IN THE AIR

SAVING ENERGY. SAVING MONEY.

ON SITE IN SAUDI ARABIA

How Air Enterprises is providing ventilation solutions for the King Abdulaziz Center for World Culture

+

Efficient execution of mechanical upgrades in an active hospital environment

Taking the rust out of Mercedes-Benz's Alabama plant

Building for the future

With limited resources and tighter operational budgets, businesses are challenged with maximizing each dollar that they spend to assure that they are getting the highest quality with the best long-term value for their facility.

This issue of *In the Air* is dedicated to these clients and their pursuit to obtain the best air handling systems for their facilities. It is Air Enterprises goal not only to provide the highest-quality equipment and service but to partner with our Clients in working to determine the best solutions for their changing HVAC requirements. Over the past five decades, we have seen and learned a great deal. We have accumulated a vast library of experiences and best practices that we can apply and share to offer unique, cost-saving solutions to each Client's air handling challenges.

In this issue, the primary feature describes how Air Enterprises provided a distinctive ventilation solution for a truly unique complex in Saudi Arabia. Though not the original design basis of the HVAC system, Air Enterprises was called upon by the owner a year into construction to improve the initial design and make it more efficient and effective. In addition to materially improving efficiency, Air Enterprises used its unique SiteBilt® process to address the logistical challenges and costs of shipping completed products halfway around the world.

Also with this issue, we have taken the opportunity to highlight other instances of applying the SiteBilt® process to solve different sets of project demands. One case study highlights "Airflow Challenges Within a Constrained Space" at a Buffalo, NY healthcare research center. This brief discusses how limited mechanical space in an iconic older building was optimized in the design to maximize airflow potential of new air handling units. A SiteBilt® solution was utilized to provide a customized multi-level configuration with safe service access to take advantage of the full height of the mechanical space.

Each project brings its own set of challenges. What we have learned over the years through experience and by listening to our customers has helped us develop unique solutions to solve these project and equipment challenges. Air Enterprises' experience and an array of solution possibilities provide clients the opportunity to meet project demands without compromise offering long-life, unit integrity, serviceability and optimized efficiencies. From the very beginning, our DNA has been to provide the highest quality air handling solutions that offer the lowest total cost of ownership. In addition, we have practiced being a good partner and offering superior service to complement the process.

We trust that you will enjoy this issue of *In the Air* and learning more about how unique solutions can be developed by partnering with Air Enterprises; solutions that will help your organization save money and provide for a better future.

Tom Elmore, Air Enterprises

IN THE AIR
SAVING ENERGY. SAVING MONEY.
VOL 2 ▲ 2018

Based in Akron, Ohio, Air Enterprises engineers and manufactures custom air handling solutions to meet the most demanding system configurations and requirements.

With over 50 years of application experience and a focus on energy savings and sustainability, Air Enterprises partners with the client to deliver the most efficient solutions at the lowest total cost.

Air Enterprises has been the leader in proving that the best quality air handling units...deliver the lowest total costs.

Quality that lasts - our equipment is outlasting and out performing everything else in the market.

AIR ENTERPRISES
Quality...not compromises

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PHONE: (330) 794-9770
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We are proud to announce that the Air Enterprises Quality Management System used in the design and manufacturing of Custom Air Handling Units at the Facility in Akron, Ohio has been assessed and approved by Smithers Quality Assessments, Inc. to the quality management system standards and requirements of "ISO 9001:2008 with Design"

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BRIEFS

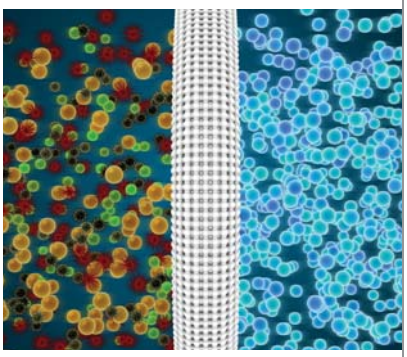
Developing a sustainable purchasing strategy

When purchasing equipment for your businesses, it is important to perform due diligence to determine the right equipment for your needs. While many businesses are searching only for the lowest cost, a more sustainable purchasing strategy takes five areas into account.

