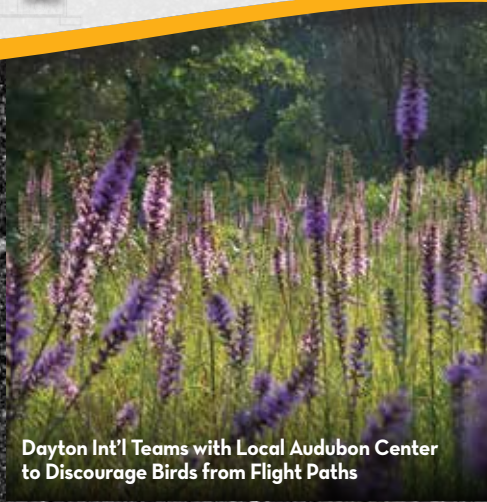


Airport Improvement



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Dayton Int'l Teams with Local Audubon Center to Discourage Birds from Flight Paths



Atlanta Int'l Goes All-In With LED Lighting & New Airfield Markings

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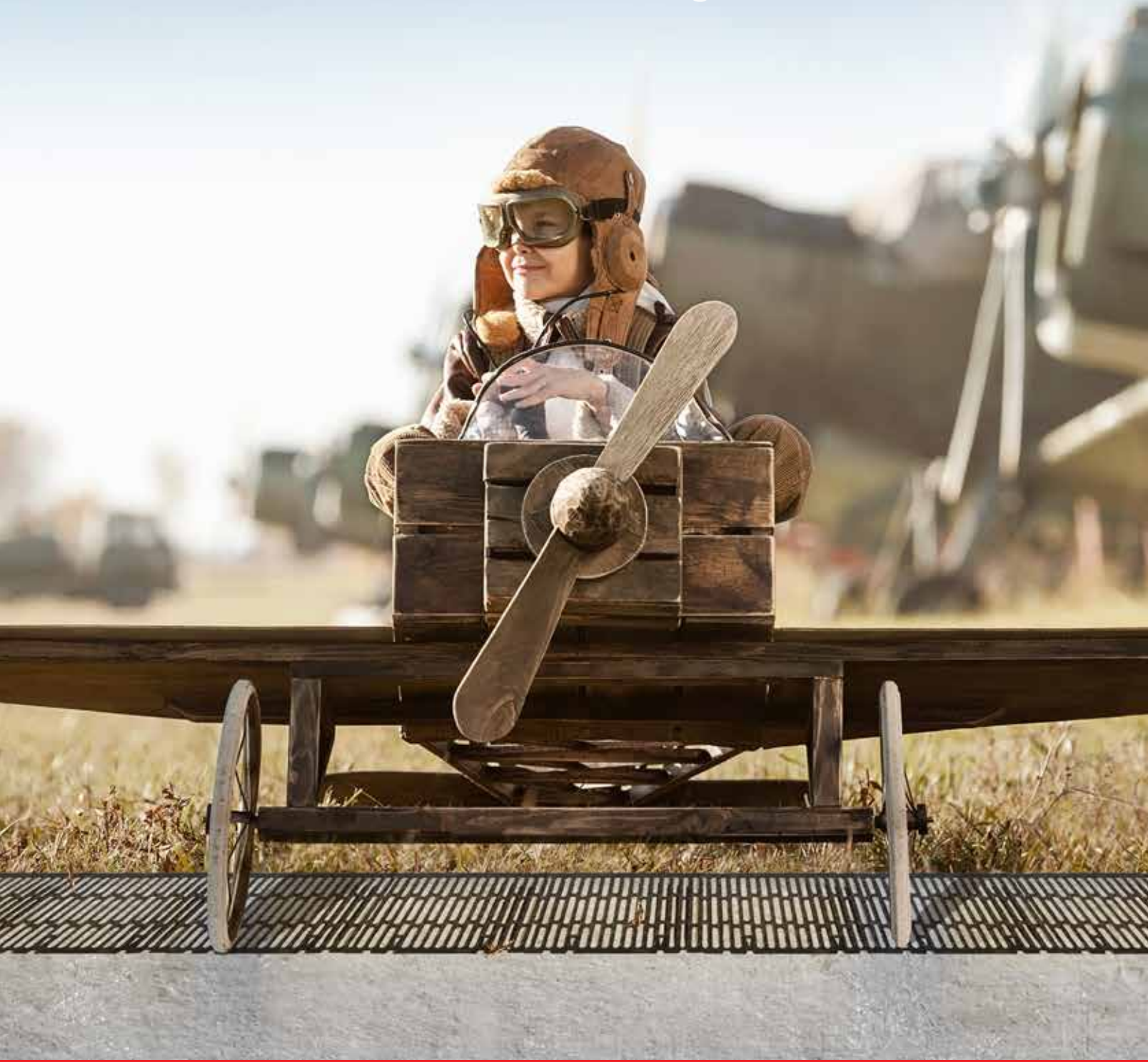


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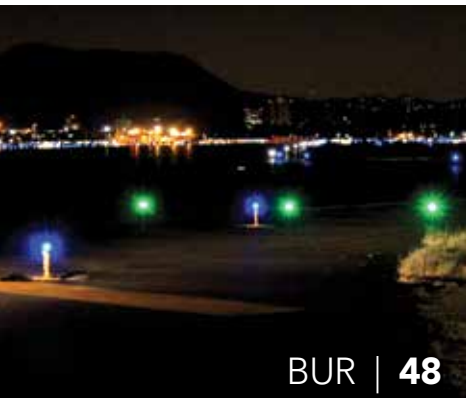
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Who's Your Role Model?

Recently, I read an article about the steps Pfizer has taken to shape its internal culture. It really caught my attention that the pharmaceutical giant explicitly uses the provocative phrase "no jerks" to convey how management expects employees to behave.

Watching this year's presidential race reminded me of that article. It's actually draining to see how much energy is spent tearing people down, building walls and working against one another...in short, acting like jerks. It seems to me that the candidates would benefit from adopting Pfizer's corporate culture. One *might* be tempted to ask: If our country's aspiring leaders behave like a bunch of jerks, is that how the rest of us should conduct business? Fortunately, there are other role models.

I'm convinced that the airport industry is more like Pfizer than our current batch of presidential candidates. After working inside this industry for 25 years, I contend that there are certain attitudes and expectations that create minimum standards for how "airport people" conduct business and

interpersonal relationships. I'm not saying we're close to sainthood, but there is ample evidence that our industry has a special culture. Perhaps it's the common goal of safety and security that's paramount to everything we do. When you're responsible for passengers' wellbeing, sitting idly on the sidelines is not an option. And airports convey this sense of importance to their consultants and suppliers to create some pretty amazing working relationships.

This issue includes several examples of teaming and learning from previous experiences. Look no further than the Burbank lighting article (Page 48) or Lakeland's airfield information technology initiatives, covered on Page 40, for prime examples. It's amazing how these airports checked their egos at the door to help others in the industry.

Thanks for reading this special Runway & Ramp issue.

Paul



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factsfigures

Projects: Relighting & Remarketing Airfield

Location: Hartsfield-Jackson Atlanta Int'l Airport

Scope: 4 of 5 runways, each 9,000-12,500 ft. long

Lighting Project

Approx. Cost: \$16 million

Funded By: Airport

Timeline: May 2014-July 2015

Scope: 13,000 LED lights; 700 airfield guidance signs; 160,000 linear ft. of cable

Electrical Contractor: Brooks Berry Haynie & Assoc.

LED Lighting Fixture Suppliers: ADB Airfield Solutions/Allen Enterprises

Constant Current Regulators & LED Retrofit Kits for Airfield Signage: Aviation Lighting Sales

Photometric Testing: Mobile Airfield Light Monitoring System by Tailor Made Systems Ltd.

Of Note: First airport in the world to light all of its runways & taxiways with LEDs

Markings Project

Approx. Cost: \$18 million

Funded By: Airport

Timeline: March 2014-July 2015

Scope: More than 2 million sq. ft. of new paint & preformed thermoplastic markings applied on runways & taxiways

Prime Contractors: GSC Atlanta; Peek Pavement Markings


Subcontractors: Hi-Lite Airfield Services; Speidel Construction

Preformed Thermoplastics: AirMark, by Ennis-Flint

Surface Prep Equipment: Road Dryer

Atlanta Int'l Goes All-In With LED Lighting & New Airfield Markings

By Robert Nordstrom



Hartsfield-Jackson Atlanta International Airport (ATL) recently completed two massive projects to relight and remark its airfield. Almost all of the work occurred simultaneously, from March 2014 to July 2015. Together, the improvements cost the airport about \$34 million — with no outside funding.



Chris Rogers

The nearly \$16 million lighting project set a new precedent: "This is the first airport in the world to have all of its runways and taxiways lit with LED," notes ATL Aviation Engineer Chris Rogers.

"We take pride in being an industry leader."

During the project, crews replaced all incandescent fixtures on four of the busy airport's five runways, as well as lights on 11 taxiways and 52 taxiway exits. (LED lighting on Runway 8L-26R was part of a separate reconstruction project.) All told, the effort required approximately 13,000 LED fixtures.

Rogers characterizes the task of changing so many lights on an operational airfield the size of ATL's as daunting. "Just finding a manufacturer that could produce and deliver the fixtures and a contractor with the workforce able to complete a project this large were major challenges," he relates.

In retrospect, Rogers attributes the success of the project to great teamwork between the electrical contractor, manufacturers and airport.

The markings project was also labor-intensive. Contractors applied more than 2 million square feet of new paint and preformed thermoplastic markings throughout the airfield at a cost of approximately \$18 million.



Chaim Van Prooyen

Chaim Van Prooyen, ATL's project manager for the initiative, explains that a Part 139 inspection in 2012 inspired the project. "The FAA was very critical of the quality



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and condition of our airfield markings,” recalls Van Prooyen. “Repainting the entire airfield was too much for our internal resources to expedite the work, but we had to get it done; so we pursued and obtained airport funds to contract the work out.”

All LED

Phasing and scheduling were critical to maintaining safety during the lighting changeover, recalls Rogers. Before starting the project, airport management and staff met with FAA personnel and pilots to discuss the best way to schedule work in order to ensure safety. Because of the perception that LEDs emit a more intense illumination than incandescent lights, pilots requested that ATL install runway edge lights before centerline and touchdown zone lights to help establish the runway boundaries. They also asked for work to begin on the landing runways before the departure runways.

“The LED lights are very crisp and clean,” Rogers explains. “As we changed them out, we didn’t want to create a situation where we went from an older, existing incandescent fixture to a new crisp, clean LED light. That presented a challenge in terms of how we sequenced the work.”

ATL hired electrical contractor Brooks Berry Haynie & Associates to manage and perform the lighting changeover under a very tight schedule. Each runway took four or five nights to complete, depending on whether it included touchdown zone lighting.

In turn, each runway shut down at 11:30 p.m. and reopened at 6:30 a.m. On the first night, workers switched over the edge lights. On the second night, they installed the new centerline LEDs. On the third night, touchdown zone lights or high-speed exit lights were replaced, depending on the runway. Schedules for the fourth and fifth nights varied by runway, with personnel performing photometric testing or replacing high-speed exit lights and then performing photometric testing.

Jason Owen, president of the electrical contracting firm, describes scheduling the changeover as a major challenge. “We had our very best people out there and kept the same crew throughout the project,” he recalls. “Airfield lighting is very specialized work. Once you get people trained on it, you want to keep them around.”

At peak production, when crews had to swap out 360 touchdown zone lights in a single night, the company had about 20 people working on the runway. “With a liquidating damage charge of \$500 for every minute the runway opened late, we wanted to make sure we had our ‘A team’ out there,” Owen says.

To facilitate the changeover process, workers spent approximately one week per runway checking every fixture. Broken bolts were replaced so that subsequent crews could swap out fixtures quickly and seamlessly.



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Careful planning and completing preparatory tasks before closures began were key factors for success, notes Owen. "When we started work on the runways, every shelf on every single aisle in our 30,000-square-foot warehouse was filled with lighting fixtures," he relates. "During the day, we had warehouse workers assembling fixtures, matching them with the proper transformer, making the connections and arranging them on a trailer so that workers on the field knew exactly where each fixture was and where it went at each location. Any work we could get done before the clock started ticking, we found a way to get it done."

After the 2,000 high-intensity runway lights were changed, workers began replacing 11,000 taxiway lights and 700 airfield guidance signs. The entire project required approximately 160,000 linear feet of new cable. Several constant current regulators were replaced, and other regulators were re-tapped to a lower kilowatt rating to increase power efficiency and save energy.

"We are realizing a 75% energy savings on the runway LED lights and 55% on the taxiway lighting," reports ATL Project Manager Kenneth Goggins. The savings have been so substantial that the Georgia Power Company awarded the airport rebates.

"We are also looking for significant savings in maintenance costs going forward," adds Goggins.

Like the contractor that installed the new LEDs, the company that manufactured the fixtures was stretched by the scope and timeline of the project.

"This was a very high visibility project for us, with significant liquidated damages if deadlines were not met," reflects Joe Pokoj, president and chief executive officer of ADB Airfield Solutions, Americas. "Once the (runway) shutdown was scheduled, there was no changing it. We had to make sure we delivered all our product to the installing contractor prior to the shutdown, which involved making sure our supply chain could handle an order of this size while maintaining our regular business."



Joe Pokoj

Working together, ATL management, the installation contractor and product suppliers completed the job ahead of the project's original two-year schedule. "I challenged my guys to do the job in 18 months instead of 24 months. To show me up, they did in 13 months," Owen relates.



