Total Quality Management (TQM) is an operational philosophy, a way of thinking, and a way of working. It has three main themes: customer satisfaction, participative management, and ongoing improvement. The focus is on improving quality by removing defects and solving problems. As such, TQM promotes the following management practices:

- Do it right the first time (zero defects)
- Minimize production variation and risk
- Emphasize problem solving through participative management teams
- Compare quality and performance results with a predetermined standard or goal (a benchmark)
- Provide continual training and education aimed at improvement

Constraints to TQM
TQM has many potential benefits for the construction industry. Its applications in construction, however, have been infrequent. This probably is due, in part, to the short-term characteristics of the construction process, industry tradition, and the unique structure of the construction process and firm.

Short-term characteristics. The focus of TQM is on long-term results, not short-term accomplishments. This is inconsistent with most construction projects and firms where the focus is on the completion of projects that usually take about a year. Success or failure is measured by a job-cost ledger.

Industry tradition. The construction process is characterized by downward vertical organization and communication. A superintendent gives orders to a foreman, a foreman gives orders to craftsmen. In TQM, where participative management is encouraged, communication is upward and downward. Tradition also focuses on monitoring results rather than challenging the process. Although monitoring is important for TQM to be successful, both monitoring and inspection become secondary to critiquing and challenging.

The unique structure of construction firms. Many craftsmen work for several firms a year. These craftsmen may become more attached to a union hall or project than to a single firm. This often makes it difficult for a construction firm to involve workers in participative management. In addition, many construction firms work for a client or project owner only once. This results in a diminished focus on quality.

Modifying TQM
Although TQM has constraints when applied to the construction process, its benefits are too great to ignore. With that in mind, I have modified the process, referring to it as Total Productivity and Quality Management (TPQM). The two major differences between TQM and TPQM are TPQM’s emphasis on productivity improvement as well as quality improvement and on obtaining short-term measurable benefits as well as long-term benefits.

TPQM also promotes participative management. Before a project starts, project teams are established to focus on key problem areas. Ideally, these teams have a diverse makeup that includes a craftsman, foreman, superintendent, project manager, and office personnel (such as an estimator, scheduler, purchasing agent, accountant, and clerical employ-
and may cause unrest with the project owner or designer. Avoiding redo work means doing it right the first time. Improved communication and preplanning are keys to minimizing redo work.

2. Number of items on the punch list. The construction process is characterized by the project designer creating a punch list of work that has to be finished or touched up by the contractor at the end of the project. Though a punch item may be the result of an over-inspecting designer, most punch list work relates to quality work. Tight inspection, quality control, preplanning, training, and communications all are key components to minimizing this problem.

3. Number of accidents at the jobsite. In addition to worker injury, jobsite accidents hurt worker morale, negatively impact project time and cost, and result in increased workers’ compensation rates. Keeping a jobsite clean, providing safety training, identifying and eliminating safety hazards, and giving recognition to workers who promote and maintain safety are components of an effective safety program.

4. Workers idle because they ran out of work. Onsite construction labor costs may approach 40% of total project cost. Because it is impossible for a construction supervisor to stand over each worker every minute of the day, it is necessary to create an environment where workers monitor themselves. Such a program should:

• Establish a line of communication that encourages workers to search out the supervisor to ask what to do next
• Give workers more of the plan so they know what to do when they run out of work
• Develop a teamwork attitude so that workers motivate themselves

5. Substance abuse. Alcohol and drug abuse at a jobsite lowers productivity, quality of workmanship, and safety consciousness. It also negatively impacts worker morale and jeopardizes the well-being of everyone involved. In addition to testing and monitoring workers for substance abuse, a program of education, prevention, and treatment is essential.

6. Workers or machines idle waiting on material, labor, equipment, tools, or another firm. Waiting can be reduced significantly by giving attention to timely and effective planning and scheduling. In addition to a project master plan that is regularly updated, attention to a daily plan and a 1- to 4-week look-ahead schedule also can reduce waiting time.

7. Theft or waste of material, tools, or equipment. Large and complex construction sites promote misuse, mishandling, and theft of materials, tools, and equipment. Carrying theft insurance is not the answer. Project controls that include a system of receiving, distributing, handling, and returning materials, tools, and equipment will return benefits far exceeding the cost of such a program.

8. Multiple handling of material. Handling materials more than once not only wastes time, it increases the chances of worker injury and damaged material. Attention to good jobsite layout, timely ordering of material, and a plan and strategy for material placement can promote the objective to handle material only once.

9. Late or inaccurate job-cost reports. To effectively manage project time, cost, and quality, managers need to be able to spot problems early. An important component to this detection is the preparation and use of a timely and accurate job-cost reporting system. There should be no excuse for late or inaccurate jobsite time cards, daily reports, or follow up job-cost reports. The objective should be to speed up the frequency and use of such reports.

10. Disputes, changes, or claims. More often than not, neither the project owner or contractor benefits from the uncertainty of disputes, changes, or claims. They adversely affect project time, cost, and quality. The cost of a

Implementing TPQM

Although the core defects previously discussed must be addressed by a TPQM program, CATs are encouraged to identify additional problems and seek zero defects. Team members are educated and trained with various TPQM tools (shown at the bottom of the TPQM diagram). These tools are the basis of measurement, analysis, and improvement.

TPQM is a process of continual improvement. Success is celebrated as a team, rather than by giving awards to individuals. Barriers are removed for implementation of new ideas. Unsuccessful ideas are not condemned, but encouraged to help promote additional ideas.

The construction industry offers much opportunity for improvement. This opportunity is what makes construction interesting and rewarding. Combining the strong qualities of TQM with the focus of TPQM can provide one such avenue for improvement.