Four basic problem-solving loops can help the most crisis-driven organization turn its operation around.

Fix the Process, Not the Problem

by Harold Sirkin and George Stalk, Jr.

In 1983, the CEO of a paper company faced a difficult decision. His board of directors had just met to consider alternatives to filing Chapter 11 for a subsidiary, a paper mill acquired two years earlier that was losing more than $1 million a month. The acquisition had been made to grow the company, but it now confronted management with the prospect of a major write-down. The price of the company's shares had already fallen 40%.

One year later, the mill was just about breaking even. Today it is very profitable. Earnings per share for the entire company tripled from 1983 to 1989, adjusted for stock splits, while price per share rose almost tenfold. Many of the mill managers can look forward to a comfortable retirement based on the value of their stake in the transformed company.

What happened? The short answer is that everyone at the paper mill became a problem solver. Together, managers and mill workers learned to take the initiative not just for identifying problems but also for developing better processes for fixing problems and improving products. Their approach did not depend on key senior executives taking charge and telling people what to do. Instead, the entire organization learned how to learn. The key to their success: a multiyear learning process in which employees developed four progressively more sophisticated problem-solving loops: fix-as-fail, prevention, finding root causes, and anticipation. (The exhibit "How the Mill Solved Its Problems" illustrates these four loops.)

Setting the stage

For the company's CEO and his senior managers, starting the learning process was neither easy nor obvious. It was simply the only alternative that could give the mill a chance.

In the two months following the board meeting, the management team made several hard but necessary decisions. It shut down a small, inefficient, costly pulp mill and three paper-making machines. It laid off roughly 25% of the work force, delivering a serious blow to the small town in which the mill was the largest employer. It fired the mill's general manager. But these actions, management knew, could only slow the mill's losses. At best, it would buy one year's breathing time to turn the operation around. Success would depend on shifting the mix of products sold by the mill. And at first that seemed an insuperable problem.

Of the 13 product lines the mill produced, only 4 were profitable or had the potential to become profitable because of the mill's special manufacturing expertise and equipment. The rest of its products made little or no money and were nothing more than filler to keep the machinery operating. Shutting down three machines had eliminated some of these undesirable products, but those machines had accounted for only 20% of the mill's production capacity. That left significant volume with limited profitability, but it could not be eliminated immediately if the mill was to sustain even a scaled-back overhead level.

Clearly, the mill had to expand its volume in the four attractive product lines fast. Cutting prices to attract business was out because it would destroy any potential for profitability. That left improving quality and service – areas in which the mill's reputation was conspicuously poor. (The mill had always had problems with quality and meeting delivery dates. Adding to the difficulty was the fact that the mill had sustained a long, nasty strike that had ended only a few months earlier. During the strike, the CEO discovered on his

Harold Sirkin and George Stalk, Jr. are vice presidents of the Boston Consulting Group. Mr. Sirkin often writes on world-class competition. Mr. Stalk's first article for HBR, "Time – The Next Source of Competitive Advantage" (July-August 1988), won the 1988 McKinsey Award and was the basis for Competing Against Time *(Free Press, 1990), written with Thomas Hout.*

way home one night that his brake lines had been slashed. Management's relations with the employees were adversarial at best.)

Management's first approach to the mill's problems was top-down. The senior managers met, analyzed the problems – as seen through their own eyes – and decided on ten key actions the mill would have to take to survive. Many of these actions required large amounts of capital and additional people, however – resources the company for the most part could not afford and that would not be available from the parent in the quantities needed. Moreover, the plans focused on solving specific problems, often in a slow and very costly way: for example, rebuilding two of the mill's paper-making machines to correct paper-thickness inconsistencies across the width and length of a sheet. The rebuilding would take two years and cost over $23 million; whether it would actually solve the problem was not clear.

The moment of truth came when the CEO's controller took the plans key managers had submitted and laid out the overall timetable for implementing them. The result startled the management team. Reaching break-even would take at least five years. With losses mounting daily, that was time the company did not have. Management had to find a way to improve results more quickly. After further discussion, the executives identified four approaches: add resources; fix fewer but higher leverage problems; fix problems faster; and learn from each experience to make subsequent efforts more effective. But the only way to make enough resources available was to enlist the entire organization's help to improve the mill's quality and service levels.

