

# CASE STUDY

## From Three to One:

*Integrating a High Performance Work Organization Process,  
Lean Production, and Activity Based Costing Change Initiatives*

### Summary

- Who:** Boeing Corporation, Wichita, and the International Association of Machinists and Aerospace Workers
- Where:** Wichita, Kansas
- When:** First Visit: Joel Cutcher-Gershenfeld, Wesley Harris, and Rocco Paduano May 23, 2000  
Second Visit: Betty Barrett and Thomas Kochan July 26-27, 2000
- What:** Evolution of a High Performance Work Organization Process

## Executive Summary

### ***Key challenges and lessons learned***

In 1997 Boeing's Wichita Division and the International Association of Machinists and Aerospace Workers agreed to launch a "High Performance Work Organization" (HPWO) process. This followed the introduction of a Lean Production Initiative in 1994-95 and an Activity Based Costing (ABC) initiative in 1996. Managers and union leaders in Wichita sought to sustain and grow each of these change and improvement efforts in ways that empower the workforce and enhance the competitiveness of the operations. Although these initiatives share some similar objectives and could potentially serve to complement and reinforce each

Managers and union leaders in Wichita sought to ...empower the workforce...

other, to date they have been led and managed separately. Each is experiencing a slow and difficult path of diffusion. The key challenge facing management and union leaders is to decide how to best integrate these separate improvement programs into a single, focused initiative that builds broader awareness, support, and demand for its features across all levels of the workforce and the management and union organizations in the Wichita operation. Given the combination of the engineering culture of Boeing and the pragmatic orientation of the workforce in Wichita, the parties may want to shift to a more targeted task or problem specific approach that engages a broad cross section of hourly workers, engineers, and managers in specific improvement initiatives. Doing so might shift from a top-down supplier push to a distributed, demand-pull process of innovation and adaptation.

The most significant *external* threats to the success of these efforts and the stability of the enterprise are the perceived threat of losing products and projects to other Boeing facilities or to external suppliers, and the corresponding insecurities and fear of downsizing on the part of the workforce. However, these external threats are not as significant as *internal* factors, particularly, the lack of consistent leadership support and follow-through within both the company and union organizations. Other sources of instability are the conflicts and political pressures that occur in the on-going labor management relationships and spillover to slow down or disrupt temporarily the ability of the parties to work together on these joint improvement efforts.

## **Mitigation Strategies**

The good news is that steps to mitigate these potential threats can be identified since they are quite similar to those often encountered and overcome by other organizational change efforts. This is particularly true because the HPWO, as well as the lean production and ABC efforts are all still in their pilot or early stages of development. The mitigation strategies suggested by other cases would call for:

1. Integration of HPWO, lean production, and ABC change efforts;
2. Shift to a demand-pull project/problem specific improvement strategy;
3. Creation of a stable pool of funds to support proposals for improvement projects;
4. Commitment by both management and union leaders to protect their joint improvement processes from being “held hostage” to the normal political cycle of union elections, collective bargaining negotiations, leadership and staff turnover, or other conflicts that occur.

## **Boeing in Wichita**

Boeing’s Wichita Division supports the commercial, military, and space products and services of the Boeing Corporation. Operations in Wichita date back to the old Stearman Aircraft Company, which became part of Boeing in 1934 when the federal government required United Airlines, Pratt and Whitney, and Boeing to split into three separate companies. Presently, the Wichita Division employs approximately 16,800 employees, down from approximately 20,000 in 1997. It is the largest employer in the State of Kansas. The division produces 75 percent of the parts for Boeing’s 737 commercial airliner as well nacelles, nose sections and other parts for Boeing’s 747, 757, 767, and 777 as well as a range of maintenance services and parts for the company’s military and commercial products.

## **Sources of Instability: Wichita and other Aerospace Facilities**

Table 1 summarizes the differences between sources of instability at Wichita and the average of four other plants in the aerospace industry. The data come from survey data collected from a cross section of managers, engineers, and hourly personnel in Wichita. Their responses are compared to the average responses from comparable samples of employees in four sister aerospace industry facilities. We break the sources of instability down into two categories. The top panel reports external sources of instability, i.e., those that come from

customers, markets, technologies, or suppliers while the bottom panel lists internal sources of instability that come from actions or decisions controllable within the company or plant. The data show that Wichita plants surveyed and more internally generated instability. Wichita employees report significantly less instability from externally generated budget shifts or changes in technology and no differences in the other external categories. In contrast, Wichita employees report greater instability coming from internal company and/or plant decisions in five of six categories than their counterparts in other plants. The highest-ranking source of instability is perceived changes in leadership vision, followed by changes in internal budgets and stresses and tensions associated with changes in the plant.