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Markings Makeover

After the FAA came down hard on ATL for the general quality and condition of its airfield markings, the airport developed a comprehensive plan to remark its entire airfield. The new strategy included a distinct change in materials. In addition to repainting four of five runways, the airport opted to apply preformed thermoplastic markings on associated taxiways. (Markings on Runway 8L-26R were included in a separate project.)



Chris Brooks

Crews replaced almost all painted taxiway markings with a preformed thermoplastic product from Ennis-Flint. Chris Brooks, sales director for the company, recalls that ATL began testing the alternate material shortly after its 2012 markings audit. "Results were favorable and the airport began using AirMark (preformed thermoplastic) on several construction projects in 2013," he relates. "It's now used on approximately 80 taxiways as well as on non-movement areas."

The relative longevity of the two materials was a critical factor in the switch. "Preformed thermoplastic has an anticipated lifespan of 10 to 15 years, which is five to seven times longer than paint," notes ATL's Van Prooyen. "On average, we have to repaint every two years."

The vast majority of taxiway markings were consequently converted to preformed thermoplastic: hold short bars and surface signs, movement boundaries, instrument landing system bars, geographical position markings, etc. Edge lines and centerlines are now the only taxiway markings that are painted at ATL. Although preformed thermoplastic can be used in such applications, the airport found it more cost-effective to continue painting those rigorously worn areas, explains Van Prooyen.

To expedite the markings project, planners divided it into four separate contracts so multiple contractors could overlap working as flight operation schedules permitted. The first contract began in March 2014 and the last concluded in July 2015.

In total, about 1.8 million square feet of paint and 294,000 square feet of preformed thermoplastic markings were applied. Contractors completed approximately 70% of the work at night to minimize operational disruptions, but they worked during the day

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Atlanta Int'l overhauled its airfield visual aids with concurrent lighting and markings projects.

when nighttime temperatures were not conducive for product application — predominantly in early to mid-spring and mid- to late fall.

“The scheduling process was our main challenge during the daytime hours,” recalls Van Pooyen. “When we finalized the contract, we collaborated with airport operations and the FAA to determine which daytime intersection closures would have the least impact on aircraft operations and proceeded in that direction until early April, when we were able to make the switch to nighttime work.”

Planners routinely took into account whether the airport was in east or west operations. “Because some intersections are utilized more than others, we didn’t want to inhibit traffic flow,” he explains.

On average, crews took two to three days to complete each intersection, which necessitated 10- to 12-hour daily closures.

“We tried to give contractors a couple of options, so they would always have somewhere to work,” Van Pooyen remarks. “That was our main challenge during the daytime hours. When we switched to nighttime hours, we were given more leeway to close pavement, allowing contractors to increase productivity. At times, we were limited to closing only one runway at a time, which allowed other projects, such as the LED project, to run simultaneously. We also tried to follow behind other ongoing airfield work projects in order to have less impact on operations.”

Weather was an additional challenge, with considerable amounts of rain pushing back the schedule. The airport had originally hoped to complete the airfield project by June 2015, in time for its next Part 139 inspection, but didn’t finish until July.

With the comprehensive markings and lighting projects completed, Van Prooyen says the airfield looks 10 times better. ✈️

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Dayton Int'l Teams with Local Audubon Center to Discourage Birds from Flight Paths

By Victoria Soukup



factsfigures

Project: Establishing a Tallgrass Prairie

Location: Dayton (OH) Int'l Airport

Primary Goals: Deter birds from active airfield areas; reduce carbon dioxide emissions; help manage stormwater during heavy rainfall

Consultant: Vanasse Hangen Brustlin

Informal Partner: Aullwood Audubon Center & Farm

Area Planted: 270 acres

Cost: \$392/acre (includes prepping, seed & planting expenses)

Seed: Ohio Prairie Mix #27, from Ohio Pheasants Forever

Seed Supplier/Wildlife Habitat Planning

Support: The Conservationist

Timeline: Seed planted in spring 2015; prairie should be fully established 2017-2018

Projected Carbon Dioxide Reduction: 25%

It's no secret that aircraft and birds don't play well together. Dayton International (DAY), Ohio's third-largest airport and the historic birthplace of aviation, strives to keep the peace on its airfield by separating the two populations from one another.

Working with a local nature center, DAY recently revamped its landscaping to make active airfield areas unattractive to migratory waterfowl, large birds and flocking species. Changes are also expected to reduce the airport's carbon footprint and help manage stormwater runoff.

Last spring, DAY joined forces with the Aullwood Audubon Center and Farm to plant nearly 300 acres of native warm-season prairie grass on non-aeronautical property at the airport. By mowing the new prairie just once per season, DAY is trying to create an environment birds will avoid because they fear natural predators are lurking in the tall grass and dense undergrowth. Ultimately, airport officials hope the new prairie will reduce bird strikes on the airfield.

In the last five years, DAY has logged nearly 150 reported bird strikes, though none were categorized as serious.

"Historically, we've been very poor stewards of our property," says Terrence G. Slaybaugh, who has served as airport director at DAY since 2011. "We wanted to know what we could do with our land that would reduce the airport's footprint, make us better stewards of the property and be better partners with communities around the airport. The theory is that the prairie will reduce bird conflict with aviation."



Terrence Slaybaugh

Slaybaugh brings out-of-the-ordinary credentials to the airport's top post: an undergraduate degree in urban and environmental studies with a concentration in fish and wildlife management. "I had a real interest in how we could utilize the land we control around the airport and ensure its impact on wildlife is positive," he says.

Beyond bird management, the new prairie is designed to absorb carbon dioxide emissions and assist with stormwater drainage.



FAA-Funded Sustainability Plan

Planting native warm-season grasses was one of the key land management strategies recommended to the airport last year in a sustainability master plan created by the consulting firm Vanasse Hangen Brustlin. DAY was one of 44 U.S. airports selected to receive FAA funds to help pay for such studies.

“The airport wanted to find opportunities to establish more sustainable land management practices, and we thought one option was to take some land out of agricultural use and re-establish a prairie that has minimal maintenance,” explains Kari Hewitt, the firm’s director of sustainability. “We worked closely with Aullwood to make sure we were doing it in the most effective way to provide appropriate habitat for wildlife but not a habitat that would endanger aeronautical operations.”

Slaybaugh notes that DAY sits on a large expanse of property for a small hub airport — 5,200 acres. Fully half is undeveloped or is being used for commercial and agricultural purposes, he adds. Much of the land was purchased 15 to 20 years ago, as part of a noise mitigation initiative undertaken when DAY’s traffic regularly included 60 cargo aircraft movements per night. “As a result of that, we acquired a lot of property outside the fence around the airport,” Slaybaugh explains.

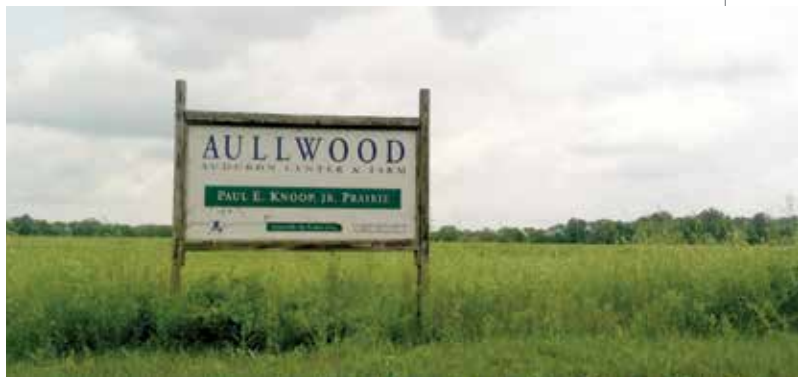
Since then, a local farm has been raising corn and soybeans on roughly 1,180 of the acres of that land, with DAY sharing costs and revenues from the crops. Converting about 270 acres of the cropland into a tallgrass prairie presented a new idea for deterring birds away from active airfield areas. “Knowing geese and large waterfowl don’t like that type of habitat, we went with it,” explains Slaybaugh.

The same farm that leases airport land for crops also maintains the prairie grass.

Planners from Vanasse Hangen Brustlin emphasize how helpful Aullwood personnel were during the project. “They offered a wealth of information on how the prairie grass areas could be set up and the value of them,” notes Ben Siwinski, senior airport planner with the sustainability consulting firm.

Lowering Emissions

DAY’s recent landscaping changes are also helping the airport reduce its operational carbon footprint. According to projections, the



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new prairie may decrease carbon dioxide emissions by up to 25%. While many agricultural processes *produce* carbon dioxide, prairie grass *absorbs* it, Slaybaugh explains.

Vanasse Hangen Brustlin created a special emissions calculator tool to help plan DAY's land conversion. According to the consultant's projections, landscaping changes will help the airport reduce its greenhouse gas emissions by 428 metric tons per year. "That's the equivalent of taking the emissions produced by 90 cars off the road every year," notes Siwinski.

"Not only do you avoid the greenhouse gas emissions associated with soil tillage, fertilizer and pesticide application, and equipment use; but the native warm-season grasses also capture CO₂ once they are thriving," Siwinski explains.

Planted from seed supplied by Ohio Pheasants Forever, DAY's new prairie should be fully established in two to three years. The special mix of prairie grasses and wildflowers got off to a good start this year due to heavy rains in late spring and summer. Mike Cross, environmental scientist at DAY, reports that the tallgrass prairie cost about \$392 per acre, including expenses for ground preparation, seed and planting.



Benjamin Siwinski

Once developed, DAY's prairie will need to be cut just once per year, compared to three times a month for airfield turf, Slaybaugh notes. Alternately, the airport could opt to burn off the grass and wildflower area every few years, which would provide additional benefits to the soil via nutrient-rich ash.

Stormwater Support

In addition to addressing wildlife concerns and lowering certain emissions, DAY's new prairie will also help manage stormwater runoff. Vanasse Hangen Brustlin personnel explain that the area's soil, grasses and wildflowers absorb water better than typical turf or agricultural land. "Studies have shown that prairies can absorb up to 9 inches of rainfall before any runoff occurs," says Hewitt.

The added efficiency provides benefits beyond airport property lines. In converting to this type of grass, DAY enhances the surrounding community's stormwater capacity minimizing the airport's impact to the local watershed. The benefits are especially pronounced during high precipitation, notes Hewitt.



Kari Hewitt

"The airport understands the significance of its role to lead by example with regard to enhancing resiliency within the region,"

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she adds. "There are a number of factors that are likely to impact agriculture in the near future, including climate change impacts, fuel price increases, pollution regulations, fertilizer and pesticide price variability. Prairie grasses are much more resilient to such changes. They manage stormwater well, but are also tolerant to periods of drought. The diversity of plant species in prairie grass systems also makes them more resilient in the face of disease or pest invasion."

History of Cooperation

The spring planting project wasn't the first time DAY has collaborated with Aullwood. The two organizations, which are located next to one other, have enjoyed an informal, but enduring, partnership.



Charity Krueger

About 15 years ago, DAY officials teamed with the Audubon Center to create a 150-acre prairie grass habitat on airport property. "The thought was that by creating a tallgrass prairie, we would be attracting some of the most threatened grassland songbirds and provide a suitable habitat for them in the summer and when they are nesting," explains

Charity Krueger, who recently retired as executive director of Aullwood after 33 years with the center. "And coincidentally enough, it is low maintenance and it attracts birds that don't impact airplane flight."


Personnel at Vanasse Hangen Brustlin describe the cooperation between Aullwood and DAY as remarkable. "Birds and airports don't mix. There are typically competing interests," says Siwinski, cutting to the chase. "But this collaboration was really exciting; and it was brought on by the airport leadership."

The local Audubon Center has certainly held up its end of the relationship. John Aull, one of Aullwood's founders, apparently appreciated both nature and aviation. Krueger relates that Aull was friends with the Wright brothers and even pulled their flying machines behind his car to help get them started. Today, the Aullwood Center includes an interpretive trail that highlights the Wright brothers and describes how they created their airplanes after observing bird behavior.

Krueger hopes that Aullwood's recent collaboration at DAY will have an even larger impact. "If this prairie grass project works, it would be a win-win for the National Audubon Society as well as the airport," she explains. "It could be a viable land use technique to use across the country. It's exciting to see how conservation organizations can collaborate with airports to make it work for both airplanes and for the little birds we care about that are threatened."



Because of its proactive work with the prairie grasses, DAY has been selected to participate in a U.S. Department of Defense study about using switch grass as airport land cover. Led by the U.S. Department of Agriculture and Mississippi State University, the study will address elements such as wildlife strikes, financial cost and environmental impact. Researchers will observe four switchgrass test beds at DAY for the next three to five years. Like prairie grasses, switchgrasses don't require frequent cutting.

"We kind of have a laboratory here at DAY for ground treatment," Slaybaugh reflects. "We're looking at prairie grass, different types of switchgrass, and then we have the airfield, where we continue to mow grass. For the next several years, we're going to be observing the wildlife impact around the airport with the different types of groundcover." 

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Project: Decoupling Runways; Reconstructing Runway & Taxiways

Location: Immokalee (FL) Regional Airport

Approx. Cost: \$8 million (\$46,800 under budget)

Funding: FAA Airport Improvement Program; FL Dept. of Transportation; Collier County

Construction Timeline: December 30, 2013 - November 19, 2014

Engineering, Design, Construction Management: Hole Montes

Design & Construction Administration: URS

Prime Contractor: Owens Ames Kimball Co.

Paving: Community Asphalt Corp.