The idea of turning to your people and asking them to solve business problems sounds less bold and risky now than it did in 1983. But even so, knowing something has worked for others and moving onto unfamiliar ground yourself can be very different things. In this case, the CEO and the mill's new general manager began by taking their description of the mill's problems to lower and middle man-
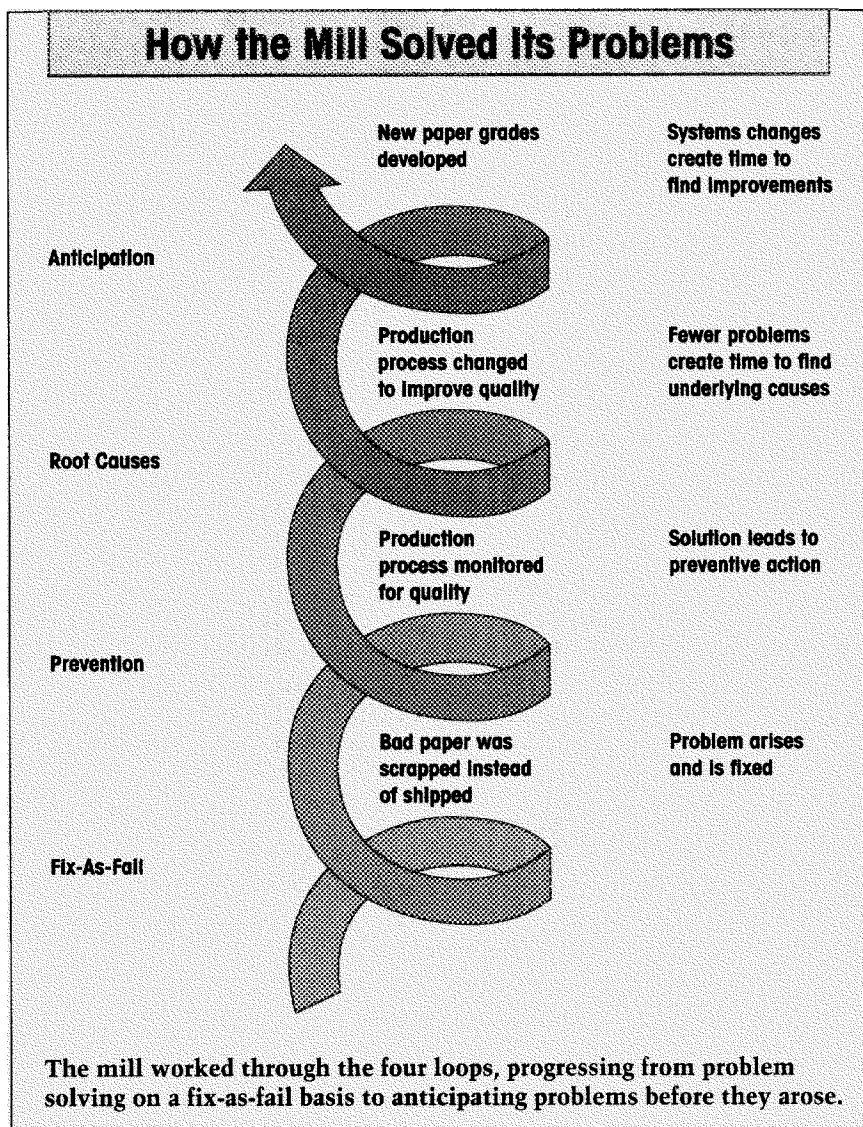
agement. They discussed the mill's difficulties frankly and outlined what the product focus would have to be if the mill were to survive.

Bonuses – for the manager and janitor alike – depended on overall profitability.

Making the stakes clear, the top managers pledged their commitment to the mill and made it tangible in important ways. They promised that the parent company would make capital investments when needed, despite the possibility of failure – a critical point, since the mill had not seen capital in many years. They promised to be available whenever called and passed out their home telephone numbers. They established a bonus plan for all the employees – from the mill manager to the janitors – that was pegged to improvements in individual product-line margins or volume but contingent on the mill's overall profitability. (For bonus purposes, the mill's financial performance would be assessed after six months and at six-month intervals thereafter.)

On the other hand, the downside was just as clear. Employees who weren't committed to saving the mill were invited to leave. (None did.) And the CEO left no question that the mill would be shut down if

How the Mill Solved Its Problems

Anticipation	New paper grades developed — Systems changes create time to find improvements
Root Causes	Production process changed to improve quality — Fewer problems create time to find underlying causes
Prevention	Production process monitored for quality — Solution leads to preventive action
Fix-As-Fail	Bad paper was scrapped instead of shipped — Problem arises and is fixed

The mill worked through the four loops, progressing from problem solving on a fix-as-fail basis to anticipating problems before they arose.

this effort did not succeed. Then, knowing that most of the employees trusted lower level management, he asked those managers to get the message to everyone at the mill and to solicit their help.

