Results-Driven Approach to Improving Quality and Productivity

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Abstract

Quality control (QC) programs do not often realize their full potential. Elaborate and expensive QC programs can easily get side tracked by the process of building a program with promises of "Someday, this will all pay off." Training employees in QC methods is no guarantee that quality will improve. Several documented cases show that such activity-centered efforts often see little improvement in quality, cost, or productivity. The discussion in this paper builds on the quality improvement efforts of mill managers and QC supervisors by focusing on specific measurable and achievable results—the results-driven approach. Companies just beginning quality control efforts or those struggling to achieve measurable results will benefit from this information. Our goal is to increase your understanding and skill in where and how to begin an effective quality improvement effort in your operations.

Introduction

Poor quality leads to high costs, low productivity, and lost market share. Today, efforts in the forest products industry are centered around recovering the highest possible value throughout the manufacturing process at the lowest cost. Better utilization and improved conversion efficiency are needed to further improve the competitive position of the primary wood-using industry in the United States. Improvement in efficiency, quality, and productivity is a major objective for the forest products industry.

With all the attention on quality and productivity, numerous schemes for achieving high business performance have come and gone. Over the years, many management schemes have been tried, such as Management by Objective (MBO), Theory Y, Self-Directed Teams, Just-In-Time Inventory, and Quality Circles. Many such efforts have failed to produce substantial improvement in business performance. Too often quality control programs and concepts, such as Total Quality Management (TQM), have suffered similar fates. Although some firms are doing quite well in improving quality, productivity, and business performance, many firms are still struggling.

Successful Change Begins With Results

The key to successful implementation of quality and productivity improvement is to focus on producing measurable results. The *Harvard Business Review* published a thought-provoking article ''Successful Change Programs Begin With Results" (Schaffer and Thomson 1992). Schaffer and Thomson report that quality programs are easily derailed when the focus is on activity-centered quality programs, and they describe the basic flaws and solutions for such failed efforts. Too often the focus of change programs is centered on activities rather than results, and the end becomes confused with the means—processes with outcomes. Deming (1986) alludes to this concept when discussing his "Do Something!" theory in his book *Out of the Crisis.*

Activity-Centered Efforts

Many companies have spent vast resources (e.g., money, time, energy) on a variety of activities with little improvement in quality, productivity, or business performance. Payoffs from the infusion of quality-improvement activities have been meager at best. Eventually, companies abandon potentially useful quality improvement techniques because the focus of these programs is activity centered rather than bottom-line improved performance. The following examples illustrate this point.

In the late 1980s, one of the largest U.S. financial institutions was committed to a TQM program to improve operational performance. The company trained hundreds of employees. At the end of a 2-year costly effort, the company reported the results of their TQM program, as summarized in the following: (1) 48 quality improvement teams are up and running; (2) two quality improvement stories are completed; (3) morale of employees regarding TQM is very positive. Nowhere did the report show any bottom-line performance improvements because there were none.

A large mineral-extracting firm stated their TQM program accomplishments as 50% of the training and employee participation goals were met but only about 5% bottom-line improvement. Another company's success consisted of getting 100% of each division's employees to attend a quality training program, but no mention of quality improvements within the company. In a 1991 survey of electronic companies, it was found that 73% of the companies reported had a TQM program, but of these, 63% had failed to reduce quality defects by even as much as 10%.

Results-Driven Efforts

Results-driven efforts bypass lengthy preparations and aim at quick, measurable gains within a few months rather than years. Investment is less, and improvement goals are short term. Top management takes action steps because they lead directly toward improved results, not promises of a someday hopeful gain (Schaffer and Thomson 1992).

The following are four key benefits of a results-driven approach that activity-centered programs usually miss:

1. **Quality improvement tools are introduced only when needed.** Management introduces innovations when it helps speed progress toward achieving measurable goals. Contrast this with activity-centered programs, where all employees may be ritualistically sent off for training because it is the "right" thing to do.

