



CASE HISTORIES IN AVIATION HANGARS





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In a world of increased terrorism and long airport delays, corporate or charter jet service adds new meaning to traveling “first class.” Companies that provide this service are building bigger and better facilities for the planes and their customers.

Keystone Aviation Services (above) is the fixed base operator (FBO) at their airport. They also offer charter jet service, and recently turned to their Butler Builder® for larger, column-free hangars to house their growing operations.

A SUPERSIZED HANGAR IN CONNECTICUT

Keystone Aviation Services Inc. is the fixed-base operator (FBO) for Connecticut’s Waterbury-Oxford Airport, one of the busiest airports serving corporate and private aircraft near New York City. Part of a national network of FBOs, it provides fueling, vehicle rentals, gourmet catering, hotel accommodations and many other

services for its 25 corporate clients and other local and transient customers who stop there.

In 2001, Keystone completed an enormous 500- by 125-foot hangar at the airport capable of housing 25 corporate-sized jets. These include the 13 planes managed by its sister corporation—Key Air Incorporated—an aircraft management and

“Pacesetter had the best proposal—and based on their performance, we haven’t looked elsewhere since”

BRIAN O’NEIL

executive charter company that is also based at the airport. The new hangar has a two-story addition across the back that houses the two companies’ headquarters and maintenance shop, as well as lounges for passengers and pilots. The addition also includes enough space for aircraft owners who rent space in the hangar to have their own offices and maintenance shops.

This showcase facility has proved so successful that Keystone is planning to build another one very much like it.

Founded in 1985, Keystone Aviation Services has built almost every building at the Waterbury-Oxford airport. And for 16 of those 17 years, Keystone has used only one contractor—Pacesetter Construction Corporation, a Butler Builder® in nearby Branford.

“I came on board when we were putting plans together for our second hangar. Pacesetter had the best proposal—and based on their performance, we haven’t looked elsewhere since,” says Brian O’Neil, president of Keystone.

Before starting the first supersized hangar, Keystone and Pacesetter had completed seven other hangar buildings and a new control tower, entirely filling the west side of the airport. When they began planning the giant hangar for the east side, they found that because of land restrictions

and FAA regulations, it could be no higher than 32 feet. This height restriction and Keystone’s desire to have a column-free interior prompted Pacesetter to add another partner to the equation—Butler Heavy Structures (BHS). BHS is an

operating unit of Butler Manufacturing™ specializing in the engineering and custom fabrication of complex, heavy-duty facilities. Terry McCale, the BHS project manager, worked closely with Brian Buckhoff, Pacesetter’s project manager, to ensure the job proceeded smoothly and on schedule.

The structure was engineered with a reverse-frame design to achieve the 500-foot clearspan, sloping the building from the front to the back. To support the building’s three 130- by 28-foot sliding hangar doors, a 500-foot -wide, 6-foot-deep super-girder spans the entire front width of the building, supported by columns between each of the doors. The trusses supporting the roof run 125 feet from front to back.

The monster components had to be shipped to the site in sections, bolted together, and erected carefully in sequence so that everything remained stable during construction.

McCale traveled to the site to work with Pacesetter on the erection process. “Setting the

KEYSTONE AVIATION SERVICES HANGAR

Butler Builder®: Pacesetter Construction Corporation, Branford, Connecticut
Structural Design: Butler Heavy Structures, Kansas City, Missouri
Size: Hangar: 62,500 square feet
Attached office: 24,000 square feet
Butler® Systems:
Shadowwall™ wall system
MR-24® standing seam roof system
VSR™ architectural standing seam roof system (office)



The giant building’s 500-foot clearspan took custom engineering and a reverse-frame design.

FIRST CLASS FACILITIES

“It went so smoothly, and they were so well organized, it didn’t seem that much more difficult than building the smaller hangars”

ALAN DEPETERS



To support the building’s three 130- by 28-foot sliding doors (photos below), a 500-foot-wide, 6-foot-deep girder (above) spans the entire front width of the building. The building’s construction had to be carefully sequenced as sections of its mammoth components were bolted together and lifted into place.

500-foot girder was the biggest challenge,” he says. “As much work as possible was done on the ground before lifting the steel. When you build bigger crane lifts, erection costs are cut.”

