Leadership at Alvey Systems, Inc.: New Measures Drive the Business

Cycle time focus through teamwork — it's really quite basic.

Paul N. Brauss

Manufacturing companies have focused on process improvements, cycle time reduction programs, problem solving, and JIT techniques since the Japanese forced the bugle call in the early 1980s. This call to arms produced tangible results in production with the aid of Pareto analysis, fishbone diagrams, and cellular manufacturing, as American industry used these tools to step up to the challenge of current global competition. What faces many companies now is making the next improvement step.

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As managers discovered at Alvey Systems starting in 1996, we needed to transform the traditional way of looking for business improvements. Alvey's search for "a better way" began shortly after the company became the first material handling equipment manufacturer ISO 9001 certified in their market segment. Alvey is an 85-year-old St. Louis, MO organization focusing on the design, manufacture, installation, and servicing of material handling equipment and palletizing systems.

Alvey's growth had zoomed upward consistently for the previous five years, with pockets of productivity gains. Improvements made in fabrication, work cells, and order entry, for example, were not tied together by a global approach. The problem was lack of consistent progress throughout the organization.

Steps to a Cycle Time Focus

After researching holistic improvement processes that could be woven into the company's cultural fabric, executive committee members decided to embark on a cycle time-centered approach.[1] They developed a management mission focused on increasing throughput without adding resources, communicated through the company's monthly newsletter and a special area of the main aisle in the offices where weekly updates on activity/performance results were posted. They also developed implementation steps needed for such a cycle time focus, and set the improvement process in motion.

First, management established a hierarchy to manage the change. This did not mean changing the organizational charts, but changing the staff approach from status reporting to continually providing guidance. Alvey selected six key executive staff members to become an executive steering committee, led by the president.

Three of the six committee members gained responsibility for business processes, divided into three groups (cross-functional teams):

- *Team 1*: All processes from initial contact with a customer to the point of an order (forecasting, estimating, strategy)
- *Team 2*: All processes from the point of an order to completion of the design of a project or product
- *Team 3*: All processes from design completion through manufacturing and shipment.

These cross-functional teams were managed by approximately eight people who were considered experts for the processes (members of the business steering committee). The structure is shown in Figure 1.

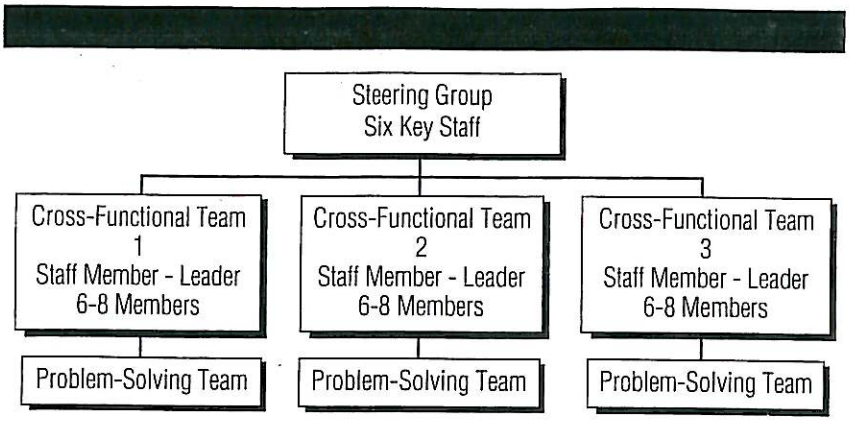

Figure 1. *Alvey's revised teamwork organization.*

Measurements for Each Team

Each cross-functional team initially set up measurements focused on time and correctness of a process. In the design process, for example, we measured the time from the day an order was received until the design was released to manufacturing. In manufacturing, we tracked cycle time from that point through all phases — fabrication, release to paint, release to shipping, etc. Macro process maps were developed by each team from the process flow charts used for ISO certification. Then they created a time line for the process and monitored time for a six-week period, in turn determining a baseline. Team members brainstormed to identify major obstacles preventing process completion in a shorter period of time. The impact of the obstacle on time and the degree of difficulty were determined for each obstacle. Next, the teams developed a prioritized list of needed activities and projected their progress against goals for the coming quarter. (An example is shown in Figure 2.)

