Testimony Submitted to the Senate Employment and Workplace Safety Subcommittee by Behavioral Science Technology, Inc.

April 1, 2008

Prepared by

Thomas R. Krause, Ph.D., Chairman
R. Scott Stricoff, President
Carmen J. Bianco, Executive Consultant

Chairwoman Murray, Ranking Member Isakson and Distinguished Members of the U.S. Senate Employment and Workplace Safety Subcommittee:

Behavioral Science Technology, Inc. (BST®) thanks the Subcommittee for the opportunity to present this testimony on achieving safety excellence through the use of employee engagement and leadership enhancement to create a strong culture.

BST's Background

BST was founded in 1979 by Dr. Thomas R. Krause and Dr. John Hidley. Drs. Krause and Hidley recognized that most safety initiatives at that time focused on equipment and procedures, but did not help us understand the organizational and cultural causes of workplace injuries and accidents. Drs. Krause and Hidley adapted the research on applied behavior analysis to reflect the teachings of Dr. W. Edwards Deming and the experience of other practitioners in organization change. As this approach evolved, approximately eight years ago BST expanded its focus to work more explicitly on leadership behavior and its relationship to organizational culture as critical factors in achieving safety excellence.

By working with executives, managers, supervisors, and individual contributors to enhance their effectiveness as safety leaders, we have helped organizations build on their

existing success to achieve step changes in safety performance. The comprehensive technology that has resulted has subsequently been customized and adapted for more than 2,000 client locations in more than 50 countries. In addition, BST has worked successfully in both union and non-union environments, with approximately half of our work at union locations and half at non-union sites. BST technology has been applied successfully in industries such as mining, petroleum, chemical, metals, paper, food, utilities, railroads, and health care, as well as by government agencies. Following the Space Shuttle Columbia tragedy, BST was asked to assess NASA's culture and recommend an intervention approach to help address the findings of the Columbia Accident Investigation Board (see case history section). BST's approach targets the reduction of exposure in the workplace through identification of systems issues that predispose at-risk behavior in addition to creating a culture in which at-risk behavior is minimized and the effectiveness of safety systems is maximized.

BST today has a staff of approximately 170 located throughout the US, Canada, Europe, South America, and Asia. BST's staff includes experts in safety, behavioral science, engineering, management, industrial hygiene, statistics, quality, and operations. BST is the only organization in the field that has published long-term results of its overall client experience in an independently-reviewed technical journal (*Safety Science*, 32 (1999) 1-18.)

What is BST's Approach?

The approach taken by BST is holistic, recognizing that leadership at all levels creates the culture that supports or inhibits the effectiveness of safety programs.

One aspect of BST's approach involves engaging employees at all levels in the continuous improvement of safety through identification of hazards, measurement of safe practices, and improvement of underlying systems. It is these systems that lead to the creation of exposures. This approach is a proactive process that improves the systems

producing safety-related behaviors and exposures upstream, before accidents happen. It is based on measurement, upstream sampling of key variables, problem solving, and employee involvement. Data collection and feedback are key aspects of the approach, which identifies and corrects existing systems that produce at-risk behavior, and develops new systems that encourage safe behavior.

Another aspect of BST's approach is working with individual leaders throughout the organization to build critical leadership skills and employ those skills to support organizational values for safety improvement. This work includes a mixture of individual coaching and group training sessions, with feedback to individuals on their leadership effectiveness.

We begin by assessing the organization's culture to understand how to tailor an implementation to the specific organization. Using a cultural diagnostic instrument that has been shown to be predictive of safety outcomes, we identify the organization's strengths and weaknesses. For example, we might find that the credibility of senior management is good, but first-line supervisors are weak in safety leadership skills.

After the planning, we usually work with an organization's leadership to help them understand the issues identified and their role in supporting the initiative. We also work with an implementation team comprised largely of front-line employees from the organization. We teach that team to identify the critical exposures at their location, to do informational meetings for other employees, and to sample at-risk behaviors that are indicative of exposures, usually through a peer-observation process. We then teach the team to train other employees to do this sampling. Part of the sampling process is a feedback step done to reinforce safe behaviors and to gain understanding of the causes of observed at-risk behaviors. Data is captured and used to evaluate and mitigate the systems-based factors that cause at-risk behavior.

Through this process an organization builds a strong safety-supporting culture. The organization has an improved understanding of the exposures that it must manage and a

new ability to identify and address underlying causes of exposure, thereby enabling employees to work safely and providing reinforcement when they do. Managers and supervisors improve their ability to support safety initiatives and communicate with front-line employees. Employees develop a strongly enhanced ability to communicate with each other and with leadership about safety issues. Employees at all levels are engaged and take ownership for safety.

The BST approach is described in Dr. Krause's book, *Leading with Safety* (John Wiley & Sons, 2005).

Benefits of This Approach

In working with more than 2,000 organizations, we have found that addressing leadership and culture is an important addition to traditional safety programs such as training, audits, policies, etc. It is important to understand that this approach does not substitute for those traditional programs, which must be present for safety excellence. But those traditional programs alone are not sufficient to give organizations excellence and continuous improvement.

On average, our clients have achieved 25% improvement in their injury rates during the first year and further improvement reaching more than 65% over the next four years. The results are representative of our complete body of clients and have been published by an independently reviewed safety management journal reflecting long-term (five year) results (*Safety Science*, 32 (1999) 1-18.)

The process also has proven sustainability. In a study conducted several years ago we determined that over a 13-year period, more than 90% of our implementations remained active.

BST's approach incorporates mechanisms for addressing not only the exposures under the direct control of the worker but also exposures that are dictated by facilities,

equipment, design, or procedures. In doing so it promotes engagement and collaboration of all levels of the organization.

This approach is truly data based, providing upstream measures of safety. This allows data-driven management of process quality, and discriminates between significant and random performance variation. This data-based approach allows the process to impact the conditions, systems, and cultural issues that encourage at risk behavior at all levels of the organization.

Success stories

Attached to this document is a series of articles that describe the individual experience of various organizations in implementing BST's approaches.

Conclusion

BST's comprehensive culture and leadership-based approach to safety is a powerful method for engaging employees at all levels in the collaborative identification and mitigation of exposures to safety hazards in the workplace. This approach helps organizations build a strong culture that not only supports safety, but also contributes to overall organizational excellence. With a proven track record unparalleled by other approaches, this approach should be considered by any organization interested in safety improvement.

I thank you for having me here today to provide testimony on such a critical topic. I am happy to answer any questions.

Behavioral Science Technology, Inc.

April 1, 2008

Success Stories

Shell's Mars Platform

Agricultural Products Producer

Columbia Forest Products

US Sugar

NASA

Shell's Mars Platform

Safety in Katrina's Wake

By Nicholas Zepeda

Situation

Hurricane Katrina significantly damaged the deepwater tension-leg Mars platform, operated in the Gulf of Mexico by Shell and co-owned with BP. Four hours of 170 mph winds and 200 mph wind gusts and wave run-up heights of up to 100 feet overtaxed the massive clamps holding the 1000 ton drilling rig, causing the structure to fail and topple onto the deck. The storm also set adrift a mobile drilling rig in the Mars platform vicinity and dragged its anchor over the Mars underwater export pipelines, cracking them. Mars' oil and gas production, the largest (by daily volume) platform in the Gulf of Mexico, shut in advance of the storm and would stay at zero for some time.

Shell Operations Manager Floyd Landry led the salvage and reconstruction project. Despite the risk issues involved with working around bent steel, collapsed superstructures, and sunken materials, Shell was able to put the Mars platform back in operation staying true to their safety goal: zero serious injuries and all workers return home safely.

How They Did It

Shell made sure they had the right technical equipment and experts for the project. They contracted a Finnish ice breaker and Dutch derrick barges for removing the toppled drilling rig structure and ferrying it to shore for repairs. They brought in a five story flotel (floating hotel) with a unique, deepwater mooring system from the North Sea for the living space needed for the extra 600 specialists. In addition, they used remote controlled robotic units and a specially designed pipe repair kit to fix damaged pipelines 2,700 ft below the surface.

Throughout the salvage and repair operation, Shell maintained a comprehensive and rigorous safety regimen. They conducted daily management and weekly safety staff meetings, safety walkthroughs, and job site environmental audits. The Behavioral Accident Prevention Process® (BAPP®) safety initiative, Continuous Observation Awareness Technique (C.O.A.T.), remained active around the clock, training everyone on site in behavior-based safety (BBS). Interpreters enabled the work crew, made up of technicians from around the world, to fully understand the training.

Personnel from throughout Shell experienced in BBS assisted Mars with safety work sponsorship. This extra help enabled C.O.A.T. to observe all types of work involved in the project. The sponsors coached new observers in side-by-side observations. Through more than 2,600 behavior-based observations, the process tracked exposures and critical behaviors for trends that revealed barriers to safe work. One observer identified fall protection exposures under Deck 1 where much of the work was over water. The personal flotation devices workers were wearing made crawling around and among piping difficult. The observation data prompted Shell to provide a new type of fall protection with built-in flotation devices.

The presence of C.O.A.T. helped everyone on the platform stay focused on safety. The site was able to remove or mitigate 365 exposures to risk identified by observations during the project.

Results

The Mars platform went back on line in May of 2006. The safety numbers showed no recordable injuries during 1 million work hours. By the time the drilling rig was put back on in March 2007, the site had logged 1.2 million salvage and reconstruction work hours without a recordable injury. The site also added other safety features to their operations: new clamps capable of withstanding 2 million psi, four times as strong as the previous clamps, improved communications systems critical for monitoring approaching storms, more on-call helicopters and ships for evacuations, and a greater number of spare parts available for emergency repairs. Shell also began a study of alternate ways to get oil to refineries when pipelines are damaged. In addition, the company participated in a joint industry effort to develop more robust mooring systems and practices for offshore drilling rigs.

Marvin Odum, executive vice president and head of Shell Exploration & Production in North and South America says, "The Mars platform recovery and deepwater pipeline repairs were among the most technologically complex operations in the world, and our people were up to the task, completing the work safely and ahead of schedule."

At a Glance

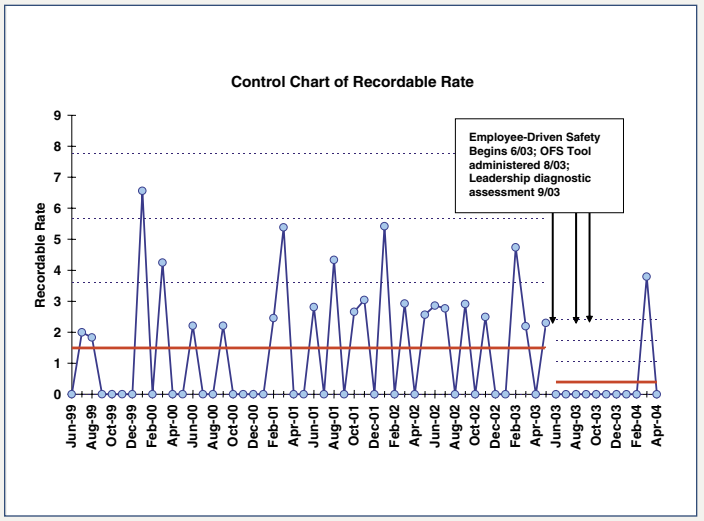
- The Mars platform is moored in 3000 feet of water 130 miles south of New Orleans
- Over 2,600 behavior-based safety observations identified 365 exposures on site
- Shell's post-Katrina repairs to the Mars platform were completed with no recordable injuries during 1.2 million work hours

Case Study

Making Good Leadership Even Better:

Accelerating excellence at an agricultural products producer

The Florida operations of this phosphates business had already received an Agri-Business of the year award when it decided to improve its safety leadership. Made up of three major facilities over a four-mile radius, the 620-employee operation has an annual capacity of 3.6 million tons of phosphate rock and 1 million tons of phosphoric acid. Maintaining this level of production, and its status as the low-cost producer in the industry, is serious business that takes high functioning leaders at all levels in three facilities. When the Florida operations implemented an employee-driven safety system early in 2004, it recognized the need to develop even better coordination across areas and functions as it captured data on exposure to risk. Each location had its own facilitator to oversee process activities, however managing resources across such a large area would require finely-tuned alignment on what the company wanted to accomplish and how.



Developing a Vision

Leaders at this location knew that one of the keys to creating alignment would be fostering a strong safety vision. If they could articulate where they wanted the company to be in the future and how it was going to get there, they could in turn determine the kind of time and resources to put into safety. The key was making sure that all leaders, from the process facilitators on up, had the skills to maintain a consistent message in their words and actions. So when a corporate-wide initiative called for managers at all sites to engage in leadership development, the managers jumped at the chance: they wanted to use their development activities to become better at articulating and implementing a safety vision for the company's 620 employees.