- **Cost of installation.** Is the equipment preassembled, or will it be assembled on site? Will you need special equipment to install your purchase, or is it plug and play? Knowing the answers will help you determine the cost of installation.
- **Cost of demolition.** Does previous equipment need to be removed to accommodate the new equipment? Having to demolish and remove older equipment can add to the costs.
- **Operational costs.** What are the costs to operate the new equipment, and how will the building's environment impact those costs? While one option may be more expensive than another choice up front, understanding the costs to operate it can make the more expensive equipment a more attractive option in the long run.
- **Maintenance costs.** What are the costs to keep the equipment up and running? How will the type of material used in the equipment impact maintenance costs?
- **Lifecycle/term of replacement.** How long will the equipment last? A piece of equipment that has to be replaced every 10 years may not be as good of an investment as one that will last for 40 years.

When buying equipment, look beyond the purchase price of the equipment to the bigger picture to determine the best option for your building.

Maintain filters for better performance



Once your air handling unit is installed, it is important to maintain the filters. Overloaded filters can increase energy usage and reduce supply air, while proper filter replacement prevents overloading and improves energy performance. New filter technologies can lead to improved efficiency and durability, and by increasing the filter cross-sectional area, the unit is able to provide more energy-efficient filtration, resulting in cost savings, benefiting the environment and improving indoor air quality.

ROI on energy efficiency

The return on your investment in energy efficiency and renewable energy depends on your buildings performing to design expectations. As a building owner, you can maximize energy savings and minimize frustration by using best practices. Here are some tips from the National Renewable Energy Laboratory.

- Determine which energy uses to measure and how to best measure them to characterize building performance.
- Calculate expected energy and cost savings.
- Compare expected performance with measured performance to diagnose problems and identify additional savings opportunities.

RETHINKING THE BOX

A UNIQUE DESIGN SOLVED THE AIR FLOW CHALLENGES WITHIN A CONSTRAINED MECHANICAL ROOM SPACE

Optimizing an air delivery system for a renovated space can be challenging when the architectural discipline dominates the available building space left for mechanical equipment. This challenge was faced during the renovation of a mechanical room for a major Buffalo, New York healthcare research center. Their architecturally driven nine-story building is a local iconic landmark viewable from many areas of the city.

The building design demanded that all the conditioned air be delivered from the basement. The basement area was constrained, with the total height available in the space at 16-feet. The project involved four units totaling 173,000 CFM. The units included outside air/return air mixing sections with Air Enterprises unique destratification shelf-mixing.

Air Enterprises engineering team and the project consulting engineer collaborated to optimize the unit capacity within the limited space. The only practical way to fit the air handling units in the constrained basement area allocated was to utilize the full height and design the units to be stacked one on top of the other. The result was four air handling units stacked in two sets with the larger units having a smaller unit on top of them. Once in place, there was less than 1-inch between the units and the ceiling structural joists in the basement!

The smaller capacity upper deck AHUs were designed 3-feet narrower than the larger lower deck units to create a full-length service platform. Using the roof of the lower units as a path so that the upper deck AHU could be conveniently and safely serviced. The building facility maintenance staff is extremely appreciative of this thoughtful design feature.

The unique design was accomplished by using Air Enterprises' SiteBilt® air handling solution with units assembled in place in the basement. Factory built units were not a good option since the allowance for larger height support bases and rigging would have required more than 8 to 12-inches in additional height than the 16-foot height limitation noted previously. Unit air capacities desired would not have been achievable.

Along with customer's previous experience, Air Enterprises was selected for their customized design creativity and for their reputation for providing units with the highest efficiencies that are expected to last the life of the building. This dedicated Air Enterprises client has dozens of Air Enterprises air handling units throughout their facilities site that have been in place and providing exceptional operation for well over 30 years.