Site Grading & Drainage: Caloosa Site Development

Electrical: On-Power Services

Quality Assurance Testing: Allied Engineering & Testing

Environmental: Passarella & Assoc.

Geotechnical Exploration & Plant Testing: Cal-Tech

Ground Penetration Radar: Geoview

Airport Geographic Information System: Woolpert

Sinkhole Grouting: Hayward Baker

Site Survey: Cooner & Assoc.; Hole Montes

Lighting Fixtures: ADB Airport Solutions

Markings: Roads & Runways Striping Services

Key Elements: Decoupling runways & creating 450 ft. of separation between their thresholds; reconstructing runway, taxiways & connectors; improving airfield drainage; managing wildlife issues

Of Note: Project was completed on schedule & under budget

Immokalee Regional Decouples Runways & Installs New Pavement

By Robert Nordstrom



Justin Lobb, manager at Immokalee Regional (IMM) in Florida, doesn't mince words when he recalls how badly the airport's north-south runway needed a major makeover: "The pavements showed signs of water intrusion and longitudinal cracking. The maze of drainage ditches between the runway and Taxiway B also presented maintenance challenges. Irregular grading had resulted in unsafe ponding and wildlife attraction conditions, and the area was accessible for maintenance only during the dry season."



Justin Lobb

Originally constructed in 1942, Runway 9-27 had long served its useful life without any major improvements, explains Lobb. In 2006, the Florida Department of Transportation officially weighed in, declaring that IMM's overall network of runways,

taxiways and aprons was in poor condition. The airfield's area-weighted average pavement condition index was 47, based on a 0 to 100 scale. By March 2011, IMM's index had fallen to 36, earning it the dubious characterization of "very poor condition."

Lighting deterioration was also an issue, given the runway's stake-mounted incandescent medium-intensity system that dated back to 1966. "It needed to be upgraded to utilize an LED base-mounted runway light system with cable in conduit (vs. direct buried cable)," explains Lobb.

Beyond the specific shortcomings of Runway 9-27, IMM faced another more severe safety challenge: Its north-south runway (9-27) shared a common threshold with its east-west runway (18-36). To be eligible for state and federal funding, the thresholds would need to be decoupled and separated by at least 450 feet.

Airfield drainage was also improved during the \$8 million project.



Fixing the airfield configuration problem and replacing aging pavement and lighting cost about \$8 million.



Matt Hoffman

At peak construction, prime contractor Owens Ames Kimball Co. had 50 to 60 people working at IMM. Matt Hoffman, the company's executive supervisor, reflects back on the main elements

of the nearly yearlong project: "We had to shut down the entire airport when we uncoupled the runways. We shifted 9-27 450 feet to the east, and the east end of the runway was extended 450 feet to maintain a 5,000-foot runway length. We completely rebuilt the runway."

After crews removed old pavements, they cold milled the pulverized asphalt and base materials, which were later used to stabilize new safety areas and as sub-base material for a taxiway extension.

Ticking Clock

In August 2012, the Collier County Airport Authority received a nearly \$800,000 FAA grant to fund 90% of the project's initial

costs — design, permitting and bidding. The Florida Department of Transportation (FDOT) and Collier County provided matching funds for the remaining 10%. FDOT and the county subsequently contributed another \$45,000 each to pay for higher-than-anticipated county permitting costs and expenses associated with adding runway decoupling to the original design and bid specifications.

In May 2013, the condition of Runway 9-27 was downgraded to "serious" during another FDOT airfield pavement inspection.

Because time was of the essence, airport officials divided the overall plan into a base project and three additional portions. This allowed them to solicit bids before funding was secured, because the airport could adjust the number of alternatives it executed based on the funding received. In the end, IMM received enough funding for all of its plans; but provisionally prioritizing key elements helped ease tensions during the wait.

The base project for improving Runway 9-27 included three major components:

- Planning
- Environmental
- Engineering
- Construction Administration
- Program Management
- Business & Financial Planning



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relocating the runway 450 feet to the east and reconstructing it; extending Taxiway B to the runway's new east threshold; and constructing Taxiway B-1 to the threshold of the 9 end. The base project also added high-efficiency LED lighting for runway edge and threshold fixtures, plus new signage, home run cables and a regulator for the runway's lighting circuit. Minor grading/drainage work and runway safety area improvements were included as well.

Alternative No.1 called for the relocation of Runway 18-36's north threshold, construction of Taxiway A-2 connectors and removal of existing concrete pavement at the old intersection of the two runways and portions of taxiways A and B.

Alternative No. 2 covered the construction of Taxiway B-2, plus grading and drainage improvements. Other elements included runway end identifier lights and precision approach path indicator lights for both approaches to 9-27; edge lighting and signage for Taxiways A-2, B, B-1, B-2 and B-3; new segmented circle and wind cones; new home run cables in conduit; and a new electrical vault with backup generator.

Alternative No. 3 added blast pads at both ends of Runway 9-27 and hold pads on taxiways B-1 and B.

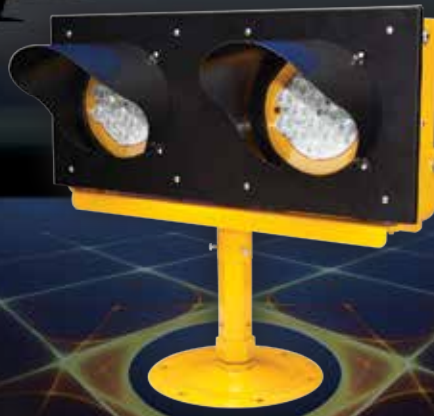
In September 2013, the FAA released about \$6.75 million in Airport Improvement Program funds — enough to facilitate IMM's base project and all three other plans. In addition, funds were provided to reconstruct Runway 9-27 at a width of 75 feet. FDOT subsequently committed \$822,436 and Collier County chipped in another \$487,040 to allow the airport to construct a 100-foot-wide runway. (The old runway was 150 feet wide to accommodate WWII aircraft, but IMM's current aircraft mix requires less width.)

Environmental Issues

Before contractors could begin working, the Florida Fish and Wildlife Conservation Commission required the airport to survey the construction area for the habitats of two specific animals. The nests of burrowing owls were removed from July to February, when the protected birds weren't using them. Gopher tortoises were relocated to a temporary holding pen built with 600 feet of wire-backed fencing.

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Hole Montes, the lead design and engineering firm on the project, researched how IMM's wildlife issues developed to devise a strategy for managing them. "When the airport was originally built, the military excavated drainage ditches in the area between the



Luc Carriere

runway and taxiway," says Luc Carriere, director of aviation engineering for Hole Montes. "Over time, the area became a wildlife attractant — great sites for burrowing animals. After removing the wildlife, we filled in the ditches and installed an underground drainage system that discharges into a canal and eventually the Gulf."

The drainage improvements also significantly enhance water quality. Because runoff must now travel across grassy areas, contaminants are removed before the water is discharged into drainage pipes, Carriere explains.

Given the propensity for sinkholes throughout Southwest Florida, IMM's airfield project raised some concerns about soil conditions. Intensive borings discovered some areas with voids or poorly consolidated soils 12 to 15 feet below the surface, reports Carriere. In areas where pavement required rehabilitation, crews used ground-penetrating radar to detect anomalies beneath the surface.

"During World War II, if the military had an old jeep they wanted to get rid of, they might just bury it," he notes. "Although we didn't find any old jeeps, we did discover seven voids, which we filled with cementitious grout."

Decoupling & Reconstruction

Construction began December 30, 2013, and followed a three-phase timeline that required alternating closures of runways 9-27 and 18-36. During phase one, 9-27 and Taxiway B were closed while crews reconstructed the runway, established a new threshold and built new taxiway extensions and connectors to meet the new threshold. Other elements of phase one included a run-up pad; new LED runway edge and threshold lights; new runway end identifier lights and precision approach path indicators on 9-27; and new LED edge lights and signage for Taxiway B and its new connectors.

Phase two began on May 20, 2014. The airport closed during nighttime hours so contractors could remove concrete pavement at the old junction of the two runways and a

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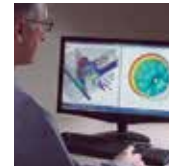
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portion of Taxiway A connector north of the relocated Runway 18 threshold.

On June 2, Runway 9-27 reopened and 18-36 closed. The Runway 18 threshold was moved 450 feet to the south, reducing 18-36's total length to 4,550 feet. Crews also added a new Taxiway A-2 to the new threshold and installed a new electrical vault with a new backup generator.

During phase three, contractors removed the pavement connecting taxiways A and B and relocated runway end identifier lights and precision approach path indicators to the new threshold of Runway 18-36. The third and final phase was completed on August 26, 2014.

Because the quantity of bituminous surface course used was less than the amount listed in the bid, funds became available to rehabilitate an additional portion of Taxiway B not included in the original contract. Heavy equipment traffic during construction and two new pipe crossings had degraded the pavement. FDOT and FAA agreed that rehabilitation of Taxiway B was an eligible project expense and approved a change order to rehabilitate 1,500 feet of the taxiway.

On Time, Under Budget

IMM's airfield makeover wrapped up on November 19, 2014 — on time and nearly \$47,000 under budget. Total cost was approximately \$8 million.

Lobb describes the project as well managed and successfully executed, thanks to excellent collaboration among the various entities involved.

"We are still discovering the benefits of this project," he reflects. "Our energy and airfield maintenance costs have decreased. Pilots appreciate the new runway and improved taxiway system. And we have received many compliments on our installation of PAPIs (precision approach path indicators), REILs (runway end identifier lights) and other guidance systems for approaching the airport. All in all, the improvements have made the airport more attractive to the flying public and resulted in increased use."

According to Carriere, the airfield is now equipped for the next 20 years of development at IMM. 

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Project: New Deicing Strategies

Location: Salt Lake City (UT) Int'l Airport

Impetus: 2012 urea ban

Previous Deicing Agent: Ammonium nitrate

Current Deicing Agents: Sodium acetate; sodium formate; blend of both

Suppliers: Cryotech; LNT; NewDeal

Pavement Maintained: 54 million sq. ft.

Runways: 4

2014 Takeoffs & Landings: Nearly 325,000

Airfield Maintenance Personnel: 84 airfield equipment operators; 30 mechanics; 12 electricians

Solid Deicing Product: 500-1,200 tons/winter, depending on severity of weather

Liquid Deicing Product: 150,000 gallons/winter

Sand: 725 tons/winter

Equipment Fleet: 22 pieces

Trucks: International; Mack

Power Broom Attachments: M-B Companies

Snow Blowers: Aebi Schmidt; Kodiak America; Oshkosh Airport Products

Plow Attachments: Henke Mfg; Meyer; Wausau Equipment Co.

Rubber-tire Front Loaders: Kawasaki/KCMA Corp

Spreader Units: Batts; Meyers; Tyler Ice

When environmental concerns prompted the FAA to ban ammonium nitrate (also known as urea) for pavement deicing, airports throughout the country had to find a replacement for the once-standard chemical. Salt Lake City International Airport (SLC) seems no worse for wear. Its crews now use three different deicing agents, and a revamped purchasing process helps the airport secure a competitive price for each one.

The ban, which occurred in June 2012, prompted SLC to test three more eco-friendly agents: sodium acetate, sodium formate and a blend of both. In the end, the airport opted to use all three FAA-approved options, each for different weather conditions.

"We found they all worked well; each one has characteristics we like," explains Medardo Gomez, superintendent of airport maintenance operations. "Some work better in warmer temperatures and some work better in colder temperatures. Our ultimate goal was not to limit our options, especially since safety is so important."

Gomez likens the airport's new approach to having a toolbox with three various-sized wrenches instead of just one.

Specifically, SLC crews report that sodium acetate works better on ice than snow. It also

stays effective longer than other agents, so it's a better choice for storms that won't seem to quit, Gomez adds. Sodium formate, on the other hand, was found to be more effective under windy conditions because it's flakier texture makes it drift less than sodium acetate pellets. The blend of the two products is dyed blue to make it easier for crews to judge how well the deicer is dispersing.

Using three agents instead of one could also help protect SLC against market fluctuations and associated product shortages. A few years ago, a Canadian work strike limited the supply of liquid deicing products, Gomez recalls. "If shortages occur now, we still have additional reliable options that we can use," he explains.

To obtain the lowest price, the airport solicits separate bids from suppliers for each deicing agent. Contracts generally run for three years, with modest price escalations built in, says Gomez.

"Before, we had only one request for proposal for supplying urea," he recalls. "Now, we ask for bids on three separate contracts ... so we can buy three different products at competitive prices. We feel like we get a little better price because there's more competition to supply each product. Continuous competition is good."



Changes Purchasing Procedures

By Ken Wysocky

Gomez shrugs off the idea that requesting and processing more proposals requires more work. "It's not that difficult," he comments. "It's like ordering navel, red and blood oranges versus ordering just oranges."

Getting the best price possible is critical, Gomez emphasizes. While SLC used to pay about \$400 a ton for urea, its newer, "greener" deicing agents cost between \$1,600 and \$2,200 per ton.

New Facility in the Works

With approximately 54 million square feet of pavement to maintain, keeping enough deicer on hand is a task in itself. Depending on weather conditions, SLC uses anywhere from 500 to 1,200 tons of solid chemicals each winter to clear its four runways and other airfield pavements. It also applies about 150,000 gallons of liquid deicer and 725 tons of sand per winter.

Given its past and future warehousing needs, the airport is building a new \$2 million storage facility specifically designed for deicing agents. Currently, SLC can accommodate 200 single-ton bags of deicing materials. The new 15,840-square-foot building will roughly triple its storage capacity.