The management team invited BST to design a solution that would help them meet their goals. BST helped the client assess the leadership characteristics of each leader. This included the facilitators of the employee-driven safety processes in the management group. Results showed that many of these leaders were already strong and influential and that they were viewed positively by others in the organization. However even the strongest leaders tended to experience diminishing effectiveness across the locations or outside of their immediate workgroup.

Before crafting a leadership development strategy, BST worked with the client's leaders—including the facilitator—to define what their vision of safety was. Working with this group of leaders, a BST consultant challenged them to think outside of traditional safety visions and articulate their own vision in strategic terms. By asking questions like, What does safety really mean to your organization? Where does it fit in the scheme of other objectives and initiatives? What does it mean to your place in the market and the bottom line?, the BST consultant was able to help the leaders reframe their thinking of leadership in safety. As a result, they developed a list of principles that they wanted to define their actions,: Uphold the safety regulations even if cost or production is at stake, Communicate frequently and effectively up, down and across the organization, Ensure that people have the information, authority and resources they need, Treat others with dignity and respect.

With a clear picture of what they wanted their leadership to look like, they then worked individually with BST consultants to design personal strategies for improving their interactions with those who report to them, and enacting their new vision. In particular, they had to define what their successes would look like. BST then helped them identify ways to gain feedback on how well they measured up to the new safety values. Once the managers had drafted their individual plans, they worked with BST to trickle the new safety vision down through the organization more effectively by learning how to coach their own reports and help them develop similar coaching plans for themselves.

Outcomes

Less than a year after starting the new initiative, the client was able to reduce its injury rate by more than half, including a six-month streak without a recordable injury. And within just a few months of defining their new safety vision and starting their personal action plans, most leaders were able to document changes in their relationship with departments, showing that the new safety vision is working.

Leading with Safety at Columbia Forest Products

How this 2,400 employee division engaged employees from the millfloor to the corporate office to redefine its culture, performance, and safety leadership

Rebecca Nigel, Steven Luttrull, Stan Owens & Don Carter

Like many international companies, Columbia Forest Products contends with the challenge of maintaining a consistent standard of performance across multiple sites. The 49-year old employee-owned company has 18 manufacturing locations in the United States and Canada, making it North America's largest manufacturer of hardwood plywood and hardwood veneer products, and through its subsidiary Columbia Flooring, the leading producer of hardwood and laminate flooring. Recognized as an industry leader, the company prides itself on responsive customer service as well as leading advancements in the field, most recently launching a new low-cost alternative to formaldehyde-based adhesives in its plywood products. Attributing its market leadership to a spirit of innovation and employee empowerment, in 2004 the company embarked on a new venture; pioneering an all-employee safety approach in the plywood division's nine sites, covering 2,800 employees. Adapting practices that target culture and leadership in addition to exposures at the mill-floor, the division has in 24 months realized a near 30% reduction in injuries.

Brad Thompson
Plywood President
Columbia Forest Products

Don Carter
HR Manager
Plywood Division
Columbia Forest Products

Steven Luttrull
Group Manager
BST

Stan Owens
Sr. Account Executive
BST

Changing How Safety is Managed

Achieving performance consistent with Columbia's high standards has long been one of the plywood division HR manager **Don Carter**'s goals. In 2004 Carter and plywood president **Brad Thompson**, recognized an opportunity to both strengthen the company's position within its industry and create a platform for motivation and engagement: safety performance. While each of the division's nine sites were already actively managing safety through traditional compliance practices, the methods – and results – varied widely by location.

> Our employees are our most important asset. How do you run a business well if you don't value that first?
>
> -Don Carter
> HR Manager
> Plywood Division

At the crux of the problem, according to Carter, was that a lack of consistent practices meant a lack of standardized indicators by which the division as a whole could manage safety efforts. Columbia, like many organizations, relied largely on outcomes, such as incident rates and workers compensation costs, to steer the company's efforts. That bothered Columbia management, who were used to managing other metrics upstream. Recognizing an opportunity, Thompson and Carter suggested a progressive solution; why not run safety like any other critical business objective?

Columbia enlisted help from BST to design a safety practice that resembled the processes and practices the company relied on for other business functions. In addition to providing a steady stream of safety indicators the division could act on upstream, the company wanted the approach to include clear roles and responsibilities for leaders from the supervisor up to the division staff. "We felt like for this to be successful we needed to lead this from the division level," says Carter. In this way, the company hoped not only to establish a safety process that was sustainable, but to foster a culture where safety led performance in other areas.

A Comprehensive Strategy

BST proposed a multi-tiered approach. At the heart of the initiative would be implementations of Behavioral Accident Prevention Process® (BAPP®) technology at the individual mills. The BAPP initiatives would serve to engage mill employees in systematically identifying, measuring, and reducing exposures at the working interface, where employees interact with technology and systems. These efforts would also serve as a common focus for the division and provide a standard measure and vocabulary for safety performance.

Just as important, however, would be targeted leadership development activities designed to support both the mill-level BAPP initiatives and foster the safety climate and organizational culture across the division that Columbia was striving for. At the division level, the company's senior

leaders would participate in workshops and individual coaching. Senior leaders at the mill level would also participate in a leadership assessment and improvement activities designed to enhance their ability to support the company's safety goals and develop leadership skills generally. Finally, mill supervisors would receive their own development training aimed at strengthening their skills for supporting the safety improvement process.

Columbia management saw the strategy as helping them provide a foundation for accountability and engagement as well. To begin the project, BST administered the *Organizational Culture Diagnostic Instrument* (OCDI) to determine the strengths and areas of improvement in the local culture. Measures of the instrument score a workgroup on nine dimensions empirically linked to downstream outcomes, providing focus points for development.

Creating a Role for Leadership

Columbia leaders led the way by beginning the safety initiative at the division level. The cultural diagnostic had raised issues surrounding the perceived commitment of the division's leaders for safety. This in turn translated into a culture where safety was seen as of lesser value than other performance metrics. The problem, says BST consultant Stan Owens, wasn't that the commitment wasn't there. In fact, says Owens, he was struck by the strong value that several of the division leaders expressed for safety. "It was really a visibility issue," he says. In part, the gap was caused by the way the organization was structured; company business rarely brought senior leaders to the mills in person and usually only then for production reasons, leading many mill employees to assume that safety wasn't on their radar. In addition, says Owens, many simply hadn't been trained how to communicate their commitment in a way that resonated down to the floor employees. To help CFP's leaders leverage their influence on safety, and make their commitment a felt presence, Owens, and BST consultant Steven Luttrull designed a development strategy that involved individual diagnostics, one-on-one coaching, and continual alignment for the division's leaders.

Carter, Thompson, and five others first underwent a 360° diagnostic instrument that asked peers, reports, and the leaders themselves to rank how often and well they used identified best practices for safety leadership. Results of the instrument were then used to design personal action plans for each leader that defined specific behaviors they could employ in their day-to-day jobs that support Columbia's desired safety performance. For some this included specific goals the leader would set within the organization, for others it would be messages that he or she would communicate, or practices to use in meetings. Every leader was assigned a BST coach who worked one-on-one to troubleshoot action plans and provide feedback on their progress.

In addition to defining behaviors, the division's leaders put in place a system for tracking their progress electronically and selected peers and people at site locations to provide feedback on how well they were doing. Leaders each had to report on their progress each period. In addition to individual goals, every leader took on an objective of participating in three mill-level safety activities for the year. As the safety strategy rolled out, Columbia went through the same process with each of the line managers, plant managers, and supervisors at each of the division's nine sites. Carter says that the process has been very positive; "The fact that we put (leadership activities) together with all of the other safety components is very important," he said. By giving leaders concrete activities, says Carter, it enables leaders at all levels to support employees as they run their safety process. "We're beginning to get leaders involved in participating in steering team, participating in observations and beginning to be held accountable to make sure observations in their areas are done."

Reducing Exposure at the Working Interface

With a leadership component in place, Columbia launched the employee-driven portion of its safety strategy, with BAPP implementations at the mill level. The first implementations were initiated at three pilot locations beginning in late 2004, Nipigon and Heart in Ontario, Canada, and Craigsville, West Virginia, in the U.S. In early 2005, CFP implemented the process at the remaining five Plywood locations; Chatham, West Virginia, Klamath Falls, Oregon, Trumann, Arkansas, Old Fort, North Carolina, and St. Casimir, Quebec. Each mill followed a similar process. Hourly employees were recruited to form a steering team and worked with a BST consultant to identify behaviors critical to safe work at that mill. The team was then trained how to operationally define each of the behaviors so that they could be observed, and then train other employees how to collect data on those behaviors through two-way observation and feedback. Finally, the steering teams would be trained how to analyze the collected data to identify and remove barriers to safe work.

Helen Ecks, facilitator of the BATS (Better Achievements Through Safety) process at the Old Fort, North Carolina, mill says that she was initially skeptical that such an approach would last. "Everything before has always been management driven," she says. Ecks says that going through the training, and getting acquainted with Thompson and other division leaders helped convince her that the company was serious about supporting an employee-driven approach. "I didn't meet Brad [Thompson] until I got this position. I'd seen him walk through the mill, but we'd never met," she says, "Now I can sit down and hold a conversation with him."

Kim Elliott
SWAT Facilitator
Columbia Forest Products

Helen Eck
Facilitator
Columbia Forest Products

Ecks says that the rapport that she and facilitators from other sites built with division leaders helped to build bridges with all employees. Faced with resistance early in the process, Ecks called Thompson directly for help, "I just called Brad and said '*Listen, these people are saying you can't walk the walk*'. *I need you to come answer these questions*'." Thompson's reply was immediate. "He just said, '*Let me know when you need me there*'. People couldn't believe I just called him. " Ecks says that mill and division leaders' support and openness helped win over floor employees. At Old Fort, Carter attended observer training with mill employees. "They loved having Don in there just being one of them – not running the show. He didn't interrupt, he let us completely lead it. He showed us right there that he'd completely support the process."

I feel so honored and proud to work for Columbia Forest Products and to not have barriers that others do with management and leadership. It's made me prouder to be an employee owner.

-Kim Eliott
SWAT Facilitator
Trumann, Arkansas

Facilitator **Kim Elliot** for the SWAT (Safe Workers Analysis Team) process at the Trumann, Arkansas, mill says that she joined the process in part because she was frustrated with the existing safety procedures. While a long-time member of the mill's safety team, Elliot says "We didn't have authority or resources to get things done." Having a data-driven process and a dedicated Barrier Removal Team has helped change that. "The SWAT process has been able to give us those resources," says Elliot. "That's one of the reasons we've been successful."

In addition to reducing the mill's injury rate by 66% in the first year, Eliot says that the SWAT process has helped to transform the culture. "Employees feel comfortable intervening with each other – it's not uncommon now for someone to walk through the plant and say '*You need earplugs, or safety glasses*'," says Elliot. "The skills that we've been taught and teach in our mill — and how things are working in the process — have given them the freedom."

Driving Culture & Performance

Since one of the key objectives of the safety initiative was creating a uniform safety management practice throughout the division, Columbia Forest Products leaders worked with BST to develop a system for managing critical process metrics. Each mill now completes a safety dashboard that is reviewed monthly by division leaders. The dashboard reports on indicators of how the employee-driven safety process is functioning, such as levels of observation activity, barrier patterns, and participation rates. The dashboard gives division leaders greater visibility of actual safety activities, and allows them to quickly respond to challenges as they are occurring.

Another key objective for CFP was to leverage safety performance to create a more unified, and higher-performing, culture. In addition to managing individual safety processes at the mill level, division leaders created a series of intersection points for safety activities among the division's nine sites and with the division headquarters itself. The company now hosts an internal users conference where representatives from the division's nine mills get together to share best practices and brainstorm solutions. To foster cross-company collaboration, facilitators from individual mills are assigned to inter-site teams to problem solve common exposures to injury, such as splinters and pinch points. Division leaders are also expected to participate actively in safety activities; in 2006 each leader was tasked with attending at least three site-level training or steering team meetings. When an accident does occur, the company's new policy is that a leader will personally call the injured person to ask how they're doing and solicit their input on what the company can do to improve safety. "We're interested in them as individuals, not just as a number," says Carter.

Results

Since launching the safety initiative in 2004, the company has realized a 27% reduction injury rates across the division, with many sites experiencing even more dramatic improvements. The severity of injuries across the division has dropped a staggering 81%. While the company continues to refine its safety approach, Carter says that the initiative has already helped the company align itself around its core principles. "Our employees are our most important asset. How you can you run a business well if you don't value that first?"