2. **Trial and error reveals what works.** Because management introduces innovations one at a time and links them to short-term goals, it can be discovered what works and what does not work. Learn from these experiences and use what works.

3. **Frequent reinforcement energizes the improvement process.** There is no motivator more powerful than repeated success. Projects that produce results demonstrate to employees and managers their capacity to succeed. This also builds management's confidence and skill for achieving continuous improvement.

4. **Management builds on previous successes.** By using each project as a testing ground, management gradually creates a foundation of experience on which to build organizational-wide performance improvement.

In the course of accomplishing results-driven efforts, management introduces many improvement techniques that promoters of activity-centered programs insist must be drilled into the organization before any gains can be expected. Results-driven teams receive training in improvement techniques when it is needed; team building exercises are used to help achieve goals more quickly—not just for the sake of team building. Unlike activity-centered programs, results-driven efforts introduce innovations as they are needed and when they contribute to realizing some specific measurable performance goal. Quality improvement tools and innovations are not interjected wholesale with the hope that some sort of improvement will be

made. There is never a doubt that an accountable manager is responsible for producing results, whether beginning measurable improvement in performance or lessons learned.

Useful Tools

Now that we have discussed a proven approach to implement improvement efforts in your organization, we give a short description of quality improvement tools. These include tools useful in problem identification and analysis. Problem-solving techniques that are useful for improving quality, productivity, and performance are discussed in *The Memory Jogger: A Pocket Guide of Tools for Continuous Improvement* developed by Goal/QPC (1988).

The problem-solving process consists of the following six tasks:

1. Decide which problem occurs most frequently or is the most important and will be addressed first.
2. Define the problem, including where and when the problem occurs and extent of the problem.
3. Develop a complete list of all possible causes of the problem.
4. Decide on the root cause(s), not just the symptom of the problem.
5. Choose a workable solution and develop an action plan to implement the solution.
6. Implement the solution and follow-up (monitor and report results).

The Memory ***Jogger*** (1988) also describes where and how to use many of the quality improvement tools. Some of these tools are summarized in the following:

Brainstorming
Brainstorming helps a group create as many ideas as possible in as short a time as possible. Typically, brainstorming should only take about 5 to 10 minutes to generate 25 or 30 ideas. This rapid pace helps creative thinking. Ideas are written down on a flip chart. Discussion and criticism are not allowed.

Nominal Group Technique (NGT)
NGT is used to develop group consensus, giving everyone an equal voice. This is done by listing each item (e.g., problem, cause, idea) on a flip chart. Each individual then ranks the items in order of importance. If there are 20 items to rank, an individual's first choice gets a score of 20, second most important gets 19, third most important 18, and as so forth. The scores of each individual are tallied. The item with the highest score is the group's most important item. The advantage is that everyone in the group has an equal vote and ownership in the ranking process.

Flow Charts
Flow charts show all the steps of a process and how each step relates to all the other steps. Flow charts are useful in identifying trouble and streamlining the process by identifying unnecessary steps. This is important because the less complicated a process or product is, the better the quality and less expensive it is to build. In problem identification, the flow chart breaks down a process into its various steps and helps focus on each area as possible sources of trouble. Flow charts show a process as it currently works and the same process as it should work. When comparing these flow charts to each other, the differences will identify where the trouble is occurring. Flow charts are also used to clarify proper procedures for employees, providing consistency in processing.

Check Sheets
Check sheets are used to gather information about processing problems and help determine what problems are occurring most frequently. They are simple forms that help answer the question, "How often are certain problems happening?"

Pareto Analysis
Pareto analysis is a simple bar graph that shows the relative importance of all problems or causes to one another. This helps to make a decision on where to start solving problems or to identify basic causes of a problem. Pareto analysis summarizes information from a check sheet (discussed previously) or other forms of data from records.