Alan DePeters, president of Key Air and vice president and partner in Keystone, watched the daily progress with admiration. “They did a great job,” he recalls. “It went so smoothly, and they were so well organized, it didn’t seem that much more difficult than building the smaller hangars. They just used bigger cranes.”

DePeters, who is a pilot himself, appreciates the flexibility of the building’s open interior. The facility houses Falcons, Hawkers and Gulfstreams—including two large Gulfstream Vs, a Gulfstream IV—and a Global Express. “It’s much easier to move aircraft of that size around

when you don’t have to worry about negotiating columns or interior walls,” he says.

The hangar’s sliding doors also are an important convenience for service personnel. One or two doors can be opened at the same time, with the panels sliding either way to allow easy access across the front of the building. When a door is opened, the zoned heating system shuts off in the open areas, conserving energy.

Like Keystone’s other Butler® hangars, the new building and its “twin,” which Pacesetter and BHS will build on the airport’s south side, include built-to-last features like the MR-24® standing seam roof system.

“We’ve never had problems with any of them,” DePeters says. “What’s important about a good hangar is the overall quality and integrity of the building. There’s such a significant chunk of money sitting under that roof. Four of the planes in the big hangar are in the \$40 million price range.”

O’Neil adds that Keystone’s good-looking, easy-to-maintain buildings are one of its most important assets. “We get compliments all the time on the great condition of our facilities,” he says. “The state even gave us an award for that.”

“We don’t need to do much advertising. If someone’s looking for hangar space, we just get them to the airport and let our buildings speak for themselves.” ■



“We needed this building five years before we got it—it’s made such a difference in productivity”

PAUL MIDDLEBROOK

A NEW FBO FACILITY IN NEW YORK

Seneca Flight Operations, a division of the Seneca Foods Corporation, was created as the corporate flight department for its parent organization in 1956. It is also the Fixed Base Operator and manager for the Penn Yan/Yates County Airport in the Finger Lakes country of western New York state. The company offers aircraft management, executive air charter service and FAA-approved maintenance* and repair service to industries in the surrounding region.

“Most of the aircraft we manage are not owned by companies based here,” says Paul Middlebrook, president of Seneca Flight Operations. “But we are centrally located in this region—easily able to serve cities such as Buffalo, Rochester, Syracuse, Ithaca and Elmira.”

The company now operates from a bright

** repair station # FFORO661*

new 27,520-square-foot hangar built by a Butler Builder® out of Gorham, New York. It manages seven jets and a twin-engine propeller aircraft: two Falcons, five Citations and a Baron. The

new facility was an urgent response to the growing aircraft management activity in the company’s service area even before the events of September 11.

Seneca Flight Operations formerly was crowded into two interconnected facilities totaling 14,000 square feet, which it still retains at the airport. “These

buildings lacked the public amenities we needed, and the smaller one was too small for the larger aircraft,” Middlebrook says.

During a recent expansion at the airport, Seneca Flight Operations decided that it wanted to be up and running in a new building as soon

SENECA FLIGHT OPERATIONS

Size: 27,500 square feet, including 5,120 office/public space

Butler® Systems:
Widespan™ structural framing system
MR-24® standing seam roof system
Shadowwall™ wall system



The new hangar’s Widespan™ structural framing system provided ample, column-free space for the larger aircraft.

FIRST CLASS FACILITIES

as the new infrastructure was in place. The company acquired the land, and began planning.

“We knew roughly what we wanted,” says Middlebrook. “We drew up specifications and went public.” The Butler Builder had the winning proposal for the design/build project. The builder was already well-known to Middlebrook and to his parent company.

Seneca Foods Corporation is in the vegetable processing business, and the builder had done quite a bit of work for them in the region, including a 312,000-square-foot warehouse. “The Butler Builder also built a number of hangars in our area, and I was familiar with the quality of their buildings,” Middlebrook says.

He and the builder quickly got down to work. “We had numerous meetings during the design process—not only with the builder, but with some of their subcontractors,” Middlebrook recalls.

In the hangar, Seneca Flight wanted space for larger planes, doors that could open in either direction, and an all-white interior. For its duties as an FBO and air charter service, the company needed an addition to provide public space for passengers and transient pilots, an operations area with offices and a pilot area, and workspace for its maintenance department.