Company representatives also point to other gains. The principles used in the employee-driven safety process are being leveraged for a division-wide quality initiative and communication among employees of all levels has increased significantly. "We have found if you run an operation safely you also run it efficiently and if you run it efficiently you also have profitability benefits that run beyond safety. And we've seen that, we've seen operations greatly improved," says Carter. For facilitator Eliot, the gains are more personal. "I learned that there are some awesome ideas and people in the plant and we just never utilized them," she says. "I feel so honored and proud to work for Columbia Forest Products and to not have barriers that others do with management and leadership. It's made me prouder to be an employee owner."

PBPI

Refining Safety at U.S. SUGAR Corporation

The United States Sugar Corporation (U.S. Sugar) is an enterprise in transformation. Based in Clewiston, Florida, the 74-year-old company is the nation's largest producer of cane sugar, a product prized by confectioners and bakers for its low melting point and high blendability. Beginning in 2002, the corporation added a new designation: that of rising star in the field of safety. Since that time the company has reduced workers compensation costs by more than 55% and overall injury rates company-wide by close to 30%.

U.S. Sugar Vice President of Environmental Compliance & Programs **Peter Briggs** attributes much of the improvement to an implementation of BST's Behavioral Accident Prevention Process (BAPP) technology. The employee-driven approach engages front-line workers in capturing information about workplace exposures and uses the data to make improvements in the configuration of equipment, systems, and what people do. "We've probably had 20,000 discussions with two peers talking to each other about safety, where before that, we hadn't had one," says Briggs. In addition to providing a steady stream of data about safety conditions, Briggs says that the process is also helping the company transform its culture. "We've got people meeting people who didn't even know they worked for the same company. There's been cross-fertilization between different organizations that has been very good."

Rebecca Nigel & Alan Grant

Driving Culture Change Across 300 Square Miles

An Industry Leader

Founded in 1931 with a single sugar mill on the south end of Lake Okeechobee, U.S. Sugar is today a multi-million dollar company operating on 300 square miles in south central Florida. Working the 196,000 acres of farmland, and the facilities that process its harvest, takes 3,500 employees and operations that could run a small country: two sugar mills, a refinery, a water treatment facility, a small railroad, and even a small hotel that is on the national registry of historic sites. The end result is an annual yield of 700,000 tons of cane sugar. Operations at U.S. Sugar are divided into three basic units. The Ag Department, which runs the farms; Sugar Houses, which consist of two mills, a refinery, a water plant, and the railroad; and Ag Services which provides maintenance and other services throughout the operation. Hourly employees in the Ag Department are non-union. Hourly employees in the Sugar Houses and Ag Services departments are represented by the International Association of Machinists (IAM).

Making the Move to Employee-Driven Safety

Since it first began farming, U.S. Sugar, as most other growing operations, cut sugarcane by hand. Increasing competition and pricing regulations in the 1990s, drove the company toward extensive modernization that included introducing both new machinery and new ways of organizing employees. It was during this time that the idea to initiate an employee-centered safety system first emerged. High incident rates were generating costs in injuries and workers compensation rates into the millions of dollars. More important than the financial implications was that ethically, the organization wanted to do a better job of protecting its employees. At the time, such an approach had gained a reputation for producing significant improvements in both injury rates and employee engagement and culture. Leaders at the organization were attracted to the approach's emphasis on identifying exposure ahead of injuries, and capturing data that would help the organization direct improvement efforts. Up to that point, says Bryant Mill Manager **Darrel Collier**, "Behavioral safety issues were only addressed if someone got hurt." The new approach could help the organization become more proactive. "We can look at it as preventive maintenance for the body," says Collier. "We don't have to wait for an injury to make small corrections."

Still, not everyone was comfortable with the idea. At the time, employee-driven safety was more commonly known as "behavior-based safety" a phrase that caused some concern with U.S. Sugar's union employees. In part, says Briggs, the problem was cultural. "There were trust factors in there and communication factors . . . areas that we needed to improve greatly on," he says. Union representatives were concerned that it would be a way for management to avoid responsibility or a means to discipline employees who didn't follow safety rules. The idea was put on hold until 2002 when Briggs and other senior management personnel championed a new look at the approach. This time, U.S. Sugar provided the means for union representatives to see the approach in action for themselves. Representatives visited a chemical manufacturing site in Kentucky that had been using BAPP technology successfully in a union environment for years. The visitors were intrigued and said they would support an implementation like the one in Kentucky. With this new interest, the company decided to pilot the approach in the Ag Department, and if successful, move the initiative to the Sugar Houses and Ag Services.

Establishing a Baseline

One of the critical objectives for U.S. Sugar in implementing an employee-driven safety approach was to realize its vision of a "safety first" culture; leaders wanted to create an organization where employees approached jobs from a mindset of finding the safest way to do the work rather than a "get it done" mentality. "It was always everybody's vision," says Briggs, "But how do you get that?" In order to develop a strategy that would address this concern, U.S. Sugar enlisted BST's help in administering a cultural diagnostic instrument that would establish a baseline of the organization's culture and identify areas that required special attention during the implementation process. The instrument surveyed employees across the organization to measure perceptions of nine cultural dimensions linked to safety performance, with scores expressed as percentiles ranking the organization against hundreds of others that had taken the same diagnostic.

Results from the diagnostic showed that U.S. Sugar had strong cultural assets to leverage in starting the new initiative. In some groups, key organizational dimensions such as Procedural Justice, Management Credibility, and Perceived Organizational Support, were ranked very high, indicating that employees perceived the organization and its processes favorably. By striking contrast, however, the instrument also showed that throughout the organization, the safety dimension of Approaching Others scored very low. This dimension, which measures the extent to which employees feel free to speak to one another about safety concerns, is predictive of involvement and initiative, individual commitment to safety, and the likelihood that workers will raise safety concerns. A low score on this dimension signaled a serious challenge for implementing an employee-driven safety process where success relies on open communication among employees about exposures and solutions to safety challenges. In order to compensate for this score, BST consultant **Alan Grant** tailored the implementation strategy to include extra time on interaction skills training for the employees who would serve on the steering committee and as observers, and special attention to rolling out the process to other employees.

On the Impact of Leadership on Safety — and Safety on Leadership

"The old saying of 'lead by example' is not really accurate. If you're in a position of leadership you lead by example whether you want to or not. The only choice you have is whether you lead with a good example or a bad one."

-Calvin Cauley
BASS Facilitator
Ag Department

"Once supervisors started to say to their employees it is okay and we want you to go out there, [the observers] started to loosen up and go out and do it. There's a direct correlation between the support and the number of observations."

-Fermin Cardona
IBIS Facilitator
Clewiston Sugar House

"It used to be there were supervisors who didn't want to hear about a problem or just wanted to hear that it had been solved . . . Now guys — men and foremen — feel like they have the power to say something. Safety and production are now equal."

-Wren Herring
JAWS Facilitator
Ag Services

"Each of our areas is run by people who've made it a top priority . . . Just about every meeting you walk into now, one of the first topics they talk about is safety as well as behavioral safety."

-Jack Webb
Former JAWS Facilitator
Ag Services

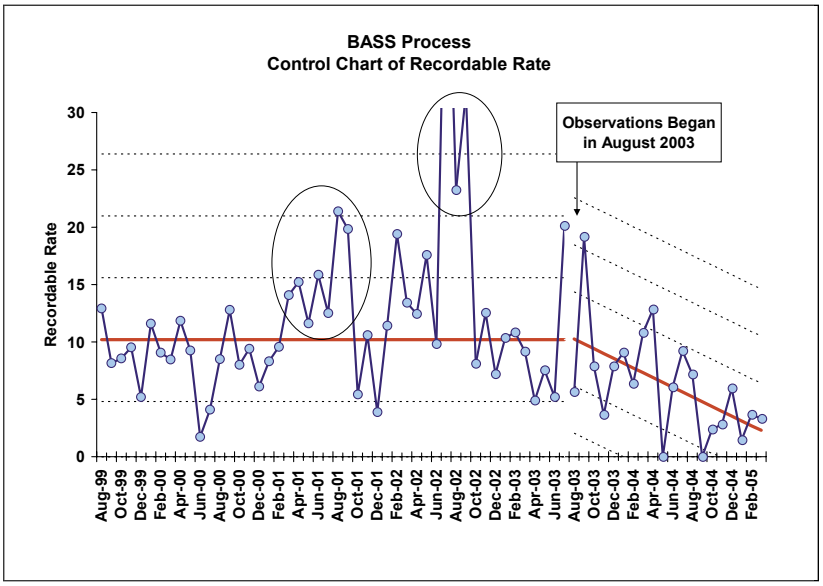
BASS in the Ag Department

The first phase of U.S. Sugar's safety initiative called for implementing an employee-driven safety process in the Ag Department. The department encompasses the organization's 196,000 acres of farms worked by an employee population that varies from a low of 120 in the off-season to more than 400 at the peak of harvesting. In addition to the frequently fluctuating employee population, this group faced other unique challenges. Many employees do not read or write well, many do not speak English, and all work over such a large area that opportunities for conducting peer-to-peer observations are sporadic.

In August 2003, hourly employees from the Ag Department formed the *Behavioral Awareness Strengthens Safety* (BASS) team. Supervisor **Calvin Cauley** was recruited to be the BASS facilitator. "I had kind of the same reaction that a lot of other people had [to the process]," says Cauley, "Here we go again trying something else new that isn't going to be around long." Still, Cauley gave the new approach a try. Together with eight other hourly employees who would make up the steering committee, Cauley went through training that covered behavioral science principles, data gathering and use, and of course, interaction skills. The training began with reviewing past injuries and other data to identify

work where employees might be exposed to risk of injury. Once identified, the BASS team was trained to define these interactions in a way that would allow observers to collect data on work being performed (whether safe or at-risk) and to capture information on barriers to performing the work safely.

According to Cauley, one of the largest challenges was launching the data gathering element of the BASS process. Employees in the group were uncomfortable approaching others to talk about safety. In addition, the workgroup's unique makeup required tailoring the observation process to make it accessible to all employees and translating the CBI® definitions/examples and observation sheets into Spanish. The BASS team, with the support of Briggs and Ag Department managers and supervisors, started by setting the expectation that all employees would



BASS Process Results: Since observations began in August 2003, the Ag Department has shown a marked downward trend in recordable injuries.

be involved in the process (both hourly and supervision/management), either as observers or by being observed. The BASS team recruited and trained observers from its corps of year-round employees to ensure consistent observation activity and made sure that all employees (year round or seasonal) were acquainted with their role in the process. Observers who had difficulty reading or writing were coached to ask the employees they observed or their observer coach to help them complete the comments on their data sheet. And to accommodate the groups dispersed workforce, the BASS team deployed a strategy of "opportunistic" observations, observations coordinated at times when employees and observers would be in the same place and timed to capture information representative of all the different tasks workers performed.

Two years later, Cauley says the strategy has paid off. "Before we started, one employee would basically not talk to another about anything safety related." Two years later the BASS process has logged more than 7,000 one-on-one conversations, with many more occurring outside of formal observations. "We'll even get an hourly employee reminding his supervisor to wear his safety glasses, for example." With the data collected through these observations, the BASS team has been able to complete action plans to address persistent barriers to safe work, including an aggressive plan around seat belt use that improved the behavior's safe use to more than 98%. Even more impressive, the injury rate for the department has shown a strong trend downwards; maintaining a 68% drop for more than 21 months.

Currently, the BASS process has 122 out of the 135 total year round people (both hourly and supervision/management) trained as observers. Of those, 17% are supervisors and managers. "Because the expectation has been set that doing observations is as much a part of an employee's job as production we can set a goal for the number of observations for each observer to conduct each month and achieve the goal," says Cauley. "That also allows us to maintain a contact rate of 1.00 to 1.10 with very little variation, and has allowed us to establish and use an effective observer rotation cycle."

Cauley says that his initial hesitation about the process has been replaced by a strong belief in the power of employee-involvement. He also says that serving as facilitator has taught him about leadership. "The old saying of 'lead by example' is not really accurate. If you're in a position of leadership you lead by example whether you want to or not. The only choice you have is whether you lead with a good example or a bad one."