Gomez explains that keeping more deicing materials on hand will increase efficiency

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Snow Much to Do

Snow and ice removal is a big deal at Salt Lake City International Airport (SLC). It's also somewhat of a marathon, with winter conditions beginning in late September and running through March. Temperatures usually hover in the low 30s, dropping near zero for some stretches, and Mother Nature delivers an average 57 inches of snow per winter.



Medardo Gomez

"It can get pretty brutal at times, especially from the latter part of December through February," says Medardo Gomez, SLC's superintendent of airport maintenance. "It comes and goes in cycles. Sometimes winter hits early and furiously; and other times it's mild, like last winter. It's been pretty unpredictable during the last several years."


The Great Salt Lake, located just west of the airport, complicates matters by creating lake-effect snow. "We always have to be ready," Gomez comments. "Predictions for a 'trace' of snow can quickly turn into 10 or 12 inches."

To keep traffic moving for eight airlines and their affiliates, SLC pre-treats its runways against ice when storms are predicted. Airfield maintenance crews prepare by applying liquid potassium acetate and FAA-specified sand. Depending on the conditions

(temperature, wind speed, moisture content of snow, etc.), workers sometimes also use a deicing agent, which essentially prevents a bond from forming between the pavement surface and any ice and snow on top of it, explains Gomez. Under some conditions, deicers also act as melting agents.

The airport's 22-piece fleet includes trucks, plows, power brooms, snow blowers, front loaders and spreader units (see list on Page 28 for specifics). Crews work 12-hour shifts removing snow and ice from four runways — three for commercial carriers and one for general aviation use — and other airfield pavement. Personnel include 84 equipment operators, 30 mechanics and 12 electricians.

"If a plow hits a light, for instance, an electrician's truck is right there to repair the damage," Gomez notes. Half of the equipment operators work from noon to midnight; the other half work from midnight to noon. SLC does not provide overnight housing on airport grounds.

Last year, SLC accommodated 21.1 million passengers and handled nearly 325,000 takeoffs and landings, many stemming from its role as a major hub for Delta Air Lines. Throughout the years, the airport has garnered 14 national awards for its snow and ice removal operations. 



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and reduce the risk of product shortages during extreme weather or unusual market circumstances. Currently, the maintenance department stores bags of deicing materials in several different outbuildings throughout the airport's 8,040-acre grounds. A single, centralized storage building is expected to improve operational productivity.

"Our goal is to always have enough inventory on hand," Gomez comments. "We certainly don't want to have to close the airport because we ran out of deicer."


Because deicing agents react negatively to moisture and humidity, the double-sealed bags must be stored in a warm, dry location. The new building will be outfitted with a special dehumidification system and include three separate areas: one for storage, another for staging materials for loading, and a third room with a drive-through loading lane for deicing vehicles.

To prepare the product for loading, a forklift raises each 1-ton package, and a worker manually unties the bag. The forklift drops the load from a height of about 6 feet, spreading the dry product onto the floor. Next, a front loader scoops up the product and transfers it to a spreading truck.

"We usually open about 40 bags or so at a time," Gomez says. "When we start to run low, we open up more bags."

In the airport's current loading facility, trucks and other deicing equipment bring slush and water into the staging/loading area — a definite no-no for the moisture-sensitive products. In the new building, the drive-through lane is lower than the staging area to protect the deicers from outside moisture. SLC officials expect the new warehouse to be complete in February 2016.

Not surprisingly, other airport operators are contacting Gomez to learn more about its new lineup of deicing agents and how it will store them. "We're pretty unique," he acknowledges. "People are starting to notice how we're doing things."

Striving for further improvement, SLC's airfield maintenance department continues to experiment with various deicing agents. "Last winter was only the second year we used these new products, so we're trying new combinations, such as mixing sand with one," says Gomez. "Who knows what else we'll discover? We're excited about that." 



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O'Hare Int'l Adds Control Tower to South Side of Airfield

By Jodi Richards



factsfigures

Project: New Air Traffic Control Tower

Location: Chicago O'Hare Int'l Airport, South Airfield

Owner: Chicago Dept. of Aviation

Height: 218 ft.

Size of Base Building: 10,000 sq. ft.

Cost: \$41 million

FAA Funding: \$33 million

Construction Notice to Proceed: April 2013

Anticipated Commissioning: Oct. 15, 2015

Program Manager: AECOM

Construction Manager: WSP Parsons Brinckerhoff

Designer: exp US Services

Construction Contractor: Walsh Construction

Sustainability Features: Geothermal heating/cooling system; energy-efficient glass; rooftop green space; low-flow water fixtures; segmented space planning to reduce energy consumed in areas not occupied by people

Environmental Accomplishments: Sourcing 90% of construction materials locally; recycling 95% of construction site waste; compliance with Sustainable Airport Manual; anticipated gold certification from the U.S. Green Building Council

Key Benefit: Improved traffic management, particularly for east flow



A new air traffic control tower is always a big deal; but the commissioning at O'Hare International Airport (ORD), scheduled for mid-October, is bound to garner extra attention. The tower's non-traditional angular design will undoubtedly turn heads within the industry, and those who look more closely will find notable eco-friendly elements. Internally, the opening of the new south tower and runway it will serve moves the Chicago Department of Aviation one major step closer to finishing its \$8.7 billion airport modernization program.

The long-term initiative is untangling ORD's previous crisscross airfield configuration to create six parallel east-west runways specifically engineered to increase efficiency, capacity and safety at the busy airport. When the new \$41 million control tower and \$516 million Runway 10R-28L open concurrently, the entire south portion of the modernization project will be complete. The additional tower (ORD's third) was needed because the main tower in the terminal core did not have a direct line of sight to all portions of the new 7,500-foot runway, which is located on the far south side of the airfield.

ORD's other tower, located on the north side of the airfield, was completed in 2008 to address line-of-sight issues for Runway 9L-27R.

Jon Leach, chief operating officer for the Chicago Department of Aviation, notes that Runway 10R-28L will be a tremendous benefit to operations at ORD, adding capacity and efficiency — primarily in east flow. With controllers in the new tower directing traffic, 10R-28L is expected to increase arrivals at ORD by 24%, from 92 east flow flights per hour to 114. It is further expected to increase the east flow departure rate by 25%, from 88 flights per hour to 110. "We're going to see significant capacity increases in the east flow as a result of 10R-28L," Leach summarizes.

Airport officials worked closely with FAA personnel to determine the optimal location for the new south tower. The site ultimately selected impacted some existing tenants, Leach acknowledges. Specifically, work crews had to relocate a fuel line and modify Lufthansa's



Jon Leach



parking area and United Airlines' cargo operations to make room for the new tower. "We placed it in a location that not only allows us to operate functionally now, but into the future should we wish to redevelop that area," he remarks.

Although the construction site was landside, contractors building the new tower still had to take into account airside operations nearby — especially during inclement weather, notes Andres Garcia of AECOM, the program manager for ORD's overall modernization program.



Andres Garcia

Crane operations needed to build the 218-foot tower added extra challenges for the project's construction manager, WSP Parsons Brinckerhoff. If visibility became too limited, crews had to pull the crane down to prevent interruptions to operations on Runway 10C-28C, ORD's Group 6-capable arrival runway. Unfortunately, the weather that winter (2013-2014) was unusually harsh, even by Chicago standards. A polar vortex delivered one of the coldest winters on record for the Windy City.



Marc Faulkner

"That hampered us quite a bit," recalls Marc Faulkner, resident engineer with WSP Parsons Brinckerhoff. "We did what we could, and on those days where the cranes were ordered to be down, we shifted crews and did other things that weren't relying on a crane."

Keeping the airfield operating at full capacity while trying to maintain the construction schedule was a delicate balancing act, adds Leach.

Not Your Father's Control Tower

The company that designed the tower, exp US Services, veered from the standard stereotype: a narrow vertical tube with a bulbous round

cab on top. Instead, exp created a tall rectangular tower that connects to a long, angular horizontal base. The tower's right angles provide a more efficient, simple and clean layout for equipment, explains exp Vice President Jeffrey Jakalski, AIA. The interior floor plan contains corners rather than curves to remain more flexible for future needs. "Technology and equipment change, and it's always FAA staff trying to adapt their existing towers to meet with today's technology," Jakalski relates.

Designers located vertical transportation for the 13-floor tower around the perimeter, rather than running it up the center, per traditional tower design. The two sets of stairs, which started out as a fire code requirement, became feature aesthetic elements. While most towers have a solid center shaft, the north and south facades of ORD's new tower are enclosed in glass and provide an elegant glow at night, explains Tom Hoepf, FAIA, principal design architect with exp. "It gives a nice scale, an identity that is unique to Chicago," he comments. "It's an elegant architectural solution to a really technical problem."

Placing the stairs on the perimeter also presents a "friendlier, transparent face" to those visiting the tower and provides natural daylight to employees working inside, says Hoepf.

AECOM's Garcia describes the design as "timeless and elegant," but also "rather iconic." By using building information modeling (BIM)



Mechanical systems are grouped in a separate tall section of the base building.

software, exp helped minimize change orders and design conflicts, he adds. "It certainly convinced us of the value of BIM in the construction industry, and we will look to probably incorporate it in any future vertical development we do here," reflects Garcia.

Green From Top to Bottom

Leach notes that the south control tower project focused on sustainability, like all other portions of ORD's modernization program. "In every facet, we've looked for ways to improve the green elements of what we're constructing," he reports.

Per standard procedure, the south air traffic control tower project followed the Chicago Department of Aviation's Sustainable Airport

Manual. In addition, the structure is expected to achieve gold certification in Leadership in Energy & Environmental Design (LEED) from the U.S. Green Building Council.

From the form of the building to the way it functions, sustainability played a major role in the design, says Hoepf, a LEED accredited professional. The structure itself is comprised of concrete — a sustainable and locally produced material. In addition, the base structure and tower were "jump formed" — a technique that allows crews to use the same concrete form as they build vertically.

Long-term, concrete is very durable and easy to maintain, Hoepf adds. Over the life of the structure, maintenance costs are expected to be less than they would be for other building materials.

Garcia notes that the tower's innovative geothermal system takes advantage of a natural resource for heating and cooling: the earth. He explains that a water-and-glycol solution circulates through a series of underground tubes, and thanks to the earth's nearly constant subsurface temperature, the temperature of the solution remains constant and is used for even cooling and heating inside the tower. The geothermal field includes 36 wells, each 505 feet deep.

The building also contains a traditional heating and cooling system, and the two approaches supplement each other, Faulkner notes.

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Designers predict that the geothermal system will reduce annual energy costs by 14%.

All of the control tower's glass is low-E coated, insulated glass with a ceramic frit pattern that allows it to be transparent but also reduces direct solar gain, explains Hoepf. Additionally, the base building includes an overhang to block the south sun, while vertical sunscreens reduce solar impact from the east and west.

The design of the base building segments different uses into separate areas to maximize efficiency of space, he adds. On the north side, the structure is taller to accommodate mechanical equipment, while the south side — the “people space” — is notably shorter. “People don’t need as much volume as big, mechanical equipment,” Hoepf explains. “By pulling all people spaces to the south and leaving mechanical to the north, it’s a very efficient way to zone the energy mechanical systems within the building.”

The roofs of the two base buildings are covered with 10,000 square feet of plants to facilitate stormwater absorption and add insulating value to the structures. Low-flow water fixtures are expected to reduce water usage by 40%, notes exp’s Jakalski. A stormwater detention cistern under the parking lot was added to collect runoff from the site.


Project officials report that fully 90% of construction materials for the new tower were sourced locally. “We took care to keep it

an open specification process and not sole source anything, but include requirements for locally sourced materials so transportation costs and emissions to the atmosphere were reduced,” Jakalski comments. On the back end, 95% of waste generated at the construction site was recycled.

Looking North

The completed tower was turned over to the FAA in December 2014 for equipment installation and other preparations before its official commissioning on October 15. The FAA committed more than \$33 million to fund the \$41 million project, including enabling work.