ON SITE

IN SAUDI ARABIA

HOW AIR ENTERPRISES IS PROVIDING VENTILATION SOLUTIONS FOR THE KING ABDULAZIZ CENTER FOR WORLD CULTURE

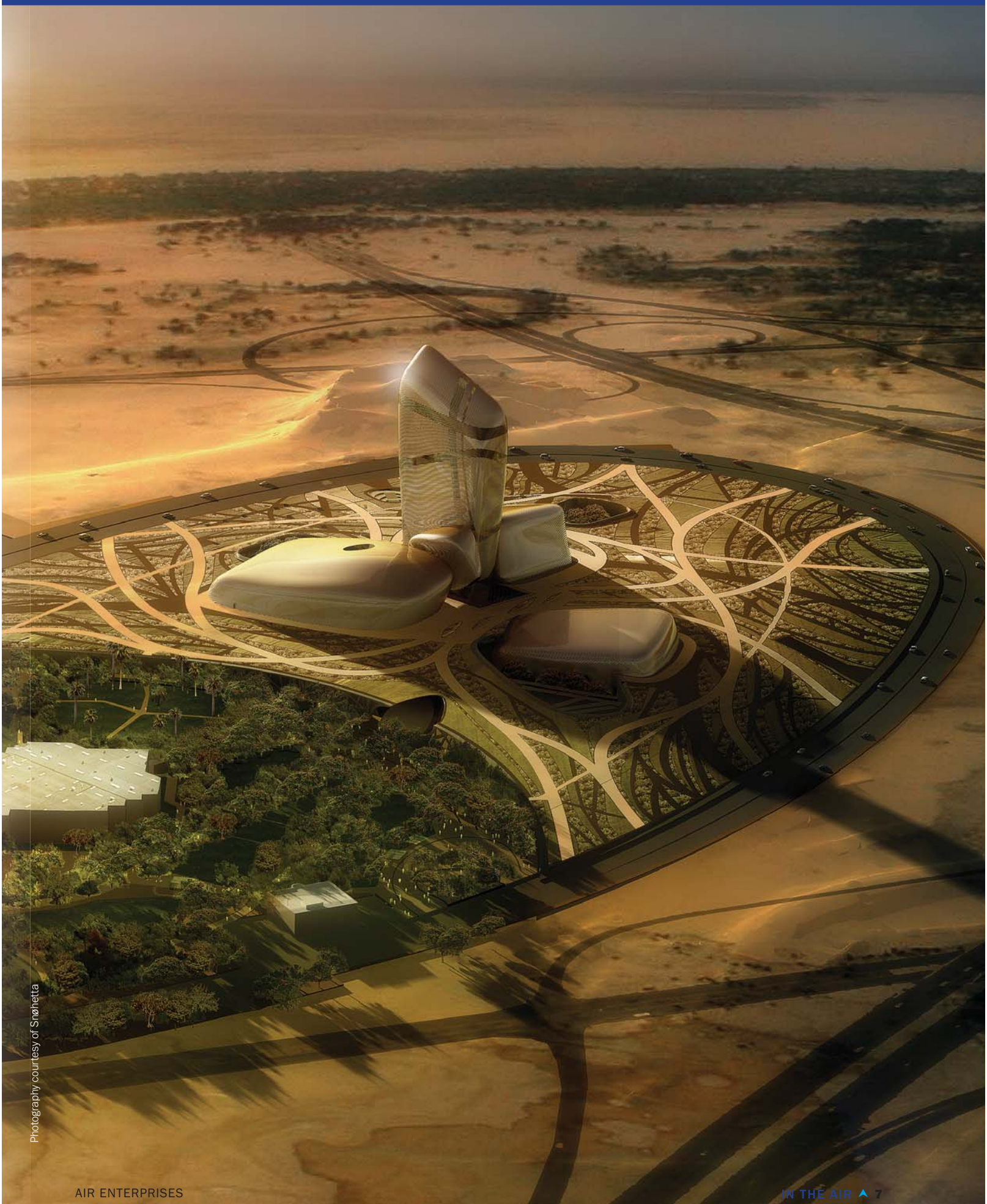
The King Abdulaziz Center for World Culture is designed to take your breath away. Completed in 2015, the sprawling complex in Dhahran, Saudi Arabia, contains a document archive, library, learning center, art and history museum, and performing arts facility, among other features.

The total space covers square footage equal to 10 soccer fields. The 217 miles of stainless steel architectural tubing on the facility, if laid end to end, would nearly cover the distance from Dhahran to the Saudi Arabian capital of Riyadh. And every square foot of the facility needs ventilation — in some cases, starkly different forms of ventilation and air quality controls from section to section.

That was the challenge facing Air Enterprises when it joined the project.