“We value-engineered the project to give Seneca Flight the most for their money,” says the builder. This involved using a Widespan™ structural framing system for an unobstructed interior, and consulting the engineers at Butler’s Annville plant. The extra-wide track for the stacking doors required a uniquely designed endwall truss and extra framing.

The building also has a long-lasting MR-24® standing seam roof system and a Shadowwall™ wall system, with 6 inches of insulation in both. To conserve energy, the hangar portion is heated with radiant gas heat.

Because Seneca Flight needed the new facility as quickly as possible, the builder worked closely with Yates County’s Industrial Development Agency. “We were almost ready with the hangar before they had power to the building, but it was operational by the time the building was complete,” Bragg says.

The project was completed in just five



months—on time, on budget and to Seneca Flight’s satisfaction. Middlebrook says everyone is proud of the clean, bright hangar, which has made the pilots’ and mechanics’ jobs much easier. “We needed this building five years before we got it. It’s made such a difference in productivity.”

The new building also helped the company increase business. While the private charter business peaked right after the terrorist attacks, there has been a continuing interest since then.

“People want to know who they are sitting beside. We’re also getting more inquiries because of the added delays on the commercial airlines,” Middlebrook says.

Although the new facility has been doing an admirable job answering the needs of Seneca Flight’s clients, Middlebrook admits he’s already thinking about adding more space. If he has another opportunity to build, he knows where he’ll turn for help.

In a business that focuses upon saving time, Middlebrook appreciates the Butler Builder’s efficiency. “If there was a delay on the job, it was waiting for the concrete to cure so they could apply the special white floor paint,” he says. “The builder was very good to work with. They did an excellent job, and this new hangar has been a godsend.” ■

Butler® engineers designed the hangar so its five doors can slide to either side. The 5,120-square-foot addition at the side includes a public area, an operations area, a pilot area, and workspace for the maintenance department.

Protecting the Fleet



Continental Airlines' new maintenance facility in Houston, Texas



Morris Communications' corporate hangar in Augusta, Georgia



Atlantic Coast Airlines maintenance building at Washington-Dulles International Airport

Whether it was to provide shelter during federally mandated maintenance or a weathertight home for a corporate fleet, these hangars were needed as quickly as possible to help protect their owners' considerable investments in new aircraft. Each project offered a unique solution to a specific problem.



From ground level inside (above), the scale of the wide-body hangar is deceptive.

FROM PLANNING TO PLANE MAINTENANCE IN 13 MONTHS

Continental Airlines faced an absolute deadline for its new five-building line maintenance facility in Houston

As part of an ongoing program which includes enlarging its hubs and updating its fleet, Continental Airlines recently completed an impressive new facility for routine line maintenance at George Bush International Airport in Houston, Texas.

The complex includes five new buildings, totaling more than 200,000 square feet: a wide-body hangar, a narrow body hangar, a parts warehouse, a two-story shop/office building, and a pump house. The project was designed by Burns and McDonnell and Butler Heavy Structures (BHS), both of Kansas City, Missouri. D.E. Harvey Builders of Houston was the general contractor, and Schwob & Sage Building Corporation, a Butler Builder® in Dallas, supplied the building materials and handled the erection.

The absolute turnover deadline for the new facility was October 1, 1998. Continental would receive delivery of its first Boeing 777—a key step in the airline’s plans to provide non-stop service to Tokyo from the continental U.S.—on October 2.

“This presented quite a challenge,” recalls

Jeff Cruzen, Continental’s senior manager for corporate real estate and their project manager for the job. “At the time we hired Butler Heavy Structures and Burns and McDonnell, we had 13 months to get the buildings open. All we had in front of us was paper, a pen, and everyone’s willingness to go forward!”

Cruzen had worked with Butler on other projects, and was confident BHS could deliver. “They were able to lay the project out for the engineers very quickly, and tell us the fastest track we could take to get the buildings designed and up,” he says.

By the time the contractors began, there were only eight months left, and D.E. Harvey and Schwob & Sage faced a substantial penalty for each day past the deadline. Work started throughout the site simultaneously, with the buildings scheduled to be completed and turned over to Continental in phases.