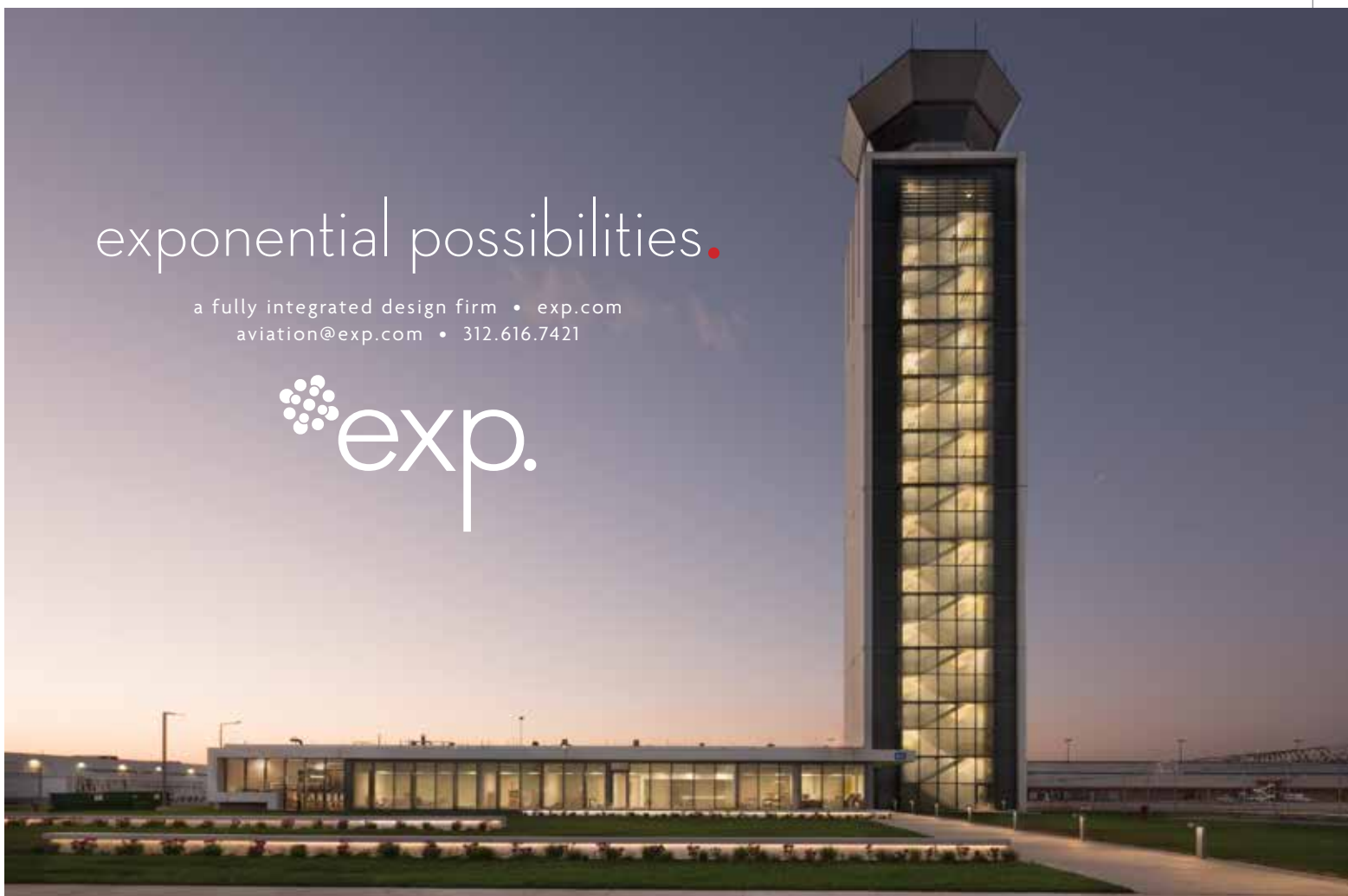
The tower project and associated new runway completes current modernization efforts for the south airfield, which now includes three parallel east-west runways and one crosswind runway. Leach describes the new south airfield as a “safe and efficient operation.”

Amid more discussion between the city and ORD’s airlines, construction will continue on the north airfield. Leach remains optimistic that the Chicago Department of Aviation will finish work on the north side in the near future to balance out the airfield and complete the overall modernization program. 

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San Jose Int'l Brings Rubber Removal In-House

By Mike Schwanz

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Project: Rubber Removal

Location: Mineta San Jose (CA) Int'l Airport

Runways: 2 north/south pavements, each 11,000 ft. long

Strategy Change: Complete work with in-house vs. using outside contractor

Equipment Purchased: Cyclone 4006 AC

Manufacturer: Nilfisk-Advance Technologies

Equipment Distributor: Team Eagle

Approx. Cost: \$619,000

Est. Break-Even Point: 3½ yrs.

Key Benefits: Greater scheduling flexibility; lower long-term runway maintenance costs; reduced water & fuel consumption; new equipment can also remove paint

Removing rubber from runways is a significant maintenance expense at most big-city airports. As such, facility operators are continually debating the relative merits of outsourcing the job or investing in personnel and equipment to handle the ongoing task in-house. Given the cost and safety-sensitive nature of the work, it's a pivotal decision.

Norman Y. Mineta San Jose International (SJC), in California's Silicon Valley, recently moved its quarterly rubber removal operations in-house; and airport officials are pleased with the change. SJC employees have been using a rubber removal machine the airport purchased at the beginning of the year.

"It has already made a big difference in our rubber removal operation," reports Mark Smith, airport maintenance supervisor at SJC,

with Cyclone supplying the curriculum material and "factory experts" to help present it.

Previously, the airport hired an outside contractor to remove rubber from its two 11,000-foot runways and perform friction tests before and after to document the results. Typically, SJC awarded three-year contracts with two-year options. Eventually, outsourcing became a less attractive strategy, due to the limited number of rubber removal contractors that are available. "They were often so busy, they occasionally had to drive all night to get here," Smith recalls. "It was sometimes challenging to get everything done on time."



Mark Smith

The airport is enjoying the scheduling flexibility that comes with owning its own rubber removal equipment.

Frequent equipment failures and associated schedule delays were other drawbacks to working with an outside service company, he adds.

As a result, SJC decided to take the airfield maintenance matter into its own hands. Last fall, the airport requested proposals from three different equipment manufacturers. In January, it purchased a Cyclone 4006 AC, manufactured by Nilfisk-Advance Technologies.

Smith considers the \$619,000 vehicle an excellent long-term investment for the airport. "It should pay for itself in only 3½ years," he reports. "And we expect it to last a good 10 to 15 years."

Equipped for the Job

The machine's self-contained design was a key factor for Smith and his employees. "You don't have to tow a vacuum unit behind it," he relates. "With the Cyclone, blades under the head produce lift. Ultra-high-pressure water scours and lifts the rubber, which is ground up within the truck itself, somewhat like a garbage disposal."

The machine is designed to cover about 20,000 square feet per hour. Crews typically run the equipment from 11 p.m. to 5 a.m., when the control tower is not in operation. (Last year, SJC logged 128,000 aircraft operations. Daily traffic includes both commercial and general aviation traffic.)

"The south ends of both runways are the main touchdown areas, so we try to concentrate the rubber removal on 3,500- to 4,000-foot sections at those ends," Smith explains.

Airfield maintenance employees at the airport rank visibility from the truck's cab as excellent. "Big windows in front and along the side offer almost a 180-degree view," remarks Smith. "You get a huge, clear view of what you are doing, and three on-board cameras also help viewing."

Because most of SJC's rubber removal is performed at night, lighting was another important selection criterion. After operating the vehicle for nearly one year, airport employees give the Cyclone top marks for illumination. "It lights up like a Christmas tree," says Smith.

Like all major airports in California, SJC faces strict state environmental standards. Airport personnel consequently pay close attention to "green" factors and performance characteristics when selecting new equipment. While some rubber removal machines use 10 to 12 gallons of water per minute, the Cyclone uses 6 gallons per minute. It also filters water with a 0.35-micron filter, notes Smith.

The city of San Jose imposes air quality regulations on the airport, including a provision that requires it to use airfield equipment that burns biodiesel fuel. SJC's new Cyclone is powered by a John Deere 9.0L Tier 4 375hp diesel engine, which meets city emission standards.

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The airport's new Cyclone vehicle is designed to cover 20,000 square feet per hour.



New Staff Skills

Training was another factor that swayed SJC toward the Cyclone. "We wanted to be sure that our maintenance staff not only learned how to use the machine properly, but could do all normal maintenance and service tasks right here at the airport," Smith remarks.

Team Eagle, the North American distributor of Cyclone, provided the

equipment training at SJC. "When an airport buys a new machine from us, we send our trainers to the facility for up to a week," says Bill Crow, the company's southwestern U.S. territory manager. "These machines are very sophisticated, computer-controlled systems with pressures up to 40,000 psi. Operators must know how and when to adjust pressures and speeds for the different surfaces and conditions. This comes with experience."

At busy airports like SJC, Team Eagle and Cyclone often perform the bulk of training on remote taxiways or ramps. (SJC averages 125 commercial and 85 general aviation departures daily.)


"Eventually, we often do take trainees out on a runway, usually at night," Crow comments. "It is important that they get out there 'where the rubber meets the road.'"

He suspects that experienced operators typically don't struggle with the training because the Cyclone 4006 AC is very intuitive to operate. "They pick it up fairly quickly; everything makes sense. But you have to get out there and do it," he emphasizes.

Crow strongly encourages airports to train a relatively small number of staff members. Following his advice, SJC designated three people to learn how to use and maintain the airport's new truck: two main drivers and a reserve employee. "We only had a few days with the Team Eagle trainers, and this is a very technical machine," Smith explains.

Employees have only encountered a few minor problems since the airport purchased the removal machine at the beginning of the year. "With every piece of new equipment there are always glitches during the break-in period," comments Smith. "We had a couple of hydraulic leaks. Also, a starwheel motor component was faulty; but this was a recall item that the company corrected immediately. Other than that, we only had to replace water nozzles, which is easy. These, and most other components on the Cyclone 4006, can be repaired in the field within minutes."

The new truck recently scored bonus points with airport officials by serving double duty. This summer, crews used the Cyclone to remove paint from one of SJC's main runways while it was closed for repairs. "It worked quite well," Smith reports.

Above all, the new machine has given the airfield maintenance staff more flexibility. "Instead of having a very rigid schedule of rubber removal, we can do it at our convenience," he reflects. "And if something needs touching up, we can do that right away — without worrying about getting the outside contractor in." 

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Lakeland Regional Switches to Cloud-based System for Airfield Maintenance Records

By Kristin Vanderhey **Shaw**



Mowing an airfield requires an organized process — especially in Florida, where grass grows quickly thanks to never-ending sun and ample moisture. Lakeland Linder Regional Airport (LAL), situated on 1,700 acres of land between Tampa and Orlando, enhanced its approach last summer by changing from one-dimensional paper recordkeeping to a more integrated cloud-based software system.

“Before we made the decision to go with the new platform, we didn’t have a clear process for mowing,” recalls LAL Operations Manager Brett Fay. “We were on a two-week cycle, and the groundskeepers mowed what needed to be mowed. Now, we have a visual real-time plan for what we need to do.”



Brett Fay

The growing airport switched to Veoci, an airport operations software system that manages Part 139 compliance/reporting, facility maintenance and property management, in July 2014. Changing to the new system has helped the airport make better decisions about airfield management, says Fay. “We can see who mowed it last, the height and condition of the grass, and how long it took to complete.”

LAL management emphasizes the importance of keeping airfield turf cut to the appropriate length, especially during Sun ‘n Fun (the second largest U.S. fly-in/airshow) and several other events the airport hosts. By using a computerized database, supervisors can allocate labor and resources more efficiently because they now know how long it should take to maintain specific areas of the property. The team even developed a color-coded map to provide a quick reference about when to mow various areas.

“In the field, our employees can input the necessary five or six pieces of information in their smartphones, and we can see what’s actually happening in the field in real time,” Fay comments. “It’s not about them doing it faster, it’s about collecting good, usable data.”

Data-Driven Decisions

The search for a system to replace LAL’s paper records began in summer 2013. The airport first used another software program, but it proved rigid and inflexible for Part 139 purposes. “We needed something that would include property management and maintenance operations,” Fay recalls. “We needed something that could cover a wide variety of uses.”

LAL considered several different vendors before making its final choice. Ultimately, a demo convinced the selection team that the Veoci system would provide the flexibility and customization the airport needed.

“We recognized that we had been operating in reactive mode,” Fay explains. “We were not able to take a proactive approach to airfield management, and we wanted to make better-educated decisions.”



Vishu Rao

Vishu Rao, director of solutions at Veoci, categorizes his company’s product as a platform rather than a software system. He compares it to Lego™ bricks: “Each piece serves a purpose, but more importantly, you can put the pieces together to make something. We give you the blocks and you can build any system you want.”

The ultimate goal for LAL was tracking data to improve airfield management and save money. With a lean staff of 16, doing more with less is always a challenge, comments Fay.

“Being able to communicate effectively and follow up on (Part) 139 work orders and discrepancies is important,” he elaborates. “We can track those from discovery to closeout and hopefully gather useful information.”



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Project: Cloud-based Recordkeeping

Location: Lakeland (FL) Linder Airport

Vendor: Veoci Software

Contract Signed: Oct. 2014

Cost: Negotiated on a “per seat” or user basis

Key Benefits: Better allocation of labor & equipment for mowing operations; increased ability to track airfield maintenance issues; easier Part 139 reporting; no computer server to maintain

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Reporting airfield discrepancies on paper is adequate for corrective action but doesn't provide airport operators with insight to make substantial improvements, adds Rao. If the same light at a given intersection breaks repeatedly, an endless string of repairs isn't the most efficient answer. "The FAA wants airports to be proactive," says Rao. "You can only do that if you have a systematic way to collect information."

LAL has used its data to demonstrate systematic failures in lighting circuits to help secure FAA funding for infrastructure improvements. "Without the ability to track the data and trends, it would be hard to prove the need," says Fay.

Because its new system is cloud-based, LAL does not spend time and money maintaining a server. It does, however, maintain control of the data stored in the cloud, Rao emphasizes. "Everything they do in our system is still theirs, and they maintain ownership," he explains. "We also give them an automatic local backup of all the information stored in our system. The whole idea of keeping it on the cloud is that we take care of all of the procedures related to servers and the hardware required for running the software. We have redundancy and backup, so that in case a server fails, the system is automatically made available from another server."

LAL personnel access data stored in the cloud with a username and password. The system's two-factor "bank-level" security prevents others — including Veoci staff — from obtaining LAL's information, notes Rao.

"We empower the airports to make their own changes," he adds. "Once the staff learns how they want to use the data, it's very simple to use."