The CEO put the company jet at the teams' disposal.

At the same time, in an effort to narrow the field of problems needing attention, the CEO implemented a new organization structure designed to make it easier for everyone to focus on problems that mattered to customers, instead of on individual functional goals. He created five product teams, one for each of the four attractive lines and one to manage the remaining products during the transition period. These teams were composed of seven middle managers, one from each of the key functional areas, and were headed up by the product-line salespeople (to reinforce focusing on customers). These managers were charged with enlisting the help of all the employees in their areas and urged to give everyone a chance to contribute.

To keep the teams from making the same mistake management had almost made – focusing on the immediately obvious problems and trying to solve them all at once – and to find further opportunities to narrow the list to problems with the greatest leverage, the CEO suggested that each product team take the next few weeks to talk with key customers to learn their needs and develop plans for responding. Beyond this, he let the team managers set their own agendas. He simply reminded them from time to time that they always had direct access to him and the general manager. And he reiterated his promise that resources would be found. To signal his commitment, he put the corporate jet at their disposal and used commercial flights for his own visits to other operations.

Learning to learn

In the weeks that followed, each team expanded from its seven-

manager core to draw in line operators, clerks, and other employees whose work related to its product line. To give the teams time to meet, the CEO created time – by authorizing everyone to ignore the crisis and stop fighting fires. Predictably, the first month was a disaster, with problems piling up and seemingly nothing to show in return. But before long, management's faith in the learning process began to pay off.

To illustrate what this process entailed, we will concentrate on the activities of one team, the food-service product team. For the turnaround to succeed, its products had to become the mill's largest line, doubling the existing volume. At the start, this looked like an impossible goal. Food-service product lines got more customer complaints than any other product, and they had gradually been losing market share.

Within ten days of its formation, the team had met with its three largest customers, all of whom rearranged their calendars to accommodate the team's schedule because they so badly wanted a reliable source of paper. These customers told the team in detail about the consequences of the mill's poor service and quality problems. Late deliveries could shut down their plants, so they compensated by holding large amounts of inventory and purchasing paper from other suppliers. Quality problems, such as holes in the paper, ruined their own end products, so they incurred additional costs inspecting incoming paper and also bought from the mill's competitors. These discussions highlighted how shipping poor paper cost the mill business. The team returned to the plant determined to solve these and other quality problems.

Team members had now seen and heard their customers' needs firsthand. They had talked with equipment operators, salespeople, and receiving employees as well as with the buyers. And they learned things they never had before – for example, the effect on a customer's operation of the mill's paper-winding procedures. Wound one way, the paper moved smoothly through the customer's equipment. Wound the oth-

er, nothing worked right. It was as easy for the mill operators to wind the paper one way as the other. But before, no one had ever known it made a difference.

Back at the mill, team members talked with everyone in their individual areas and reported what they had learned in the customers' plants. More importantly, they enlisted everyone's help in resolving the problems and brought along people from all levels, including machine operators and shipping clerks, on subsequent customer visits.

Loop one: fix-as-fail

Operators at the mill knew all about the line's quality problems. But poor quality paper had always been shipped to make tonnage goals set by the CEO and agreed to by the mill manager. The team decided on its own to do its best to stop shipping defective rolls, whatever the cost of rejecting paper. A team member checked every roll and, if there were problems, set it aside. To show customers that quality mattered, the team also asked the mill's general manager to be the final inspector and sign every roll. At first, half the rolls were rejected and later salvaged by removing the defective portions. This salvage process was costly and time consuming, but customers were not sent low-quality rolls. The team had developed its first important problem-solving loop.

Getting stuck in fix-as-fail problem solving guarantees limited productivity gains.

Put simply, fix-as-fail means that when something goes wrong, the product or service is fixed before it is sent to the customer. It is the most basic kind of problem-solving loop, one that every company engages in to some degree or it could not remain in business. But many organizations

get stuck in a fix-as-fail problem-solving mode, guaranteeing static performance and limited gains in productivity. The frequent need for last-minute fixes, the unpredictability with which problems crop up, the recurrence of the same old problems – all lead to stress, extra hours, and finger-pointing throughout the organization. Production processes come to seem uncontrollable. Operations often fall further and further behind with no apparent hope of catching up, since problems seem to accumulate faster than they can be solved. Improvement looks – and is – impossible because an ever-growing number of resources must be thrown into dealing with continual crises.

