SUSTAINABLE ASSET MANAGEMENT BEST PRACTICES

Your input is needed. Starting in January 2014, there will be a standard feature in *Airport Magazine* that recognizes the accomplishments, innovations and best practices for airport asset management and sustainability initiatives and programs. We are looking for article contributors for the next year.

Combining asset management and sustainability makes sense. Asset management provides a proactive approach to monitor long-term thinking about our facilities development and ownership; focuses on the total cost of facility ownership to better link capital investment and ongoing operating costs; provides clear data on project performance; institutes an industry-best management practice that maximizes and links the efficient use of available funds; and further integrates environmental, social and financial performance.

"Sustainability encourages stakeholders to communicate and inspire a commitment that business actions will be conducted within a framework of socially responsible values, such as fairness, inclusion, openness, and economic development for all," said Michael Cheyne, director of asset management and sustainability at Hartsfield-Jackson Atlanta International and sustainability issue leader for the AAAE Environmental Services Committee. "To be successful, we must create and foster a community dedicated to sustainability through best-in-class leadership and to implement solutions and practices that will reduce the carbon footprint of the airport.

"Airports only can be successful if our plans are developed through a framework of sustainable, creative, cost-effective, and proactive solutions combining economic, social, and environmental values to airport challenges while humanizing the vast scale of the airport environment," Cheyne noted.

Contact Cheyne at michael.cheyne@atlanta-airport.com with ideas and contributions for this column.

Reducing Heat in Airline Passenger Boarding Bridges

By Michael Cheyne, A.A.E., and Tanita Toatong

Thermal Coated Passenger Boarding Bridge at Atlanta's Gate E34

Hartsfield-Jackson Atlanta International (ATL), currently averaging 250,000 passengers a day, has been the world's busiest passenger airport since 1998. The terminal complex covers 130 acres and, as the largest employer in the state, the airport provides jobs for more than 58,000 employees. A facility of this size, serving nearly 300,000 people a day, obviously, uses significant resources.

The city of Atlanta, which owns the airport, is committed to environmental responsibility, saving energy and eliminating waste. In November 2011, the city's department of aviation released its first sustainable management plan for the airport, setting a goal to reduce ATL's per-passenger purchase of energy by 20 percent by the year 2020. The airport already has reduced consumption of paper, water and electricity and continues to study other opportunities to reduce, reuse and recycle resources.

One common airport feature, however, presents a challenge to conserving energy — the passenger bridge connecting the arrival/departure gate to the aircraft. Passenger bridges are constructed of metal, so, during Atlanta's hot summers, the sun's rays and outdoor ambient temperatures can raise temperatures significantly inside the bridge through a process known as external heat gain.

Mounted under each bridge is an air-handling unit that provides pre-conditioned (cooled) air to the aircraft while it is parked at the gate. It is not uncommon for a bridge to be configured with a supplemental cooling unit (such as a rooftop cooling unit), which is used exclusively for lowering the passenger boarding bridge temperature.

However, 96 percent of passenger boarding bridges at Hartsfield-Jackson International, including the bridges evaluated in this study, are not configured with such bridge-dedicated cooling systems.

When the doors to the airplane and terminal are open as passengers board and disembark, pre-conditioned air from the plane and air from the terminal circulates within the bridge but does not cool the structure to the extent that is possible in the terminal itself or in the aircraft. In addition, energy use increases when hot air escapes into the terminal.

Heat Reduction Coating

In 2013, ThermaCote Inc. of Lawrenceville, Ga., which manufactures an environmentally friendly, water-based, spray-applied thermal barrier ceramic coating, offered the airport a chance to test its thermal barrier product, ThermaCote®. ATL's Asset Management and Sustainability Department agreed to use this opportunity to study the effectiveness of this product in reducing solar heat gain in the summer. Materials and labor costs for the test project were $9,990.

Local contractors applied ThermaCote® to all the surfaces outside of Gate E34. Nearby Gate, E36, was left untreated as a control unit. Both of these bridges receive direct sunlight all day.