IBIS in the Sugar Houses

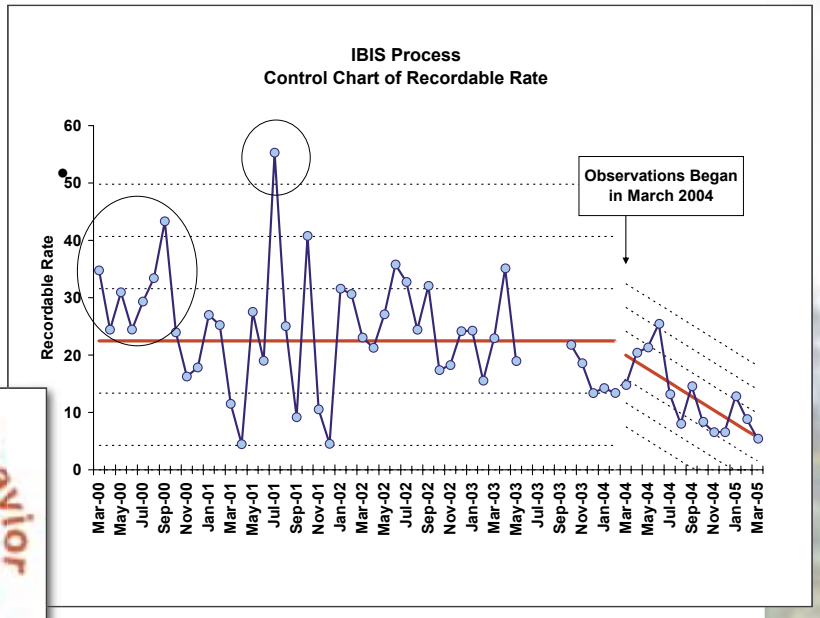
Following the success of the BASS process, U.S. Sugar rolled out the approach in March 2004 to the organization's two Sugar Houses in Clewiston and Bryant, where the company's sugarcane is turned into raw sugar. Starting at the operation's mill, harvested cane is pulverized for its juice. The juice then goes to the Sugar Houses to be

Calvin Cauley
BASS Facilitator
U.S. Sugar

Fermin Cardona
IBIS Facilitator
U.S. Sugar

Jack Webb
Former IBIS Facilitator
U.S. Sugar

Wren Herring
JAWS Facilitator
U.S. Sugar



IBIS Process Results: Since observations began in May 2004, the Sugar Houses have shown a marked downward trend in recordable injuries.

evaporated, treated, and boiled down again to make sugar crystals. At this point, the raw sugar is ready to be taken to the refinery to be melted down again to create refined white sugar

Within the Sugar Houses, the initiative is called IBIS for *Integrating Behavior into Safety* and covers approximately 700 employees. Hourly technician **Jack Webb** was tapped as the IBIS process' first facilitator, "I knew absolutely nothing at that point. My first reaction was I thought it was a good idea — then it was, 'How in the world are we going to start something this drastic in a place this spread out and old'?" **Fermin Cardona**, who is currently taking over facilitator duties for Webb at Clewiston after starting as an observer at Bryant, says that many people were skeptical. "They thought it was another fly-by-night, flavor-of-the-month safety program." Unlike the Ag Department, culture indicators showed low perceptions of management credibility and organizational support. Briggs understood their concern, "We had some trust issues."

Briggs felt that the key to overcoming the lack of trust was defining roles for managers and employees that matched the intensity of the company's work. "There's nothing subtle about our workforce. We rip, tear, boil, and cut. It's not like a chemical reaction. We're very hands on." Before rolling out the employee-driven safety effort, Briggs established clear expectations for the company's managers, "I told them that it isn't enough to be on board, you need to show the flag and show you're sincere." Briggs followed his own advice and went through steering committee training alongside hourly employees. "In a week I went from being 'Mr. Briggs' to 'Peter'," he says. "When we all went through that training, we realized we all want the same things and all have the same gripes. The camaraderie that was built has helped to build bridges even two years later."

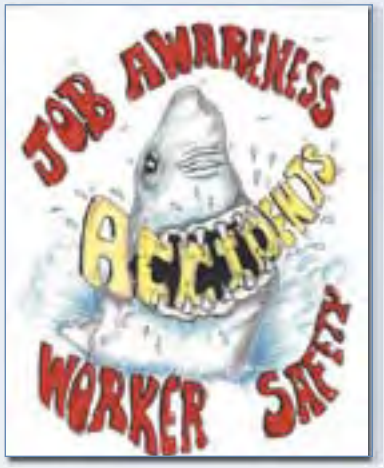
To date the IBIS team has trained 100 observers who engage in one-on-one conversations with their co-workers about safe work. As in the Ag Department, the process starts when an IBIS observer approaches a coworker and asks to watch him or her work for a few minutes followed by a discussion of all safe and any at-risk behaviors observed. During the discussion, the observer makes a note of any barriers that prevent the employee from working safely. Barriers range from enabled (within the control of the employee) to non-enabled (impossible for the employee to do in the current configuration or systems and equipment) or difficult (possible but requiring significant effort). Data are then added anonymously to a database that the IBIS team uses for problem solving and action planning.

Webb says support from managers and supervisors played a large part in the success of the IBIS process. "Each of our areas is run by people who've made it a top priority," says Webb. "Just about every meeting you walk into now, one of the first topics they talk about is safety as well as behavioral safety." This support has translated into more training in the process for supervisors. "Increased supervisor training leads to increased management training and support," says Cardona who credits this support with helping observers engage more readily in the process. "Once supervisors started to say to their employees it is okay and we want you to go out there, they started to loosen up and go out and do it. There's a direct correlation between the support and the number of observations."

Enabling Safe Work

In the Sugar Houses, many of the barriers identified go directly to the joint union-management safety committee which oversees solutions such as maintenance items or supplying new equipment. When the root cause of an exposure is not so easy to determine, the IBIS team takes on the problem to develop a more comprehensive solution.

Early in the IBIS process, the team discovered that fall protection was consistently scoring at a low 70% safe. This number indicated that approximately three out of every 10 times where fall protection was necessary to complete a job safely, the protection was either used improperly or not at all. In reviewing the data collected by observers, the IBIS team found that there were a range of reasons why employees were not using their fall protection. In some cases, the safe practice was enabled but the employees didn't think they needed to use it. In other cases, the practice was difficult or non-enabled (for instance, the employees



didn't know how to use it, the fall protection equipment was hard to access, or the equipment didn't fit).

To increase the frequency of adequate fall protection use, the IBIS team developed an action plan that addressed these various aspects, making it a practice that was both easy for the employee to do and supported by the organization. The IBIS team arranged training in fall-protection use, coached supervisors to include a discussion of the practice in prejob planning, and worked with management to ensure that fall protection was accessible where it needed to be. Within a few weeks, IBIS observers documented a marked increase in the frequency of adequate fall protection use. According to Webb, fall protection use was a classic example of moving work practices toward a new culture. "In the past our company was more production-driven than safety driven. Unfortunately a lot of employees still had that state of mind." The IBIS process and the action plan helped to show employees that the organization was serious about changing how employees worked. According to Bryant Safety Manager **Kenny Williams**, the BASS process has helped the group live up to the organization's value for communication, "Communications are to be open, honest, and direct. This is lived up to hundreds of times per month with each observation completed."

JAWS in Ag Services

U.S. Sugar's Ag Services department functions as a mobile resource of support and maintenance services for the company's sugar houses and farms. Within Ag Services, the BAPP initiative is known as JAWS for *Job Awareness Worker Safety*, and is facilitated by **Wren Herring**. Work in the Ag Services department is as varied as the territory it covers. "We're kind of the firemen of U.S. Sugar," says Herring referring to the group's mission of keeping U.S. Sugar's various operations running smoothly in its 300 square mile territory. Ag Services' 105 employees perform everything from repair and operation of heavy equipment and facilities, to maintenance, carpentry, and electrical work.

Herring says that he initially shared the same concerns as other employees when starting the process, in particular that his coworkers would not want to be observed. However, "There was nowhere near as much resistance as I thought," he says. According to Herring, the bigger obstacle was in changing the old "just get it done" working culture. "We had the normal little safety meetings . . . we'd watch a safety film, talk about it a little bit and that's the last time it was mentioned." As the JAWS process rolled out, however, employees started to see safety take a more integral role in every day work life. "We've now had almost 1,200 times that people have talked to each other about safety," says Herring. The power of these contacts has been reinforced by the improvements that follow from them, oftentimes with a simple phone call from Herring to a manager who knows how to fix equipment or procedures that are contributing to exposure. "The communication line with management has been gradually changing over the years. But with the JAWS process it has got even better." Herring says that sometimes foremen and managers now approach him with safety problems looking for help. "It used to be there were supervisors who didn't want to hear about a problem or just wanted to hear that it had been solved," says Herring. "Now guys — men and foremen — feel like they have the power to say something. Safety and production are now equal."

Results

Bryant Mill Manager Collier says that the process has been extremely worthwhile."I don't think our company's incident rates have ever maintained such a low running average." In addition to achieving improvements in numbers, U.S. Sugar has also seen dramatic changes in how employees approach management, safety issues, and each other.

Webb says that an Ag Services employee working in the Clewiston sugar house exemplifies the culture change experienced at U.S. Sugar. Crane operator and JAWS observer **Chris Musgrave** was working with Clewiston Sugar House employees (an area outside of the process he is a part of) when he noticed they were unfamiliar with crane work. Since a crane operator relies on those he works with for signaling and rigging to keep the load secure, inexperienced riggers presented exposure to themselves and others in the area. Webb says that rather than keeping quiet, as the culture might have encouraged in the past, Musgrave approached the foreman. He explained the situation and volunteered himself as a trainer. The foreman agreed and helped Musgrave arrange classes on rigging and hand signals. "I don't think this would have happened before," says Webb. "Before, either the guys who did receive the training would have blown it off or [Musgrave] might not have even been willing to step forward . . . But he brought it up and said 'Here's how we can solve it and I'm willing to do it'." The culture change, says Webb, is not just that employees are speaking up, but that managers are collaborating with them to reconfigure work and reduce exposure.

Briggs is especially proud of the facilitators and steering team members who have helped to make the safety initiatives successful. "Beginnings and endings usually get a lot of attention. The middle, the maintenance stuff, the real two-in-the-morning gutsy stuff to keep going, is what I'm seeing from our guys. There's been days when they encourage me."

PBPI

This section excerpted from
Leading with Safety by Thomas R. Krause, Ph.D.
John Wiley & Sons, 2005.

Chapter 12

NASA's Approach to Transforming its Organizational Culture & Safety Climate

This chapter was written
by Scott Stricoff

- Assessing the existing culture and climate
- Findings
- The intervention
  - The importance of values
  - Addressing culture and climate
  - How leaders drive culture change
- The culture change plan
- Results
  - Glenn Research Center and Stennis Space Center
  - Johnson Space Center

The National Aeronautics and Space Administration (NASA) was established in 1958 to lead efforts in space exploration and aeronautics research. Today NASA has roughly 19,000 employees at its headquarters and nine Centers throughout the U.S., and more than 5,000 additional staff at the Jet Propulsion Laboratory which is operated for NASA by the California Institute of Technology. NASA's programs in space exploration, space science, and aeronautics research are widely known, with some of its most visible programs including the Space Shuttle and the International Space Station.

On February 1, 2003, the Space Shuttle Columbia and its crew of seven were lost during their return to Earth. A group of distinguished experts was appointed to comprise the Columbia Accident Investigation Board, which spent six months conducting a thorough investigation of the accident.

The Accident Investigation Board issued its report in August 2003 with findings focused on three key areas: 1) systemic safety, cultural, and organizational issues, including decision-making, risk management, and communication; 2) requirements for returning safely to flight; and 3) technical excellence. The Board found that NASA's culture and related history contributed as much to the Columbia accident as any technical failure. Specifically, the Board identified the following organizational cause of the Columbia accident:

> *"The organizational causes of this accident are rooted in the Space Shuttle Program's history and culture, including the original compromises that were required to gain approval for the shuttle program, subsequent years of resource constraints, fluctuating priorities, schedule pressures, mischaracterizations of the Shuttle as operational rather than developmental, and lack of an agreed national vision. Cultural traits and organizational practices detrimental to safety were allowed to develop, including: reliance on past success as a substitute for sound engineering practices (such as testing to understand why systems were not performing in accordance with requirements/specifications); organizational barriers that prevented effective communication of critical safety information and stifled professional differences of opinion; lack of integrated management across program elements; and the evolution of an informal chain of*

command and decision-making processes that operated outside the organization's rules." [1]

The Board made specific recommendations calling for a number of structural changes to the organization and identified a number of gaps in leadership practices important to safety. While there were no recommendations explicitly addressing leadership practices, the report identified many examples of gaps in the leadership practices that support safety, such as:

- Failing to follow NASA's own procedures
- Requiring people to prove the existence of a problem rather than assuming the need to assure there was not a problem
- Creating a perception that schedule pressure was a critical driver of the program

As a result of the Accident Investigation Board investigation and related activities, NASA established the objective of completely transforming its organizational and safety culture. At a minimum, it targeted making measurable progress in changing its culture within six months and having broad changes in effect across the Agency in less than three years. The six-month marker was identified as particularly critical as the Agency prepared to return to flight.