Loop two: prevention

To avoid or escape a fix-as-fail cycle, an organization must be able to engage in a second kind of problem-solving loop: developing processes to keep problems from occurring. For food-service product team members, this loop began when they looked at the buildup of scrap from rejected rolls and realized they had to find a way to stop solving quality problems through inspection. Realizing that they had to walk before they could run, they agreed as a first step to assign an inspector to watch as each roll was produced. When a defect appeared, the inspector would tell the machine operator, who could adjust the equipment immediately and prevent further problems. Adding the extra person was expensive, but productivity (as measured by good output per person) improved measurably. Scrap rates dropped dramatically, the quality of the product remained high, and the reject rate fell by some 75%.

As this example indicates, prevention does not depend on tracing problems to their root causes but on developing learning loops to feed information rapidly from the point where problems can be discovered to the people who can keep them from recurring. At one level, therefore, second-order learning is simply a matter of resource allocation. Investing one person in increasing the effectiveness of this problem-solving

loop, as the paper company did, can free up 10 or 15 downstream people, who had been correcting problems on a fix-as-fail basis, and give them the time – and motivation – to embark on the third stage of learning, finding root causes.

At another level, however, second-order learning is also an organizational issue. Unless they are tackled head-on, old habits can enter in to keep people from moving beyond fix-as-fail problem solving. The corporate culture may block change. Employees may not have the tools

Six months out, customers were beginning to notice a marked difference in quality.

to find and institute an effective problem-prevention process. Everyone may have accepted problems as a normal and inevitable part of doing business – especially if they are routinely rewarded for solving rather than forestalling them.

Loop three: find the root cause

Six months out, the team had the production process under control, and customers were beginning to notice a marked difference in quality. One of the mill's best customers called and said it would increase its orders if the quality level held. The team was pleased but not satisfied. Assigning someone to watch every roll was inefficient, and scrap rates remained much higher than desired. It was time to look for root causes, a process in which operators, not managers, would take the lead because they understood better than anyone how the machines worked.

Holes in the paper continued to be one of the team's biggest problems. By experimenting with the many variables that control paper quality, the operators and team members learned that they could produce paper with fewer holes if they changed

the wire mesh in the paper-forming machine more frequently. They tested their finding, confirming that more frequent changes produced higher quality paper. Then they asked the mill manager if they could integrate this new procedure into the process permanently. He granted permission on the spot.

The operators also found that they could raise quality and lower the total cost per ton of good paper by using pulp furnish that was slightly more expensive. (Furnish is the mix of pulps that constitutes the raw material for a paper-making machine.) The team made this change too, without asking for approval from the mill manager until it could demonstrate the positive effect. Scrap rates fell further, and quality steadily improved. Before long, the team was able to do away with the in-process inspector because the machines were producing quality paper almost all of the time. The root causes of the quality problem had been found and eliminated.

By the end of the year, satisfied customers were giving the mill increasing shares of their business, the volume of the top four products had doubled, and profit margins had improved. The change in morale was equally dramatic. People knew they were winning the fight to save the mill. Friction between management and labor all but disappeared. Everyone knew more about the mill's operation and customers' needs. Customers who had previously been discouraged from visiting the mill were invited to tour the cleaner facility. The organization now felt strong enough to move from defense to offense.

Loop four: anticipation

One of the keys to the food-service product team's success was its new understanding of its customers' needs and how their businesses worked. Such understanding would have been unimaginable while the mill's people were spending most of their time fixing problems. Perhaps the most dramatic example of this understanding came when a machine operator's suggestion led to the discovery of an unsuspected competitive advantage.

As part of the team's effort to learn about one customer's business, the operator had gone to one of its plants and spent a long time watching the machines and talking with their line operators. He returned to the mill convinced that the customer could run slightly thinner paper just as efficiently as the paper it was then using, and he proposed that the mill offer it as an alternative. The team liked the idea, but the mill manager was not

One floor worker's idea unearthed a competitive advantage.

convinced, since paper is sold by the ton and thinner paper weighs less. Rather than reject the idea outright, however, the manager and the team reviewed the proposal with other teams, key functional managers, and key customers.

The breakthrough came when the mill manager realized that their key competitor did not have machines that could produce lower basis-weight paper. If the mill reduced its paper's weight, it could provide a low-cost alternative that competitors could not match. The mill could therefore raise its price per ton and make more money, while the customer's cost would go down since it would need less paper (by weight) to make its product. Everyone was ahead except the competitor.

After this, operators were invited to work with the team to develop new grades of paper. With experience, the team found new combinations of furnish and additives that let them make lower cost varieties that they had not been able to manufacture before. The operators were also able to alert the team to potential manufacturing problems before the new papers were put into production.

