

Boeing Redesign for Workplace Effectiveness

How an earthquake helped instigate a major cultural and physical change for the Boeing 737 manufacturing site in Renton, Washington.



Measures revealed a newfound “connectedness” between employees and the aircraft, earlier and better problem solving, a higher sense of urgency to improve, and a greater satisfaction when planes go out the door.

SITUATION

BOEING: SHAKING THINGS UP.

Earthquakes aren’t generally good for business.

But for Carolyn Corvi, Vice President – General Manager, Airplane Production at Boeing, one earthquake in particular helped instigate a major cultural and physical change for its Boeing 737 manufacturing site in Renton, Washington. This potential tragedy resulted in a dramatic change to the face and working model of Boeing’s 737 operations that included production gains of 50%, a space reduction of 40%, and a cultural shift to on-site teamwork and persistent communication.

The journey began in 2000. The ubiquitous 737 is Boeing's most successful aircraft and commands 40% of the world's commercial jet sales.

Despite - or perhaps because of - its market leadership, Boeing was facing fierce competition amidst the added effects of the 9/11 terrorist attacks on air travel and the race to incorporate lean manufacturing into its processes.

More efficient manufacturing processes and new ways of working were essential for future success. Corvi was searching for a way to break away from the traditional, regimented Boeing culture that kept engineers and office workers separated from the mechanics and manufacturing employees who build the planes. The question was how to implement a major culture change and revolutionize the aircraft production process.

Surprisingly, help came in the form of Mother Nature. A 6.8 magnitude earthquake hit Renton and almost flattened the building housing 1,400 Boeing 737 engineers. Corvi seized the opportunity to make an economic case for not just relocating employees but to initiate a whole new way of working within her organization.

"There was always a huge gap between the people who design the product and those who build it on the factory floor," recalls Corvi. The plant was a "no-go zone" for some engineers proud of their hard-earned white-collar stature.

"Everyone's got to be focused on the airplane," she says, "and you can't be focused on the airplane if you're in an office a quarter of a mile away."

So she decided to move the engineers into vacant warehouse space in the 737 plant on the shore of Lake Washington, an idea dubbed "Move to the Lake."

Corvi pledged to Boeing executives that the new model would meet specific productivity and efficiency targets. "But the real point," she says, "was to get people working together in a different way."

For help, Boeing engaged the Steelcase consulting team, including its Seattle area furniture dealer, BarclayDean, and the architectural design firm of NBBJ, experts in merging manufacturing and office environments.

ASK, OBSERVE, EXPERIENCE

The "Move to the Lake" began at a three-day kick-off workshop. Steelcase assembled a team of 35 Boeing executives, managers and engineers. The group was equipped with still cameras and video recorders, and they fanned out into their office areas. They set out to record things they were forced to "workaround," furniture that didn't support their needs, patterns of work and problems with heat, cold and lighting.

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"As part of the process, we take hundreds of photos and video clips," says Steelcase Consultant R.T. Yates, "and sort them into patterns to understand what all this data is telling us."

It's all part of an exclusive Steelcase "workplace effectiveness" methodology that taps into the knowledge and creativity of the people who actually use the workplace. Described as "ask, observe and experience," the Steelcase process asks questions through its proprietary Workplace Surveys. The process also includes interviews, observations through first-hand anthropological techniques, and gives people the experience of thinking through the physical requirements of their workplace and modeling their ideal spaces.

Those who attended the workshop credit it with much of the later success of the project. "It would have taken on a whole different character if they hadn't pulled us into the process as they did," says Pat Manelly, the factory superintendent and liaison between engineers and mechanics at the time of the move.

To test the ideas generated from the workshop, Boeing moved a 35-person engineering team into an open-air mezzanine in the plant for 90 days.

Many of the engineers didn't look forward to working in the factory, according to Kendall Krieg, a manager in the group. But they liked the new style of work. Working closely with the shop-floor mechanics allowed them to solve problems as soon as they arose and made for a better product.

"The biggest change was that it gave people an opportunity to know they didn't need to do things the same way anymore," says Krieg. "We began mapping processes better because everyone began thinking about how their work flowed to and from others. It broke down the barriers."

By the end of the pilot, the engineers didn't want to leave their space. Lynda Carlson, engineering leader for the "Move to the Lake," says the pilot project marked a turning point. "There was a 180-degree difference in attitude from the beginning of the pilot to the end," she says.

SOLUTION

THE "MOVE TO THE LAKE."

Through the summer and fall of 2004, the "Move to the Lake" brought 2500 employees – including engineers and the eight-member executive team – into the newly completed workspace, closer to the products and people they support.

