

EFFECTIVE MANUFACTURING IMPROVEMENT

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EXECUTIVE SUMMARY

Effective manufacturing improvement is like a two-minute drill in football. Put the quarterback in charge, use the right players in the right plays, and move the ball down the field. You easily see the ball's progress with the use of a scoreboard that guarantees time management and goal achievement.



Using the tools of lean and Six Sigma is common practice for the modern manufacturer. Any manager involved with production operations will speak the language of waste elimination, green belt requirements, and continuous improvement. These tools have re-energized the contemporary manufacturing manager and created a necessary focus on gaining significant competitive advantage through the core business. Unfortunately, there has been a lack of real execution, and the true bottom-line effect has been nebulous at best.

The commonality between these programs has been training, proven tools, employee enthusiasm, and the belief that effective organizational improvement is in progress. However, the necessary management practices for effective execution, bottom-line results, and creating a win for the organizations are often missing. Our research with more than 1,000 organizational change initiatives has shown there is a need to develop an execution model that ensures that the chosen tools of improvement deliver actual results. This execution gap is often the missing link for performance improvement.

The two-minute drill in football offers an appropriate and powerful metaphor for this dilemma and is chronicled in our book *The Two-Minute Drill: Lessons for Rapid Organizational Improvement*.

Assume that a team's normal game plan in a high-stakes football game has not been effective, and the home team finds itself behind on the scoreboard with time running out. It is at this point that real change to the game plan is implemented and a two-minute drill is initiated. The two-minute drill puts the results of the game in the hands of the quarterback. Winning is clearly defined, and a new level of team focus and urgency is developed. Employing the right players and the right plays helps ensure that the ball is moved down the field. The scoreboard is monitored to guarantee time management, interim goal achievement, and proper adjustments. The two-minute drill secures a game-winning score when the previous

game plan was insufficient.

The following case description demonstrates the effectiveness of a two-minute drill mindset when applied to a specific lean initiative. Although the names are fictional, the details of the recent case are very real for the contemporary manufacturing enterprise.

The quarterback takes charge

Sara, the recently appointed plant manager for the CTSK Industries manufacturing facility in Houston, knew that her success determined the continuation or elimination of the plant. This manufacturing facility had spent the past two years implementing lean initiatives in an effort to save the plant from relocation out of the country. The facility had a long track record of excellent customer satisfaction and quality performance, resulting in several industry awards and recognitions. But recently the facility had been squeezed by the economic conditions of the high-tech hydraulic pump market and the plant was struggling to adjust accordingly. The plant had seen declining profits for eight consecutive quarters and had been operating in the red for the past year and a half. The facility was currently losing upwards of \$100,000 per month, and corporate executives determined that if they didn't see significant improvement in the next quarter, a number of the product lines from this facility would be pulled out and taken offshore.

Corporate management knew that adjustments needed to be made. Three areas were targeted for significant cost improvement: excessive overtime, the use of three outside warehouses for excess finished goods storage, and a large work-in-process inventory. Just two years prior, the corporate engineering and logistics group had begun a lean initiative to champion the necessary cost improvement efforts as part of an organizational improvement strategy. Plant management at this facility had been engaged in a number of appropriate planning activities for the improvement initiatives, including plant-wide training classes and certi-

fications, colorful banners throughout the plant, the creation of a full-time continuous improvement coordinator, and the development of process maps that were prominently displayed in the front office lobby. However, no significant bottom-line improvements had yet been achieved.

Sara was given an eight-week assignment as acting plant manager. She was specifically assigned to the plant in an effort to move the facility beyond the planning and training stages of their improvement efforts. It was Sara's job in the words of her boss, "to go in and make real improvement happen." Sara made an initial assessment of the situation and continued her analysis on her first day in the facility. It was obvious to her that the plant had good people who could ensure that current operations met the ongoing service and quality requirements during the proposed cost improvement initiatives. The managers had shown a history of achievement and an understanding of their roles in all aspects of the operation. Every team member understood the dire situation the plant was in and had a vested interest in the plant's turnaround.

