



January 27, 2014

## **Best in State: Gold award Originality/innovation**

### **FSi**

**Project:** Robotic painting facility for 777 aircraft wings

**Client:** The Boeing Co.

In 2012, The Boeing Co. was producing 84,777 airplanes each year at its Everett plant. To keep up with increasing demand, the company announced a 20 percent production rate increase, to 100 per year.

Boeing identified the wing-painting process as one of the areas that would require improvements to meet the new rates. At that time, hand-operated spray guns could paint only vertical surfaces, so each 125 foot-long 777 wing needed to be placed, partially painted, then moved to a second spray booth and repositioned to paint the remaining surfaces. The process took 4.5 hours for each wing.

Meeting the new rates meant designing a new kind of facility to paint the wings, and Boeing decided to explore robotics. While robots are used to paint cars and other vehicles, they had not been used for aircraft painting on this scale, making Boeing's new robotic wing-painting facility the first of its kind.

Using robots, the new wing-painting facility at Boeing's Everett plant is able to paint a wing in just 24 minutes, reducing the time spent by over 90 percent. The robots in the new facility apply multiple coatings precisely and evenly for a 60 percent improvement in quality over a manual paint job.

Because the robots can be programmed to apply the exact amount of paint required by specification, they use 50-60 pounds less paint per wing set, reducing waste and emissions, and contributing to improved fuel economy for the finished airplane.

The new facility includes two painting cells (for right and left wings), two robotic painting



Photo courtesy of FSi [\[enlarge\]](#)

**Boeing's new robotic wing-painting facility is the first of its kind. After it was built, painting time for a 125-foot-long wing fell from 4.5 hours to 24 minutes.**

machines, and the infrastructure to add two additional robots. A 50-by-150-foot retractable rolling roof opens to allow a crane to place a wing in the cell.

The roof closes over the cell during painting, creating an environment that can be controlled for particulates, odor, temperature and airflow. A robot hangar between the two cells provides space for servicing and maintaining the robots.

With this and other automation improvements, Boeing has increased its production rates for 777 aircraft at its Everett plant from seven planes per month in 2012 to 8.3 planes per month in 2013. Using the lean production model, Boeing has been able to reassign paint workers to other duties, including programming and running the robots.

### **Other Stories:**

- [National finalist: Platinum award](#)
- [Best in State: Gold award](#)  
Owner/client needs
- [Best in State: Gold award](#)  
Future value to engineering profession
- [Best in State: Gold award](#)  
Complexity
- [National finalist: Gold award](#)  
Structural systems
- [National finalist: Gold award](#)  
Environmental
- [National finalist: Gold award](#)  
Energy
- [National finalist: Gold award](#)  
Structural systems
- [National finalist: Gold award](#)  
Special projects
- [Best in State: Gold award](#)  
Social/economic sustainability