Led by design principal Anne Cunningham and project manager Lori Walker, the NBBJ design team created the final space design based on a lean manufacturing process. It incorporated a "parts-to-whole" theme, which represented the manufacturing process of taking many individual parts at the beginning of the production line, assembling them and testing the finished aircraft before it emerges at the end of the plant. This theme was reinforced with everything from artwork that featured various airplane parts to the pervasive visual connection to the production line through a special lighting system that signaled problem areas, as well as the product's progression through various manufacturing stages.

Today, Boeing veterans hardly recognize the 60-year-old plant – birthplace of the first commercial jetliner, the 707. More mind-boggling still is the new Boeing culture that has taken root inside.

Engineers now work in mezzanine-level, open-plan spaces alongside a transparent polycarbonate wall that stretches the length of the vast plant. Through it, engineers view the entire panorama of the massive, moving production line. The visual connection between people and planes is stunning and persistent – and the impact is dramatic.



A wide boardwalk – formerly a staging area for aircraft parts – extends outside the offices and opens to the factory environment. It’s a frequent meeting point for discussions among executives, engineers, mechanics and others, and adds to the distinctly democratic feel of a workplace where the line between office and plant, blue collar and white collar, is blurring.

On the production floor – where it now takes 11 days, not 22, to make a 737 – is the revolution.

And employees move freely in and out of the new common areas – communal “knowledge cafes” with projectors and screens, mini-libraries and soft seating. In the employee services center, mechanics and engineers alike visit their credit union, use Internet connections, drop off dry cleaning or get photo film developed. At the north end, above the catered cafeteria, employees and executives eat before a glass-fronted vista of Lake Washington.

But on the production floor – where it now takes 11 days, not 22, to make a 737 – is the revolution. Light streams in through windows carved into the 10-city-block facility, a highly controversial move – distracting and dangerous, said the naysayers – which eventually came to define the liberation of corporate culture. Engineers who once never set foot inside the factory now see what’s happening. After all, it’s right before their eyes.

Where a problem encountered by a mechanic once took days or weeks to solve, it's now often solved within the hour. A system of green, yellow and purple lights visually displays the status of production on the line and helps communicate when urgent issues require attention. Engineers come down from the mezzanine to offer help. Huddles form around a bottleneck. There are even cases of engineers anticipating issues and arriving before a problem arises.

"You're working right next to the airplane you helped design," says Manelly. "When you see them move down the line inch by inch towards the back door, you know you've got to move, too."

"Before this project, Boeing didn't see the physical workspace as something they could use to leverage for work performance, culture, behavior or attracting and retaining young college graduates," notes Steelcase Workplace Consultant John Naismith.

"This traditional-thinking company was able to prove to itself that physical space can bring about new behavior and better results."

RESULTS

BREAKING DOWN BARRIERS.

Many changes underlie that 50% productivity bonanza, including the adoption of a lean manufacturing culture. And "Move to the Lake" played a crucial role.

The immediate-term measures revealed a newfound "connectedness" between employees and the aircraft, earlier and better problem solving, a higher sense of urgency to improve, and greater satisfaction when planes go out the door.

The "Move to the Lake" reduced space occupancy by 40% and made engineers partners, side by side, in the production process. "Using space and existing assets more efficiently," notes Naismith, "is significant in helping break down blue-collar and white-collar barriers that previously stood in the way of real collaboration. In that sense, it allowed Boeing to make superior use of intellectual assets, too."

It's a lesson that many manufacturers may consider. "Just-in-time and sub-assembly outsourcing creates a lot of excess manufacturing space," Naismith notes. "It presents an opportunity to evaluate space differently and consider ways to bring organizations closer to the products they make."

"We're at the beginning of a journey," adds engineering leader Carlson. "A lot happens in smaller, more interactive settings."

Planned medium and long-term measures – such as engineering responsiveness to shop floor issues, employee satisfaction, and individual and team productivity – will go even further in getting a firm grasp of what the "Move to the Lake" really accomplished.

CREATING VELOCITY.

With the "Move to the Lake" completed, Boeing now focuses on sustaining and building on its success. Corvi calls this next phase "Living at the Lake." "It's the process," she says, "of establishing the norms and behaviors to make sure the gains don't slip."

Part of those criteria is for people and space to remain flexible. Teams and people need to move wherever necessary, and look for opportunities to improve communications, quality and productivity.

“We’ve got to keep changing,” Corvi says. “We said going in that this was going to be the great experiment. It has been hard and it’s been a lot of change for a lot of people. But I know that no one would go back to the way it was.”

Boeing leadership, through Carolyn Corvi and her team, recognized the opportunity to make the “Move to the Lake” a milestone in using their physical space to enhance their productivity and effectiveness in building new generations of aircraft.

“It started out as an idea about a facilities change,” Corvi recalls. “It quickly turned into an opportunity for all of our people to work together to continuously improve and trust one another to get the work done. We have places to concentrate and public spaces for people to come together and collaborate.

“This is really about engagement,” Corvi says. “It’s about the power of creating velocity in the ways we’re working together.”

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