Learning Curve

Using paper records, LAL personnel could fulfill compliance requirements but couldn't track trends. The airport passed its certification inspections but didn't have the information needed to improve procedures and policies. Converting to a computerized data-driven system changed all that, but the transition required extra effort from the operations team.

"The biggest challenge, in the initial stages, was wading through the data," says Fay. "There are various ways to set it up, and we had to figure out how we wanted to manipulate the data once it was up and running."

LAL Operations Coordinator Adam Lunn describes the data entry process as easy but long. "We spent a lot of time inputting the data," he recalls. "Sometimes, we could complete a mass upload using Excel. Otherwise, a lot of what we were doing was new — the airport had never captured the information before."



Adam Lunn

Rao notes that initial data entry is a one-time project worth the investment, because important details about airfield assets and properties remain accessible for as long as the airport needs them.

Lunn recalls that the hardest part of the process was establishing the relationships between forms and determining how to use



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the data. The operations team gathered all of the managers in one room to brainstorm about leveraging LAL's new information. Together, they decided how to segment data and make specific pieces interact to create useful reports.

Within the properties department alone, the team built three different interrelated forms — a tenant database, a properties database (elevators, heating/venting/air conditioning, etc.) and a physical address form. Because all three forms work together, it's easy for staff to quickly find correlating data, explains Lunn.

"The primary component was deciding what we wanted to capture," he reflects. "We knew we had to change from paper records due to the rapid growth of the airport, and we wanted to be sure that what we captured was useful and would be beneficial."

The computerized system has definitely reduced the amount of time employees spend on recordkeeping, reports Fay. "Handwriting or typing in data takes a lot of time," he comments. "With the software, it automatically populates different forms, eliminating the need for redundant data entry."


Untapped Potential

In addition to improving the efficiency of airfield mowing operations, LAL's new computerized system also helps the airport manage data about wildlife hazards and other facility issues.

"We have some 15 miles of ditches that have to be sprayed quarterly to prevent weeds and trees from growing," Fay reports. "Ditch maintenance is a major struggle in Florida."

Personnel use LAL's cloud space to store photos of airport signs and track their condition over time.

"The map function is light years beyond where we were," Fay adds. Airfield employees can fill in entry points from their trucks, ensuring that the real-time data they provide is as accurate as possible, he explains. Workers can also geotag the latitude and longitude of a sign, building or other airport asset based on their current location.

"I'm not sure exactly what data we're going to see yet, in total; but the software offers a lot of options," Fay concludes. "This program is constantly evolving and constantly changing. As of right now, we have really just scratched the surface of what we'll be able to do with it." 



The airport's new system makes it easier to track lighting repairs and other airfield maintenance.

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Primary Project: Runway Safety Area Improvements

Associated Projects: Pavement repair; joint sealing; runway shoulder rehabilitation; upgrades to airfield lighting & navigational aids

Location: Los Angeles Int'l Airport

Airport Oversight & Operations: Los Angeles World Airports

Runways Affected: 4

Total Budget: \$250 million

Runway 7R-25L

Timetable: March – April 2015

Design: HNTB

Contractor: Griffith Co.

Runway 6L-24R

Timetable: June – Oct. 2015

Design: AECOM

Contractor: Griffith Coffman Joint Venture

LED Runway Centerline & Touchdown Zone

Lights: Crouse-Hinds, a div. of Eaton

Light Bases & Related Hardware: Jaquith Industries

Runway 6R-24L

Timetable: Nov. 2015 – Oct. 2016

Design: AECOM

Contractor: Griffith Coffman Joint Venture

LED Taxiway Centerline Lights: Crouse-Hinds, a div. of Eaton

Incandescent Runway Centerline & Edge

Lights: Crouse-Hinds, a div. of Eaton

Light Bases & Related Hardware: Jaquith Industries

Runway 7L-25R

Timetable: Oct. 2016 – June 2017

Design: AECOM

Contractor: To be determined

One by One, Los Angeles Int'l Adds Safety Areas to All Four Runways

By Jodi Richards



Los Angeles World Airports (LAWA) is nearly halfway through an ambitious three-year project to bring all four runways at Los Angeles International Airport (LAX) into compliance with FAA runway safety area requirements.

As the fifth busiest airport in the world and second busiest in the United States, LAX simply could not afford to shut down or affect more than one runway at once; so planners carefully sequenced the project to mitigate impact on airfield operations, explains Mark Vicelja, P.E., senior airports engineer at LAWA.

Construction on the four-runway project began this spring and is scheduled to run into summer 2017. The total budget for LAX's multi-faceted initiative is \$250 million.

New runway safety areas will provide an extra margin of safety for landing and departing aircraft alike, LAWA officials explain.

Specifically, they are designed to provide a buffer zone should an aircraft overshoot, overrun or veer off a runway. At LAX, like many other airports, the safety areas are 1,000 feet by 500 feet at each runway end and 250 feet from the runway centerline.

LAX's ongoing project will add runway safety areas on all four of its east/west parallel runways: 6R-24L and 6L-24R on the north airfield, and 7L-25R and 7R-25L on the south airfield. Beyond making

the required safety improvements, the airport is also performing other discretionary airfield work. Crews will repair pavement, reseal joints, rehabilitate runway shoulders and replace airfield lighting and navigational aids.



Mark Vicelja

Installation of runway safety areas at both ends of 6R-24L is scheduled to begin in November.

"We're taking full advantage of the closure to try to perform upgrades and repairs to mitigate future closures for maintenance work," Vicelja remarks.

The airport finished the first phase of its four-part project earlier this year. New safety areas for Runway 7R-25L were created during a 33-day closure, from March to April 2015. LAX took advantage of the closure to perform temporary pavement rehabilitation as well.

According to Vicelja, work on 7R-25L could have easily required a three-month closure, but LAX consolidated it into just more than a month with careful planning. The airport even completed some preemptive work. Crews relocated FAA equipment associated with the 7L-25R project, which is scheduled to begin next fall, because it will eventually affect Runway 7R-25L. "We added scope from one runway to another to mitigate having to do a future closure on 7R-25L," he explains.

After LAWA completed the 7R-25L project in April, it jumped right into safety area improvements for 6L-24R, LAX's northernmost runway. Operations on the runway were shut down on June 29 and are scheduled to resume in mid-October. "October 19th is the published opening date, and we're working diligently to meet that schedule, if not beat it," Vicelja reports.

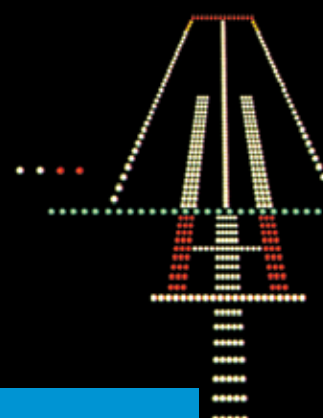
To meet runway safety area requirements for 6L-24R, the airport will cover portions of the Argo Ditch, a stormwater open channel that drains the north airfield. Extra infrastructure was needed because a portion of the channel lies within the runway safety area limits, explains Shammi Ratti, P.E., vice president of Aviation with AECOM (formerly URS). New components include a 542-foot extension of the existing concrete box culvert system using three 8-foot by-10-foot reinforced concrete box culverts connected to a newly constructed headwall outside the new runway safety area.

Two roadways are also being relocated during phase two. Part of a service road on the east side of 6L-24R will be moved outside the runway's new safety area; and a maintenance road located between the north runways will be relocated outside the 6R-24L safety area that will be built during phase three.

At the same time, LAX is reconstructing about 7,000 feet of 40-year-old concrete pavement on Runway 6L-24R, including new infrastructure for light emitting diode (LED) centerline, touchdown zone and hold bar lights.


Robert Scariano, western region sales manager for Eaton's Crouse-Hinds airport lighting division, notes that the airport's new PRO APF lights use up to 53% less power than other LED lights. Their modular design will also help lower overall costs by simplifying maintenance for airfield technicians, he adds.

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To fulfill safety area requirements on 24R, engineers added a headwall and modified the existing stormwater ditch (left) by extending a concrete box culvert nearly 550 feet (right).



Strategic Scheduling

With such an ambitious scope and condensed timetable, Vicelja says that a detailed plan and focused schedule were critical to minimize impact at the busy airport. Despite careful planning, LAWA officials acknowledge that the required runway work could cause flight delays similar to those experienced during bad weather.

The first phase, which included the full closure of Runway 7R-25L, required close coordination between airfield operations, FAA, the airlines and the project contractors, recalls Vicelja. Making sure everyone is updated at least daily is also paramount to safety and success, he adds. “We want to get the work done and fast, but we need to make sure it’s safe,” he comments.

He describes the coordination meetings LAX held from the conceptual design phase through the development of final documents as “intimate and detailed” — and necessary to keep the runway safety area initiative on task.

Scheduling the first phase of the project during spring was also important. “From an operational standpoint, we’d prefer not to do a runway closure during the peak summer travel season,” says Vicelja.

The subsequent 6L-24R project had to occur in the summertime, because one of its main components involved a large channel on the north side. “You couldn’t operate in a storm drain channel during the rainy season, so we had to start in the summertime where the likelihood of rain would affect us the least,” he explains.

In another attempt to minimize impact on aircraft operations, planners designated special airfield entrances for contractors use. “Each project has a different location they are bringing in the contractor to access the site to mitigate the possibility of having to cut across and intermingle with active traffic patterns or across taxiways,” Vicelja relates. “We’re very diligent about making sure to dictate the routes; and we worked with the FAA, our airfield operations crew, TSA and airport police to figure out what is the best way to allow ingress and egress out of our site.”


Phase Three & Beyond

Remaining on the north side of the airfield, LAX expects to begin work on a new safety area for Runway 6R-24L in mid-November. Airport officials plan to keep the runway partially operational during the entire 10-month construction schedule — more available for departures than arrivals. “It’s our primary departure runway and will remain the primary departure runway for the north side,” Vicelja explains. From an operational standpoint, phase two is expected to have less of an impact on overall operations than phase one, because it won’t include a full closure, as with 7R-25L. “We’ll still have four runways,” he notes.

Crews will begin working on the east end of Runway 6R-24 for approximately six months, and then follow up with the west end for another four months. Work is expected to be finished in October 2016.

Immediately after phase three ends, LAX will switch back to the south side of the field for the project’s final phase, construction on Runway 7L-25R. Beyond adding a new runway safety area, work will include taxiway intersection improvements, lighting upgrades and a full pavement reconstruction of the eastern portions of Taxiway B. Construction is scheduled to span October 2016 to June 2017.

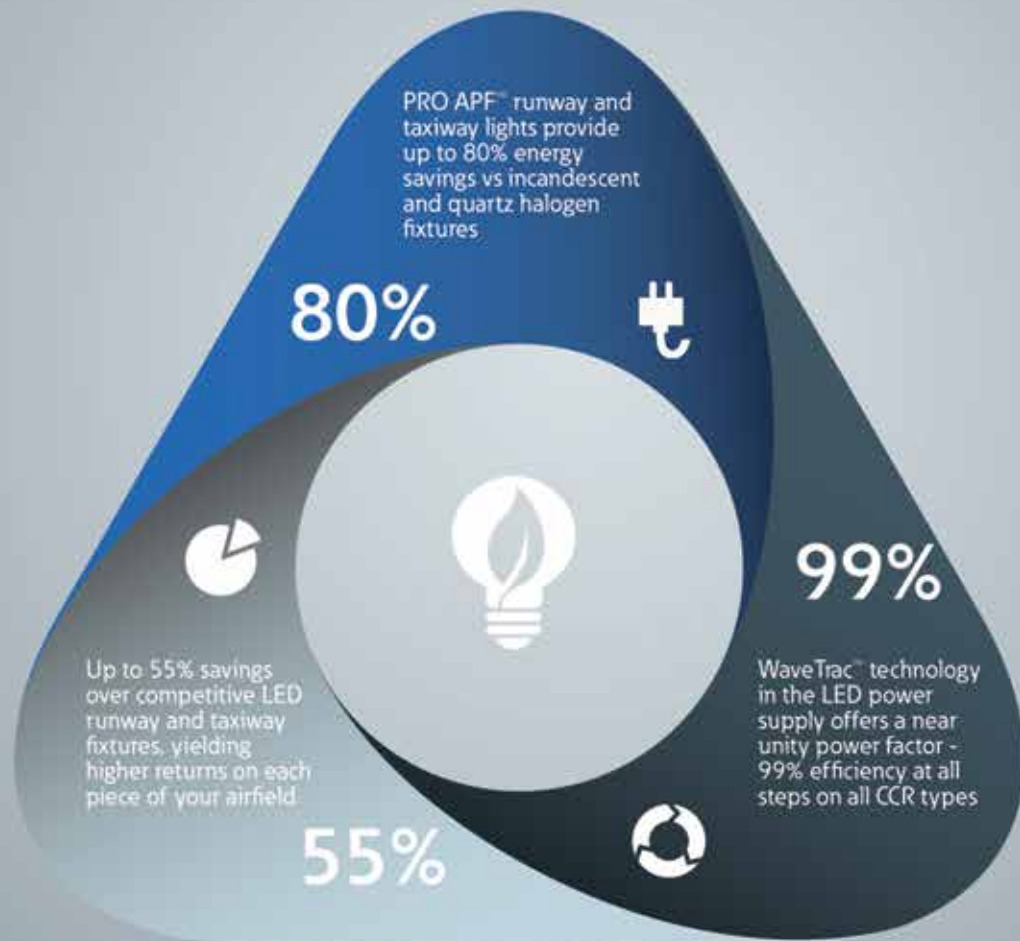
Vicelja explains that LAX will meet the FAA deadline for runway safety area improvements on 7L-25R by temporarily shortening the runway with the use of declared distances, until it can be extended 832 feet in 2017. Plans are to shorten the runway for a little more than three months while crews improve and rehabilitate its east end, and then close the runway for approximately four months to facilitate construction on the west end, where the runway will be extended.