"This is a project that was funded by Saudi Aramco, the national oil company of Saudi Arabia," says Glenn Swartz, Air Enterprises. "They were looking to construct a complex that would both celebrate and contribute to the social and intellectual progress of Saudi Arabia and its people. The fact that it's in Dhahran, very close to the site of the first oil-producing well in the country, is very significant."

When Air Enterprises agreed to work on the project, the company soon discovered that the museum, archive, and library had unique ventilation requirements. The archive and library needed air conditioning and humidity controls conducive to preserving paper, while the museum had different requirements for the artwork and exhibits housed within. But it all had to coexist under one roof.



Photography courtesy of Snøhetta

"We started looking at that in 2011 when Saudi Aramco first came to us and asked about our interest in working on the project — not just in quoting the job, but in developing the final engineering and design prospectus for the HVAC," Swartz said. "We had done other work for Aramco's research facility, and they had been impressed with the results, so they had confidence that we could find solutions for this project, even with its incredible size and scope."

The climate

Maintaining constant, precise air quality is difficult even in a temperate climate with mild conditions, but Dhahran is far from that. Situated on a seam between the Arabian Desert and the marine climate of the Arabian Gulf, Dhahran is subject to both blistering desert heat and wilting humidity. An HVAC system designer is fighting an arduous uphill battle against the elements, even before the first section of ductwork is hoisted into place.

"It's not the dry desert you might expect," Swartz says. "It's both high temperature and high humidity. In that environment, adapting the outside air for the required ventilation needs of the building is a big challenge. It requires a great amount of energy to treat the outside air."

Adding to the complexity of the project, Saudi Aramco aimed to construct a "green" building with limited energy consumption and a high level of sustainability.

"Because it is such a high-profile, iconic facility for their country, there was and is a major push for all forms of efficiency and energy sustainability," Swartz says. "There is an across-the-board effort to reflect the best possible utilization of resources. We had some experience working with Saudi Aramco in that climate, with those types of conditions and expectations, so we were able to engineer some creative solutions."

One of the main energy-saving features Air Enterprises is utilizing is a thermal energy recovery wheel, the Themowheel®, to treat air. In cooling systems, a thermal wheel utilizes rotating honeycomb-shaped air pockets to absorb and dissipate heat from the outside air, cooling it and reducing the humidity before introducing it to the air conditioning system, where it undergoes final cooling and conditioning before entering the building's occupied space.

"The Thermowheel® which is an energy recovery ventilator (ERV), was one piece of technology we could use to help minimize energy consumption in the facility," Swartz says.

A unique situation

Air Enterprises wasn't the original supplier/designer of the center's HVAC system. The company was called upon by Saudi Aramco to improve upon the initial design, to make it more efficient and effective.

That meant that Air Enterprises joined the project a year after construction had started, so the company had to retrofit the design and devise creative ways to install the new components into sections of the center that had already been built.

Swartz says the company utilized its SiteBilt® process to deal with the logistical challenges of shipping products halfway around the world and installing them into an existing structure.

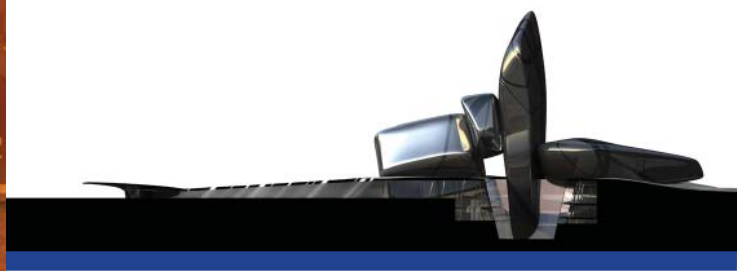
"Air Enterprises manufactured the casing panels, structural base, and other subassemblies, those parts were then crated for shipment to the jobsite," he says.

There were 81 air handlers, which took 75 shipping containers to transport the SiteBilt® units via ocean freight. The units were then assembled at the job site.

In most instances, large components such as air handling units are assembled at the company's Akron, Ohio, plant, as

"ALUMINUM HELPS MAINTAIN THE PERFORMANCE EFFICIENCY OF THE SYSTEM BY HELPING TO PREVENT AIR LEAKAGE AND OUTSIDE CONTAMINANTS FROM ENTERING THE SYSTEM."

