phone, or at lunch. The informants were cooperative, but most were surprised at the line of inquiry. And, some operators were initially nervous, because they did not know the quality philosophy of the site.

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I limited the study to a single case of quality management, quality at the XYZ Corporation New Jersey site. Additionally, this is a time-bounded study (two weeks). My initial interviews involved operators, engineers, operation leaders, supervisors, purchasing, process engineering lead, site leaders, and the training coordinator, who also functions as the management representative for the ISO of the site program. I did not structure formal interviews. However, I gathered observational data and reviewed pertinent quality documents (see table 1 for the type of information and sources).

My protocol consisted of the following questions: Who is responsible for TQM or quality management at the site? Do you perceive that the XYZ site leaders focus on quality? How do they project or signal quality commitment? Can you provide examples of site leader commitment to quality? What anecdotal stories can you provide in favor of or against quality management of the site? How does quality management help the site? In addition, I used direct observational techniques and experiential background information. In some instances, however, the questions asked in the field differed from the case study research questions (Yin, 1998). The interviews were open-ended. Thus, following Yin (1998), I considered the respondents' informants and corroborated their reports with other informants, including a member of the SLT and my historical observations.

The narrative blends related literature, comments, and edited quotes from interviewees, my interpretation of events from an organizational point of view, and my experience at the facility. It is an exploratory attempt to describe the employees' perception of quality management of the XYZ New Jersey site. Both techniques, unstructured interviews, and direct personal observations can lead to a biased outcome. However, I verified the narrative by providing a sample of the write-up to selected

interviewees and non-participants for feedback and incorporated their comments in the

final draft (Creswell, 1998). I asked the interviewees and those that did not participate in

the study: Is my description of XYZ New Jersey site quality management accurate? Are

the themes that I identified consistent with your experiences? Did I miss anything? What

type of quality management would they like to see?

TABLE 1   Data Collection Matrix: Type of Information by Source

Information/ Information Source	Interviews	Observations	Documents
Operators	Yes	Yes	Yes
Mechanics	No	Yes	Yes
Engineers	Yes	Yes	Yes
Operation Leader	Yes	Yes	Yes
Maintenance Supervisor	No	Yes	Yes
Utility Operator	Yes	Yes	No
SLT Member	Yes	Yes	Yes
Purchasing	Yes	Yes	Yes
Safety	No	Yes	Yes
Contractor	No	Yes	No
Engineering Lead	Yes	Yes	Yes

 Themes

Accountability

Few leaders at the XYZ New Jersey site clamor for TQM responsibilities. Focusing

on quality management is cumbersome and overshadows the quantity bottom line

(Harari, 1993). I asked the former quality leader, who is responsible for quality

management at the site? He hesitated, and after some thought, answered the training

coordinator. Thus, he did not perceive the leadership team of the site has responsib[e for

quality management. Likewise, most operators were unaware of who at the site was

responsible for the quality and some believed that their supervisors were responsible for

quality. Harari (1993) sees the delegation of TQM to quality czars, such as XYZ's training

coordinator and supervisors, as a weakness, because leaders cannot delegate quality. Becker (1993) states that delegation of quality to czars or an expert is not TQM. Quality is about unbending focus, passion, iron discipline, and a way of life for all hands (Harari, 1994). However, only management can institute a new philosophy that can affect the entire structure of the organization and the reward system to encourage collaborative approaches to solving organizational problems.

The view at the site, however, is that TQM is about statistics and jargon. Hence, site leaders and operators interpret TQM as performance measurements, conformance indices, and technical specifications (Harari, 1994). The New Jersey XYZ training coordinator noted that the SLT members seldom attend quality-related training courses. Thus, they consistently failed to model the way. Zbaracki (1998) also found that managers do not use TQM; nevertheless, they want their employees to use it.

Viewing TQM as a system emphasizes the role of top management and decreases the risk of partial implementation (Hellsten & Klefsjo, 2000. For instance, in Allen Mendelowitz's report to the General Accounting Office (GAO), two of his salient features were the belief that for TQM to work, top executives must be supportive and that corporate culture must reflect TQM values at all levels of the operation (Higginson & Waxler, 1994). Therefore, management is responsible for sharing, communicating, and articulating the TQM values. However, the reality at the New Jersey XYZ site, as well as at 29 percent of U.S. companies, is that senior management seldom evaluates the consequences of their company's quality performance (Higginson & Waxler, 1994). For instance, a process engineer indicates that quality management in his manufacturing unit is SPC charts, but that the operators do not believe in the charts.