Cause and Effect Diagram
Cause and effect diagrams (also called fish bone diagrams) are used to identify, explore, and display possible causes of a specific problem. Possible causes of a problem are grouped into major categories, such as people, machines, methods, materials, and environment. Each category is further broken down into possible causes. These causes can be further broken down into detailed causes. A detailed cause and effect diagram looks like fish bones. Causes of a problem are developed from brainstorming or information collected on check sheets. From the cause and effect diagram, the most likely cause of the problem is selected for further analysis.

Statistical Process Control

Statistical Process Control (SPC) provides effective tools for improving quality and productivity. Implementing SPC helps objectively evaluate and improve process performance. It also helps management set reasonable specifications for processes and identify processes that cannot meet such specifications. SPC is useful in setting maintenance priorities and establishing specifications for new machine centers. The two basic statistical tools of SPC are control charts and process capability studies.

Control Charts
Control charts are designed to objectively evaluate process performance and maintain statistical control. Control charts help you decide when to take corrective action and when to leave the process alone, avoiding unnecessary expense. Control charts help identify trouble as it develops within a process. When trouble occurs, it can be identified and corrected in a timely manner. Control charts are also used as a diagnostic (troubleshooting) tool to help tighten up process performance. Process performance is monitored with control charts by taking periodic samples from a process and plotting the sample points on a control chart. Interpretation of control charts is done by comparing plotted sample points against control limits. Statistical control is, in part, indicated by whether sample points fall within the control limits, called in-control, or outside the limits, called out-of-control. Out-of-control points call for a search for special causes and corrective action.

Process Capability Studies
Process capability studies are used to determine the ability of a process to meet specification (called process capability). Process capability shows how the process is performing in relation to its specification and may suggest the actions required to meet specification. The percentage of output falling beyond the specification (that is, percentage defective) can also be estimated using these statistics. When a process does not meet specifications, it might be possible to bring the process into specification by making adjustments to the process. Sometimes, defects will be produced no matter how the process average might be adjusted. This calls for improving the process and may require rebuilding or replacing equipment, more uniform quality of incoming material, or better training for machine operators and millwrights.

Case Studies

There is no better way to gage something, than by results. Quality improvement programs have already curbed losses to our Nation's natural resources and improved the productivity and competitiveness of the forest products industry. The following are examples of positive results:

Case Study 1
SPC technology helped a hardwood sawmill owner in the Upper Midwest reduce lumber target sizes on his machine centers. A lumber size study was conducted, and it was determined that excessive oversizing of

lumber was a major contributor to mediocre lumber recovery. New target sizes were calculated and implemented. The sawmill owner reports that properly adjusting his target sizes reduced oversizing, resulting in improved lumber recovery. This was a savings of about $35 per 1,000 board feet. With an annual production of 7 million board feet, a savings of $250,000 per year was realized! Properly adjusted target sizes in the sawmill also allowed for greater lumber dry kiln capacity and shorter drying times. This resulted in an additional $70 per 1,000 board feet or $500,000 annually in energy savings and increased productivity! This helped the sawmill gain competitive position in the hardwood market. The firm expanded into value-added manufacturing with the addition of millworks and a hardwood dimension plant.

Case Study 2

A large cabinet maker was experiencing finishing problems. Sometimes, bubbles were in the finish of the cabinets; at other times there was "sand through" of the finish. These problems continued for some time, even though employees in the finishing and sanding departments were instructed by their supervisor to do better. Eventually, a quality improvement team was formed to determine the cause and solve the problem. The team used Pareto Analysis to determine that the problems were related to finish thickness. The team then brainstormed and developed a cause and effect diagram. It was agreed that the basic cause of finish thickness was variation in the finish viscosity. An on-going plan of action to control variation in finish viscosity was implemented. Each employee now customizes and monitors their viscosity using control charts; their problem was solved.