During the full closure, crews will relocate FAA navigation equipment and reconstruct approximately 6,000 feet of concrete pavement, including a segment over the Sepulveda Tunnel, which allows public vehicle traffic to pass under runways 7L-25R and 7R-25L. 

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Burbank Airport Modernizes Lighting System After Airfield Blackout



factsfigures

Project: New Airfield Lighting System

Location: Burbank (CA) Bob Hope Airport

Owner: Burbank-Glendale-Pasadena Airport Authority

Design: AECOM

Contractor: Royal Electric

Fixtures: ADB Airfield Solutions

Signs, Sign Panels & LED Sign Retrofit Kit: Standard Signs

New Wiring: 80 miles (56 miles of #8 wire; 24 miles of safety ground wire)

Trenching & New Conduit: 1 mile

New Fixtures & Associated Components: 1,285



The lights are once again bright at Burbank Bob Hope Airport (BUR), thanks to three years of planning and teamwork, plus a giant dose of resiliency. After enduring a complete airfield lighting failure, the Southern California airport rallied to reconstruct an entirely new system.

Airport Director Dan Feger explains that BUR's previous airfield lighting, which dated back to the late 1970s, had functioned reliably until one day in November 2012.

"Our runway lighting system failed; and when it failed, we were not able to timely fix it," he recalls. "That evening, the runway was shut down, and it went dark — creating all kinds of problems for the air carriers."



Dan Feger

Airfield electricians determined that wiring was the problem and had the system "marginally operational" the next day, recounts Feger. Each subsequent day, crews removed and replaced individual sections of corroded wire that were causing trouble. A battery-operated standby system was also purchased in case of another outage, but officials realized it could prove to be a small bandage for a potentially large wound.

"The authority recognized it was now time for us to invest some substantial money and rebuild the entirety of the system," Feger comments. In 2013, BUR began researching federal funding and secured FAA approvals for a completely new airfield lighting system.

No Time to Wait

Bob Anderson, director of engineering and planning at the Burbank-Glendale-Pasadena



By Jennifer Bradley



Bob Anderson

Airport Authority, notes that after BUR's system failed, immediate attention was given to procuring a design consultant. AECOM was selected for the design work and put to task immediately. "We knew it was going to take some time, and we'd have to keep the bandage system going until the bidding process and construction process were completed,"

Anderson recalls.

While airport personnel are proud that they kept the old system running for more than three decades, Feger reflects on the outage as part of a greater learning process. "We want people to learn from our experience," he comments. "You should not let a wiring system go as many as 20 to 30 years; it's too long. So, we will, in the future, accelerate the time in which we re-wire the system."



Karen Sepulveda

After a new system was engineered, BUR quickly hired an electrical contractor to start replacing and rewiring the entire airfield lighting system. Royal Electric was engaged

immediately at the start of construction, relates Karen Sepulveda, manager of construction services for the airport authority.

The new system required more than a mile of trenching and new conduit, plus 80 miles of wiring. Contractors also installed 1,285 new fixtures and associated components.

Keeping Pace

Royal's crews reported for duty at BUR the Monday after New Year's, just months after the airport bid the project in October 2014. "It was a pretty quick turnaround from the time we found out we got the project to the funding, to actually mobilizing people to the site," remarks Randy Sondreal, a division and project manager with the electrical contractor. "We understood the need to get out there as soon as possible because their circuit readings were fluctuating all over the place."



Randy Sondreal

Crews installed cables while waiting for other materials to arrive. They performed most of the work at night, to minimize impact to airport operations. Teamwork allowed for minimal daytime work on certain taxiways, opening up the schedule and speeding progress, Sondreal explains. Work ran from early January until mid-June, with a mix of about 25 electricians, laborers and operators on-site at peak. "There wasn't a circuit or light fixture we didn't replace," he notes of the project's scope. "Almost all of the signs were either brand new or upgraded as well."

Sondreal notes that he is always happy after a successful installation. But he recalls feeling an extra adrenaline rush the first time BUR's new airfield lights flipped on.

Drainage Difficulties

The local climate stresses airfield lighting at both ends of the weather spectrum. Burbank's usual hot, dry conditions create a tough environment for electrical systems. When it does rain, however, water gets into the conduits and cans — especially since BUR slopes to the southeast, explains Feger. Prior to the recent system replacement, cans would fill with water and take a long time to drain. "The wires feeding the high voltage system were completely submerged and stayed submerged," he elaborates. "Over time, the splices in the wire started to leak, the water got into the splice and started deteriorating the wire. That's a lesson we're proud to say we learned from it."

As a fix, the airport retrofitted about 800 cans with drains and gravel draining beds. Sondreal says the new changes are a good solution that significantly upgrades the system's performance. That said, he also notes that over time, the cans could fill with dirt and need to be cleaned. "Preventive maintenance will keep the system going," he adds.

The new measures definitely reduce draining time, Feger reports. While it used to take days for rainwater to leave the cans, they now drain almost immediately. Considering that Burbank's groundwater table is 250 feet below grade, BUR has good drainage compared to other area airports, he comments.

New LED lighting has proved crisp and clear for pilots, but not too bright for airport neighbors.



Long-term Solutions

The lights inside the cans were upgraded to LEDs. Feger describes the new illumination as very crisp and clear, and says that the airfield lighting is better than it's ever been. The new LEDs are not so bright, though, that they prove annoying or distracting to BUR's urban neighbors. "It's actually really hard to see the airport from businesses, homes, etc.," Feger reports. "We're very pleased with the final outcome of the project."

He also notes that the new system has a much higher resistance than before, and has eliminated "leaks" into the ground. These days, current readings regularly exceed 50 mega-ohms; before the previous system failed, they averaged less than 1 mega-ohm.

Moving Forward

In retrospect, Sondreal largely attributes the success of BUR's project to having everyone included in decisions right from the start. "That doesn't always happen," he reflects, noting that sometimes an engineer simply hands plans off for installation. "In a case like this, that would have been disastrous," he remarks.

Sondreal encourages airport executives to stay involved with airfield lighting projects. Keeping everyone on the same page saves time, money and gives the best end product for every dollar spent, he emphasizes.

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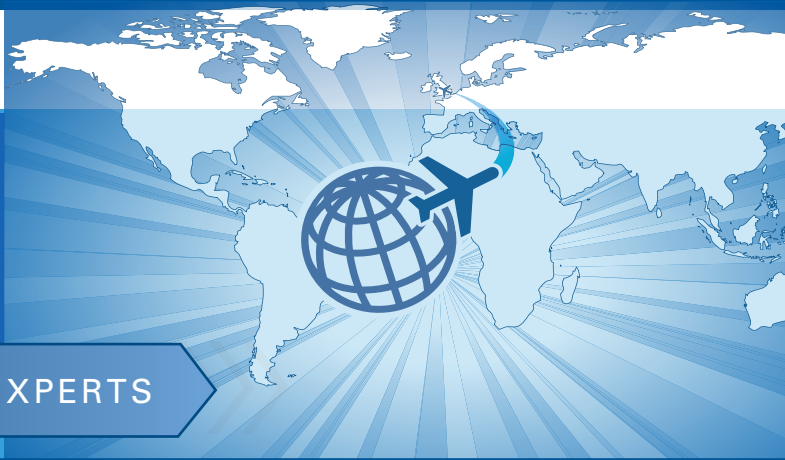


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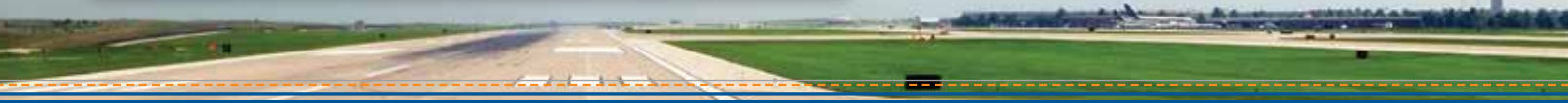
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Replacing corroded wiring and adding drainage to cans were key elements of the project.



As the individual tasked with bringing the design through construction safely and efficiently, Sepulveda also highlights the project team's collaborative approach. "The operations, maintenance and engineering departments work as a unified team at BUR, and the result is efficient coordination and execution."

The entire project was consequently completed without delays to air carriers or general aviation tenants, she notes. According to Feger, work was so well coordinated, that construction was practically "invisible."

Next on the airport's bucket list is runway reconstruction, and preliminary design work has already begun. Discussion about replacing BUR's 85-year-old terminal building is also ongoing.

In the meantime, it's business as usual at BUR ... only brighter.



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Denver Int'l Eliminates Noise Fees & Improves Traffic Flow With Early NextGen Implementation



DENVER INTERNATIONAL
AIRPORT

factsfigures

Project: Implementing NextGen Procedures

Location: Denver Int'l Airport

Stakeholders: FAA; National Air Traffic Controllers Association; Denver Airport Authority

Localized Effort Launch: Jan. 2010

FAA Metroplex Design Launch: April 2015

Est. Implementation of Holistic Denver Metroplex Procedures: 2017

Other Denver Airports Affected: Centennial Airport; Rocky Mountain Metropolitan

Key Benefits: Improved safety; decreased fuel consumption/aircraft emissions; noise abatement; enhanced traffic efficiency

In addition to the standard noise abatement challenges all airports face, Denver International (DEN) has an additional layer of complexity: a stringent noise compliance agreement with its county that dates back to 1989. Each of the agreement's 101 points includes a \$500,000 annual penalty; so noise infractions could potentially cost DEN more than \$50 million every year.

Given the high stakes, DEN jumped ahead in the official nationwide sequence to implement new procedures of NextGen, the FAA program that is modernizing the National Airspace System with satellite-based navigation, optimized routing and widespread infrastructure improvements. DEN and its local system siblings, Centennial Airport and Rocky Mountain Metropolitan, began adopting the program's efficiency measures in January 2010.

Previously, DEN had racked up three \$500,000 noise violations with the county. Using NextGen procedures, the airport resolved its long-standing community noise issues and has maintained a clean violation record with the county for the last three years.

"Right off the bat, we were saving \$1.5 million" recalls Mike McKee, DEN's airport noise abatement manager. The decision to proceed with more NextGen efforts was clear — despite not being selected as one of the 12 U.S. airport metroplexes prioritized for improvements via the federal program.



Mike McKee

"The FAA was targeting the locations where they had the biggest air traffic issues to try to resolve with their limited resources,"



By Nicole Nelson

explains McKee. “I think (the FAA) probably viewed Denver International Airport and the airspace to go along with it as being pretty efficient, all things being equal, compared to other airports.”

But DEN wanted to do better. With more NextGen changes, the airport is improving traffic flow and has already decreased go-arounds for arriving aircraft. This, in turn, improves the airport’s on-time performance record, saves its carriers millions of dollars in fuel costs and decreases aircraft emissions.

Airport officials consider the overall results nothing less than exceptional.

“I have no qualms about saying it,” reflects McKee. “We are absolutely the most successful NextGen implementation in the country, and yet we were the one that did it on our own.”

Optimizing Flight Patterns

McKee cites increased traffic in the Denver airspace as a key impetus for early adoption of NextGen. As flight volume grew during the mid-2000s, local FAA personnel began encountering challenges handling traffic efficiently using legacy procedures that relied on conventional radar and controller discretion, he explains.

“We started to see difficulties crop up in certain areas where controllers were having to vector traffic out of the arrival stream — just to keep it out of the way — and bide time to find (flights) a spot in the landing sequence,” McKee recalls.

Stair-step descents became common for aircraft flying into Denver-area airports. After passengers heard the engines throttle back and felt the nose pitch down slightly, the aircraft would power back up and climb ... only to be throttled down once again. Air traffic controllers directed the series of up and down movements to ensure that flight paths of arriving and departing aircraft would not cross one another.

“That approach is very inefficient,” McKee comments. “Every time the aircraft would level out and have to increase power, it would burn about three times as much fuel as compared to an idle descent.”

Not to mention the noise. And emissions.

In contrast, NextGen’s Optimized Profile Descents are designed to be more formatted and predictable. Landing patterns are set before aircraft enter local airspace, with less reliance on human judgment from the control tower. A network of regimeted procedures are designed to allow aircraft to safely pass each other upon arrival and departure, with required separation built in both vertically and horizontally to largely bypass the previously used air traffic controller dynamic. Aircraft following DEN’s new procedures often descend on idle power almost all the way down, notes McKee.

“With NextGen being so predictable, you can build those crossings in and make sure the departing aircraft continue climbing, and descending aircraft continue descending,” he explains. “They don’t have to level out, because you know they are going to miss each other and provide adequate separation.”

DEN worked with a variety of industry stakeholders to evolve its legacy traffic control approach into a model with NextGen efficiencies. The collaborative design process produced 15 standard terminal arrival routes (STARs) and 15 required area navigation (RNAV) departure procedures.

“When you get to that level, you are not going entirely away from radar, but you are referencing more GPS satellite navigation, which is much more precise,” McKee explains. “The computer is flying the aircraft much more than in the past, and it is flying those procedures very efficiently and predictably, so that it will do it the same way every time. That gets you to a point where you can start, to some extent, to narrow the airspace that is needed to protect either side of a route, because now you know the aircraft are going to stay on those desired routes more predictably. There is still some dispersion and some drift, but it is much more precise than the old way of doing it.”

