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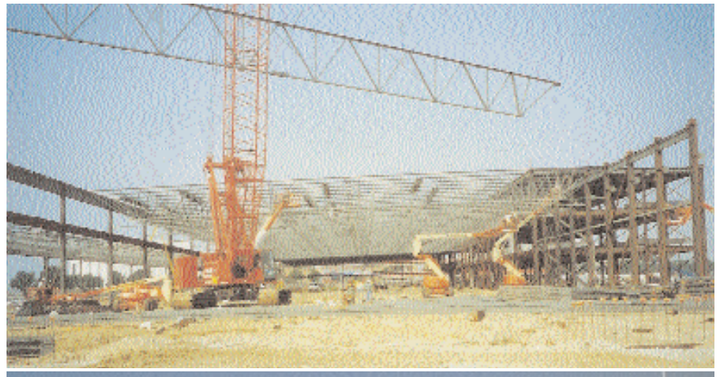
Value Engineering and Steel Erection Scheme

Enhance Design Build

How do you build a 563,000-sq.-ft., two-building cargo facility at a major international airport in just 13 months? For Airis Holdings LLC, the aviation facility developer of The Airis Cargo Facilities at John F. Kennedy International Airport (JFK) it came down to the right combination of method and material: fast-tracked value-engineering and steel. And using the design-build method of project delivery for this $89 million facility provided the project team with a real advantage in this regard.

According to Mark Fetah, a Senior Vice President with Skanska USA Building Inc., the project's New York-based design-build contractor, "the design-build process allowed us to fast-track the design schedule and simultaneously inject our constructability and value engineering solutions into the project scope." Value engineering of the steel began early on in the design process. It included the redesign of the moment frame so the east and west walls of the TV/ULD (Transfer Vehicle/Unit Load Device) building could be used as buttresses to carry the loads in lieu of moment frames. Using design-build also allowed the project, which is located on a 45-acre site and was designed by William Nicholas Bodouva & Associates of New York, to be fast-tracked. Fast-tracking meant the construction of each building, one on Tract 8 extending 800 feet long and the other on Tract 9A extending 730 feet in length, could be broken down into multiple Tenant Application Packages for Port Authority of NY & NJ review and approval. This allowed the Port Authority to facilitate its review process as the project moved forward on its initially planned 21-month schedule.

"In order to further expedite construction, the enclosure package, which was designed with a metal girt system, was analyzed," Fetah noted. "Instead of erecting the metal girts and then the cladding in separate operations, we selected a system that incorporated the girts into the panels as a single prefabricated assembly, [thereby speeding] erection of the buildings. This [enabled] us to enclose and dry-in the building four weeks faster than our original project duration."



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Revised Erection Scheme The value engineering process also resulted in a revised steel erection scheme. Instead of using one long column, the columns were broken into three pieces. This allowed the steel to be erected one floor at a time, an advantage that permitted rigging in place that floor's roller deck storage equipment and then continuing with erection of the steel around the equipment.

Coordinating the roller decks for the movement of equipment was indeed a challenge, according to Dominick D'Antonio, a Senior Project Engineer with Helmark Steel Inc., the project's Wilmington, DE-based steel fabricator and erector. "Coordination was based on the exact sequencing and scheduling of equipment deliveries so the deliveries could be dovetailed with the steel erection," he explained. "This sequencing also stabilized the structure at the end of each workday.

In order to create the large open spaces needed to rack cargo and to have space for an automatic loading and racking system, 150-foot-long spans and 70-foot-high bays were incorporated into the design of the buildings and became the prime design feature of each facility. Airis President Ron Factor adds, "This clearspan requirement is essential for modern air carriers who are moving freight through some of the most expensive real estate in the nation. The more cargo flow transits efficiently through the facility, i.e., without having to maneuver around columns and other support structure, the faster and safer the products get from the truck to the aircraft or vice-versa, which is where carriers really make their money." These long-span trusses are nine-feet deep and were assembled by splicing two 75-foot long pieces together on site, prior to erection. Erection required a specific procedure in accordance with requirements established by OSHA and the Steel Joist Institute. Essentially, Skanska designed the structure to accommodate the highly specialized air cargo handling and state of the art TV/ULD systems designed and manufactured by Lodige.

The trusses were set in tandem with all of the bridging installed for erection of the joists. The average weight for each joist was approximately 12,000-lbs. The two buildings used a combined total of 2,400 tons of A-572 Grade 50 steel.

According to Mr. Fetah, all of the steel was erected using two Manitowic M77 Series 2 crawler cranes. Two cranes were used during erection so each pick had redundancy. The cranes assisted each other in maneuvering each truss into position. Use of two cranes also provided added safety because of the high-wind situation at JFK.

Difficult Logistics Site logistics posed a unique challenge to the project team. The project was constructed adjacent to an existing taxiway and an operational air cargo building. Building 8 was located at one end of the site and 9A was at the other. A taxiway servicing Korean Airline's air cargo facility went right between the buildings on the construction site and it was necessary to keep the taxiway active.

In addition to fabricating and erecting the steel and metal panel exterior, the project scope also included major bulk excavation and contouring of the new grade in order to prepare for the installation of the new facilities' truck docks, parking lots, aircraft taxiways and aircraft ramps. Building 8, which will be used by Lufthansa Cargo and Alliance Airlines, consists of 206,000 square feet of cargo space, 3,000 square feet of ground service equipment space and 53,000 square feet of office space. It features 56 truck docks and four aircraft positions that can accommodate four Boeing 747 aircraft. Building 9A, which will be used by Alliance and Swissport Cargo Services, has 138,000 square feet of cargo space, 34,000 square feet of office space, 45 truck docks and two aircraft positions.

The project, including extensive underground utility work, construction of an aircraft taxiway and apron, aircraft directional lighting and ramp lighting, was completed in mid-July 2003, a mere 13 months from commencing steel erection in June 2002 and seven months ahead of schedule. ■

AIRIS CARGO FACILITY

Design-Build Contractor	**Skanska USA Building, Inc., NYC**
Architect	**William Nicholas Bodouva & Associates, NYC**
Structural Engineer	**Haines Gipson & Associates, Lawrenceville, GA**
Fabricator	**Helmark Steel Inc., Wilmington, DE**
Erector	**Glasmar Steel Erectors Inc., Rockville Centre, NY**