Team 1 focused on estimating and closing new business. In all operational areas, throughput and cycle time measurement was determined at the key process level. These measurements were accumulated and published weekly for all managers to use in running their processes. The results were shared with all employees through our monthly newsletters. A key measure in Team 1 which had a great impact was the time from receipt of order until all required technical data were available to begin design. Often, two or three weeks were lost in the overall cycle because such information was incomplete.

We learned the benefit of publishing cycle time at the process level, because this allowed each group to learn the impact their process had on others' downstream processes. For example, the sales group reviewed their results and modified order entry requirements to ensure that correct data accompanied orders.

Team 2's measurement for time focused on job request. Their macro process steps included data receipt, scheduling, technical review, development of bills of material, customer approval, and drawing finalization. In this group, new measurements centered on design requests in each of the processes. This later became a primary tool for all project management.

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The matrix for this team appears like a project Gantt chart. Time in each of the processes was recorded for several weeks, and as in the other groups, the team established a baseline.

Manufacturing (Team 3) people easily established measurement using work orders. Here, the time from work order generation to completion became the measurement.

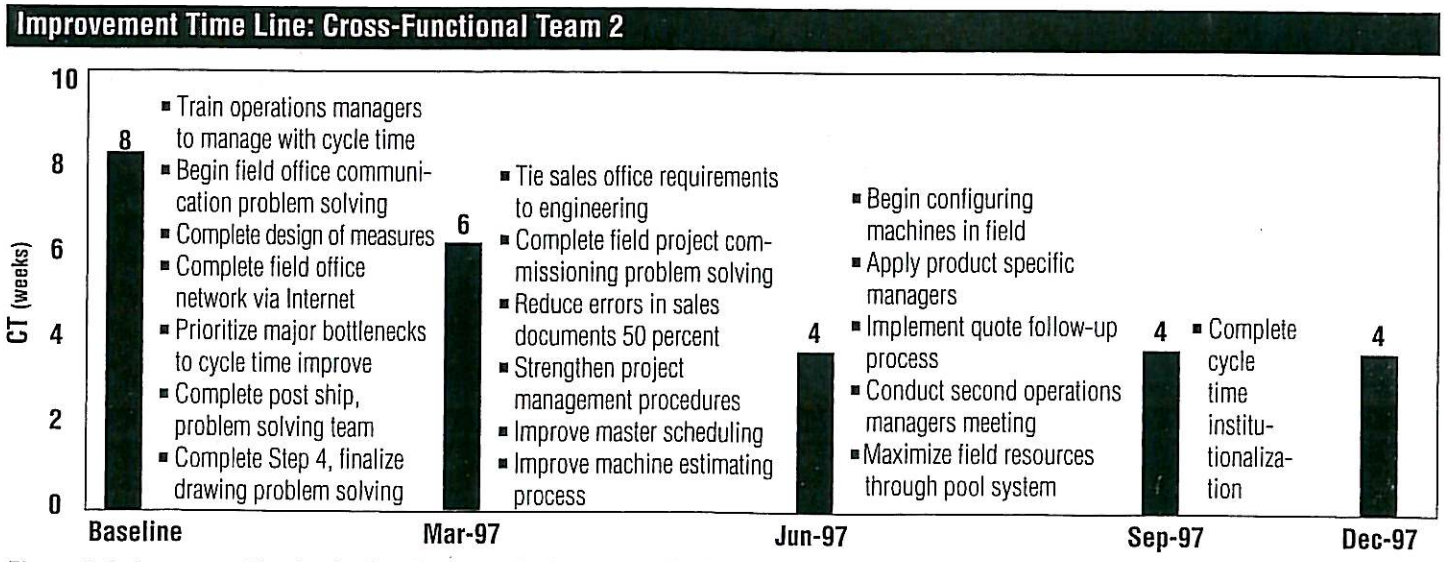

Figure 2. *An improvement time line developed by one of Alvey's cross-functional teams.*

This work order timing was broken into logical major process steps of fabrication, sub-assembly, and final assembly. Actual total cycle time included induction time, drawing release time, and stockroom kitting time. All the queue time between processes where the work order waited to start the next process was also added to give a total process time.

