



State-of-the-Art Solutions in Long Beach

The considerable C-17 Globemaster III cargo plane required an equally significant manufacturing facility, and again, The Austin Company delivered.

That was the situation McDonnell Douglas found itself in during the mid-1980s when it was awarded the contract from the U.S. Air Force to begin building the C-17 Globemaster III cargo plane at its aircraft manufacturing complex in Long Beach, California.

But McDonnell Douglas knew where to turn to get the job done, and it called The Austin Company, as it had been doing for more than 60 years, whenever it

needed quality design, engineering and construction services, and it needed them fast.

The facility that was needed to build the C-17 was going to be no small shop. The C-17 is a wide-bellied 175-foot-long transport plane with a wingspan of 165 feet and a tail height of 55 feet. The behemoth is designed to carry a maximum payload of nearly 171,000 pounds. It can airdrop as many as 102 paratroopers and all their equipment, and its rear doors can accommodate battle tanks, armored trucks and trailers, and other palletized cargo.

When Austin tackled the job, it was tasked with building a 1.1-million-square-foot high-bay assembly manufacturing building, with extensive overhead crane systems; a 600,000-square-foot subassemblies plant and warehouse; a main utilities plant; a wire-harness assembly facility; and multiple aircraft aprons.

The foot-print of the entire facility covered 25 acres of Douglas's Long Beach complex.

In addition, the state-of-the-art facility involved adding 700,000 square feet to an existing 600,000-square-foot building that had previously been used to build DC-10 jetliners. The creative design team at Austin wrapped the new space around the existing space in a U-shaped configuration.

When all was said and done, the plant would be able to handle simultaneous final assembly of 10 C-17s at one time, in only one-third of its overall area.

But Austin's involvement with the C-17 facility didn't end when the manufacturing plant was finished ahead of schedule and under budget. In addition, Austin tackled multiple other projects at the Long Beach

Giant of the Sky

To the non-engineer, it's a complete mystery how the C-17 ever gets off the ground.

But the Globemaster III has been essential to the U.S. military not just because of its impressive size, or the mammoth loads it can carry, but because it can perform in ways much smaller aircraft cannot.

The massive four-engine jet, manned by three crew members, tips the scales at about 585,000 pounds, including its maximum payload of more than 80 tons of troops, supplies and vehicles. But what makes it all the more remarkable, and versatile, is its ability to take off and land on runways as short as 3,500 feet and only 90 feet wide, and on unpaved, unimproved runways, as well. It can also turn around easily using a three-point star turn, and it can back up.

Its payload capacity and versatility have not only made the C-17 invaluable in war, but it has also become a mainstay of humanitarian aid missions all over the world during times of famine, flood, earthquake or other natural disasters.

The open hangar where the U.S. Air Force's C-17 is manufactured.



facility, partnering over the years with McDonnell Douglas Corp., and eventually The Boeing Company.

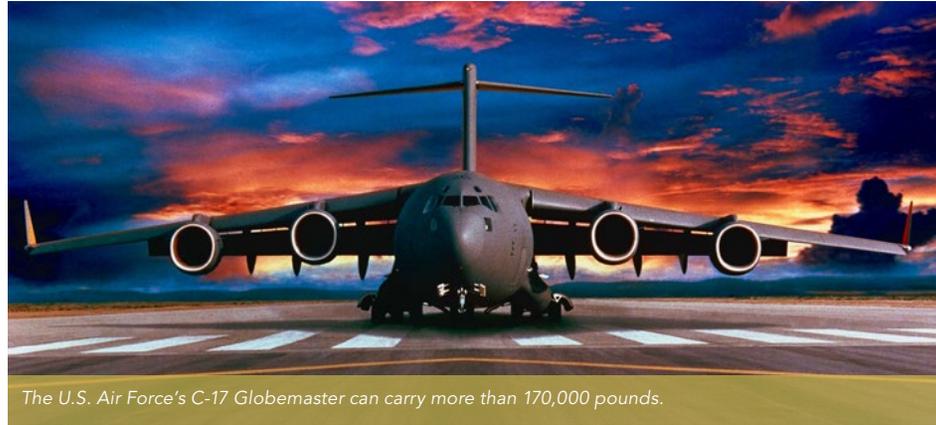
Austin performed master planning, design, engineering and construction services on other new, expanded and renovated assembly, subassembly and support facilities, such as offices and central plant operations; as well as extensive site work.

Building 52 was one such project overseen by Austin. Originally a manufacturing parts storage and assembly area, the building was redesigned to house engineering and administrative support offices for the C-17 program. In addition to interior renovations that included an employee fitness center, Austin also constructed an attractive and inviting exterior employee plaza.

Austin Goes with the Flow In Retrofitting Building 58

Austin also did a comprehensive redesign and retrofit of Boeing's Aircraft Paint Building 58, where planes were finished with multiple coats of paint on their way to being flight-ready. The paint facility was a 50,000-square-foot bay within a larger 128,000-square-foot building housing mechanical and support spaces. The paint building project was a \$6.3 million modernization effort.

The retrofitting of a paint facility is complicated. The project included a comprehensive redesign of the supply and



The U.S. Air Force's C-17 Globemaster can carry more than 170,000 pounds.

exhaust air systems, including conversion from wet scrubbers to dry media filtration, and the addition of controls for a "fully automated" operation.

The building originally had been built in 1986 by another firm, which had installed a vertical airflow system. It also utilized a water wash exhaust air filtration system, but after bringing the facility on-line, Boeing experienced operational difficulties, including clouding, poor particle entrainment and high concentrations of solvents in the hangar.

When Boeing called on Austin to fix the problems, the firm tackled the issues by completely redesigning the airflow system to address operation, maintenance and quality problems, and enhancing the facility's ability to better handle a variety of aircraft types and sizes.