The timing of steel fabrication and delivery was crucial. “Schwob & Sage did a great job of coordinating all that, and Butler gave them great

PROTECTING THE FLEET

“When you put a 6-foot man next to a 20-foot-deep truss, you can see you’ve got a lot of steel”

KELLY HALL



support,” says Kelly Hall, D.E. Harvey’s project manager.

The steel for the two-story shop and offices, which required extensive finishing, shipped in early March, with the wide-body hangar arriving in April and the narrow-body hangar and warehouse in May.

The most challenging buildings were the two hangars. Due to extremely poor soil conditions, huge 50-foot piers—some as large as 3 feet in diameter—had to be drilled into the earth to bear the weight of the steel. To reduce the number of necessary pilings, BHS designed the hangars with braced, rather than rigid, frames.

The hangars’ roof trusses were shipped in pieces, and put together on the ground. Once the huge trusses were assembled, two 220-ton cranes set each one atop braced wall columns.

The wide-body hangar was the first, and most difficult, to erect. It took close collaboration between the general contractor and the erector. “We had to do some things differently than we would ordinarily, to get them done on time,” says Kelly Hall. “For instance, after the foundation was in, we put a very sturdy crushed concrete sub-base down for Schwob & Sage to come in and erect the steel. The slab was poured after the erection.”

The cranes’ first lift consisted of two 237-foot trusses fastened together with bracing and purlins, and weighed 70,000 pounds. The subsequent single-truss lifts were 35,000 pounds each. To ensure that everything went smoothly, Schwob & Sage brought in experienced hoisting specialists, Peterson Beckner Industries from



During construction (photos above and at left) the massive components of the huge building dwarfed the men working on it.

This is the complex’s enormous wide-body hangar, seen from the back.



The three main buildings as seen from the air are: (1) the warehouse, (2) the narrow-body hangar, and (3) the wide-body hangar.



CONTINENTAL AIRLINES LINE MAINTENANCE FACILITY

Butler Builder®: Schwob & Sage Building Corporation, Dallas, Texas
Program Manager: Phelps Program Management, Greeley, Colorado
Architectural Engineers: Burns & McDonnell, Kansas City, Missouri
Structural Design: Butler Heavy Structures, Kansas City, Missouri
General Contractor: D.E. Harvey Builders, Houston, Texas
Size: Wide-body hangar: 66,400 square feet
Narrow-body hangar: 27,300 square feet
Office and shop building: 27,400 square feet (including both floors)
Pump house: 4,284 square feet
Warehouse: originally 76,835 square feet; with 16,600-square-foot addition
Butler® Systems:
Butlerib® II wall system: all buildings
MR-24® standing seam roof system (all buildings except office/shop)

“They were able to lay the project out for the engineers very quickly, and tell us the fastest track we could take to get the buildings designed and up”

JEFF CRUZEN



Houston, to assist with this part of the work.

Each massive truss was 20 feet deep. “You couldn’t really appreciate the size of them until you saw them on the ground,” says Hall. “When you put a 6-foot man next to a 20-foot-deep truss, you can see you’ve got a lot of steel.”

The hangars’ unusual eave heights (86 feet for the wide-body and 65 feet for the narrow-body) required special erection techniques. Schwob & Sage put its crews on electric “sky climber” scaffolding (the kind used by window washers) to attach the buildings’ Butlerib® II wall panels.

To make things even more challenging, there was little room to maneuver. The site included an existing Continental hangar that had to stay in full operation during construction. “We had to fit that into the complex, and build the new buildings around it,” Cruzen says. “It was tight.”

Nonetheless, the erector and general contractor were able, through constant coordination, to finish the five buildings on time. “Schwob & Sage did a fantastic job,” says Hall.

The project won awards for both companies. D.E. Harvey was chosen by the Associated Builders and Contractors (ABC) for an ABC National Excellence in Construction Merit Award for metal building construction in the \$2- to \$99-million category. Schwob & Sage won the Texas Building Systems Association award for Building of the Year.

The facility has been a big success for Continental, too. In fact, just one month before the original work was completed, Continental had D.E. Harvey and Schwob & Sage build an addition to the parts warehouse, expanding it to 93,435 square feet.