Management's Challenge: Using the Tools

With the needed hierarchical approach to problem solving and appropriate measurements in place, management accepted the challenge of developing new yardsticks for its own performance. The functional organizational changes were minor. A revised management method focused on cycle time measurements, activity under way to reduce cycle time, and steps to synergize team activity on the "big hitter" projects.

The steering committee met each Monday afternoon for 1.5 hours with the president. Here they reviewed their numbers for the hottest projects going (such as throughput increases, completeness of design, and system program risk assessment (applications and capabilities of the equipment).

This weekly session became the cornerstone of management commitment. The tone of the meetings changed over the one and a half-year transition to a cycle time focus. Initially, steering committee meetings consisted of short status reports. As they gained experience with the new measures and related improvement tools, they discovered the benefits of letting improvements in cycle time drive change. The result was an overall process cycle time reduction of 35 percent (order receipt to shipment).

After six months, the meeting evolved into a detailed review of one team's activity per meeting. The detailed review often included presentations by team members on results of their team activity. This allowed deeper probing of facts and possible solutions to problems. Team leaders became well aware they had better come prepared to discuss their activities and results. Each meeting held to the 1.5-hour time frame and focused positively on team progress.

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The Next Level

Cross-functional meetings, also held weekly, initially zeroed in on individual process measurements. One person on each team was assigned responsibility for measurements, including preparation of charts, copies, and distribution. This member also led discussion on results. Often this led to brainstorming activities when results were less than desired. Then specific action assignments were typically made by the team leader.

The appointed cross-functional team leader developed the meeting agenda and minutes. The minutes featured brief information on specific improvement assignments and progress against completion dates, as well as the team's list of future projects originating from brainstorming sessions. An accurate description of the minutes is a single-page activity chart showing active, backlogged, and completed tasks. The whole point is to limit the number of things you are working on so you are "up, down, and done."

In addition to the six-eight people with expertise in the process on each team, the groups included a participant from outside the defined process. This "outside" member can help to prevent tunnel focus and look at solutions more globally. Meanwhile, team members continued to build problem-solving leadership skills.

Problem-Solving Teams

The cross-functional team selects a problem to be addressed and assigns a member to lead a problem-solving team. They also ensure the problem-solving team is selected and supported, monitor its results, and set priorities to help it reach targeted goals.

Once a problem-solving team is launched — dealing with problems such as BOM accuracy, work order kitting, and design retrieval — they meet as frequently as required to resolve the problem using well-defined criteria. The criteria include problem and problem cause identification, and a task sheet specific to who, what, and when. Fishbone diagrams and ranking sheets are added tools.

A format for each tool allows all participants in the problem-solving process to monitor their progress and ensure the disciplines of problem solving are applied. There are three basic formats to monitor progress. The first is a master action list. The second is a problem removal sheet specifying who, what, and when. The third is a fishbone diagram used to identify root causes. These must be filled out; they serve as a record of actions/results and keep a team on track. The discipline to this process is very important.

Overcoming Challenges in Final Assembly

Focusing on measurement in weekly problem-solving team sessions eliminated most of the finger pointing and encouraged fact-based activity reviews. One particu-

lar problem was the inability of final assembly to meet schedule and increase production. The department averaged 28 days late in early 1997, averaging 30 percent overtime, and not making any progress against schedule. Much of the delay reflected increased product demand and the short supply of qualified external people plus training needs of current employees.

A final assembly problem-solving team documented the dilemma and identified improvement goals: 1) increased quality, 2) better on-time delivery, 3) faster cycle time, and 4)improved utilization of people. Next, they brainstormed the roadblocks preventing progress.