In short, Austin converted the hangar to a system that utilized both horizontal and vertical airflow components, with the introduction of a significantly greater quantity of air at the nose of the aircraft,

and additional exhausting at the rear of the aircraft. The new system made for a state-of-the-art ventilation system that was not only more effective, but also safer for the facility's employees.

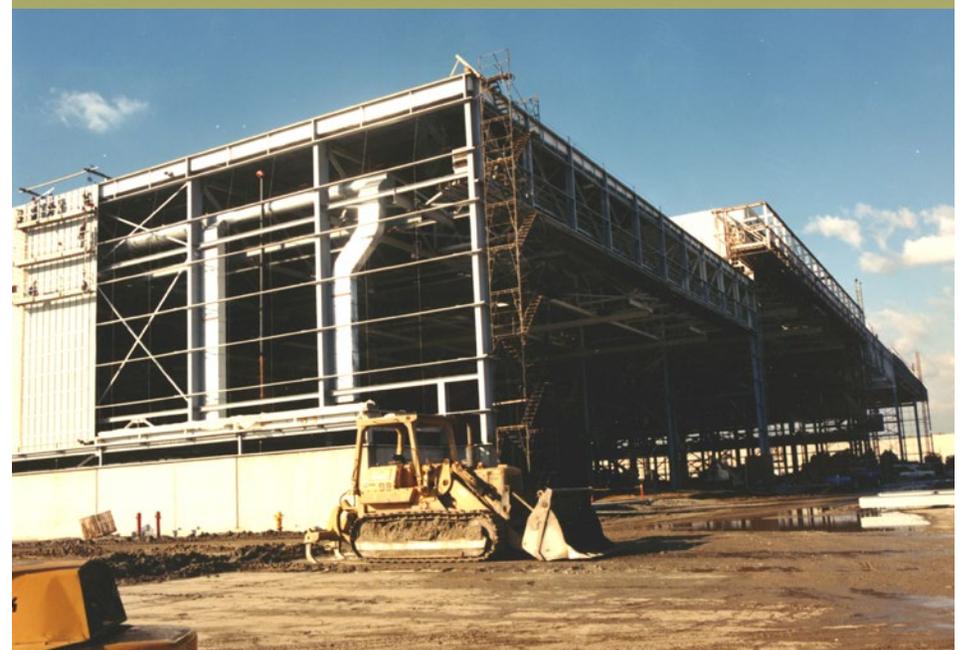
Due to the significant size and weight of the new mechanical systems, extensive structural steel framing also was installed for support, including towers, stacks and trusses that took into consideration not only support, but wind and seismic conditions.

Austin completed the conversion of Building 58 in phases to allow for the ongoing painting of aircraft, so that Boeing could continue to meet delivery schedules.

Closing Out an Era

In November, 2015, Boeing shut down its C-17 assembly facility and closed its entire Long Beach plant, a victim of

The C-17 Globemaster building under construction in Long Beach, CA.

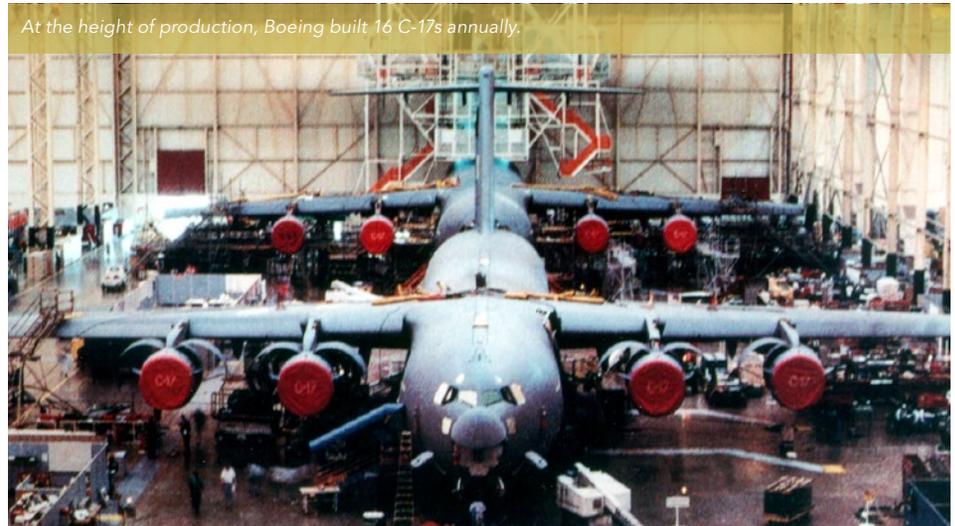


dwindling demand and increasing labor costs. Built in 1942, in response to the beginning of World War II, the plant had become an icon in Southern California, building a strong and bustling middle class, and employing tens of thousands, turning out MD-80 jetliners, Boeing 717s and earlier, during the war, B-17 bombers.

The C-17 also enjoyed a thriving heyday after Austin built its plant in 1988. At peak production, 590 teams were churning out 16 of the \$202.3 million planes a year. Altogether, Boeing sold the Air Force 223 of the C-17s. But when the U.S. government stopped ordering

new C-17s in 2006, Boeing officials looked around for foreign orders to continue its production line, and they found them. Since 2013, when Boeing announced it would close the plant, dozens of C-17s have gone to Qatar, United Arab Emirates, Kuwait, the United Kingdom and India, among others.

All in all, Austin's work at the Long Beach site totaled more than \$200 million, and lasted until Nov. 29, 2015, when the last dark gray C-17, bound for the Qatar Air Force, roared down the runway, circled back over a cheering crowd, and then faded into the sky.



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