Consequently, they seldom use them to adjust the processes (Zbaracki, 1998). Zbaracki's findings are that statistical training for operators is overwhelming. The process engineer also noted that the site implemented the quality program to achieve and maintain ISO certification. However, Sun, Hui, Tam & Frick (2000) indicate "Curkovic and Handfield found that ISO registration criteria failed to measure key areas of quality management, including strategic planning, employee involvement, quality results, and customer satisfaction." Moreover, the training coordinator indicated that not all-manufacturing units at the site displayed the SPC charts and that the site leaders were aware of the double standard because previous audits documented it. However, she indicated that the site leaders have not acted to correct the discrepancy. Nevertheless, she believes that such a double standard affects the employees' mindset.

In attempting to determine with some objectivity if site leaders are responsible for the quality, I relied on Dervitsiotis' (1998) key features of TQM. His essential features are TQM basic principles, TQM basic functions, and TQM basic tools (Appendix B). Under the basic principles, only one behavior was partially evident, and site leaders focus on external customers. However, they do not focus on internal customers; some site leaders do not believe in the concept of internal customers. But, their focus on external customers is not all encouraging, because they only focus on the external customer's present needs, not on their future needs as Deming recommended (Carson et al., 2000; Anderson et al., 1994). Focusing on the external customer's future will help design products and services that can satisfy the customer's future needs. In examining Dervitsiotis' basic functions, I concluded that none of the three, quality planning, control, and improvement, were operational. Likewise, none of the basic tools, quality, management, and product

planning, were fully operational at the site leadership level; however, the site uses some quality tools, such as SPC charts. Moreover, there is some indication that the site leadership wants to emphasize quality improvement.

<u>Culture</u>

Organizational culture is a pattern of beliefs and values shared by members within the organization (Goldhaber, 1993). In addition, the organization's core values determine its culture (Hellsten & Klefsjo, 2000). Examples of core values are site management's commitment to focus on processes, external and internal customers and learning-to-learn, employee empowerment, etc. The XYZ New Jersey site, however, has no salient operational core values, although the procedures of the site document volumes of core values, the leadership has been unable to institutionalize them. Perhaps because there is no consistent technique, activities performed in a certain order, to bring about cultural change. Organizations cannot institutionalize core values in the absence of suitable techniques, such as improvement groups and quality circles (Hellsten & Klefsjo), and, most of all, trust. Interviews with the New Jersey XYZ site production supervisors, process engineers, and operators confirmed the absence of consistent problem-solving techniques and trust.

Nevertheless, there was evidence of sporadic use of problem-solving teams, but not all were aware of the use of tools, such as Ishikawa and Pareto diagrams, and histograms. The site, however, uses some tools, such as control charts and Pareto diagrams, but usage is not widespread, and it is not associated with a dominant quality language. Thus, managers have yet to institutionalize quality tools, techniques, and core values in the culture of the site. It is interesting to note that production supervisors slowly

dismantled the cross-functional improvement teams, which are a core component of quality management. The site leaders, however, were not aware that unit leaders were no longer using improvement teams. They are, nonetheless, aware of their inability to develop and communicate a consistent vision that will motivate the employees. Thus, they are attempting to develop and adopt a new philosophy (Deming's Point 4). However, their major hurdle has been overcoming the lack of trust. Accordingly, their historical behavior has not been trustworthy.

The current reality of the site excludes the philosophical concept of quality. Interviews with operators affirm the absence of well-understood and disseminated quality management. Most operators indicated that the site did not have a quality program. A few, however, indicated that they were aware of the existence of quality procedures, but they were not familiar with the procedures. These operators, as well as some members of supervision, view inspecting for defects and audits as the quality management of the site. This view is not surprising because members of the site leadership also associate inspection and auditing with quality. Nevertheless, checking for defects does not eliminate process problems or the costs associated with those problems. Organizations must build quality in the process and hence the product. Thus, the site quality management from the employee's viewpoint focuses more on legitimacy than on continuous improvement.

Hellsten and Klefsjo (2000) indicate that TQM fails when managers only use a portion of it in their organizations. TQM will also fail when top managers are not in control of the quality language and culture. Nevertheless, the language of the organization

communicates its culture; leaders either use language to perpetuate, or to transform, the existing culture (Westbrook, 1993).

To influence the culture, management must decide what core values should characterize the organization, identify the techniques that will support the core values, and finally, the tools that will support the techniques (Hellsten & Klefsjo, 2000). For example, Goldhaber (1993) in referring to Barnett, notes that it is through communication and common social activities that new employees learn the meanings of the group's symbols. He also adds that the process helps them generalize a set of attitudes, values, and beliefs common to members of the organization. Thus, it is important for site managers to consistently and relentlessly communicate the proper core values.