The food-service product team's volume did not just double, it quadrupled, while the number of employees stayed the same. The mill went from being the fifth of five suppliers to being the industry's

number-one supplier for its products in two-and-one-half years. By 1986, the mill had to expand the capacity of its machines to meet demand. The organization had moved from being a mill that faced shutdown into the lead mill of the group.

Despite their success, mill employees are healthily dissatisfied. They want to know more about their company, their customers, their suppliers, and their competitors. Team members and operators have purchased samples of competitors' products to study and analyze. They have also asked for, and are receiving, training in management techniques as well as in new skills. Formally, the organization chart looks the same. But informally the organization has been revamped. Operators move from one machine to another as necessary or where there is a problem. People participate and make suggestions without worrying about layoffs. Bonuses (averaging 10% to 12% of compensation) have allayed workers' fears that management might get more than its fair share.

Patience makes progress

One mark of a world-class organization is that its managers seem to have easy jobs. Operations flow smoothly, and people put more time and energy into making improvements than reacting to problems. Such an organization will typically spend 80% of its time on root-cause and anticipatory problem-solving loops. In contrast, a lesser performer is likely to spend 90% of its effort in the fix-as-fail loop.

Executives from lesser performing companies often return from visits to superior operations charged up to achieve similar results. In their enthusiasm, however, many overlook the fact that the effectiveness they admire comes from steady progress through increasingly sophisticated problem-solving loops. And that progress, as we have seen through the paper mill's experience, takes time. Although the mill began to see the effects of its learning in three to six months (a typical time frame, in our experience, for the first signs of progress to become apparent), it took two years to reach the fourth loop.

Depending on circumstances, a company may need as many as five years to work through the entire cycle.

Given this, it is easy to understand why many managers itch to short-circuit the process and jump to root-cause problem solving at once. But most companies that take this approach achieve unsatisfactory results, both because the organization does not truly understand its problems or the processes needed to resolve them and because it lacks the necessary resources. Instead of better performance, the net effect is overworked employees who neither solve problems well nor do a good job of maintaining the day-to-day business.

A better, more systematic approach to organizational problem solving should begin with a few simple questions:
☐ What are the critical problem-solving loops in our company? For a manufacturer, for example, these might include engineering change notices and warranty-claim resolution, while a service company might focus on satisfying nonroutine requests and its response to customer complaints.
☐ How well does our operation work from the customer's perspective? Do we respond to problems quickly and well or are we slow and unreliable?
☐ Do we learn from problems or are we continually fixing the same problems over and over again?
☐ Where do we spend most of our effort: on identifying and responding to specific problems or on resolving underlying causes and finding new ways to improve?

Progressing through this four-loop cycle is both a natural and an unnatural experience. Moving from fix-as-fail to prevention demands a great deal of effort, but there is little subtlety about what needs to be done. The problems that need attention are clearly identifiable. The demanding task is getting people to organize around them, if only because something else will always seem more important to one or more of the critical players. By the time the organization is ready to move from root cause to anticipation, however, this balance typically shifts. By then, problem-

solving processes are familiar, so everyone is likely to be much more at ease. But the problem-solving loops that will yield meaningful improvements to the business (as the operator's suggestion did at the paper mill) are much more subtle and often depend on finding creative ways to expose employees at all levels to the right people in customers' organizations.

As an organization establishes more sophisticated problem-solving loops and begins to learn, its fundamental culture changes. But unless management supports this change by rewarding new performance metrics as well as those it has traditionally used, no one is likely to stay the course. At the paper mill, for example, the CEO took a number of unusual steps to let people know it was safe to expand beyond the old ways of working. He rewarded early change makers by recognizing their accomplishments publicly. He promoted people who were trying hard to manage the right processes and to make the right decisions, even if their efforts were not entirely successful. Perhaps most dramatic, though, was the way he handled the mill's first six-month bonus review. By the numbers, the mill just missed making its profit hurdle. Performance had pulled up a lot, but not quite enough to meet the plan. Nevertheless, the CEO decided (and the board agreed) to pay maximum bonuses anyway to support and reinforce what was happening. They knew that customers' perceptions change slowly and blamed the shortfall on history, not on the efforts under way.

In the pressure to get things done, many managers fear being patient. They focus on short-term fixes to existing problems rather than on instituting processes to solve and eventually prevent problems and to identify unsuspected opportunities. But as in the fable of the tortoise and the hare, the companies that seem to move most slowly and laboriously at the start often lead their industries by the end of the day.

Reprint 90411