– Glen Swartz, Air Enterprises



shipping and installing preassembled components provides the quickest and most efficient means of completing a job. But some jobs aren't well suited for the shipment and installation of ready-made components, and in those cases, SiteBilt® provides an ideal alternative.

"It's an alternative in situations where you might have rigging access limitations, crane issues, and other jobsite challenges," Swartz says. "At the King Abdulaziz Center worksite, they received the materials, assembled the components and did final testing on them without disrupting the completed portion of the building structure."

Air Enterprises supervised the final assembly and installation of the components, although Saudi Aramco's workers performed the actual work, due to their intimate knowledge of the building construction.

Materials and maintenance

In a harsh climate like that of Dhahran, construction materials play a critical role in the life of building components. That's another reason that Saudi Aramco sought out Air Enterprises to complete the HVAC work on the King Abdulaziz Center.

Air Enterprises fabricates its components from aluminum, which doesn't rust and is resistant to other types of corrosion and deterioration. The durability of aluminum makes it an ideal material for use in extreme heat and humidity.

"It's particularly important for the air handling units," Swartz says. "The interior and exterior of the air handlers are directly exposed to the elements, so they have to be extremely durable. That's why we use aluminum. It's durable, it has a low weight compared to steel, and it's going to last the life of the building. They won't have to tear everything out and replace it in 15 years, or incur high annual maintenance."

However, the metal itself doesn't have to corrode in order for problems to develop. If metal plates and joints aren't able to endure shifts in temperature and humidity, they can warp, causing seams to fail and allowing moisture to enter the system and cooled, processed air to escape. The net effect is an inefficient system that has to work exponentially harder to condition the air, and that can potentially damage the interior of the building with leaking moisture, or pose building control issues.

"That's probably the most compelling argument for using aluminum," Swartz says. "It helps maintain the performance efficiency of the system by helping to prevent air leakage and preventing outside contaminants from entering the system. That is what really helps keep utility costs low over the life of the building. In a hot, humid environment like that of Dhahran, that's obviously very important."

Air Enterprises designed the HVAC system with maintenance in mind. Even with aluminum components, the system will need regular upkeep to ensure that it continues to run at its most efficient. That means regularly scheduled maintenance, which, in turn, means building a system that is relatively easy to maintain and control.

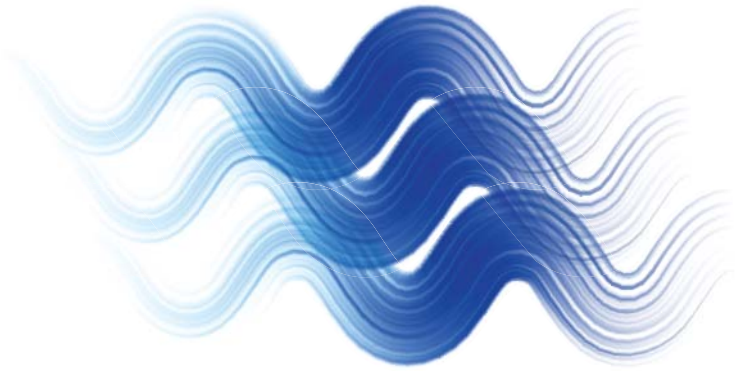
Because the system was, in effect, retrofitted to the building design, the engineers at Air Enterprises faced design challenges.

"Some of our units are configured in an over-under, stacked arrangement," Swartz says. "That required us to build service platforms into the design, so the owner of the building can service the equipment on the stacked, double-deck units. It required us to utilize our collective engineering expertise to design configurations that would allow for relative ease of access, making service as easy as possible for the owner."

Air Enterprises finished shipment of the final materials to Saudi Arabia in September 2013 and began supervision of the on-site construction process in October. With the facility slated for completion in less than two years, the timeframe to complete the assembly of the units was another challenge for Air Enterprises.

"Each job has its own unique challenges, specifications, and requirements, but we've been installing these systems for 50 years," Swartz state. "We've had experience building and installing our equipment in hot and humid environments. We've done work in Saudi Arabia, and we've built and installed units for pharmaceutical companies in Puerto Rico. We've done complicated work like this before, and we know how to get it done, even in extreme climates. We were confident in our ability to meet the project schedule to make sure Saudi Aramco and the people at the King Abdulaziz Center were thrilled with the final product." The project was completed in late 2014, well within the schedule to the great satisfaction of the client.