According to the Sapir-Whorf hypothesis, the structure of a culture's language determines the behavior and habits of thinking in that culture (Littlejohn, 1999). Following their hypothesis, leaders can conclude that if organizational leaders articulate quality concepts, quality concepts will shape the thought processes of members of their organization.

Unfortunately, the XYZ site leadership team does not fully understand quality management. They believe that quality management is tantamount to conducting audits and checking for defects. However, as mentioned above, checking for defects does not improve the product nor reduce costs. Leaders must ensure that organizational members build quality into the process and hence into the products or services.

<u>Legitimacy</u>

Interviews with production supervisors, engineers, and operators confirmed that TQM was not operational at the New Jersey XYZ site. Some supervisors were even

unaware of total quality management. However, when I applied the term to statistical process controls (SPC), they acknowledged that the site uses control charts. Nonetheless, TQM is more than control charts: it is a philosophy. It integrates strategy, management practice, and organizational outcomes, to create an organization that continuously improves and sustains performance (Terziovski & Samson, 1999). Accordingly, the technical portion, statistical process control, used at the XYZ New Jersey site serves to legitimize the certification of the site with the International Organization for Standardization (ISO).

Approximately seven years ago, the site developed Tier 1, Tier 2, and Tier 3, quality manuals. However, there is widespread agreement that the site adopted a "quality program" not because of socio-technical considerations of efficiency, but rather because it was socially sanctioned as the "right one" and initially transmitted through experts (Moss-Kanter et al., 1992).

Communication

Often people confuse communication with information. However, information is a measure of uncertainty or entropy in a situation (Littlejohn, 1999). Littlejohn also notes that the more information people possess, the greater the uncertainty. At the New Jersey XYZ site, procedural information, including quality-related information, is abundant and somewhat overwhelming. However, many at the site, including leaders, believe that information is communication.

Nonetheless, unlike information, communication does not exist in isolation, people attach meaning to what is said and who says it, and the relationship between communicators affects the interpretation of the message (Dodd, 1998). Words in

themselves have no meaning, rather meaning depends for the most part on the context (Goldhaber, 1993), and communication involves non-verbal cues, such as kinesics (Dodd, 1998). Thus, employees indicate that the site leaders' non-verbal cues often contradict their verbal communication and in many instances, their verbal communication from period to period is contradictory. Additionally, supervisors point to the SLT's naive belief that the only requirement for good communication is to ensure that they express all messages clearly.

Consequently, the site accumulates volumes of quality manuals and a host of other procedural manuals. However, the accumulation of "quality information" has not significantly improved the quality management of the site. Rather, the site uses it to obtain and maintain ISO certification. Hence, the main purpose of accumulation is compliance with ISO requirements.

The site leadership adheres to the old maxim that communication is a linear act, whereby leaders transmit information to subordinates. Thus, from their viewpoint, there is a beginning and an end to the communication process. Current thinking in communication research is that communication is a dynamic process: it is transactional (Goldhaber, 1993). Thus, the sender encodes the message, and the receiver decodes it, re-encodes his or her understanding, and sends it back for decoding by the original sender (Goldhaber).

Because the New Jersey XYZ site leaders view communication as linear, they have had difficulties developing and communicating management guidelines for specific and general activities intended to move the organization forward. Leaders that communicate linearly are autocratic and often infuse fear in the management process, a

violation of Deming's Point 8 (Drive out fear). Therefore, whenever there is fear, there is no reciprocal influence between communicants' (Goldhaber1993).

Quality management is posited on interrelationships and honest exchanges; that is, transactional communication. In essence, communication is the creation and exchange of messages (Goldhaber, 1993) within the organizational structure. When site leaders are autocratic, there is often a one-sided flow of messages with limited employee "feedback," and learning to learn does not occur. Therefore, many employees have come to believe that the SLT members do not possess the requisite socio-technical knowledge for leading a quality process.

<u>Education</u>

Although site leaders echo the mantra of continuous improvement, it is often hollow. The leadership of the site has not consistently supported training and education. They view training and education as an unnecessary expense. They deny tuition benefits and are reluctant to promote skill training. Thus, they reject Deming's Points 6 (Institute training) and 13 (Institute a vigorous program of education and retraining) (Anderson et al., 1994). A cursory look at Appendix A would indicate that the New Jersey XYZ site does not adhere to any of Deming's 14 Points.