Like Kelly Hall, Jeff Cruzen appreciates the skill the erector brought to the project. “We’ve been very impressed with John Schwob’s knowledge and commitment to this project,” says Cruzen. “Back when it looked like a huge hurdle, he just jumped in as a team member with Butler Heavy Structures and said, ‘Here’s how we’re going to get it accomplished’ – and they did! Our aircraft maintenance group is very happy with the complex.” ■

The maintenance complex’s parts warehouse (above) holds a complete spectrum of replacement gear for Continental’s fleet—from mechanical parts to cabin furnishings such as overhead reading lights and seats. The pump house (below) contains fire-retarding foam for use in an emergency.





ENGINEERED FOR PROTECTION

Headquartered in Augusta, Georgia, Morris Communications is one of the largest mid-sized media companies in the U.S. It needed to keep its corporate planes and passengers out of the weather.

At first glance, it seems to defy gravity. The new hangar built by Morris Communications Corporation (MCC) at Bush Field in Augusta, Georgia, looks poised to tip forward at any moment.

A huge canopy, representing more than a third of the roof area, runs the full 150-foot width of the hangar and projects 65 feet beyond its doors. It appears to be unsupported, but nothing could be further from the truth. “The side walls are essentially giant truss systems,” says David Darby of Kuhlke Construction, the contractor that built the hangar.

Kuhlke, a Butler Builder® in Augusta, was among a group of local firms invited by MCC’s corporate architect, Robert Kuhar, AIA, to submit a design/build proposal for the project.

True to the maxim “form follows function,” the canopy specified in Kuhar’s preliminary program plan answered a request from Morris Communications’ CEO: the overhang for the 18,300-square-foot hangar had to be large enough to taxi corporate planes beneath it, allowing passengers to embark or disembark under cover.

“Once we understood the owner’s requirements, we turned to Butler,” says Darby. Butler Heavy Structures (BHS), an operating unit of Butler Manufacturing that specialized in the engineering

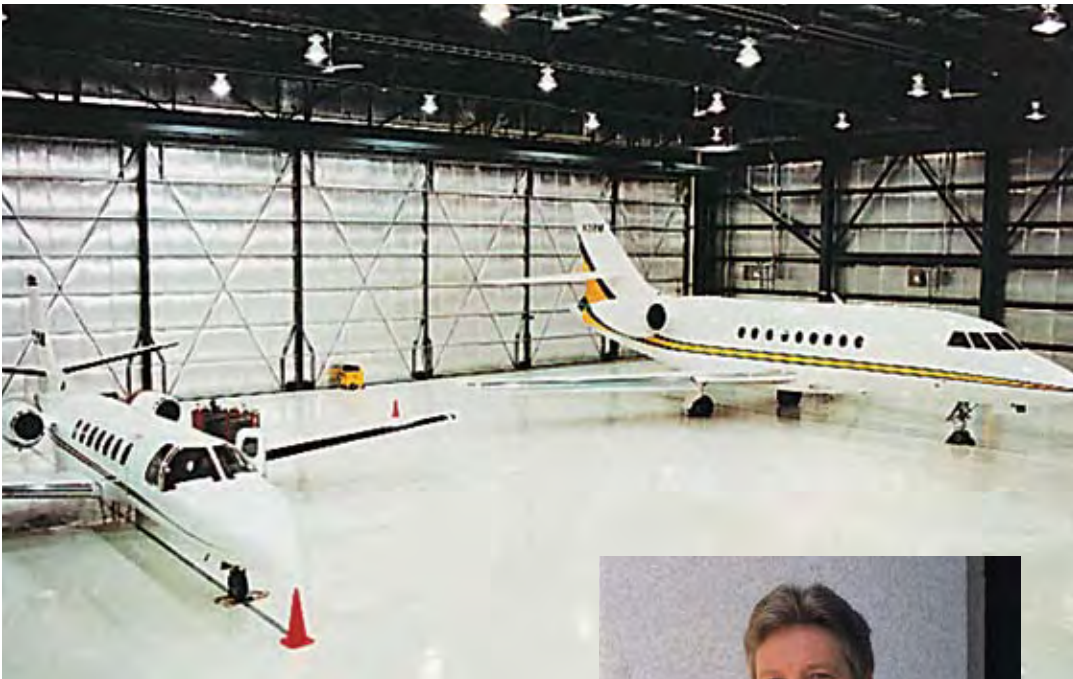
and custom fabrication of complicated, heavy duty structures, quickly assembled an expert team to meet with Kuhar and Kuhlke’s designers.