It was Sara's assessment that the team was failing to implement and use the tools they had developed. She was determined to succeed in this assignment and realized that the opportunities for improvement were achievable. She was optimistic going in to this incredibly trying situation.

The right plays, the right players

Sara called a staff meeting on the afternoon of her first day at the plant. Clarifying roles, goals, and the current state of the operation, she established three cross-functional teams to attack each of the targeted improvement areas. Specific goals for each of the three teams were also clearly defined:

- Team 1: Eliminate all overtime for the plant in eight weeks. The savings achieved was targeted to be \$650,000 annually.
- Team 2: Eliminate all three outside warehouses and associated logistics in

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eight weeks. Perform all necessary warehousing functions in the plant's own attached warehouse during that time period. The targeted savings for this team was \$1.6 million annually.

- Team 3: Reduce finished goods and work-in-process inventory by 50 percent. The targeted improvement was a one-time savings of \$900,000 and an annual savings in material handling of \$460,000.

The lean initiatives and training already completed by facility employees

had prepared the teams to take on these challenges, but it was now time to make improvement happen by attacking these specific areas. While these changes would take place quickly, the plant still had to maintain its production and shipping schedules, making the challenge even greater.

Each team was given the assignments and a timetable for action:

- Week 1: Measure the current situation and identify the specific reasons for waste by using process mapping, layout analysis, work sampling, and historical analysis.
- Week 2: Analyze and assess the specific opportunities for improvement, and develop appropriate buy-in from plant personnel.
- Week 3: Redesign the current operation, create an action plan, and present the proposed improvement plan to the entire plant staff.
- Week 4: Develop a detailed implementation plan to ensure team buy-in, clearly defined roles and responsibilities, goal achievement,

appropriate measurement, and a plan for execution.

- Weeks 5 - 8: Implement the proposed improvement plan and measure improvements toward goal attainment, making ongoing adjustments as the situation changes.

Monitor the scoreboard

Sara created a single four-foot by eight-foot whiteboard that depicted the plant's current financial performance in each of the areas being tackled by the three teams. The board displayed the progress and timing for all three teams, goal targets, and attainment. Finally, the board had a daily countdown for the eight weeks that could be continuously updated. The whiteboard was strategically located between the front office and the employee break room so that team members had a constant reminder of the current status of their project. It also served to keep all of the plant's personnel informed and updated.

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A weekly meeting was scheduled for Thursday mornings, at which time each

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team was to provide a 15-minute status report, comment on the project status board, identify issues that needed decisions, and have a 5-minute group discussion for problem solving. If a team's goals or timelines were not where they needed to be, they had the weekend to adjust their activities accordingly. This adjusted plan was shared with Sara on Monday for her input and approval.

At the end of the first week, the improvement reviews were made with cautious enthusiasm. Each of the teams knew what needed to be done and were confident that improvements could be achieved, but they were uncertain about the timing and support. Sara assured the teams that their training, ability, and focus could make it happen.

The second week was critical because each of the changes affected a significant number of employees throughout the plant. Each team held daily meetings to review their findings, obtain team input, and ensure that everyone affected by the change understood the necessity for the action. Teams learned from each other as they presented their weekly assessments. Week two was filled with concerns, suggestions, resistance, and even some enthusiasm for what was going on. The leaders of each team showed eagerness to advance to the detailed designs of their game plan for improvement, making sure that their people were informed and involved. The team members knew their assignments and were performing their individual roles effectively.

Week three saw the detailed designs developed and again presented daily to the people affected by these changes. By Thursday of that week, the designs were nearly complete with the exception of the outside warehouse elimination team. This team had reached a roadblock. Two of the three warehouses could be eliminated, but the third was still needed for space in the interim. Investigation and discussion by the entire group led to an option of improved racking and storage in the existing facility. Sara adjusted this team's plan by providing immediate corporate

support to redesign the in-house racking systems. This redesign effort would dip into week four of the timeline but appeared to offer the necessary solution to achieve the original goals.