Nevertheless, Ashby's law of requisite variety stipulates that for any system to preserve its integrity and survive, its rate of learning must at least match the rate of change in its environment (Dervitsiotis, 1998; Morgan, 1997). Additionally, Dervitsiotis (1998) notes that Juran believes that a well-structured TQM aims to create an environment that encourages people to grow as individuals and learn to bring about both small but continuous (Kaizen) and drastic or breakthrough improvements.

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Managing change requires changing consistent behavioral patterns (Kanter-Ross et al., 1992). Thus, one way to infuse new beliefs is through education. According to Deming, education is anything that keeps people's minds developing, and he further stated that no organization could survive with just good people, like quality they need people that are improving (Dobyns & Crawford-Mason, 1994, p. 87). Leaders at the New Jersey site, however, do not believe that education is important, except if they are the recipients. Thus, the site leaders do not work together with employees to achieve mutually beneficial educational goals; and by not cooperating, they create a non-collaborative climate. This non-collaborative management-induced climate affects employee involvement (EI) and ultimately TQM. Anderson et al. (1994) point to Shaw, and the extensive literature review by Johnson and Johnson that indicates that cooperative behavior results in superior achievement under most circumstances. They also indicate that it enables higher individual performance by creating mutually beneficial conditions among organizational members.

The XYZ New Jersey leaders often restructure functions at the site without providing the necessary attitudes and skills to make the new structure work (Cao et al., 2000). However, Deming believes that knowledge of the business and continual learning are essential prerequisites to effective leadership (Anderson et al., 1994).

Conclusion

The rate of learning at the XYZ New Jersey site does not match the rate of change in its environment. The site does not train managers or encourage employees to grow as individuals. Therefore, managers and employees do not understand the philosophical concept of quality. Thus, they continue to prefer quantity tools for managing the site. The

New Jersey XYZ site leaders view quality as a sub-component of the overall management process, a component that they can delegate. Moreover, their concept of quality is a dependency on inspections and audits, instituting fear, developing slogans, exhortations, and targets for the workforce, as well as numerical quotas. Deming, however, rejected this view of quality.

It was evident from observation and conversations with the site leadership that they want to adopt a new philosophy. However, their belief system prevents them from accurately assessing the employees' current reality. Consequently, there is dissonance between their reality and that of the employees. Thus, when they fail to address that gap, issues remain unresolved, causing subsurface tension and a non-collaborative climate. Collaboration, however, is essential for the establishment of a quality philosophy (Deming's Point 9).

The site leaders did not appear to have an understanding of Deming's system of profound knowledge (SoPK). Deming's SoPK includes system thinking, knowledge, variation, and psychology. For instance, Deming believes that management's task is not only to determine the aim of the system but also to manage the system (Dobyns & Crawford-Mason, 1994). Managing the system requires leaders to understand the interrelations of the system's parts. Additionally, they must understand variation, psychology, and they must embody knowledge. However, the XYZ site leaders focus on optimizing sub-units because of their belief that optimization is additive. Moreover, they often act as if the education and training of the workforce are not necessary for the acquisition of knowledge and understanding. Consequently, they believe that manuals

loaded with information are knowledge, but the information is not knowledge (Dobyns & Crawford-Mason).

Thus, the leadership's beliefs prevent them from developing and sharing a viable vision and core values with the employees. Consequently, they are unable to inspire a new philosophy and establish constancy of purpose for continuous improvement.

Appendix A

Deming Fourteen Points

1. Create constancy of purpose for improvement of product and service.

2. Adopt the new philosophy.

3. Cease dependence on mass inspections.

4. End the practice of awarding business on the price tag alone.

5. Improve constantly and forever, the system of production and service.

6. Institute training.

7. Institute leadership.

8. Drive out fear.

9. Breakdown barriers between staff areas.

10. Eliminate slogans, exhortations, and targets for the workforce.

11. Eliminate numerical quotas.

12. Remove barriers to pride of workmanship.

13. Institute a vigorous program of education and retraining.

14. Act to accomplish the transformation.

Appendix B

TQM Basic Principles

Management Responsibility	Evident	Not evident
Customers and employees focused		📇
Insist on everyone's participation		📇
Decision-based on facts		📇
Institutionalize continuous improvement		📇

TQM Basic Functions

Management Responsibility	Evident	Not evident
Quality planning		📇
Quality control		📇
Quality improvement		📇

TQM Basic Tools

Management Responsibility	Evident	Not evident
Quality tools		📇
Management tools of quality		📇
Product planning tools		📇

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