The team held a series of problem-solving meetings over eight weeks, in turn achieving:

- *Conceptual buy-in*: The floor supervisors became the problem-solving team and developed their mission statement for needed improvements
- *Process breakdown*: The problem-solving team reduced final assembly to individual steps and evaluated the necessity of each task
- *Layout changes*: The flow of sub-assemblies and the work area had to be redefined when space became a problem due to an increase in business; most of the ideas for layout changes came from shop floor people.
- *Responsibilities*: The purpose/use of teams, the number of people in a team, and team leader/member roles were defined and team members were trained for expectations. Often, workers had been given assignments without knowing exactly what outcome was expected. Management established and communicated cycle time reduction and first pass yield as a set of expectations shared equally among all layers of the organization.
- *Supervisor roles*: Supervisors were coached to communicate overall expectations to their work groups and they were trained by management in problem-solving techniques.
- *Quality*: They designed an audit program to support the final assembly process, training the team on required attributes. A quality assurance engineer talked about non-conforming issues with the team, greatly enhancing awareness of improving quality performance. Many of the non-conformance issues were minor in detail. Sharing the results in this team format was received positively.

Within two months of the start of this process improvement, the average days late dropped from 28 days to three days. By the third month, the final assembly group turned in on-time performance, with the highest throughput level in the company's history. Financial measurements showed reduced hours required per job, decreased rework, and reduced start-up costs once a product was shipped. The improvements in final assembly were amplified with better equipment start-ups in the field. Part shortage and commissioning issues were greatly reduced.

Communication

Constant communication to resolve problems fueled the success of this new management initiative on time. Bulletin boards in the main aisle of the office and in strategic areas throughout the facility were dedicated to the

Sales Involvement in Total Cycle Time Reduction: Doing Things Right the First Time

The sales organization is an essential ingredient in the success of Alvey Systems' cycle time reduction efforts. As explained by Bill Harton, senior vice president of field operations, this involvement dovetails with four major processes affecting cycle time and first pass yield performance: pre-order sales, post-order field systems (which Harton heads), post-order major systems, and manufacturing.

In post-order field systems, for example, the focus is on the cycle time between contract receipt and release to manufacturing (when a BOM is generated). This process averaged eight weeks until Harton and others identified barriers within the process and took action to remove the barriers and thus cut cycle time. The average is now four weeks, and the target is another 15 percent reduction by the end of 1998.

A cross-functional team (Team 2) approach to reducing cycle time was very effective. Harton's 11-member team includes engineering, field management, manufacturing, order entry, product management, and other representatives. This post-order field systems team meets every Monday afternoon for about 1.5 hours. They've developed a "battle plan" for targeted improvements. Establishing a baseline for each step to measure improvement against is an important, though sometimes difficult, part of their work. In turn, they give specific assignments to Problem-Solving Teams — people in the organization who are closest to the action where improvement is needed. These teams form and then dissolve as problems are eliminated.

For example, six complete documents are required before a palletizer order can be turned over to engineering. "When we first analyzed this process, we found that documentation was accurate and consistent approximately 30 percent of the time," Harton said. "In other words, about 70 percent of the time, we were forced to go back and redo something. After a Problem-Solving Team identified and took the necessary steps to remove barriers, we were averaging 75 percent accuracy. Our objective in 1998 is 90 percent." Formal training and work instructions on completing the appropriate paperwork and distributing information company-wide on the required documentation increased accuracy and consistency.

Every order is now measured for completeness. If even one of the required six documents is inconsistent, the sales engineer and sales region responsible for the order are notified. Regional directors' incentive is tied, in part, to order completeness and its impact on first pass yield. Failure to make the grade on order completeness qualifies involved parties to talk with the senior management's steering team, which meets each Monday; nobody wants to be on this "hot seat."

Thanks to this focus on cycle time and first pass yield, Alvey Systems drives more product through, improving delivery and quality, according to Harton. "Doing things right the first time makes such a difference," he said.

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cross-functional team and problem-solving team activities. Cycle time measurements were posted for review, too.