After reviewing proposals from more than forty organizations, NASA selected our firm in January 2004 to assist in the development and implementation of a plan for changing the culture and the safety climate Agency-wide. We were asked to provide for a systematic, integrated, NASA-wide approach to understanding the prior and current safety climate and culture norms, and to diagnose aspects of climate and culture that did not support the Agency's effective adoption of changes identified by the Columbia Accident Investigation Board. We were further asked to propose a course or courses of action to change behaviors and to introduce new norms that would: 1) eliminate barriers to a safety culture and mindset; 2) facilitate collaboration, integration, and alignment of the NASA workforce in support of a strong

[1] *Columbia Accident Investigation Board Report*. August 2003. Vol. 1, Chapter 7: 177.

safety and mission success culture; and 3) align with current initiatives already underway in the Agency.

We began with an assessment of the current status, and the development of an implementation plan. NASA asked that both be completed within thirty days. Following the assessment and the development of a plan, we began implementation. The result: significant progress towards the longer-term goal of strengthening NASA's culture. This chapter describes the assessment and its results, the plan implemented to influence the culture, and the results obtained from that plan after the initial six-month period.

Assessing the Existing Culture and Climate

Before we could change anything, we first had to understand the current culture and climate at NASA and identify focus areas for improvement. We approached this task with the belief that there was much that was positive about NASA's culture. Our challenge was to build from those positive aspects, strengthen the overall culture, and at the same time, address the issues raised in the Accident Investigation Board report.

In undertaking this work, we focused on the difference between "culture" and "climate." By culture we mean the shared values and beliefs of an organization — commonly described as "the way we do things around here." The culture can also be thought of as the shared norms for behavior in the organization, often motivated by unstated assumptions.

Climate refers to the prevailing influences on a particular area of functioning (such as safety) at a particular time. Thus, culture is more deeply embedded and long-term, takes longer to change, and influences organizational performance across many areas of functioning. Climate, on the other hand, changes more quickly, and more immediately reflects the attention of leadership.

The significance of this distinction for NASA was that in the aftermath of the Columbia tragedy there was a strong safety climate; however, we were concerned that in the absence of properly focused efforts, the culture would not change, and over time the safety climate was likely to be compromised by the inevitable schedule, budget, and operational pressures that occur in any organization.

As described below, the culture assessment was based on review of previous work, a survey of NASA employees, and a program of interviews.

Previous Studies

In late 2003, NASA Administrator Sean O'Keefe commissioned a detailed review of the Columbia Accident Investigation Board report to determine which recommendations, observations, and findings had Agency-wide applicability to NASA and to develop measures to address each one. The internal NASA team that conducted this review produced a detailed report that identified a number of concrete improvement actions and recommended assignment of these actions to various units within NASA. According to the report, the team had focused on the organizational (as opposed to physical) causes identified in the Board report, but it "did not do a broad, in-depth assessment of the cultural changes needed to address the organizational causes."

The NASA team's recommendations were divided into seven major topics:

- Leadership
- Learning
- Communication
- Processes and rules
- Technical capabilities
- Organizational structure
- Risk management

The team recognized that there was a broader need for culture change that they were not addressing. According to the report, "Some of the recommended actions are those one might expect in an organization trying to change its culture, but the goals offered by the Team are intended only as a first step in the process."

The NASA team also reviewed previous culture surveys conducted at the Agency to provide historical perspective for this assessment.

During 2003, the Federal Office of Personnel Management (OPM) conducted a survey throughout the Executive Branch entitled "Best Places to Work." This survey measured employee attitudes about various aspects of the government's agencies and resulted in an overall ranking of agencies and locations within agencies. NASA ranked highest among all agencies, and several NASA locations were on the list of the top ten locations in the entire federal government. The survey found strengths in teamwork, employee skills-mission match, and strategic management. It was also designed to identify areas in which each agency could make improvement, and at each NASA center the general category of "Leadership" was identified as an improvement target.

These findings were generally consistent with results NASA had obtained in its own previous surveys. While NASA had not conducted an Agency-wide culture survey in many years, there had been such surveys at several of the individual Centers within the last few years. These surveys identified leadership as a top area for improvement. However, they had not clearly defined the nature of the leadership improvement opportunity.

Safety Climate and Culture Survey

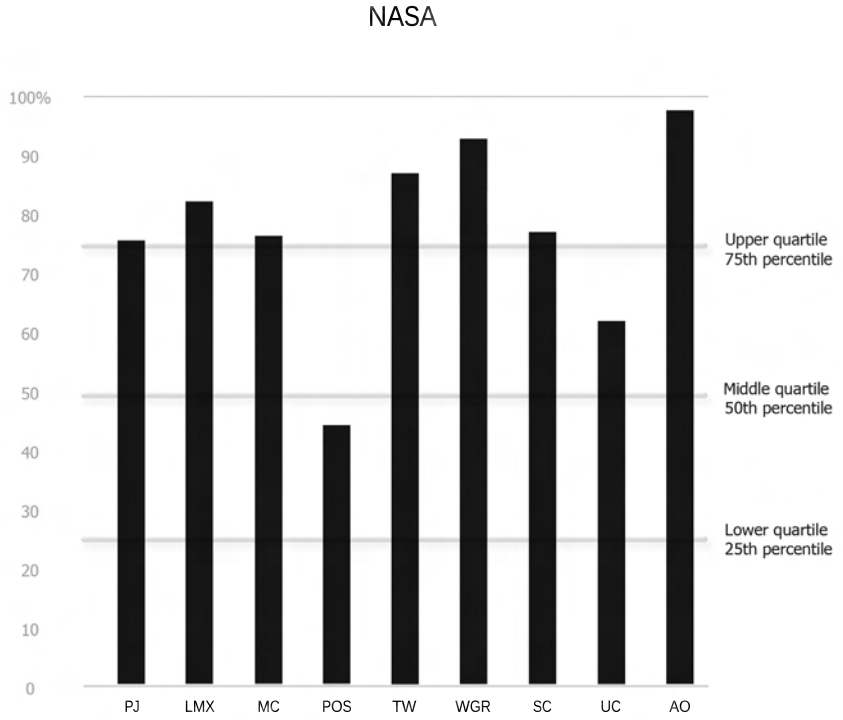
We conducted a specially modified version of our Organizational Culture Diagnostic Instrument (OCDI) at all 11 NASA locations. We asked all NASA employees plus Jet Propulsion Laboratory (JPL) employees to complete the survey via a web-based link. As previously described in Chapter 4, the OCDI measures the underlying organizational determinants of organizational culture and safety climate.

We administered the survey to solicit information about mission safety, which was defined as follows: "the prevention and avoidance of injury or damage to the mission or its hardware in all aspects of NASA missions."

In addition to the basic survey scales, we added questions specifically designed for use in NASA. Those questions were designed to evaluate the current situation in comparison to the desired state and to gather data on several specific culture-related issues raised by the Accident Investigation Board report.

An overall response rate of 45.2% was obtained for NASA employees, comparable to response rates obtained on previous NASA culture surveys. We evaluated potential response bias in the sample of people who responded, and these tests indicated that the respondent group was comparable to the overall NASA population.

Agency-wide response to the basic survey scales is shown in Figure 12-1 (percentile scores) and Figure 12-2 (raw scores). The percentiles in Figure 12-1 reflect comparison of NASA with a normed database compiled using this survey.



Organizational Dimension	Team Dimension	Safety-Specific Dimension
PJ - Procedural Justice LMX - Leader-Member Exchange MC - Management Credibility POS - Perceived Organizational Support	TW - Teamwork WGR - Workgroup Relations	SC - Safety Climate UC - Upward Communication About Safety AO - Approaching Others About Safety

Figure 12-1. Combined OCDI scores for NASA showing overall percentiles for all locations.

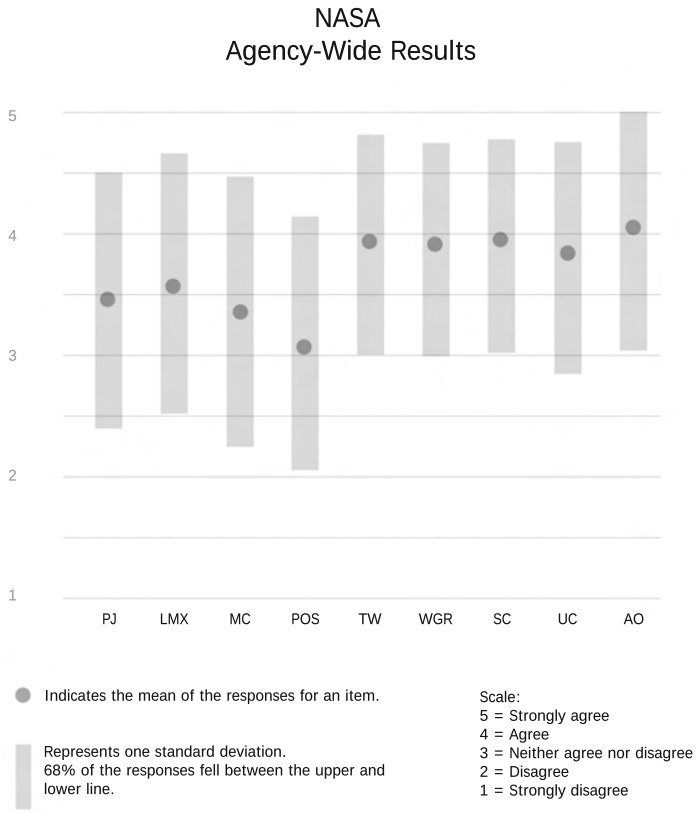


Figure 12-2. Raw scores of OCDI scales for NASA (mean and standard deviation).

At an Agency-wide level, NASA scored well in relation to other organizations in the database on most of the scales comprising the survey. It scored above the 90th percentile on Approaching Others, and Workgroup Relations, and between the 80th and 90th percentiles for Teamwork, and Leader-Member Exchange. These results indicated that across the Agency there was generally effective team functioning at the local level, with employees who have the ability and inclination to speak up to peers.

NASA scored lowest on two scales: Perceived Organizational Support (46th percentile) and Upward Communication (62nd percentile). Perceived Organizational Support (POS) measures employees' perceptions about the organization's concern for their needs and interests. Those perceptions in

turn influence beliefs about the organization's values for safety. This influences employees' willingness — or unwillingness — to raise safety concerns. Upward Communication (UC) measures perceptions about the quality and quantity of upward communication about safety, the extent to which people feel encouraged to bring up safety concerns, and the level of comfort discussing safety-related issues with the supervisor.

Lower scores on POS and UC indicated areas for particular focus during the culture change effort. Senior management and the behaviors they stimulate through the management chain influence both of these dimensions. These dimensions are also a strong influence on the culture in ways that relate directly to mission safety.

Findings

To help provide context for the survey results, we conducted a series of interviews with more than 120 people at representative locations — NASA headquarters, the Glenn Research Center, and the Johnson Space Center. At each location we interviewed individual members of senior management and met with representative groups of individual contributors, and supervisors and managers. The purpose of these interviews was to provide general background to help us interpret survey data.

In general, the interviews disclosed a strong sense of dedication and commitment to the Agency's work. However, we also found frustration about a number of things.

During the interview program, we received a number of indications that there were impediments to speaking up at NASA. On more than one occasion individuals would hang back at the end of a group session and either make comments after others had left or leave written notes expressing thoughts they had not brought up in front of others. These comments tended to be on the topic of barriers to communication. This was consistent with the Upward Communication survey result and indicated that there was a group of non-managers within NASA who felt that open communication was impeded.

We also heard many comments indicating that not all managers and supervisors had the leadership skill levels that many considered appropriate.

A common theme was the issue of respect for individuals and the need for some managers to act in ways that better reflect that value.

Safety & Mission Success Week Data

In November 2003, nine months after the shuttle disaster, NASA held Safety and Mission Success Week. During this week each Center Director was asked to collect feedback from his workforce on the Columbia Accident Investigation Board report and the issues it raised.

NASA analyzed data from the centers, identifying major themes. We received the summary of this data as the assessment report was being prepared and found it was consistent with the findings of the assessment. Several of the themes and specific issues identified were important to culture change at NASA, including:

- Lack of a process for delivering upward feedback. This was reflected in the survey scores for Upward Communication
- Leaders do not follow words with actions. This contributes directly to lower Management Credibility
- Message of "what" delivered without the "why." This is likely to contribute to lower Management Credibility and lower Perceived Organizational Support
- Need a culture that values and promotes respect and cooperation. This relates to Perceived Organizational Support
- Need a renewed emphasis on respect for each other, and cooperation
- Minority opinions need to be embraced — create an open atmosphere in which disagreements are encouraged and new ideas/alternatives are pursued. (This was consistent with survey findings that Upward Communication was one of the weakest scales measured)
- Contractors are treated as second-class citizens. This can result in inhibiting communications, with the potential for impeding performance excellence

Conclusions

The assessment found that the NASA culture reflected a long legacy of a can-do approach to task achievement, but did not yet fully reflect the Agency's espoused values of Safety, The NASA Family, Excellence, and Integrity. The culture reflected an organization in transition, with many ongoing initiatives and lack of a clear sense at working levels of "how it all fits together."