There was little time to spare. MCC’s existing hangar lacked the tail height for newer, longer-ranged jets, and the company already had one of these aircraft—a Falcon—on order.

After exploring several alternatives, BHS assisted Kuhlke to develop the winning proposal. As well as using the hangar’s sidewalls as a massive truss system to support 10-foot deep cantilevered canopy trusses, the design called for bracing the building with structural steel framing members running front to back and side to side. This braced frame solution, plus the use of the sidewall framing as a truss system, would greatly reduce wind loads on the foundation, and therefore cut foundation costs significantly.

“It was the solution we felt most comfortable with,” says Kuhar. “We knew the cantilever would drive up the project’s cost, but we needed to control that cost as much as possible. The Butler engineers were able to reduce the number of foundation pilings that were required.”

The trusses for the hangar were shipped in pieces, assembled on the ground, and lifted into position in component sections. It was essential



Robert Kuhar, MCC's corporate architect (left), also wanted the interior of the hangar to be attractive, well lighted and energy-efficient.

to choreograph the canopy erection carefully, and Kuhlke enlisted the expertise of a local steel erector. BHS also sent a field representative to the site to assist with the sequencing.

The huge canopy also presented some challenges in detailing. It is fitted with four 8-inch interior drainpipes to prevent a drip line at the edge and lighten the water load during a rainfall. And it also had to be carefully closed off with paneling inside the hangar to keep out nesting birds.

Designed to be a pleasant and energy-efficient workspace, the hangar itself is well-insulated, has a translucent wall panel system across the back to let in natural light, and has a beautifully finished floor.

An adjacent, two-story conventional building connects to the hangar and was erected simultaneously by Kuhlke.

It has offices, a locker room, showers, flight room and kitchen for the company pilots, plus a lounge and private work areas on the ground floor with conferencing and data capabilities for the corporate passengers.

Kuhar sums up the completed, first-class facility in a single word, "great!"

Morris Communications' CEO, William S. Morris III, is pleased as well. The hangar's protective overhead has proven quite popular with personnel traveling to and from the corporation's far-flung locations.

"It's nice to always be protected from the weather," Kuhar says. ■

Morris Communications Corporate Hangar

Butler Builder®: Kuhlke Construction & Associates, Inc. Augusta, Georgia
 Architect: Robert Kuhar, AIA, Morris Communications Corporation, Augusta, Georgia
 Structural Design: Butler Heavy Structures, Kansas City, Missouri
 Size: 18,300 square feet
 Butler® Systems:
 Butlerib® II wall system
 MR-24® standing seam roof system



BUILDING FOR MAXIMUM EFFICIENCY

Atlantic Coast Airlines, which operates as United Express in the Eastern United States, needed to centralize maintenance for its expanding fleet

When Atlantic coast Airlines (ACA) recently completed its new maintenance facility at Washington-Dulles International Airport, it centralized its maintenance operations at its major hub—an important step in its ongoing growth.

“We had a maintenance operation in Lynchburg, Virginia, which is several hundred miles away from our headquarters here at Dulles,” says ACA spokesman Rick Delisi. “It just wasn’t convenient in terms of operation or efficiency. Moving it to our hub airport put it just five minutes away.”

Depending on the type of work being done and the type of aircraft, the 64,000-square-foot hangar can hold six planes at a time, and its maintenance crew includes 150 mechanics. A 25,000-square-foot wrap-around support building provides space for parts storage and shop areas as well as 50 offices—which include the quarters for ACA’s purchasing department.

Butler Heavy Structures (BHS), a division of BlueScope Construction, designed and fabricated the structural components for the hangar, and a Butler Builder® in Clear Spring, Maryland, supplied and erected the hangar.

At the start of the project, more than one pre-engineered building manufacturer was asked to provide preliminary ideas on how to achieve the most efficient design for the hangar.