Case Study 3

By applying lumber size control technology, a sawmill was able to stay in business and retain 80 jobs, saving a small rural community in the Pacific Northwest from economic disaster. The problem was that this sawmill could not afford to buy logs and remain viable as a result of escalating stumpage costs. In an effort to improve profitability, the mill owner needed to control manufacturing costs and did so by reducing the work force. Shortly thereafter, lumber recovery decreased with an increase in thick and thin lumber. In desperation, the mill owner requested help from the State Wood Products Extension Specialist. A sawmill study confirmed that excessive lumber size variation and poor lumber recovery were contributing to the demise of the company. Upon further analysis, the lumber size study uncovered a gradual increase in sawing variation during the course of 1 week. This occurred repeatedly for several weeks. It was discovered that the saw filer, who changed saws twice a shift on the headrig, was only changing saws weekly on the gang edger. Simply put, one saw filer could not do the job of two. The second saw filer had been laid off with many of the other employees. The employed saw filer had been overwhelmed. The solution was to hire back the other saw filer. Lumber size variation immediately improved. Target sizes were then properly adjusted to reduce oversizing, and an immediate improvement in lumber recovery resulted. This reduced the raw material cost per unit of output (i.e., improved productivity), and the mill was able to purchase logs and stay in business. The mill owner later admitted that the mill would have had to shut down permanently, a loss of 80 community jobs, without this improvement in quality and productivity.

These three case studies are good examples of Deming's "Do Something" theory. No elaborate corporate-wide quality effort was necessary to achieve such measurable results. Successful results build faith, knowing that quality improvement is worth the effort. Management and employees can see positive results, rather than promises of "a someday pay off," and each success builds on the last success. Ultimately, a company, its management, and employees are transformed into new ways of thinking — one of continuous improvement. These case studies illustrate the straight forward, no nonsense approach of results-driven improvement efforts. In each case, a problem was first identified, then appropriate action was taken, incorporating only those improvement tools that would help solve the problem were used. The end result was success.

Pick One Project

Results-driven improvement efforts focus on achieving specific, measurable improvement goals. With results-driven improvements, a company introduces only those quality improvement tools that help achieve specific bottom-line results. The key to success in the beginning is to select one or two improvement projects that can be achieved quickly. It is critical to maintain a clear focus on launching the improvement process that enables meeting such goals.

Management begins by identifying the performance improvements that are most urgently needed, then immediately sets about to achieve measurable progress in a short time. Typically, a quality improvement team will be formed. Improvement teams, made up of perhaps 5 or 7 operators and maintenance employees and their supervisor, are formed to achieve specific performance goals. Management charges each team with not only studying the problem and recommending solutions but also producing measurable results. The team, in a step-by-step manner, identifies the problem and possible causes of the problem, develops a plan of attack, receives the necessary training needed to solve the problem, solves the problem, and reports the results to management. Management communicates successes, including cost savings realized, lessons learned, and acknowledges the contributions of the employees to improvements throughout their organization. As each team reaches its goals, new performance goals are set, and the beginning of another continuous improvement effort is set into motion.

Note that in results-driven efforts a few key actions are necessary to achieve positive results. First, get top management's commitment for resources to solve the problem. Without management's commitment, the problem will not be solved. Next, form a quality improvement team of in-house experts (i.e., people who know and work with the process daily) to identify the problem, possible cause(s), and course of action to correct the problem. The team then develops an action plan using the various problem-solving tools (e.g., SPC, brainstorming, flow charts, etc.). Last, report results and acknowledge team members for their contributions.

Concluding Remarks

Both activity-centered and results-driven strategies aim to strengthen a firm's competitiveness; however, their approaches differ dramatically. Activity-centered efforts can spend vast resources on a variety of activities that may not directly improve quality and productivity within a company. Results-driven efforts set specific, measurable improvement goals and match resources, tools, and action plans to the requirements of accomplishing success. As a result, investment is less, goals are short-term, and action steps lead directly to improvement results.

Literature Cited

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