Examining NASA's espoused values, we found that:

Safety was something to which NASA personnel were strongly committed in concept, but NASA had not yet created a culture that was fully supportive of safety. Open communication was not yet the norm, and people did not feel fully comfortable raising safety concerns with management.

The NASA Family value was inconsistent with the fact that people felt disrespected and unappreciated by the organization. As a result, the strong commitment people felt to their technical work did not transfer to a strong commitment to the organization. People in support functions frequently did not fully understand or appreciate their connection to the Agency's mission, and people in technical positions did not fully value the contribution of support functions to their success.

Excellence was a treasured valued when it came to technical work, but was not seen by many NASA personnel as an imperative for other aspects of the organization's functioning (such as management skills, supporting administrative functions, and creating an environment that encourages excellence in communications).

Integrity was generally understood and manifested in people's work. However, there appeared to be pockets in the organization in which the management chain had sent signals — possibly unintentionally — that raising negative issues was unwelcome. This was inconsistent with an organization that truly values integrity.

In summary, we identified an opportunity and needed to strengthen the culture's integrity by helping NASA become an organization that lives the values.

The Intervention

Overview

Based on this assessment, we recommended that the culture change initiative should build on the strengths shown in the safety climate and culture survey. NASA employees generally worked well as teams, liked and respected each other, and felt comfortable talking to peers. These strengths could be harnessed to create reinforcement mechanisms for behaviors that support the Agency's values and desired culture.

In addition, we recommended that the culture change initiative should focus on helping managers and supervisors maintain an effective balance between task orientation and relationship orientation. At NASA many managers had a natural inclination toward task orientation, which is not unusual for technical organizations. However, strong task orientation at the expense of relationship orientation can lead to inhibition of Upward Communication and weak Perceived Organizational Support. By taking steps to help managers and supervisors improve their balance between task and relationship orientation, NASA could move toward integrating its values of Safety and People and create a culture that would more effectively support the Agency's mission.

We believed that NASA needed to avoid falling into the organizational "trap" of viewing its response to the Board report purely in a project-driven manner. The NASA culture tended to think in terms of identifying problems and solving them through discrete projects. Over the years NASA had proven to be outstanding at defining and executing projects. However, a project is, by its very nature, something that has a start and an end. If it came up with separate projects to address specific issues in the report, the Agency could fail to address the underlying culture issues that gave rise to many of the problems in the first place. This may explain why safety climate changes observed after previous accidents (e.g., the Shuttle Challenger accident) did not generalize and become part of the ongoing culture.

To address NASA's needs and build on its strengths, we developed a culture change plan based on one core concept: *Organizational values must underlie the definition of desired culture.*

The Importance of Values

Values underpin everything an organization does to ensure that objectives are reached. They help inform everyone in the organization about the considerations that should be reflected in day-to-day actions and decisions. Values set out the basis for the strategic considerations necessary for success and help ensure that everyone understands the organization's expectations of them.

An organization cannot create specific rules covering every situation and variation. In the complex world in which NASA functions, the Agency must be able to rely on individuals making independent judgments about unexpected and unforeseen situations. Having organizational values that are well understood and embraced by everyone will reduce the variability with which these judgments are made.

According to the assessment results, there was no uniformity of adherence to the espoused organizational values that would lead to safety performance excellence. The implementation plan recognized the importance of values for a safety-supporting culture being widely disseminated and embraced within NASA and actively reflected in the leadership practices of individuals at all levels of the organization.

Addressing Culture and Climate

Both climate and culture are important. While identifying values was an important first step, building these values into the fabric of the Agency required transforming the culture.

Organizational climate often changes very quickly after a significant incident, but the underlying organizational culture may not change sufficiently to prevent further incidents. Since climate that is inconsistent with culture will not be sustained, a favorable safety climate following an incident does not assure real improvement unless steps are taken to shift the culture.

As we developed the implementation plan, the current climate for safety in NASA was very strong and favorable. Since favorable organizational climate is a condition for successful culture change, this situation presented a limited-time opportunity to introduce new principles that could lead an Agency-wide cultural change initiative.

How Leaders Drive Culture Change

The key to changing culture is through leadership. Leaders influence safety through what they do and what they don't do. They can express this influence intentionally or unintentionally. However, leaders with the right knowledge and skills can move the culture in desired ways and do so with accelerated results. Therefore, the key is to make leaders more effective, and the best way to do that is through the use of behavioral tools.

Using Behavioral Tools. Behavioral tools are the most practical and effective way to transform culture; culture changes when new behavioral norms are established. Because behavior is definable and measurable, it lends itself to change efforts. By using behavior-based tools, organizations can undertake very concrete and specific initiatives to accelerate cultural transformation and can measure progress toward results.

Behavioral tools may be used to create accelerated change within organizations as well as to ensure that future leaders are selected and developed to sustain the desired culture. Our assessment results confirmed the opportunities to use these tools for the change desired by NASA.

Focusing Culture-Change Efforts. There should be one, single culture change initiative. NASA was in a period of change, with many active teams and task forces. Many of these had identified issues that relate to culture, and this raised the possibility that there could be overlapping, or even contradictory initiatives.

For culture change at NASA to be successful, there needed to be a consistent culture change initiative that incorporated all of its culture-related issues.

The Culture Change Plan

The specific plan we developed for the initial six-month period was designed to begin the culture change while validating the adaptation of the approach to fit NASA. To do this we focused on three NASA locations — the Glenn Research Center, the Stennis Space Center, and two large directorates of

the Johnson Space Center (Engineering and Mission Operations). These organizations collectively comprised approximately 3,600 people.

Changing the culture involves two thrusts. The first engages leadership and individual contributors in changing the current cultural environment; the second assures that the culture is sustained by grooming future leaders who can support the desired culture. This initial phase of the effort focused on the former objective.

At the outset, NASA's senior leadership re-examined the organization's core values and reaffirmed those to which the Agency aspires. Those values were used to articulate a vision of the future state that would exist following successful culture change:

> *"The objective of this effort is to strengthen the organizational culture and safety climate at NASA. In this desired future state, each individual feels highly valued as an individual and knows that his or her contributions are appreciated. Everyone at the Agency, in all roles and at all levels, understands the important ways they contribute to the Agency's exciting mission, feels like an integral part of the larger Agency team, understands the way that others contribute to the larger team effort, and is committed to the success of the Agency and its overall mission. Managers and executives at every level of the Agency, from top to bottom, routinely treat people with respect. People are comfortable in raising issues, and confident that the issues raised are considered and appropriately factored into decisions. There is a high level of trust in management, and a sense that management, in turn, trusts each individual.*
>
> *In this desired future state, safety is widely recognized as an integral component of mission success, and is considered by every individual in everything they do. The Agency is recognized for its pursuit and outstanding achievement of cutting edge endeavors, as well as its extraordinary safety record, all of which are understood as compatible goals."*

In designing a strategy to achieve the culture change objective, we began with the recognition that culture is a reflection of shared perceptions, and beliefs and behaviors. It is related to unstated assumptions. If we change those perceptions and beliefs, we change culture.

Individuals' perceptions and beliefs are influenced by a variety of factors subject to intervention. For example, perceptions and beliefs about the organization are strongly influenced by individuals' interactions with their immediate supervisors. These interactions inform the individual about the organization's real values and shape his or her views about the organization. There are dozens of these interactions each week. A change in the leadership behavior of the immediate supervisor will influence culture, but is unlikely to occur unless there are changes in the leadership behavior of that supervisor's supervisor. Similarly, we must change behavior up through the leadership chain.

To change individuals' perceptions and beliefs, we wanted to change their supervisors' leadership behaviors to more consistently reflect behavior that reflects the desired culture. The new behaviors we wanted to encourage in NASA's first-line supervisors — Branch Chiefs — were a set of critical behaviors that exemplify NASA's core values. The behaviors we wanted to encourage up through the chain of command — through Division Chiefs, Directors, and Center Directors — were those that exemplify the values and encourage the use of these behaviors by subordinate managers.

There is a large set of behaviors that supports NASA values, including both leadership behaviors and individual contributor behaviors. To change culture we needed to focus on a manageable subset of those behaviors, selected for their leverage in affecting perceptions and beliefs related to areas in which we wanted the culture to change. For example, survey results showed that NASA's culture was strong in the area of Workgroup Relations. While there are behaviors related to Workgroup Relations, those were not the ones on which we chose to focus as they were already comparatively strong. However, in an area like Upward Communication, where NASA needed to improve, the related leadership behaviors would be considered "critical behaviors." Critical behaviors for NASA at this time related to communication, consideration for individuals, management consistency (credibility), and decision-making.

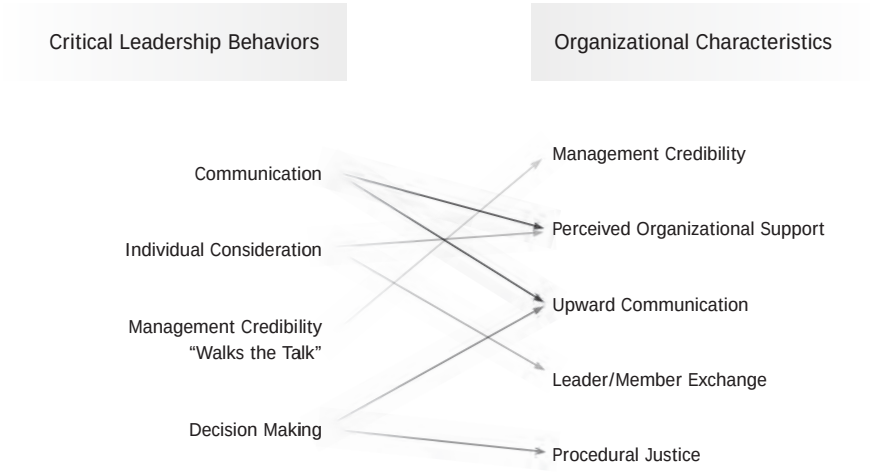


Figure 12-3. The relationship between critical leadership behaviors and key organizational characteristics.

Critical behaviors were identified based on a variety of data sources such as the Columbia Accident Investigation Board report, the OCDI, NASA's internal review of the broad applicability of the Board recommendations, and Safety & Mission Success Week findings. A foundational set of critical leadership behaviors was identified based on those data sources. This foundational set of critical behaviors was then reviewed by each location at which the culture change effort was to be implemented. This review verified the relevance of the behaviors to each location and developed examples of how each behavior was manifested at the location, to embellish the definition for local use.

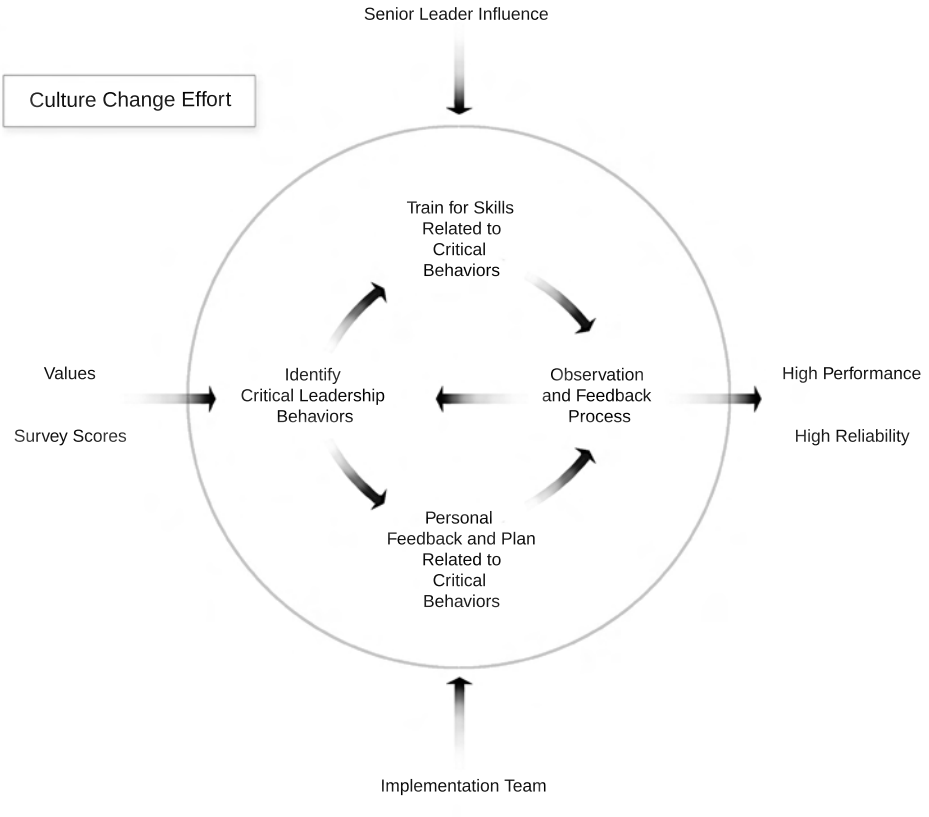


Figure 12-4. Implementation strategy for individual NASA locations.