The general contractor had the Butler Builder—as the supplier of the building and an experienced specialist in large pre-engineered building erec-

tion—make a choice about the building manufacturer and they chose BHS.

The builder felt Butler Heavy Structures was better suited because of the massive size of the building. They knew they had the engineering capabilities to build something of that kind.

The BHS design gave Atlantic Coast’s mechanics maximum flexibility, and also reduced the costs of the foundations. BHS presented a reverse-framing solution that created a completely column-free interior.

A single column-placed in the front wall of the building at the center of the 360-foot-wide door opening-supports a 16-foot-deep supertruss that spans the 400-foot width of the hangar. This bears the weight of its two giant sets of 180-foot-wide sliding hangar doors. The primary building frames are a group of 9-foot-deep trusses that “T” into, rather than run horizontal to, the supertruss and are supported at the back of the building by columns.

The resulting, fully braced building also allowed the elimination of tie rods in the foundation across the 400-foot width of the building.

Because the design was atypical for a pre-engineered building, it called for inventive erection techniques. The builder had to come up with a way to brace and tie the steel so it wouldn’t fall down during erection. They also had to have the right equipment there to set it up. They used four telescoping man-lifts, two 20-ton cranes, and two

“The growth and development of our fleet has been the major driver in the growth and success of our company, and the new maintenance facility has played a major part in that”

RICK DELISI



The hangar’s primary building frames “T” into the 16-foot-deep supertruss that spans the 400-foot front of the building (large photo, left). Holding the supertruss in place during construction were 15 cable braces with 18-ton concrete anchors.

60-ton cranes.

The roof trusses and the supertruss arrived in sections and had to be assembled on the ground, rigged, and hoisted into place. The greatest challenge was not just erecting the huge front truss, but holding it in position afterwards while the rest of the framing was fastened to it.

The builder used about 15 cable braces on a 45-degree angle to guy it off. These were anchored to the ground by pouring concrete “dead men”—each consisting of 9 cubic yards of concrete, which weighs around 18 tons.

While the entire project took about five months, the bulk of the erection work was completed

ACA MAINTENANCE HANGAR

Structural Design: Butler Heavy Structures, Kansas City, Missouri
General Contractor: Charles H. Tomplins Company, Washington, D.C.
Size: 64,000 square feet (hangar building)
25,000 square feet (wrap-around support building)
Butler® Systems:
StylWall® II flat wall system
MR-24® standing seam roof system

in 3-1/2 months. The finished hangar is not only functional, but attractive. To comply with design regulations at the airport, its StylWall® II wall panels were finished in a custom color—“Dulles gray”—and it is topped by a white MR-24® standing seam roof system.

Atlantic Coast Airlines is very pleased with the flexibility of the building, and with the efficiency and increased capabilities it has given maintenance operations.

“The growth and development of our fleet has been the major driver in the growth and success of our company, and the new maintenance facility has played a major part in that,” says Delisi. ■

Southwest Airlines Maintenance Hangar

SOUTHWEST AIRLINES MAINTENANCE HANGAR

Butler Builder®
Schwob Building
Company, Ltd.

Size: 80,000 square feet

Butler® Systems
Butlerib® II wall system
MR-24® standing seam
roof system



Butler Heavy Structures, a division of BlueScope Construction, has designed and fabricated airplane hangar facilities for some of the biggest names in the commercial and corporate airline industry. Take, for example, this maintenance hangar for Southwest Airlines located at the Dallas Love Field Airport.

A unique framing system was required to meet the owner's requirement for a two bay opening on the front of the hangar and a one bay opening on the side of the hangar to accommodate three Boeing 737-700 Next

Generation series aircraft.

The framing system consists of a 22' deep parallel chord truss spanning 275' across the front of the hangar and 12'-6" deep parallel chord trusses spanning 158' and spaced at 27' centers span from the front truss to the backwall of the hangar. With maintenance crane runways and a two story office, this hangar covers the gambit.

Schwob Building company, the Butler Builder on the project installed the MR-24® standing seam roof system and Butlerib® II wall system – both by Butler Manufacturing™.