Week four witnessed the development of a detailed implementation plan for each of the teams as well as a continued redesign of their detailed proposals. By Thursday of that week, each team saw their implementation plans thoroughly reviewed and approved by Sara. In only four weeks, the teams had executed all of the steps necessary to develop game plans in each of the three designated cost-reduction areas.

It was time to execute changes to the plant's operation that would begin over the weekend. The teams had moved quickly, worked together effectively, and set the stage for the change effort, but now it was time to see if they could score.

The next four weeks provided a stage for a wide variety of emotions, including enthusiasm, frustration, excitement, stress, passion, apprehension, and even glee. Team 1 ensured that there was a real focus on their issue so that no overtime was scheduled for the second week of implementation. Changes to achieve this reduction included reorganizing maintenance activities into the production teams, concentrating on product completion rather than just keeping people busy, and establishing an understanding that overtime would no longer be considered business as usual. Eight weeks after the beginning of this specific change initiative, the plant was running zero overtime.

Team 2 was on a task by their second week of implementation as they targeted obsolescence in the facility, including dealing with material without a purpose and poor storage habits. This housekeeping endeavor, combined with the efforts of the Team 3 to reduce inventories, resulted in the elimination of the first two warehouses. The new racking systems, allocation methods, aisles, and traffic patterns were implemented in the in-house warehouse, and the lights of the third

warehouse were turned off by the end of the fourth week of implementation. Two of the warehouses were month-to-month leases and their expenses were eliminated immediately. The third was subleased to a neighboring organization (the idea was a brainchild of a team member) and within two months was generating income.

Team 3 saw their finished goods inventory reduced significantly by redesigning the production process and ultimately reducing production lead-time. This was achieved by the elimination of work-in-process at two critical processing steps. The WIP had always been deemed important in the production process at this facility until the team challenged those processing requirements and implemented experiments to prove that they were unnecessary. Rethinking these two processing steps accounted for nearly 80 percent of the WIP throughout the facility. This activity created a reduction in production lead-time, which led to the opportunity to produce to order many of the lower-volume products that had previously accounted for a high percentage of finished goods stock.

Into the red zone

While the earlier lean effort at CTSK set the stage for improved performance, it did not by itself create the momentum necessary to drive real improvement. Going in, Sara used the foundation laid by the lean initiative to drive change by creating a clear focus on what had to take place. She also created a sense of urgency about doing it because of the importance and necessity of the changes that needed to be made. Sara spent the majority of her time supporting each team's activities throughout the eight-week rapid improvement period. Here are a few comments that team members offered about Sara's performance as a change leader when they were asked to evaluate her in a post-project assessment:

- "Sara created the vision for what improvements were needed, but more importantly, what we needed to systematically do to get there."

The next four weeks provided a stage for a wide variety of emotions, including enthusiasm, frustration, excitement, stress, passion, apprehension, and even glee.

- “She was always reminding us that we could pull this off and was encouraging people to stay on task.”
- “Sara helped our team solve problems fast and she was on the phone getting quick answers from the corporate people, which was no small thing.”
- “She was constantly communicating with all of us and asking what we needed from her to get the job done.”
- “She was good at answering questions and encouraging people to be innovative in all that they were doing.”
- “Ms. Payne was quick to compliment people and give praise, but she was also not afraid to let people know when they needed to improve and move faster.”
- Sara had helped her team achieve real performance improvement because of her confident, calm and caring style of leadership using a disciplined approach to change.

CTSK scores, wins

CTSK Industries achieved tremendous improvements in just eight weeks of concentrated and focused effort. The proper execution of this organization's lean initiative achieved savings of more than \$2.5 million annually. This plant continued to see additional improvements and was performing in the black by the end of the following quarter, in large part because of success in executing the three cost-savings initiatives with the utmost precision. Today, this plant is one of the best performers in the company and has shown its ability to flex in response to new market opportunities and other organizational changes. While Sara received a great deal of recognition for her efforts in leading this potentially plant-saving improvement initiative, she was quick to give credit to the people on her improvement team and everyone in the plant for all of their hard and noble work.