**Table 1**  
Sources of Instability: Wichita and Other Aerospace Plants

EXTERNAL SOURCES OF INSTABILITY	AVERAGE OF OTHER PLANTS	WICHITA	DIFFERENCE
Budget allocations	0.98	0.27	-0.71
Product demand	1.23	1.28	+0.05
Customer requirements	1.28	1.26	+0.02
Equipment/technology	2.09	1.21	-0.61
Supplier performance	0.96	0.96	0.00
<b>INTERNAL SOURCES OF INSTABILITY</b>			
Internal budgets	0.98	1.25	+0.27
Voluntary turnover	0.95	0.91	- 0.04
Reengineering	0.96	1.12	+0.16
Leadership vision	1.01	1.29	+0.28
Tension/stress around change	1.11	1.19	+0.08
Subcontract out work	.059	0.92	+0.33
In sourcing of work	0.49	0.58	+0.09

### **The HPWO Initiative**

Unlike most similar efforts introduced into American companies over the past twenty years, the process and elements of the HPWO program were built around a model developed by the IAM's High Performance Work Organization Partnerships Department rather than around a

strategy initiated by the company. The decision to embark on this program arose out of conversations between Richard Schneider, the IAM Vice President responsible for aerospace industry and Jerry Calhoun, Boeing Corporation's Vice President of Labor Relations. They wanted to start an initiative somewhere in the company and felt that Wichita would be a good option because of the good relationships among top management and labor leaders there.

This decision reflected a shift in IAM philosophy and strategy toward employee participation. For many years, the IAM was skeptical and suspicious of the motives behind company initiated participatory efforts, seeing them as efforts to undermine local unions where they were present and avoid unions where a facility was not organized. Given this view, international leaders urged locals to not participate in such efforts. In the late 1990s, the IAM strategy shifted. Top union leaders decided to take a proactive approach by outlining a model HPWO program with full union participation and co-management. The union set up a department to promote and support this effort. Figure 1 summarizes the elements in the IAM HPWO model.

In the late 1990's, the IAM strategy shifted.

Two years after the agreement to launch the initiative, the program showed significant potential. A first pilot project had been implemented in the strut drill out machine shop—a unit that produces titanium engine mounts for the 737 and 777. But warning signals were clearly present. Union and management leaders all agreed the process was moving slowly. Moreover, the program seemed to be experiencing many of the same dilemmas and challenges that prior HPWO programs in other companies have experienced. The question posed in this case is whether the parties can learn from the experiences of others and use these challenges or pivotal events to reinforce and strengthen the effort. Or will they repeat the same mistakes or behavioral patterns that have stalled or destroyed similar programs in other companies?

**Evolution of the Process.** As noted above, the HPWO program was a top-down initiative stimulated by corporate and international union leaders' desire to pilot a new approach to labor management relations. This is consistent with the perception the workforce at Wichita has of most change programs. In response to a question in the survey, 59 percent see change at Wichita initiated by corporate executives and 27 percent see change as coming from Wichita executives. In contrast, only 8 percent see change as arising negotiated changes involving all parties with a stake in the issue and even fewer (6 percent) see change as coming from the "bottom-up by

employees.” The effect of this is to place a high reliance on corporate and plant level leaders to continue to lead the process.

Top management and union leaders were active and instrumental in launching the HPWO efforts. They attended a weeklong training session with union counterparts at the IAM’s training facility in Placid Harbor, Maryland. All accounts of that week of learning and interaction were very positive. Out of it came a shared commitment and plan for implementing the HPWO program consistent with the IAM guidelines shown in Figure 1. Our interviews with the key leaders indicated that they continue to be committed to goals of the HPWO initiative. However, there does not appear to be a shared view for how to move the process forward.

