
OTHER VOICES

THE DEMING APPROACH TO CONSTRUCTION SAFETY MANAGEMENT

By JOHN SOMMERKAMP

Dissemination of quality management theory and increased knowledge of the human dynamic both present an extraordinary opportunity for the safety professional. W. Edwards Deming's management theories are helping managers scrutinize their effect on outcomes produced by workers. This shift in thinking is also being adopted within the construction industry, as contractors focus greater attention on workers. To be effective in this

setting, the safety professional must understand and apply systems thinking, the concept of variation, psychology and the theory of knowledge.

BREAKING THE INDUSTRY STEREOTYPE

Focusing on how management can facilitate employee productivity has not historically been common practice in the construction industry. Back when "men were men" and construction was "real work," a manager simply delivered tools and materials to a job site and hired some hard-as-nails, brute-

force-type "tradesmen" to construct the finished product. The stereotypical construction worker was independent and self-willed, someone who lived and played hard. Contractors often viewed their workers as similar to backhoes and welding machines: a means to an end—profit.

During the past decade, however, these stereotypes have been dismantled, as more contractors are exposed to advances in management theory. The shift to the concept that the manager must be a coach is driven by the underlying principle that "workers want to perform well"; at the end of the work day, they want to feel they have accomplished something. Management and workers alike are learning that their independent, sometimes adversarial, roles of the past are counterproductive. As a result, those roles do not contribute to achieving the overall goal of providing quality work at a fair cost and without injury.

A safety professional implementing the quality philosophy must adjust his/her methods to coincide with new management attitudes. The safety professional must realize that employees are not taking risks intentionally; they are simply trying to do their best with the tools they are given.



Depending on the individual, these factors combine in various mixes to influence how well each worker accomplishes assigned tasks.

- Employees learn about their jobs via personal observation and hands-on experience.

- Employee actions are influenced by the way company management treats them.

- Tools and equipment are self-provided or company-supplied.

- Employees must work with materials provided by the company.

- Employees must process information and instructions provided by the job foreman.

- Employees must rely on training provided by the company.

NEW MANAGEMENT CONCEPTS

Consider how Deming's management philosophy applies to employees (Deming 96). How do the concepts of *system thinking*, *variation*, *theory of knowledge* and *psychology* affect employees? How can the safety professional enhance the impact of these concepts?

System Thinking

Everyone lives and works within a system, which is comprised of interconnected processes. For example, one process describes interactions of the world economy; another may involve how someone purchases a hammer. Both are observable and (to some degree) their occurrence can be described.

In discussing the world economy, the level of detail will depend on personal observations and knowledge. The same holds true for buying a hammer; most people could precisely detail such a process and how it is influenced by other processes. For example, problems in the trucking industry may limit the store's hammer supply. A store owner can order a complete stock of hammers; getting them delivered is another process.

Such factors are part of the system that affects any consumer's purchasing ability. Road construction enroute to the store can also impact the buying process, as can budget (how much one will spend affects selection). Clearly, the way any task is accomplished depends on the condition of the system.

How does this relate to construction? Consider again the tools employees have traditionally been given to work with.

They start the process equipped with experiential knowledge of tools, materials and tasks. Using this knowledge and instructions provided, they perform as well as possible. However, employees cannot control what tools the company provides, nor how other crew members use them. They also have no control over how tasks are accomplished. Does the foreman ask for employee input on how to perform a task? Employees are often acutely aware of safety hazards inherent to a task. Do employees have proper tools or an accurate (if any) plan of action? Can anyone ensure that projects finished today will not hinder tasks to be completed tomorrow? In other words, the prevailing system controls all employee activities.

The old system of thinking places responsibility on the foreman. Yet, the foreman is limited by the same system that traps employees; s/he performs as well as possible within the prevailing system. Does the foreman know how to maximize the crew's experience? Has s/he received leadership and interpersonal skills training? Has s/he been given sufficient time and a viable method for planning? Without these tools, the individuals—and thus the system—cannot achieve maximum potential. Because the system controls job costs, completion time and safety, system thinking is a key part of safety program management.

Moving Toward Quality:

One Contractor's Experience

Early in its continuous quality improvement journey, BMW Constructors Inc. learned a valuable lesson, one that reached from the job site to the front office. The company's safety approach called for its supervisors to "Pay more attention to safety!" Management talked about safety at every opportunity, hoping results would improve; yet gains were not detectable.

To address this problem, a project safety analysis was conducted. The resulting report had company-wide impact. Job-site photographs (with comments) clearly showed management what was not being done day-to-day. As an organization, BMW did not recognize unsafe conditions or unsafe acts as they occurred. Supervisors assumed such conditions/acts were part of the work-

environment because the system did not teach them otherwise. As a result, they did not have sufficient knowledge to recognize these problems and improve site safety performance. The system itself was at fault, not the individuals.