Sara had done a great job of quarterbacking her team down the field and into the end zone, executing each of the plays in her team's improvement play package with great precision. They knew what to do, but more important, they

did it. During weeks one through four, she created the necessary momentum for her team to get into the red zone. She then took the appropriate steps to ensure that the team scored by executing the improvement plan that had been designed and mapped out during the previous month. Our research tells us that momentum is a critical factor in driving real organizational change.

Momentum builder 1: Establish your two-minute drill scoreboard.

It is incumbent at the start of any rapid improvement effort that the quarterback and team set up a scoreboard to help manage the change process and keep the team informed on the information that is most critical to success. Football coaches will frequently tell their teams that the scoreboard has been reset for a two-minute football game when their team has the opportunity to run a TMD to win a game. That is what we are suggesting here. One of the key characteristics of successful change initiatives is that the leader and the team know the status of their change effort at every point during the process. A scoreboard can help make that happen.

A scoreboard is a specific visual aid that contains the most pertinent performance measurements and information for a given improvement initiative. A critical component for effective execution is having a team that knows exactly where they are on the playing field, what the score is, and how much time remains in the game.

The visibility of the scoreboard is paramount to its usefulness, so it should be located in a place that ensures every team member has a clear view of the critical statistics. We have seen organizations make great use of electronic and even Web-based scoreboards to supplement physical scoreboards. It is also important that every team member understands every indicator of the status presented on the scoreboard. This may, at times, require both explanation and training for team members. Finally, to ensure that every member of the team understands the scoreboard, it must be kept simple.



Momentum builder 2: Snap the ball and move the chains. One of the most notable aspects of a two-minute drill is the simple fact that teams cannot afford to waste time and plays.

Waste loses games. Each play in a two-minute drill must be executed in a time-sensitive fashion to achieve a specific desired outcome. When people talk about execution in the context of organizational change, they frequently target their discussions around the actual implementation phase of the change process. In reality, successful change requires that each phase of an improvement process be executed in a time-sensitive fashion. That is why we describe phases of a change initiative as plays. They start with the snap of the ball, generate organized activity, have a clear stopping point, and an outcome that is measurable.

In the case of CTSK, Sara asked her team to run five plays: needs assessment; options analysis; change design; planning implementation; and change initiative implementation. Sara was highly effective at keeping the chains moving. She made sure that play was properly executed and measured to determine the outcome before calling the next play. Each Monday during the first month, the ball was snapped on four different plays, and players executed their individual assignments on each of the three

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improvement teams. In one month, her team ran four specific plays designed to move the facility to a position on the field where they could actually experience real cost-savings performance improvement. At the completion of each play, performance was measured and appropriate adjustments were made to keep the overall improvement initiative on track. Members of her team constantly reviewed the cost improvement scoreboard that had been set up to monitor the performance of each of the teams on each of the plays that they were running during that first month.

Momentum builder 3: Make necessary adjustments fast. In reality, most two-minute drills in both football and the workplace require adjustments between, and even during, plays. It is imperative for the quarterback to keep a finger on the pulse of the game and to know what is going on during each play of the improvement effort. In a football game, a wide variety of things can occur that require a quar-

terback to make rapid adjustments on the playing field. Some of these would include penalties, a dropped pass, not getting out of bounds to stop the clock, an injury to a key player, and facing an unanticipated defensive formation. In these situations, the quarterback has only seconds to call an "audible" and make the decisions necessary to keep the drive alive.

In the workplace, the same thing happens that requires change leaders to make adjustments quickly to keep the drive alive. The following are just a few of the things that we have seen go wrong in some organizations:

- A needs assessment took longer than necessary to secure accurate data.
- Team members could not meet because they were pulled out of meetings to handle a crisis with a customer.
- A team could not agree on an appropriate set of actions for a needed change due to analysis paralysis.
- Information technology people said

that they could not provide the necessary software to support a needed change by the due date.