Jeff Turner, the Vice President and General Manager of Wichita operations, sees the HPWO initiative as a vehicle for improving flexibility, costs and labor management relations. He recognizes the need for union leaders to share ownership of the process and attributes the failures of prior efforts to introduce quality improvement programs to the lack of union involvement in them. But he also expresses some frustration with the slow pace of change and the inability of the company and the union to develop a shared vision regarding the challenges facing industry in general and Boeing and the Wichita operations in particular. In his words:

HPWO appears to be the only way I can get the IAM to move with us. The world is moving away from us---our labor relations are part of an anachronistic system. The last contract—we just didn’t get it, we were like ships passing in the night. We [management] see the whole issue as being lean and efficient and expanding our markets where you really have confidence in your ability and partner with others who are good at other things.

For our part, we have been naïve on how incredibly important it is to recognize the legitimacy of the union and to see their shared interest in growing the business—if the union is left out of this they feel their legitimacy is being undermined.

Time is the major constraint ...in supporting the HPWO effort.

Jeff, therefore, sees it as his responsibility to diversify and grow the business without building in employment swings, and to involve the union in this process. That is why he supports the HPWO process. Time is the major constraint he faces in supporting the HPWO effort. He is responsible for moving multiple initiatives forward at Wichita,

including the lean production and activity based costing efforts.

This vision is quite similar to that of Ron Eldridge, the IAM Directing Business Agent and statewide leader. Ron hopes that the HPWO effort will help transform labor management relations from its old, and in his view, outdated arms' length model to one that truly empowers employees and involves the union as a partner with management in maintaining the work currently done at Wichita and/or bringing in new work:

The HPWO process started slow because of mistrust from our history. But by going through HPWO we found new ways to look at costing. We are trying to get the company to truly get into cost based accounting. It's been healthy for both of us.... It's all about growing the business—more opportunities.

The biggest challenge we face is over the direction of the company. We can't get caught up in selling off things because Wall Street perks up and bumps up the stock. We have to keep this [facility] in tact...That will be our biggest struggle.

We have two full time people doing this. One full time person is looking at contracting out—this came out the last contract negotiations. This causes more people to get their pencils sharpened. In the past work went out the door for no good reasons. Today that's changed because there are these checks and balances. But that means the onus is on our back to get involved and be responsible. But that's the future of unions. If we are going to keep manufacturing in this country, we have to do it.

The initial support from senior management and union leaders has not yet cascaded down to other plant and local union levels. The local lodge president, Garland Baird, shares a strong commitment to empowering the workforce but expressed deep frustration over the time constraints that management and union leaders face.

I've been involved in HPWO from the start.... Witnessed this program change and change and think it could make a difference for people and the company. But I don't see the effort on both sides of the street to make it fly. If we could get some of the higher levels out of the way we could do some good. People are way too busy and the [international] union leaders who don't work here don't know what's going on and are not available. Company leaders are also busy and so it's frustrating to get something accomplished.

Garland sees great potential in the HPWO process if workers could be “turned loose” and truly empowered, and in this sense his vision for this process is quite similar to that of top management and union leaders:

HPWO could be the tool workers use to do their jobs and to make the place more profitable. For example, if you have a process you can't get changed, HPWO could be used to fix it. Just put people in charge of their work. People don't want to be empowered to the point that managers don't have a say, but HPWO could teach people the right way to work together. If successful, it would give people pride in their work. They would be making actual decisions on how to do their work without a supervisor standing over them and allow them to have knowledge based on how the business works so that they would really understand how this place works.

But while he shares this general vision, he sees a contradiction between what HPWO stands for and the reality workers experience on the shop floor. The layoffs and downsizing of the facility, in his mind, continue a climate of skepticism and distrust of program initiatives such as HPWO.

Within management, similar ambivalence exists. Those engaged in other initiatives, such as the lean production efforts and activity based cost accounting see their initiatives as running parallel but with only tangential interaction with the HPWO efforts. But like HPWO, these efforts are moving forward in a slow, incremental fashion and must also compete for scarce managerial time and support. (See Figures 1 and 2 for short summaries of the lean production and the activity based costing projects).