Beyond that, the airport’s use of required navigational performance (RNP) is making RNAV more accurate, repeatable and predictable in order to narrow down areas in need of protection.

“When you are flying multiple strings of aircraft to multiple runways, and you have parallel final approaches that are coming in next to each other, RNP enables you to do a lot of things

with that traffic that you couldn't do before," says McKee. "We can get creative with it, because in the past, we would have had constraints due to the large blocks of airspace we had to protect."

In fact, the Denver area is at the cutting edge of required navigational performance development, with DEN serving as a demonstration site where FAA is proving new concepts to maximize airspace efficiency. As of late August, DEN had implemented 16 RNAV arrival procedures and 16 RNAV departure procedures. Within that initial group, it implemented 12 RNP arrival procedures — one for each end of the airport's six runways — and all have been used in earnest since October 2013.

High Returns

The combined result of all of these measures is a dramatically, yet predictably, shorter distance from descent to the runway, McKee reports. "With NextGen here, we have seen a 35% reduction in go-arounds," he specifies.

And when pilots don't have to repeat landing patterns, airlines save time and fuel.

"When it comes to savings in general, it all starts with fuel burned, because noise and emissions are really just a derivative

of that," McKee explains. "If you're not going around, you're not burning as much fuel. You're also not creating as much noise, and you're not generating as many emissions. It is all proportional."

Importantly, DEN's improvements in noise abatement, scheduling efficiency and fuel burn/emissions have required very little cash outlay, notes McKee. "The investment was almost nothing," he reflects. "We had controllers, air carriers and managers working on their own time. They eventually donated hundreds of thousands of dollars of their time to this effort. It was an amazing collaboration."

United Airlines, for instance, provided simulator time to verify that new NextGen procedures or changes to existing procedures would prove "flyable" for its pilots and aircraft. The carrier also helped ensure that noise and emissions were minimized prior to implementation.

"One of the guiding principles of NextGen arrivals is to be at idle power during the descent," says Ron Renk, United's chief technical pilot for navigation. "The simulation exercises help identify areas where the design of the procedure may not be producing that desired result.



Ron Renk



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“United strives to be a good steward of the environment and a good citizen of the communities we serve,” Renk continues. “We always keep that in mind as we work with the FAA on initiatives to modernize our National Airspace System.”


Building on the localized effort that developed several new performance-based navigation and RNAV performance procedures to enhance safety and efficiency at DEN, FAA began the design phase of the Denver Metroplex Project this past April. The design team, which includes representatives from the FAA, National Air Traffic Controllers Association and other key industry stakeholders, will work together to develop new arrival and departure procedures for DEN and its satellite airports. McKee will collaborate with the team to ensure that the designs include noise abatement practices.

From an environmental perspective, the design will be evaluated using the process defined by FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, which details the agency’s policies and procedures for implementing the National Environmental Policy Act. Designers will also check for compliance with other relevant federal laws.

From a safety perspective, system evaluation tools will be used to ensure that designs are developed within standardized safety

criteria and adhere to standard separation minimums. Individual procedures will also be tested in flight simulators to ensure safety and operability. Officials expect the designs to be developed and ready for environmental modeling by April 2016.

Southwest Airlines has committed to supporting FAA and industry efforts to develop performance-based navigation procedures across the National Airspace System, including required navigational performance approaches, RNAV Standard Instrument Departures and STARS.

“Cooperation between carriers and the FAA is vital for the success of NextGen across the system,” says Rick Dalton, director of air space and flow management for Southwest. “Through collaboration, the outcomes can benefit the industry as a whole, as well as the communities the airlines serve. We remain a committed part of a collective effort to transform the National Airspace System with PBN and remain very interested in the work that continues at Denver.” 



Rick Dalton

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Deicing Gets Greener at Halifax Int'l

factsfigures

Project: Glycol Recovery/Recycling

Location: Halifax (NS) Stanfield Int'l Airport

Annual Traffic: 3.6 million passengers; 32,000 metric tons of cargo

System Design & Construction: Inland Technologies

How it Works: Vacuum trucks collect spent fluids from aircraft deicing operations & system distills the glycol & recycles it to produce Type I aircraft deicing fluid for reuse at the airport

Avg. Volume Deicing Fluid Collected: 7 million liters/yr

Avg. Volume Reused: 650,000 liters/yr

Total Deicing Fluid Collected: 63 million liters (2004-2014)

Of Note: Inland owns & operates the glycol recovery/distillation/recycling system; carrier fees pay for its operating expenses



Halifax Stanfield International (YHZ) is staking its claim as an industry leader in environmental management with the commissioning of a glycol recovery and distillation facility built at the Nova Scotia airport last year. The new system not only collects spent glycol from YHZ's aircraft deicing operations, it also recycles the liquid and uses it to produce Type I aircraft deicing fluid that is subsequently reused at the airport.

Inland Technologies, the company that has provided a variety of glycol recovery services at YHZ for the last two decades, designed and built the new system. It also owns and operates the environmentally advanced facility. Operating expenses for the system are covered by fees paid by airlines that operate at YHZ.

According to Inland personnel, the company has collected an average of 7 million liters of deicing fluid per season since it established onsite operations at the airport in 2004. The average volume of glycol that is eventually reused is trending at 650,000 liters annually. Throughout the years, the company has recycled roughly 63 million liters of deicing fluid (not including this year's volume).

Mike Rantala, senior manager of regulatory affairs for the Halifax International Airport Authority, reflects positively on the evolution of the company's operations at YHZ. "Since the arrival of the first glycol recovery vehicle



Mike Rantala



By Dan Vnuk

in 1995, we've seen better recovery efficiency as Inland improved their methods and equipment," says Rantala. "The volume of glycol-impacted water has decreased, while the concentration of the glycol in the material collected has increased."

Recovering and managing the glycol from aircraft deicing is a challenge YHZ shares with airports throughout North America's Snowbelt. For safety reasons, airlines operating in cold weather areas follow a "clean-wing" policy, which requires wing surfaces to be free of all snow and/or ice prior to takeoff. (Even a small amount can severely reduce an aircraft's lift.) Glycol is the active ingredient in Type I deicing fluid, the heated agent sprayed onto aircraft exteriors to remove snow and ice, and Type IV anti-icing fluid, which is applied to prevent snow or ice from building up on critical surfaces.

With annual snowfalls that average 2.2 to 2.3 meters (about 86 inches), YHZ personnel are well versed in the need for both products and processes. Weather conditions that alternate between freezing

and thawing further add to the glycol-impacted stormwater the Nova Scotia airport has to manage.

Like airports in all 10 provinces, YHZ must comply with the Canadian Environmental Protection Act, which limits the amount of glycol reaching stormwater to 100 milligrams per liter. Before Inland installed a recycling plant at YHZ in 2004, the airport's contaminated stormwater was collected and disposed of off-site via biological treatment. With the addition of the recycling plant, collected effluent could be treated on-site, producing a 50% raw-grade glycol product that was sold to low-value industrial markets for re-use. After Inland's more recent system upgrade last year, the YHZ plant now distills a 99.5% virgin quality glycol product that is reused at the airport.

Three-Step System

The custom recovery and recycling system that Inland Technologies designed for YHZ uses purpose-engineered glycol recovery



vehicles to “vacuum” spent deicing fluid from the apron. Because of dilution by rain and snow, the liquid collected normally averages 5% glycol. The recovered fluid is delivered to a landside recycling plant, where the effluent is processed by Inland’s Glycol Concentrators. A third system then distills it for reuse.

Previously, Inland used recovery vehicles produced by a third-party manufacturer. But in 2010, the company introduced its own equipment, the Glyvac™, to improve collection efficiency. In order to meet environmental regulations and minimize the area where aircraft deicing fluid is used, all deicing operations at YHZ take place on

a pad. Glycol recovery vehicles capture effluent quickly to reduce the volume of liquid on de-icing pads, collect fluid before it is diluted and decrease associated labor and equipment fuel costs.

Richard Johnson, product development manager of Inland Technologies, considers the company’s specially designed recovery vehicle a key component of YHZ’s environmental program. “This custom-engineered vacuum truck maximizes chemical recovery while improving operator safety,” says Johnson.



Richard Johnson

According to Inland, the Glyvac consumes 30% to 45% less fuel than similar vehicles. It also has a 6,814-liter storage tank, which reduces offloading time to further conserve fuel and increase efficiency.

Beyond the new recovery vehicle, Inland engineers and operations personnel



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developed a multi-faceted program for the YHZ facility. Key elements include a drain management system, fluid storage, fluid testing and onsite recycling of effluent via an airport-specific distillation system. Inland also installed a block-and-pump collection system to supplement Glyvac operations during extra heavy precipitation. (Halifax typically experiences 156 wet days per year). Two diversion vaults, located at the deicing pads, are used to pump effluent directly to two airside tanks. Material is then transported via tanker a short distance to the recycling facility for processing. As part of the customized approach taken at YHZ, effluent is pre-treated using a dissolved air flotation skid to remove sediment and polymers that might clog or slow the recycling process.

From there, effluent is processed in energy-efficient Glycol Concentrators, which take raw, diluted effluent and produce a 50% glycol product. That

material is then sent through the recently installed Starcevic Distillation System, which produces a 99.5% virgin quality glycol product. After the glycol is polished to remove trace contaminants, it is used to produce Inland's certified Type I aircraft deicing fluid. When ground crews apply the fluid to aircraft departing from YHZ, the full-circle process is complete.




Roger Langille

Currently, water used during processing is sent for further management, but Inland is investigating options to use the distilled water at the airport. "We have always invested heavily in research and development," says Inland President and Chief Executive Officer Roger Langille.

The proximity of YHZ to the Inland's corporate headquarters in Truro, Nova

Scotia, makes the airport a natural site for equipment trials. Inland has deployed the glycol recovery technology originally tested at YHZ to numerous other airports in North America, including facilities in Washington, D.C. and Portland, ME.

While YHZ officials are pleased with recent advancements to glycol management at the airport, they hope for even more. "Inland has been a tremendous partner in helping us reach our environmental goals," says Rantala, "We look forward to our continued partnership as we move forward with further minimizing our environmental footprint."

Glycol recovery and recycling isn't the only area in which YHZ distinguishes itself. The Atlantic Canadian facility was the first North American airport to offer self-service baggage drop for all passengers. It also consistently ranks high in worldwide traveler satisfaction surveys. 

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Are You Complying with Updated Training Requirements for Specialized Airfield Maintenance Workers?



The name Advisory Circular (AC) is a bit of a misnomer, as many are more mandatory than advisory in nature.

The latest version of AC 150/5340-26(C), *Maintenance of Airport Visual Aid Facilities*, is a clear example of an FAA document that does more than advise.

Issued in June 2014, it contains significant changes, even though the AC has been revised three times in the last 10 years. Previously, the FAA didn't define "adequate training" or explain what type of knowledge employees have to demonstrate to be considered "qualified" airport visual aid maintenance workers.

Now that the AC includes general training requirements (the specifics of which vary for different types of operations), airports must provide adequate safety for their employees and ensure the most reliable operation of the visual aids on their airfields. To do less is to reduce safety and reliability at our nation's airports and could potentially saddle individual facilities with increased liabilities.

Many of us who work with ACs have viewed some of them as good advice rather than regulatory requirements. In fact, they all include this reader-relaxing statement: "In general, use of the AC is not mandatory." Not so! Read the rest of the section and it delineates the various situations where the AC becomes a regulation or requirement. Most airports fall somewhere into the requirement section because they receive federal grant money or they have installed systems that must meet FAA requirements for (CFR) Part 139 operations.

Airport operators: Do not try to mitigate the responsibility for properly training your visual aid maintenance workers! If you do, it will certainly come back to bite you.


I've emphasized two words in the current AC to demonstrate its mandatory nature: "Because the function of airport visual aid facilities is to assist in the safe and efficient movement of aircraft during landing, takeoff and taxiing maneuvers, it is **essential** that a high degree of

operating reliability be maintained. To achieve this, an effective preventative maintenance program **must** be established and maintained."

When the FAA revised other parts of the document in 2014, it added a definition from the National Fire Protection Association. Now the AC specifies who can perform maintenance work on airport visual aids: "A Qualified Person is one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved." [NFA 70E]

The training offered at each airport should be specific to its particular visual aids and must include proper procedures for work in aircraft operation areas. Following the current AC, each airport should provide an ongoing training program that suits its individual requirements, is seen as credible for the profession and will withstand close scrutiny when liability issues are considered.

With assistance from Navaid Lighting Associates, the American Association of Airport Executives (AAAE) developed a training course for airport visual aid maintenance workers more than a decade ago. Instructors present standardized content and award successful participants with an industry-recognized certificate for training per FAA requirements. The course is one of several options offered by AAAE as part of the organization's ACE (Airport Certified Employee) program, which trains airport personnel in specialized areas of responsibilities. Over the years, the course has evolved to reflect pertinent AC changes. Some airports have all of their visual aid maintenance workers complete the AAAE course.

Following the training requirements covered in the latest version of AC 150/5340-26 not only promotes the safety of airport maintenance workers; it also benefits the passengers who rely on your airport to keep them safe and on time while they travel. 



Seward Ford

Airfield lighting consultant Seward Ford is president of Visual Aids Services and an associate of Navaid Lighting Associates. His long history in the field includes several LED development projects with the FAA and technical advising for the International Electrotechnical Commission subcommittee that is generating worldwide standards for airfield lighting.

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