VISIT AIRENTERPRISES.COM TO LEARN MORE.



Stop the leaks

DESIGNING AHU'S FOR LOW AIR LEAKAGE

Air leakage is an important factor to consider when purchasing an air handling unit (AHU), as it directly impacts the outcome of the final product or process being served. "Within a leaky AHU the integrity of the envelope has been breached allowing contaminants to be delivered into the area being served," says John Milligan, Chief Engineer at Air Enterprises. This can result in potentially higher rates of infection for healthcare clients and higher rates of product defects for manufacturing clients. In addition, a higher utility cost is burdened by the client due to air leakage since energy is being wasted to filter, cool, heat and move air that ultimately does not reach the space being conditioned.

Although most AHU manufacturers now offer less than 0.5% casing leakage, it is important to understand how the AHU manufacturers design to these tolerances. Manufacturing techniques and methods of assembly are critical to maintaining low leakage and unit integrity over the full lifespan of the equipment. Just after a few years of operation, many of these so-called "0.5%" manufactured AHU's are leaking at higher rates which have a direct impact on their operations.

ASHRAE recommends a maximum system (AHU and associated duct) leakage of 5% with a recommended maximum of 1% leakage AHU. To maintain a leakage rate of less than 1% over the life of the unit, Mr. Milligan recommends specifying AHU leakage to be less than 0.5% and to look for manufacturers of units inherently designed and manufactured to control leakage. Critical to achieving low leakage, design considerations must be made for materials of construction, the method of sealing joints and methods of mounting equipment to eliminate penetrations.

The use of extruded aluminum construction offers superior dimensional tolerance control resulting in a tighter finish than can be offered by steel construction. The corrosive-resistant nature of aluminum also limits the increase in casing leakage that can result from rust and corrosion found in steel construction as the unit ages. Rust and corrosion have also been found to harbor contaminants that affect the air quality.

Most air handling units are constructed using a silicone caulking on the exterior of each panel joint. This method of sealing will dry, shrink and crack over time which can lead to casing leakage rates increasing to 5% or more within the first few years of operation. This method of "caulked" construction requires routine inspection and repair of caulked joints to properly maintain the desired low leakage.

A superior alternative method is one that uses butyl sealant applied internally to the panel joints. This type of seal remains flexible over time and does not experience drying, shrinking or cracking. Being internal and not exposed to the elements, this method of sealing maintains its integrity without routine inspections or repairs and will provide for original low leakage for the life of the unit.

It may seem obvious, but each fastener penetration used in the construction of an air handling unit creates a potential air leakage path. Inherent design for low leakage involves eliminating any penetrations into the unit base and/or panel skins. Having a fully welded unit base support structure and utilizing integral support mullion framing members eliminates these penetrations and greatly reduces the unit leakage for the life of the unit.

"Many manufacturers in order to reduce costs do not focus on the details that promote casing integrity. They try to reduce leakage by applying less permanent sealing methods such as silicon tape or caulk" Mr. Milligan says. "Air handling units should be inherently designed with high attention to sealing methods along with the elimination of penetrations. This attention to detail will provide a unit that typically requires less maintenance to provide superior life and energy performance while continuing to deliver contaminant-free air."

QUESTIONS TO ASK PROSPECTIVE AHU MANUFACTURER:

- **How are equipment or accessories attached to the unit?** Avoid manufacturers who penetrate unit floors and/or panel skins to secure equipment, accessories, and safing. These penetrations generate leak points and potential areas to initiate corrosion.
- **What is the detail of door construction?** Doors should be dual-gasket type with provision to fit tight and square in the jambs. Higher quality manufacturers will arrange door swings to take advantage of the unit pressure for better sealing.
- **How are units sealed and what maintenance is required?** Avoid manufacturers who rely on exposed caulked joints. These areas require routine inspection and maintenance of caulked seams to limit increasing leakage as the unit ages.