While the survey data indicate that employees see little joint or bottom up stimulus or effort for change, focus group sessions with both engineers and hourly employees identified several examples of effective off-line problem solving efforts. One group we observed and interviewed, for example, was working on solving a problem with rivets that were not properly aligned on a particular sub-assembly. In response to a question of what factors made the group successful, the unanimous answer was that the problem (rivets not lining up properly) was identified as a serious concern by front line shop floor workers, and the process followed brought together the different technical and functional experts needed to search for root causes, evaluate alternative solutions, and create buy in for the solution

The process was demand-driven --



chosen. This approach fits well with Boeing-Wichita's engineering and pragmatic, quality oriented culture. The process was demand-driven—initiated by a problem identified by front line workers that supervisors and engineers agreed was both important and solvable. The supervisor and engineers with responsibility for the problem were given the resources to bring together a team with the mix of knowledge needed to generate options for correcting the problem. Front line workers were part of the team and their views weighed heavily in evaluating alternative solutions, since in the end, they would be the ones to both implement and live with them.

The management and union coordinators of the HPWO project, Dana Smith and Gary Cochran, have a planned timetable and gradual strategy for moving the HPWO program forward. They seek to continue to train more workers and supervisors and to encourage additional work units to initiate change efforts. By May, 2001, they hope to have completed the training of all the workers in the pilot strut fabrication work unit and then move on from there. They agree that the best approach is one of gradual, incremental expansion, but see the major constraint as the competition for top management and union leadership time and support. They express some frustration over the number of plant leadership steering committee meetings that have been postponed or cancelled due to competing commitments.

In summary, at the suggestion of corporate and international IAM leaders, the Wichita HPWO program was launched. It got off to a strong start with the highly acclaimed leadership training session at the IAM Placid Harbor, Maryland Education Center. A first pilot program was implemented and also appears to have been successful. The program continues to evoke positive statements of support from top management and labor leaders. But progress has been slow and the momentum may be declining. Neither top management nor union leaders have been able to commit the time needed to hold regular meetings of the joint steering committee called for in the program design. Union and management turnover in the facilitator positions has slowed the process. Union election politics have further slowed the effort. Competing visions for the role of HPWO, Lean, and Activity Based Costing programs as the lead change efforts in Wichita further limit progress. Few rank and file union members or salaried personnel have been exposed to the program yet.

The Wichita  
HPWO program  
...got off to a  
strong start...

**Lessons from a Similar Case: Xerox and UNITE.** If other cases are any indication, the slow evolutionary path laid out in the conventional HPWO model will not materialize and be difficult to

sustain. Consider, for example, the lessons from one of the most highly acclaimed and long lasting joint union-management partnerships in the country: Xerox and the Union of Needtrades, Industrial, and Textile Employees (UNITE). That effort began in 1980 at the urging of Xerox's CEO and proceeded with a similar gradual, incremental quality circle effort governed by a joint union-management structure and supported by a training effort very similar to what is in place in Wichita. But, like the Wichita effort, the incremental process slowed down about two years after it got started as the parties began to encounter layoffs and other conflicting pressures. What moved it forward and sustained it for twenty years was not a smooth gradual planned expansion of quality circles anticipated in its original design. Instead four things happened. First, the parties took advantage of naturally occurring pivotal events to reinforce their commitment to the effort, signaling skeptical rank and file and managers alike that the process was valued and could be used to address the key challenges facing them. One highly visible example was the threat to outsource work. Instead of following the standard contractual process for outsourcing, management and union leaders assigned a trained task force of hourly workers, union representatives, engineers, and middle managers to study the work at risk, recommend changes in work processes and accounting systems, and other organizational practices that might make the work competitive. If the estimated savings matched the estimated savings from outsourcing, the work would stay in house. Use of ad hoc problem solving task forces like this appealed to both operations managers and rank and file workers because they were focused on critical issues and problems, were finite in time, and engaged a vertical cross section of the workforce—hourly and salaried workers in a common problem solving process.

The second thing that worked at Xerox was the integration of the QC and employee involvement process with a top-down total quality management process that first focused on the CEO's top executive team and then cascaded down throughout the ranks of the organization. Bringing the resources and strengths of the top down and the bottom up processes together reinforced and helped to sustain both efforts.

Wichita is well poised to apply the lessons from this experience. It already has in place a number of ad hoc problem solving task forces and teams. We met with several that were functioning well, proud of what they were achieving, and enthusiastic about the use of similar approaches in the future if or when problems suited to this approach surfaced.