Our company newsletter featured a page dedicated to each team, also helping to keep everyone up to date on improvement targets and performance. As each problem-solving team activity ended, mini-celebrations such as lunches, cakes, and ice cream breaks marked the events.

Problem-solving teams also presented their accomplishments to the steering committee. The accent was on praise and guidance during these sessions.

Results, Including "Comfort Level" With Change

Learning to manage with cycle time as the driver and using problem-solving disciplines took some time to get used to. The staff did not reach a "comfort level" with cycle time measurements for at least six months. Focusing on improvement trends day-by-day was also tough to practice, especially when we were used to running in a mode that everything stops on the last shipping day of the month.

Customers realized actual improvements when the order management process reflected leadtime reductions. Order management calculated a 25 percent increase in orders because we were able to trim leadtimes. On one product, for example, leadtime fell more than 35 percent while throughput rose over 30 percent in the same time frame. Actual costs decreased on this product line by ten percent as a result of problem solving.

Our cross-functional teams each achieved a number of successes. The manufacturing cross-functional team, for example, solidified most of its improvements because of the design cross-functional team successes. It's a perfect example of process improvement trickling well downstream from the initial point. Productivity measured as sales/people cost increased more than 47 percent in sales/estimating, over 28 percent in engineering, and more than 44 percent in manufacturing (see Figure 3).

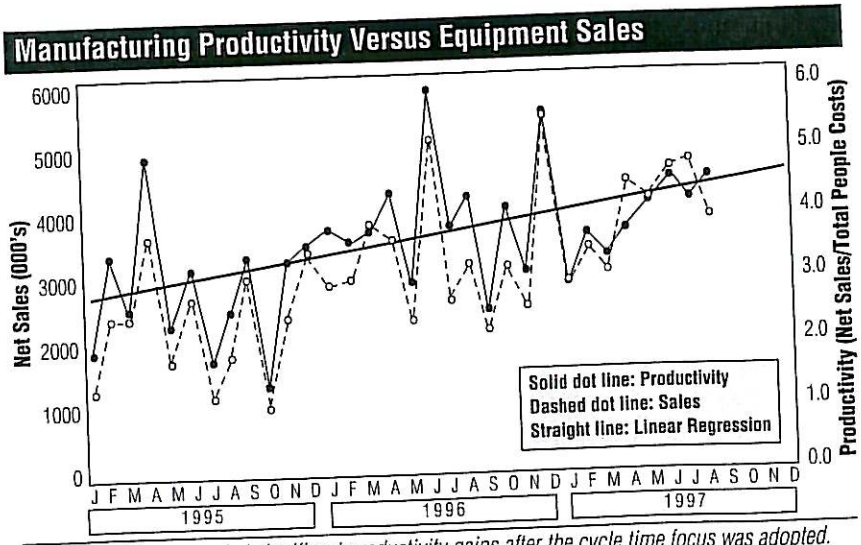

Figure 3. *Alvey recorded significant productivity gains after the cycle time focus was adopted.*

Lessons Learned

When we look back, the lessons learned are quite basic:

- Establish realistic, meaningful measures and let them drive the business
- Determine roadblocks to improvement and remove them
- Continuously strive to improve
- Management recognized and used basic management tools and embraced a willingness to change the norm.

This methodology requires discipline at every level to ensure management (and organization-wide) focus. It also means holding team meetings consistently, completing paperwork, and defining/communicating results.

Paperwork includes meeting minutes with assigned responsibility. Using charts, fishbone diagrams, and effective measurements is also critical. Without these details, participants often try to jump to a resolution — resulting in a wrong action or implementation of a process which does not provide desired results. Commitments are monitored and results verified through the problem-solving teams.

The discipline of this process has been in place for two years now. The work climate is changing from chaos to logic-based resolution. Our cycle time focus has pulled a group of sub-optimized efforts into a synchronized effort capable of achieving ever-higher performance levels. This management approach prepared the organization for the challenges that lie ahead and provided a consistent base of tools to ensure leadership continuity.

1. The Thomas Group, a consulting company, was selected to assist in this transition.

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