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Over 45 Air Enterprises Units

Bringing the shine back

HOW AIR ENTERPRISES TOOK RUST OUT OF THE MERCEDES-BENZ U.S. INTERNATIONAL PRODUCTION PLANT

Located just outside Tuscaloosa, the city of Vance, Ala., is subject to the heat and humidity that blankets the South in spring, summer and early fall.

That climate can take a rapid toll on corrosion-prone metal, such as the steel that was used to construct the original rooftop air handling units on the local Mercedes-Benz manufacturing plant, which opened in 1997. Presently the only Mercedes-Benz automotive manufacturing plant in the U.S., the 100-acre facility produces the company's GLE Coupe and GL-Class SUV lines, and soon the successor generation of the current C-Class as its fifth product.

The massive plant's 100-plus rooftop air handling units supply the ventilation and air conditioning systems. But after only a decade of operation, the facility's officials noticed a troubling and rapidly developing problem: The steel on the external portions of the units was already rusting.

Once rust starts to form, the integrity of the units is quickly compromised. Air begins to leak out, moisture begins to leak in, and it's only a matter of time — usually a relatively short amount of time — until the units need to be replaced.

"You shouldn't need to replace those units after just 10 years," says Glenn Swartz, of Air Enterprises. "But it's a hot, humid environment for much of the year, and the air handlers were made of painted steel. They had started to corrode within five to seven years, and after 10 years, it started to get pretty bad."

To address the problem, the plant's leaders decided to install aluminum air handling units from Air Enterprises. Unlike steel, aluminum doesn't rust and is highly resistant to other forms of corrosion.

The process of replacing the 100-plus units began in 2007 and is ongoing. Mercedes-Benz has allotted enough funding to replace a handful of units each year, and thus far, Swartz says Air Enterprises has installed 28 new air handlers at the plant.

BECAUSE ALUMINUM UNITS DON'T RUST, THERE IS MUCH LESS RISK OF CORROSION, LEAKS AND SUBSEQUENT DOWN TIME TO MAKE ADDITIONAL REPAIRS.

"There have also been a couple of expansions at the facility, and we're supplying the air handling units for the expansions, as well," Swartz says. "That will actually add to the overall total of air handlers at the facility once everything is delivered and installed."

The installation process

Air Enterprises custom designed the units with ease of installation in mind. The units are relatively large, and although they can be assembled on site if the job calls for it, the simpler solution from an installation standpoint is to ship the units fully constructed and hoist them into place with a crane.

The units arrive fully assembled, with all controls, electrical and piping already in place, allowing for a relatively quick and simple installation process. Workers hoist the unit into place, attach the necessary utilities to the building and secure it.

Mercedes-Benz U.S. International Production Plant in Vance, Ala.

"With everything in place and ready for installation, it essentially allows the units to be 'plug and play,'" Swartz says. "You crane it up, get it in place, plug the utilities in and it's up and running."

Speed and ease of installation are important factors on the Mercedes-Benz project because the portion of the plant receiving the installation must be shut down while the unit is being installed.

"We try to work within the regularly scheduled plant shutdowns that occur in July and December," Swartz says. "But if we have to work outside that timeframe, we have to ensure that they can get that section of the plant up and running again in a short time frame, without disrupting the manufacturing process."

Investing in the future

By investing in aluminum air handling units, Mercedes-Benz is investing in the future efficiency and safety of its Alabama facility. Because aluminum units don't rust, there is much less risk of corrosion, leaks and subsequent downtime to make additional repairs.

"The design of air handling units in a facility like that isn't unique — it's pretty standard," Swartz says. "But by upgrading the materials, the owners invested in their facility. They decided to invest a bit more money now to purchase equipment that will last much longer than steel units and are treating it like an investment in the plant's future — which it is."

Swartz says corroded air handling units can directly affect the manufacturing process, allowing water and contaminants to leak onto the production floor, creating safety hazards and possibly damaging machinery and products. The future safety and efficiency of the plant is all the more important when you consider the planned expansion to accommodate production of Mercedes' C-Class auto line — the first compact car line it will manufacture in the U.S.

"It's a major expansion, both for the plant and for Mercedes," Swartz says. "It will be the first nontruck, non-SUV vehicle line to be manufactured in the U.S., and we're hoping to be a part of that expansion over the coming years."