Third, the Lean and ABC program initiatives serve as the counterparts to Xerox's total quality effort. Better integrating these efforts and creating one common steering committee with representation from the IAM, SPEEA, and management, identified specific projects that have high payoff potential.

Finally, Boeing and the IAM have another program that can be integrated more fully—its joint training fund and program. Some links to the joint fund already are being pursued—the fund has been used for some training on safety. One of the strengths of this joint program is that it has a steady stream of funds based on payroll hours, and application for use of the funds comes directly from the workforce or units that will benefit from them. Thus it is more demand driven, rather than efforts to supply or convince a group of workers and their managers to initiate a HPWO training program or activity.

### **Summary and Recommendations**

The HPWO effort at Wichita got started with strong support, has demonstrated its ability to contribute in a specific work area, but has been slow to evolve largely because of the multiple demands on top management time and lack of a bottom up demand for the program. In addition, HPWO must compete for scarce management and union leadership time with the lean manufacturing and activity based costing projects, both of which appear to also be moving slowly. All are at risk of atrophying unless actions are taken to build a broader base of support for them and to focus them on specific problems. This shift is not only consistent with the pragmatic, engineering culture at Wichita; it is also consistent with what has worked for other successful labor and management joint change efforts.

Figure 1  
The IAM Principles for High Performance Work Organization  
Partnerships

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**A Full Partnership Between the IAM and Management...** The union and the employer draft a Partnership Agreement, which is signed by those individuals with the highest level of responsibility within the firm and the union.

**Shared Decision-Making...** Joint design, joint decision-making, and joint implementation of new work systems is at the heart of a partnership.

**Development of Continuous Learning and Skill Building....** The IAM strongly believes that we must engage in life-long learning, both on the job and in the classroom, to continuously upgrade and expand skills.

**Continuous Integration of Leading Edge Technology...** As the partnership develops, the workers need to be actively involved in all aspects of technology integration.

**A Co-Determined Definition of Quality...** Labor and management must jointly define the meaning of quality, the customers' expectations, and develop a strategy to meet or exceed those expectations.

**Shared Technical and Financial Information...** If the partners are going to engage in shared decision-making, then they must have the information to make good decisions.

**Ongoing Joint Determination of the Cost...** Traditional cost accounting methods lump costs together and give us flawed information with which to make critical decisions about our workplaces. We need to have an activity based costing system that takes the costs of all of the activities—both direct and indirect—that go into producing a product or service.

**A Labor Union...** Management must accept and understand the union as the independent source of power for the workers.

**Dedicated Individuals...** Both labor and management assume leadership roles in the partnership. This requires dedication to the partnership process, without compromising the independence of the partners.

**A Jointly Developed Strategic Business Plan...**The IAM strongly believes the partners must jointly develop a plan for the future of the business, that examines current products and services, develops new products and services, and sets forth the goals and direction the partners will take to achieve future growth.

Source: Field Manual: High Performance Work Organization Partnerships. International Association of Machinists and Aerospace Workers, January 1999, pp. 7-1-7-4.  
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Figure 2

### **The Lean Production Initiative\***

Wichita's lean production initiative began in 1994 when Dan Becker, Director of Operations asked for options for how to make use of just in time and manufacturing resource planning processes in Wichita. He had just come from Boeing Canada where he had implemented both of these processes successfully. A group was formed to benchmark how other organizations such as Hewlett Packard, Motorola, and NUMMI use these concepts and how they relate to other efforts such as employee involvement, activity based costing, among others.

In late 1994 a concept paper was prepared based on these visits but higher priorities sidetracked it, particularly the effort to re-engineer the facility's information systems. In late 1994 we got the go-ahead for a pilot project. We tried to convince our leadership that we had to involve the union early to be effective, but we didn't do this and had problems over who should be involved. Eventually we got around this by agreeing we would work within the current work rules in the contract. This limited us but we knew we had to do it this way.

So the pilot was launched in August 1995. When the HPWO idea came along in 1997, we saw this as an enabler—a way to get people engaged. After the joint training on HPWO at Placid Harbor, we set up a lean training for the same group. We customized the training to be compatible with HPWO—focused on kaizen workshops. We showed how the tools were compatible—could use kaizen tools, stay within work rules, and promote HPWO.

But then there was not more interaction between lean and HPWO. The teams never met again. My hope was that we would have the business unit levels point the way. But these teams never got going. I'm not sure why. Maybe contract negotiations got in the way.