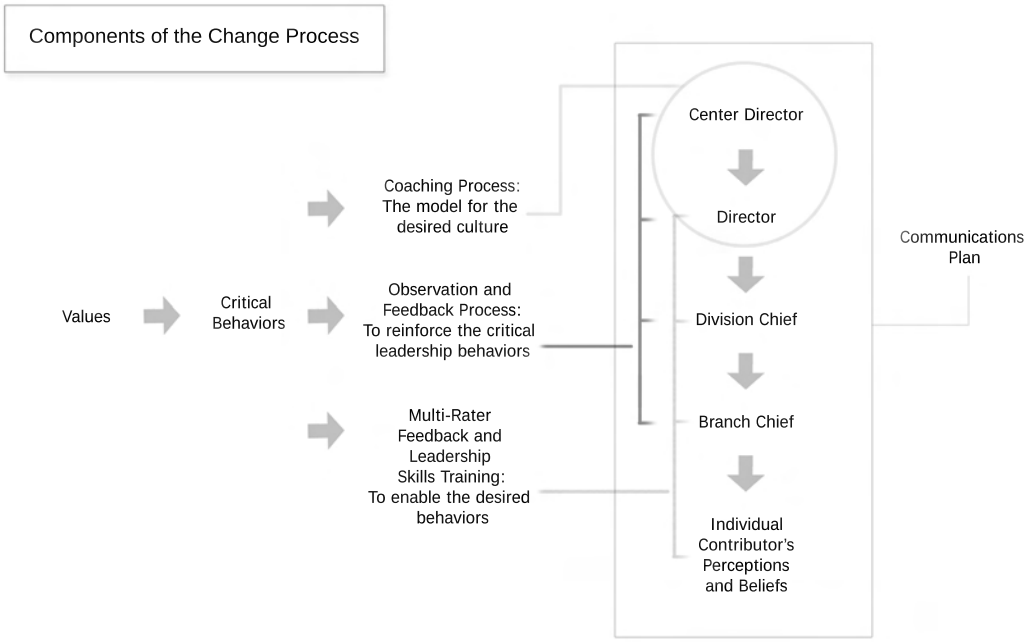


Figure 12-5. Key components of the change process at NASA centers.

We designed a multi-pronged approach of specific activities that included introducing leadership coaching for senior-level leaders, implementing a behavioral observation and feedback process for all leaders, and providing multi-rater feedback and skills training for all leaders. A communications effort was also launched at each location to inform people about the changes occurring.

Coaching

The senior-most leaders in the organization have an important, but indirect, influence on the perceptions and beliefs of most individual contributors. Therefore, the senior-most leaders must possess strong leadership skills and a solid understanding of how they can exert influence. It is important that they set the direction for the culture through everything they do and that they create consequences that cause their reports to do the same. To help senior-most leaders support the culture change, we employed a leadership coaching process. This helped the leaders improve their ability to support

the critical behaviors (as well as practice these behaviors themselves) and helped them learn how to meaningfully support the other elements of the change process.

The coaching process was designed to help senior leaders understand their leadership strengths and weaknesses and to work with them in developing individual action plans. The process began with a detailed individual assessment including a 360 diagnostic survey plus a series of assessment interviews with subordinates, peers, and managers. The assessment resulted in a detailed feedback report that assessed the individual's leadership style and practices. Because this report was based on information from individuals familiar with the leader and provided detailed examples of his or her leadership behavior, it filled a vacuum that most senior leaders have — a lack of direct feedback on their leadership.

The coach reviewed the feedback report with the leader and then helped to develop a coaching action plan. This plan identified areas for the leader to concentrate on, drawing on the critical behaviors, the actions needed to drive support for NASA's values, and leadership best practices. Once the plan was developed, the coach provided the leader with guidance as the coaching action plan was implemented.

The coaching process was used for senior leaders, beginning at the top of the Agency and extending down through the management chain to the senior-most levels of the Center.

Behavioral Observation and Feedback

All leaders in the organization were required to adopt and consistently use the critical leadership behaviors. A behavioral observation and feedback process was implemented to promote use of these behaviors. Leaders receiving regular, structured reinforcing feedback on their use of critical behaviors and guidance feedback on missed opportunities to use these behaviors would change their behavior. When their use of critical behaviors was encouraged by those senior to them in the organization (as a result of the coaching process), this change would be further encouraged.

Anonymous data was gathered during these observations, allowing the local implementation team to track progress in promoting critical behaviors,

analyze the reasons for non-performance, and design corrective action as appropriate.

Multi-Rater Feedback

We provided each leader with individual multi-rater survey feedback to help him understand which types of behavior represented existing strengths, and which represented areas for focusing improvement efforts. We used a 360 diagnostic survey to gather feedback on each individual leader's use of leadership and management best practices. Leaders attended a workshop to review and discuss the results and to develop individual action plans focused on increasing their use of leadership behaviors that supported the organization's values.

Skills Training

The objective of the skills training was to improve skills leaders need to perform the critical behaviors and support the desired culture. Managers received two days of training, which covered cognitive bias awareness and feedback skills (day 1) and influential leadership skills such as building trust, valuing minority opinion, and influencing skills (day 2). Each of these segments was explicitly tied to critical behaviors being addressed in the culture change initiative.

Communications

The fifth element of the near-term culture change process was communications, and there were two aspects of this challenge.

At the individual Centers where culture change activities were occurring, it was important that there be communication about these efforts. "What" was occurring and "why" had to be communicated at the outset. Then, as implementation proceeded, it was especially important to communicate about early indications of progress.

The specific mechanisms for this communication varied from Center to Center based on the communications vehicles available locally. Existing communications channels such as site newsletters, intranets, and all-hands

meetings were used to help relay information about this effort. In addition, managers were encouraged to speak about it at their staff meetings.

More globally, it was important that NASA's overall communications reflect consistency with the culture change effort and the desired culture. Even on topics not directly related to the culture change effort, senior leaders indirectly send messages about how seriously they take the desired culture. When members of NASA's senior-most leadership spoke or sent written messages, the content of those messages needed to reflect specific consideration for the cultural undertones of the communication.

Results

For five months beginning in mid-April 2004, we worked with the Glenn Research Center, Stennis Space Center, and the Engineering and Mission Operations Directorates of the Johnson Space Center. This initial phase of work was designed to provide a mechanism to learn how best to deploy the culture change approach while meeting the objective of achieving measurable progress in six months.

As the work progressed, various forms of results data became available.

Anecdotal Data

Soon after implementation work began, we started hearing anecdotal evidence that the effort was having an effect. Examples of the anecdotal evidence are listed in Table 12-1. This evidence provided early indications that the culture change effort was beginning to have an impact.

Behavioral Data

As data began to accumulate from the behavioral observation and feedback process, we started seeing improvement in the percentage of times an observed behavior was observed being done, rather than observed as a missed opportunity. Figure 12-6 shows early data from one location. Several of the specific behaviors are showing an improvement trend. Other behaviors did

Early Anecdotal Data
"Helps me be less judgmental & see myself as others do" – an observer
"I wasn't sure of this thing in the beginning. Now I am convinced that it will help us; we need to support it. I have invited observers to my meetings; I encourage you to do the same." – Division Chief
Division Chief asks that two meetings be observed
"I found myself conducting my Branch meetings and day-to-day interactions differently as part of this effort. I am convinced that others will also change their habits; even if they are not bad right now but improvement is good."
One Implementation team had a well-known skeptic as a member. After observer training he got up and told the group that he hadn't been in favor of this, but now that he understood it he thought it was going to make a big difference.
Individuals requesting to have 360 leadership survey done to provide them with feedback
Training evaluations consistently indicating that participants arrived as skeptics and left as believers ("prisoner" to "advocate")
Division Chiefs giving each other feedback in a staff meeting, referring to the coached behaviors
Observer invited to observe MMT meeting

Table 12-1. Examples of early success indicators in the change process at NASA.

not show improvement this rapidly, but the data produced by the process provided a mechanism to know where to place emphasis in seeking further improvement.

Culture Survey

Approximately six months after the start of the culture change efforts, we administered the OCDI again to the groups where culture change work had been undertaken. This was the same survey used in the initial assessment phase of the effort, and we used the same email-prompted, web-based survey administration method.

The response rate was quite good, and at most locations it exceeded the rate obtained in the original (February) survey administration, as well as

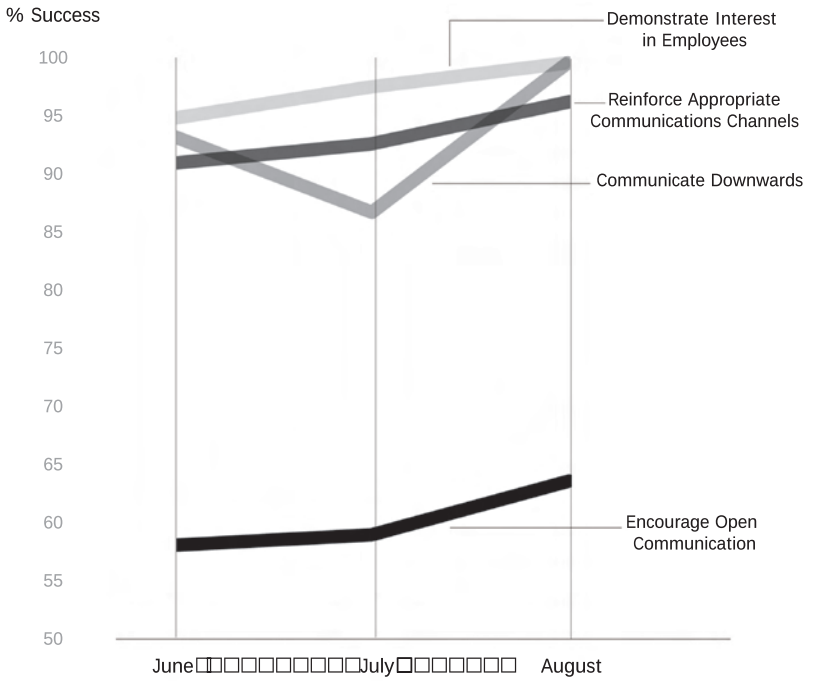


Figure 12-6. Early data from one NASA location showing improvement.

the rates obtained on previous NASA culture surveys. The response rate by location is shown in Table 12-2.

Tests to evaluate potential response bias in the sample of people who responded indicated that the sample was representative of the total surveyed population.

The Glenn Research Center and Stennis Space Center had survey scores during the initial assessment that were low compared to the NASA overall averages. The Johnson Space Center had scores that were high relative to the NASA average. The results of the intervention at these centers are interesting to compare.

Glenn Research Center and Stennis Space Center Results

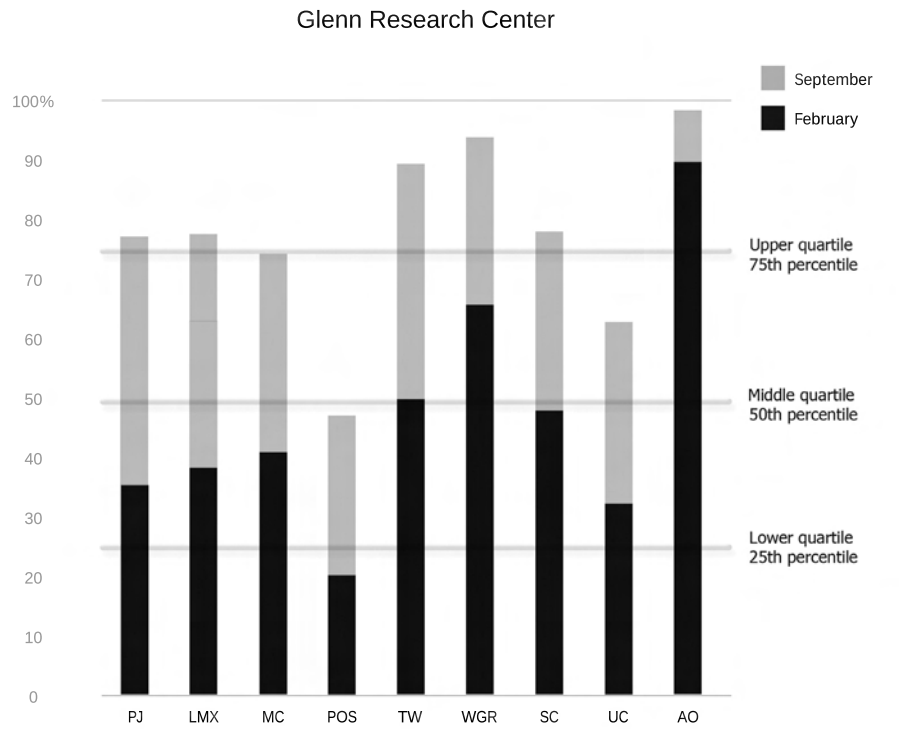
All scales on the basic Safety Climate and Culture survey showed improvement at the Glenn Research Center (GRC). These results are shown in Figure 12-7 (percentile scores) and Figure 12-8 (raw scores.) The September results (after intervention) show significant improvement over the February results (pre-intervention).