FOR MORE INFORMATION, CONTACT AIR ENTERPRISES, (330) 794-9770, AIRENTERPRISES.COM.

BIG RETURNS

EFFICIENT EXECUTION OF MECHANICAL UPGRADES IN AN ACTIVE HOSPITAL ENVIRONMENT

Like many facilities in the United States, maintaining an efficient physical plant with an aging mechanical system is challenging for the owner. The University Hospital at the University of Virginia Health System (UVA) in Charlottesville, VA is no different.

Efforts are underway to upgrade the existing mechanical infrastructure including their air handlers and other HVAC equipment/systems. The HVAC Replacement project represents a phased approach to replacement of air handling units (AHUs) and ancillary HVAC systems nearing the end of their projected lifespans in the main hospital at UVA. The hospital evaluated both AHUs and hydronic systems for criticality, condition, and age. They then developed a program for replacements which are scheduled to be executed in multiple phases.

The project's programmatic goals included enhancing the integration of the work by getting the project team in place early in the process by contracting the construction management, the engineer and the commissioning agent, all at the start of design. The team worked together with key maintenance representatives to develop the program and logistics that allowed for efficient execution of the work in an active hospital environment. This integrative approach has served to establish multiple University protocols for improved construction and operational processes. The project also included the development of a Building Information Management (BIM) execution plan for this work that will serve as a prototype for future UVA projects.

Each phased project is being released in two packages to optimize the overall project. The procurement process will include two key bid packages, AHU equipment purchase and Contractor installation. This method of procurement is more commonly known as Owner Pre-Select. This owner controlled process provides for schedule efficiency and also allows for improved competitive bidding from the installing mechanical contractors.

Through a competitive bid process, UVA chose Air Enterprises and their SiteBilt® method of air handling unit replacement. Air Enterprises method focuses on special field erected project processes and techniques. The second step for UVA was to bid the installation of the SiteBilt® air handlers. The Owner

THE SITEBILT® PROCESS ALLOWS UVA TO MINIMIZE THE DISRUPTION TO THE DAILY OPERATIONS OF THE HOSPITAL

Pre-Select process allows all parties to work together towards a common goal and minimize delays and unnecessary disruptions to the facility. All trade contractors at the time of bidding are able to review the AHU shop drawings, coordinate construction details and confirm milestone dates with the AHU vendor.

The phase II project was conducted in two segments. The first segment consisted of upgrades to the glycol system that provides preheat to the incoming outside air during low ambient conditions and the installation of ductwork on the hospital roof that will enable excess capacity from the new Hospital Expansion AHUs to serve as temporary capacity during the removal and installation of the AHUs in the hospital penthouses. This saved the expense and difficulty of installing a temporary AHU on the roof and provides limited backup capacity in the event of future needs.

The AHU's provided by Air Enterprises are being shipped and delivered to the hospital in parts on pallets, then fully-assembled, tested, and commissioned on-site under the supervision of specialized on-site technicians. The SiteBilt® process allows UVA to minimize the disruption to the daily operations of the hospital since all pieces of the air handler could fit through a standard man-door leading into three penthouse areas.

The SiteBilt® process of replacing air handlers includes coordination meetings and product training with the installing contractor. This process occurs at Air Enterprises' facility in Akron, Ohio prior to the shipment of any equipment to the jobsite. Through these meetings project details such as rigging egress into the building and shipping crate sizes are confirmed. The project field-assembly labor is confirmed and a specific assembly sequence is agreed to by both parties. This coordination and training process assures UVA that all details of the AHU assembly are understood by the installing contractor before any work begins within the hospital.

The installation of each air handler is performed by the contractor, which is directly supervised by Air Enterprises. In addition, Air Enterprises performs site acceptance testing that confirms the performance of the unit and assures UVA of an air and water tight assembly which is a high priority of the hospital. The aluminum structural base and extruded panel construction of the Air Enterprises' product will provide many years of service for the hospital.

Over the past three years, UVA has installed over fourteen SiteBilt® units by Air Enterprises. UVA is currently installing the next six air handlers in their fourth phase of upgrades at the hospital.

FOR MORE INFORMATION, CONTACT AIR ENTERPRISES, (330) 794-9770, AIRENTERPRISES.COM.

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