Three years ago I wrote a vision document suggesting that in two years we should have a production system with 80 percent of what most people consider lean. Instead of it happening in two years, it looks like it will take six years. That's still not bad for a company as big as ours.

\*Based on an interview with Don Blake, Executive Program Manager, Just – in-Time/Lean Manufacturing, Wichita Division.

### **Figure 3**

#### **The Activity Based Costing Initiative\***

The Boeing Wichita Activity Based Costing and Management (ABCM) effort started as a movement championed by middle management. This is very important since these are the employees that are in charge of streamlining factory operations based on financial accounting data. Thus, the thrust to explore ABCM applications was born internally to the plan, and was not brought about by external market factors.

The goal of the implementation revolved around cost, i.e., to “offer a strategic view of how to reduce costs by focusing on operations, and helping to develop a manufacturing strategy based on financial data.”

Presently there have been a number of different ABCM implementations in different manufacturing processes. The ABCM implementation team at BCAG developed a framework that will serve as a baseline for all future implementations. The team uses ABCM as a support tool for BCAG’s lean initiatives, while at the same time linking the typical manufacturing floor performance metrics to financial performance metrics such as cost and returns on assets. ABCM enables BCAG to address different issues related to cost such as cost of quality, make versus buy decisions, and optimal asset management. It enhances the lean manufacturing effort by accurately identifying the true ownership cost of a product or process. Although the ABCM effort is only 2 years old, BCAG is striving towards making ABCM and activity analysis the focal point of all cost management. In turn, the BCAG ABCM implementation team hopes to export ABCM techniques to all other operations in the facility, and migrate the facility’s cost accounting system from its present status to a so-called Stage IV, where all standard financial reporting originates from activity analysis data collected from the facility’s operations.

To date, the implementation process has been slow, mostly due to lack of upper management support. To counter this problem, the ABCM implementation team has found that continuously communicating the potential benefits that can be gained from implementing ABCM is critical to building support from upper management, while avoiding the perception from below that ABCM is “just another lean initiative of the week.”

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\*Based on Rocco Paduano, “Employing Activity Based Costing and Management Practices Within the Aerospace Industry: Sustaining the Drive

for Lean.” MIT Lean Aerospace Initiative, LARA Case Study working paper, January, 2001.

## Teaching Notes

*It is people who are at the heart of new work systems – establishing stability and then driving continuous improvement. The Labor Aerospace Research Agenda (LARA) at MIT is committed to furthering our understanding of the human and institutional aspects of these new work systems, especially as they relate to broader issues of employment and vitality in the aerospace industry.*

*These case studies were written by a MIT-based research team and were developed in conjunction with representatives from each of the sites with the help of representatives of the United Auto Workers and the International Association of Machinists.*

*These case studies will be valuable to union leaders, labor educators, college professors and human resource trainers as well as anyone interested in discussing current dilemmas in the aerospace industry around employment. These can be used in a classroom setting, in small discussion groups, or by individuals as thought starters. This case study was prepared as an example of the challenges of instability in the aerospace industry. It was written as a basis for dialogue and learning, not as an illustration of either effective or ineffective actions. There may be many possible answers to these questions. They are designed to foster constructive dialogue and action on these very challenging issues.*

Potential Discussion Questions
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- What do you see as complementary aspects of HPWO and Lean?
- What do you see as the potential points of tension?
- What do you see as complementary aspects of HPWO and Activity Based Cost Accounting (ABC)? What do you see as the potential points of tension?
- What do you see as complementary aspects of Activity Based Cost Accounting (ABC) and Lean? What do you see as the potential points of tension?



- What are options to ensure funding to support front-line continuous improvement efforts? What has worked in your organization? What might help accelerate these efforts in your organization?
- How can we best insulate improvement initiatives from internal politics within labor or management? Or, is it okay for these initiatives to be impacted by internal politics?
- What are the opportunities associated with giving joint training activities a higher profile? What would be the impact on HPWO, Lean and ABC initiatives?

Thomas A. Kochan prepared this case with editorial and design input from the entire LARA team. This case study is an example of the challenges of instability in the aerospace industry and was written as a basis for dialogue and learning – not as an illustration of either effective or ineffective actions.

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