	February Response Rate (%)	September Response Rate (%)
Glenn	32.4	65.2
Johnson (Engineering & MOD)	52.6	45.8
Stennis	45.2	71.5
Overall	**45.2** (Nasa-Wide)	**57.9**

Table 12-2. NASA survey response rate by month.

Figure 12-8 shows the comparison of these results with their confidence intervals. Where confidence intervals do not overlap, the differences are statistically significant.

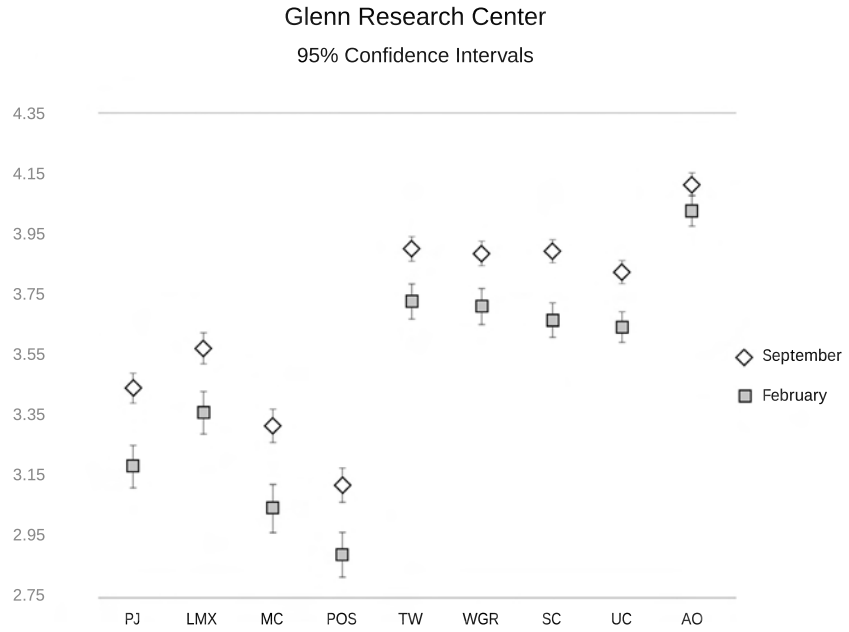
Comparing managers' responses to non-managers' responses at GRC, we found a greater change in survey scale results among managers than among non-managers. This is consistent with what we would expect after just six months: the culture change strategy was to work with leadership as the mechanism for driving culture change. Initial activity in the culture change



Organizational Dimension	Team Dimension	Safety-Specific Dimension
PJ - Procedural Justice LMX - Leader-Member Exchange MC - Management Credibility POS - Perceived Organizational Support	TW - Teamwork WGR - Workgroup Relations	SC - Safety Climate UC - Upward Communication About Safety AO - Approaching Others About Safety

Figure 12-7. OCDI percentile scores for NASA's Glenn Research Center showing results from before and after start of intervention.

effort focused primarily on managers at all levels. After just six months, one would expect to find managers seeing greater change than individual contributors, and that is what the results indicated.



Organizational Dimension	Team Dimension	Safety-Specific Dimension
PJ - Procedural Justice LMX - Leader-Member Exchange MC - Management Credibility POS - Perceived Organizational Support	TW - Teamwork WGR - Workgroup Relations	SC - Safety Climate UC - Upward Communication About Safety AO - Approaching Others About Safety

Figure 12-8. OCDI raw scores for NASA's Glenn Research Center.

Scale : 5 = Strongly agree
4 = Agree
3 = Neither agree nor disagree
2 = Disagree
1 = Strongly disagree

The final question in the survey was open-ended: "What changes have you seen in NASA's culture in the last six months?" Among GRC managers, 46% of respondents provided comments, and among non-managers 44% provided comments.

In analyzing the comments provided by managers, we found that 32% mentioned specific indicators of culture improvement such as seeking input from others[2], while 10% indicated they had seen no change, and 4% indicated that the culture had worsened. Among managers providing comments, 21% indicated an improved safety climate, while 4% indicated the safety climate was worse.

Among non-managers, 22% mentioned specific indicators of culture improvement, with 16% indicating no change, and 4% indicating a worsening of the culture.

In addition to the basic survey scales, this survey included a series of NASA-specific questions. They were grouped into several thematic areas such as guiding principles for safety excellence, consistency between words and actions, cooperation and collaboration, potential inhibitors, communication, and employee connection to mission safety. All NASA-specific questions showed improvement compared to the first survey.

Results from the Stennis Space Center were very similar to those from GRC. All survey scores improved, and comments were consistent with these results.

Johnson Space Center Results

The survey was administered at Johnson Space Center (JSC) to the Engineering Directorate and the Mission Operations Directorate (MOD). The culture change efforts had been focused on these two groups during the initial phase of the process.

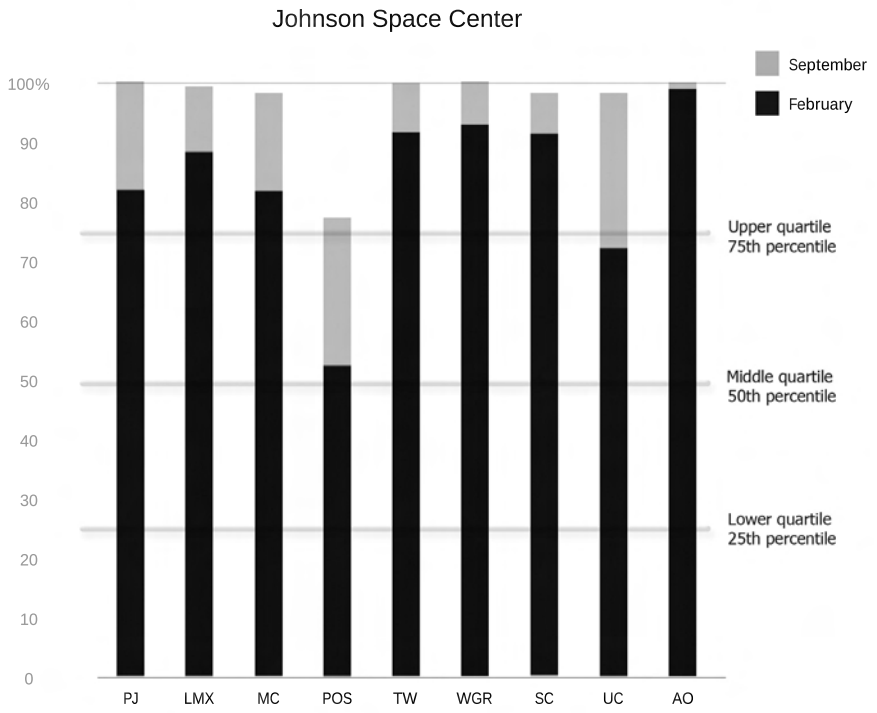
All scales on the basic Safety Climate and Culture survey showed improvement for these two JSC organizational units. These results are shown in Figure 12-9 (percentile scores) and Figure 12-10 (raw scores.) The September results

[2] Only comments mentioning changes to cultural characteristics were counted. Many other comments mentioned activities undertaken during the last six months, such as training or meetings, but descriptors of activities - as opposed to characteristics of culture - were not counted for analysis.

show significant improvement over the February results.

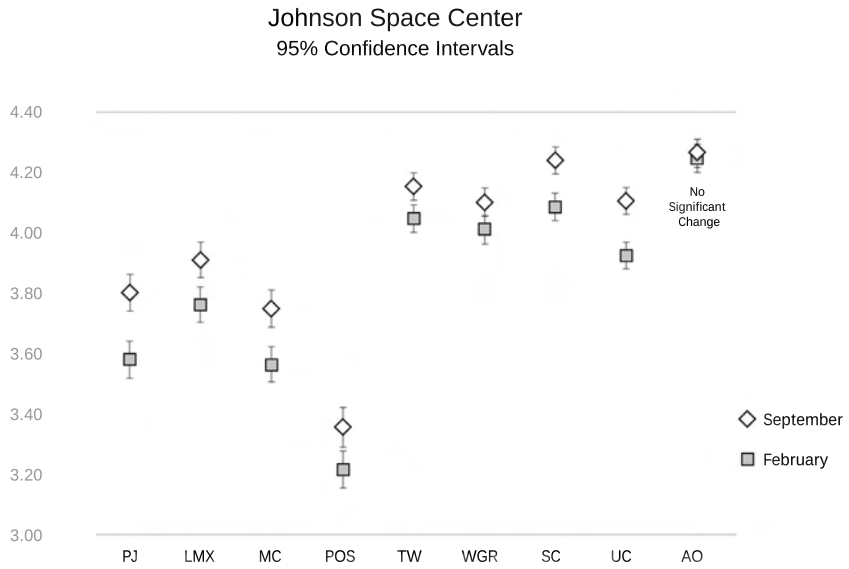
Figure 12-10 shows the comparison of these results with their confidence intervals. Where confidence intervals do not overlap, the differences are statistically significant.

JSC had generally high scores on most scales prior to the culture change efforts, with most scales above the 80th percentile. In the survey conducted after the initial culture change efforts, every scale showed some level of improvement. Percentile scores were high, although raw scores still showed room for improvement.



Organizational Dimension	Team Dimension	Safety-Specific Dimension
PJ - Procedural Justice LMX - Leader-Member Exchange MC - Management Credibility POS - Perceived Organizational Support	TW - Teamwork WGR - Workgroup Relations	SC - Safety Climate UC - Upward Communication About Safety AO - Approaching Others About Safety

Figure 12-9. OCDI percentile scores for NASA's Johnson Space Center showing results from before and after start of intervention.



Organizational Dimension	Team Dimension	Safety-Specific Dimension
PJ - Procedural Justice LMX - Leader-Member Exchange MC - Management Credibility POS - Perceived Organizational Support	TW - Teamwork WGR - Workgroup Relations	SC - Safety Climate UC - Upward Communication About Safety AO - Approaching Others About Safety

Figure 12-10. OCDI raw scores for NASA's Johnson Space Center.

Scale : 5 = Strongly agree
4 = Agree
3 = Neither agree nor disagree
2 = Disagree
1 = Strongly disagree

Comparing managers' responses to non-managers' responses, we again found a greater change in survey scale results among managers than among non-managers. As noted in the discussion of GRC results, this was consistent with what we would expect.

The final question in the survey was open-ended: "What changes have you seen in NASA's culture in the last six months?" Among JSC managers, 52% of respondents provided comments, and among non-managers, 45% provided comments.

Among the responses provided by managers, 52% mentioned specific indicators of culture improvement such as seeking input from others[3], while 7% indicated that they had seen no change, and 4% indicated that the culture had worsened.

Among non-managers, 22% mentioned specific indicators of culture improvement, with 22% indicating no change, and 3% indicating a worsening of culture. In addition, 13% indicated improvement in safety climate.

In addition to the basic survey scales, this survey included a series of NASA-specific questions. All NASA-specific questions showed improvement since the February survey.

Summary

By focusing on leadership using behavior-based tools, NASA has made a strong start in its effort to change its culture. Both survey scale scores and comments indicate that the change effort at NASA has made good progress in a brief time, but that more work remains to be done. As would be expected in the early stages of a major change effort, there appears to be a segment of the population that is seeing positive change and is optimistic about the direction the organization is moving, and another segment that is skeptical and not yet seeing what its members articulate as change. However, the overall perceptions, measured by the survey scores, indicate that there is solid movement in the desired direction.

The approach taken has built ownership for the culture-change effort among the leaders of the target groups and has produced a rapid start to the longer-term job of changing the culture. Leaders have been given new tools to help them carry the change forward, and as the effort is now being expanded to the rest of the organization, NASA is on a trajectory toward an enhanced organizational culture.

• • • • •

[3] Only comments mentioning changes to cultural characteristics were counted. Many other comments mentioned activities undertaken during the last six months, such as training or meetings, but descriptors of activities - as opposed to characteristics of culture - were not counted for analysis.