Big Names
in the Air

NETJETS, INC. AIRCRAFT HANGAR

Butler Builder®
Renier Corporation

Size: 124,000
square feet

Butler® Systems
StylWall® II fluted wall
system
MR-24® standing seam
roof system

NetJets, Inc. Aircraft Hangar



Working closely with Butler Builder, Renier Corporation, Butler Heavy Structures designed and supplied the structural framing system and roof trusses for this business jet maintenance base. The trusses taper in depth from 9' 6" at the low side of the building to 11'6" at the high side and bear on 17' deep jack trusses that span each of the 100' hangar door openings.

The centerpiece of this 124,000 sq. ft. facility is a 190' wide clearspan hangar. The front-to-back single slope provides for over

80,000 sq. ft. of column free interior space. Aircraft access the building through two 100' wide hangar doors on the high sidewall. Business travelers can get their work done in the 27,000 sq. ft. two-story office space and relax by browsing through the shops located in the 15,200 square foot single-story building in the rear.

The entire building is covered with the weathertight MR-24® roof system and the StylWall® II fluted wall system.



Big Names
in the Air

General Electric Co. Corporate Hangar

GENERAL
ELECTRIC CO.
CORPORATE
HANGAR

Butler Builder®
Bette & Cring, LLC

Size: 75,000 square feet

Butler® Systems
MR-24® standing seam
roof system



This striking 75,000 sq. ft. corporate hangar facility for General Electric Company is located north of New York City. The design incorporates a dramatic 282' clearspan accomplished with a bow string truss system that bends on a 450' radius. The braced frame structure allowed the use of shallow perimeter columns and eliminated the large horizontal loads at the foundations typically found on traditional rigid frame structures.

The attached three-story office utilizes the MR-24® metal roof system with a 4:12 roof slope to create an equipment screen to hide roof mounted units from view. Both the office and hangar are flooded with natural daylight through the use of translucent wall panels and a curtainwall system. In the evening, these panels provide a sophisticated appearance to the exterior of the hangar.



A Weathertight Haven for Aviators and Aircraft

"I decided we were not going to have any bolted-down panels in our new roof"

GORMAN HANGAR

Butler Builder®
Freeman Building Systems,
Mansfield, Ohio

Size: 9,900 square feet

Butler® Systems
Widespan™ structural
framing system
Butlerib® II wall system
MR-24® standing seam
roof system

Jim and Marge Gorman are passionate about flying. So when Jim's pump manufacturing firm, the Gorman-Rupp Company, purchased a plane that was too large for its hangar, the Gormans decided to give the company their personal hangar in Mansfield, Ohio, and build another for themselves that would give them more opportunities to fly.

Jim explains, "We decided we would make provisions to at least spend the weekends there. So that's what we did. We built an apartment into the hangar."

The Gormans chose Dan Freeman, of Freeman Building Systems, a Butler Builder® in Mansfield, to build the new hangar because Jim was impressed by what he had read about Butler® roof systems in trade publications. He wanted an MR-24® standing seam roof system, with its interlocking, weathertight panels that allow for thermal expansion and contraction. "I was impressed with the design," he says. "I decided we were not going to have bolted-down panels in our new roof."

The Gormans' new hangar is a 9,900-square-foot building that is as comfortable for the Gormans as it is for their planes. Butlerib® II wall panels provide appropriate bracing on the bifold hangar doors, while brick with a

band of masonry-like finish define the exterior. A Widespan™ structural system provides column-free space and flexibility for the various functions of the building.

The Gormans' living space is a 2,000-square-foot extension off one side of the hangar with a living room and an eat-in kitchen. An elegant spiral staircase built by a Maine ship's chandler leads upstairs to a bedroom and bathroom.

The hangar itself spaciously accommodates the Gormans' three planes. One, a Staggerwing biplane, debuted as Beechcraft's first airplane in the 1930s and is one of the last of its kind produced after World War II. Designed as an executive transport airplane, the Staggerwing was the Lear jet of its day. Its neighbor a Beech Bonanza, is Marge's, and she has flown it to Europe and back. The third aircraft, a twin-engine Beech Duke is used as the Gorman-Rupp Company's back-up.

On the opposite side of the hangar, a second extension provides space for Jim Gorman's other hobby-restoring vintage Mustang autos.

The building has proved very satisfactory for the Gormans. But of all its features, Jim is still most pleased with the roof system. "I like Butler's approach to roof design," he says.





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