The Concept of Variation

Everything varies—no two things are identical. The amount of work one employee can accomplish in one day differs from that which another employee can perform. On some days everything works; on others nothing works. Variability in tools, equipment, materials, skill, knowledge, customers, engineers and weather are constant obstacles.

Without variation, however, work would be boring. Exact costs and profits would always be known, as would the amount of achievement or disappointment involved in executing a project. In the real world, however, these factors remain unknown.

Knowledge and, in turn, profits, are based on averages, such as knowing the average time required to complete a forming operation or execute a weld.

Most averages are compilations of several averages; in other words, any given outcome is the product of a process comprised of many factors, each with individual variation (McConnell 82). To apply this concept to safety, the practitioner must recognize that some people are safety conscious, while others cannot recognize an unsafe act.

The safety professional's goal (in short) is to protect against, reduce or eliminate task variables that affect employee safety. Job safety analysis, as a tool, requires a cooperative effort between supervisors and safety personnel; it can help identify alternative methods for accomplishing a task. At this stage, the question, "What variables are we dealing with?" must be asked. Five minutes spent brainstorming key variables can reduce site incidents. Teaching employees about this process before they begin a task will, over time, reduce the system's incident rate as well.

Theory of Knowledge

The theory of knowledge is an obvious, yet often neglected, management concept. Deming said that, for a statement to convey knowledge, it must be based on theory, from which future out-

As Deming recognized, changing behavior requires a holistic approach. By collectively incorporating system thinking, the concept of variation, theory of knowledge and psychology into safety programs, the safety professional can develop a comprehensive approach to workplace safety and health.

comes can be predicted (Deming 105). Personal observations must be constantly evaluated to determine whether they fit a theory. If they do, the prediction is sound; if not, the theory must be revised. Without theory, learning cannot occur and knowledge cannot advance because observations have nothing to be compared with.

Consider this theory: When a cold chisel mushrooms on the end, parts of it break off. Energy is then released, which allows the fractured particle to damage objects it strikes. If this situation occurs, yet energy is not released, the theory must be revised. If energy release does occur and produces undesirable effects, preventive action must be taken. As this illustrates, effectively using theory to advance knowledge is key.

The safety professional must analyze and explain theory in order to convey knowledge and predict future outcomes. Quality is improved by continually comparing theory to observation. For example, if used as a formal means of evaluating theory, incident investigations can help advance knowledge. Cause-and-effect analysis, when shared with employees to advance their knowledge, is direct application of Deming's concept: State the prevailing theory about a work practice, explain the incident that transpired, examine cause-and-effect, and re-evaluate the original theory; specify lessons learned from the incident.

Another illustration: One common theory among workers is to render immediate aid to an unconscious coworker. This is a good theory, unless the unconscious worker is located in a hard-to-reach, confined space. Such a circumstance requires a new theory.

Psychology

Studying psychology enhances the understanding of people, and their interactions with circumstances and other people (i.e., managers). Because people

differ, a manager must effectively utilize each employee's unique abilities and inclinations.

For example, people have a natural inclination to learn, which also serves as a source of innovation. To be effective, management must nurture these positive attributes (Deming 110). However, people learn in different ways: some read, some observe, others must actually perform a task in order to understand it. Such differences must be acknowledged on the job site.

Motivation is another key psychological factor. When people are intrinsically motivated, they do things because they feel it is right or fits some "natural order." Motivation can also be extrinsic—if I do this, I will receive some reward. By activating intrinsic motivators (self esteem, pride, challenge, accomplishment), work, and safety's role in it, will be more productive.

Safety incentives are a common extrinsic motivator (Kohn 59). Typically, however, those who win incentives view them as symbols of victory, not as symbols of improved safety knowledge. To win the prize, an employee must not be involved in any safety incidents. As a result, the employee's first reaction when an incident occurs: "Can it be covered up? Did anyone else witness it? My prize is at stake." Such a reaction does not advance the company's safety effort because the employee's only true concern is receiving the reward.

To be effective, a safety professional must understand these psychological variations and consistently apply that knowledge. Clearly, a negative approach to safety—don't do this, don't do that, follow these rules—cannot sustain a safety effort over the long term. Instead, management must demonstrate genuine concern for employee well-being and provide meaningful educational experiences. These approaches appeal to employees' natural interests and keep them interested—and involved—in genuine safety efforts.

CONCLUSION

Implementing a safety initiative within a company is no different than executing a quality initiative. Both attempt to change human behavior. People change behavior patterns because they want to. The safety professional, as change agent, must understand how to identify the intrinsic motivators that prompt such change.

System thinking, as a discipline, has much merit. Understanding the concept of variation and its applications within the workplace are key aspects of program management. Utilizing the theory of knowledge is also useful, as is being aware of how management actions impact worker psychology. However, as Deming recognized, changing behavior requires a holistic approach.

The safety professional and management alike will benefit from an examination of Deming's management philosophy. Through its application, a safety professional can tie together all safety program elements and, thus, develop a comprehensive approach to workplace safety. ■

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