- A current department budget could not support the training needs for the implementation of a new customized work procedure.

All of these problems have two things in common: They were unanticipated, and they require immediate attention on the part of the change leader to keep the change initiative on track. Adjustments are usually required whether you are implementing someone else's "fool-proof" improvement plan or creating your own.

Sara made several key adjustments throughout the improvement drive to ensure success. She provided time on the weekends for each team to fine-tune assignments that took longer than planned. She adjusted personnel to support the racking designs in the warehouse during the third week of the effort. She adjusted the implementation phase for several of the teams to allow

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them earlier starts to meet time requirements. Making adjustments quickly requires that change leaders always know what is going on around them, monitor the progress and performance of each team, act quickly when barriers to progress emerge, and have the courage to do whatever is necessary to get the team back on track.

Momentum builder 4: Manage the clock and keep the team hustling. One of the primary reasons that two-minute drills are successful is that quarterbacks and their teams stay focused on the game clock. Fans and



analysts are frequently amazed when a team runs a seven-play scoring drive in under a minute. How is that possible? The answer is simple: Every activity in the team's two-minute drill play package is designed not only to advance the ball but to do so in the least possible amount of time, and every player on the team has to hustle on every play.

Change represents a hardship for the people involved. This is primarily a time issue. People who are already busy with their regular jobs now have to find time to take on additional responsibilities. Effective change quarterbacks look for creative ways to manage the clock and minimize non-productive change activities.

Successful change leaders are aware of two old axioms that lie at either end of a continuum: Haste makes waste; however, work expands to meet the time allotted to it. Change that is overly aggressive in its time frame can create an ineffective change that cannot produce sustainable results. Conversely, if a change could be accomplished in two months, what is gained by setting up a six-month time frame? Both of extremes require effective change quarterbacks to manage their game clocks effectively in executing any change from start to finish. Managing the clock means that the team and individual players are running each play in a time-sensitive fashion. One of the attributes of successful change initiatives is that they take place rapidly in condensed time frames, which means that clock management is of prime importance.

Momentum builder 5: Execute in the red zone and score. Football devotees will tell you that it's the performance in the red zone that determines a team's success. The red zone is the area within 20 yards of the end zone. The goal is to score a touchdown or a field goal and thereby clinch the game. In the workplace, the final play of the drive is to execute the implementation of the actual change flawlessly so that real improvement takes place. We call this the scoring play.

This is often the most difficult play and may require a timeout just before the ball is snapped. It is during this timeout, with little time on the clock and the team in position to score, that the team leaders ensure the team is prepared for the change implementation and is ready to score. Everyone understands their role, eyes are on the scoreboard, the quarterback has control of the game, and the ball is snapped. It is at this point that individuals carry out their assignments that support the change in operation. Each of the CTSK teams did a great job of running the first four plays, which set the stage for them to execute their actual improvement plans in weeks five through eight. All three teams executed in the red zone and achieved their desired cost-saving scores. Prior to Sara's arrival, they had executed planning and training plays, but they had not created or executed a scoring play that won them real cost-savings. The true mark of any real change leader is his ability to get his team into the improvement end zone. This is exactly what Sara did.

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No spectators allowed

When asked what the secret to her success was, Sara offered this simple answer, "If you really want your organization to change, you have to help your people change, so be ready to put your heart and soul in the effort because they are worth it." The purpose of sharing this case study was to demonstrate that real manufacturing improvement should be run as a two-minute drill and not simply as a collection of business-as-usual activities. Whether the efforts are lean initiatives, Six Sigma analysis, or aligning manufacturing strategies, the two-minute drill mindset increases the likelihood of effective execution, faster activity, and victory. As you lead your next improvement initiative and establish yourself as the quarterback, be sure to provide constant communication, keep the chains moving, maintain poise and seize control of the game. Remember that if an improvement initiative is not worth winning, it's pointless. ❖