Dry bulb thermometers at three points inside each bridge and one on the rooftop recorded temperature readings at five-minute intervals for 35 days from July 12 to Aug. 15, 2013. (See figure 1) A study team from the International Knowledge and Research Center for Green Building at

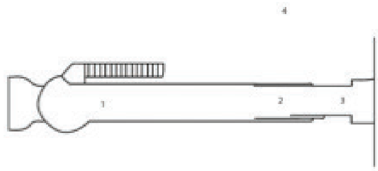

Figure 1

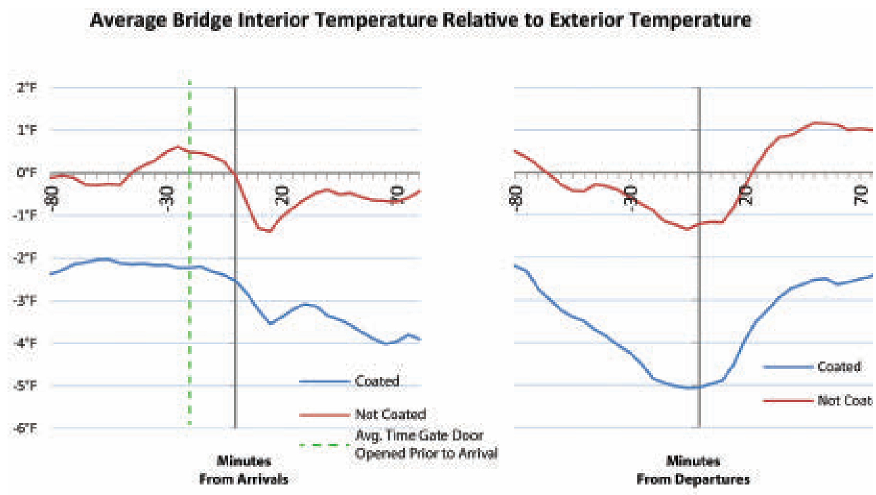

Figure 2

Southern Polytechnic State University in Marietta, Ga., analyzed the data to determine if the applied thermal barrier reduced temperatures within the coated bridge compared to the uncoated bridge.

During the sample period, gates E34 and E36 experienced nearly identical numbers of arrivals and departures and serviced relatively the same number of aircraft. Flights typically took place from 7 a.m. to

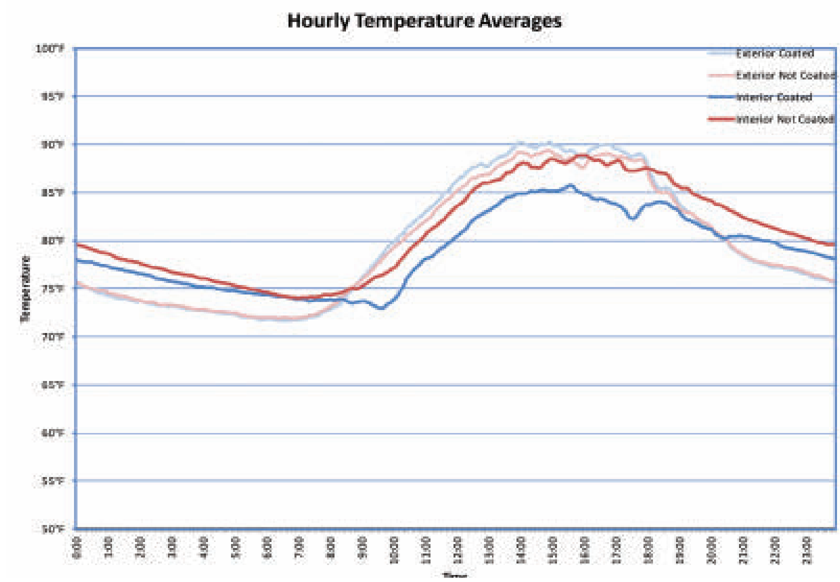

Figure 3

1 a.m., and the average gate time per flight was 110 minutes. Because the length between arrivals and departures varies, the study looked at temperatures before, during, and after each arrival and departure (see Figure 2).

As the graphs show, temperatures in both bridges dropped quickly in the 10 minutes after arrival, while passengers were disembarking and doors to the concourse were open. However, when the doors were closed, temperatures in the non-coated bridge rose back to previous levels, while in the bridge coated with ThermaCote®, temperatures continued to decline until boarding — 20 to 30 minutes before departure.

Dry bulb thermometer inside the bridge

Energy Savings

Temperatures in the bridge coated with ThermaCote® were consistently at least 2° to 3° (1.3°C) lower than in the uncoated bridge, beginning around 10 a.m. and continuing through the night The average temperature inside the uncoated bridge was 1.4° (0.8°C) higher than the outside temperature. The average temperature inside the coated bridge was 0.9° (0.5°C) lower than the outside temperature (see Figure 3).

Since the rate of air conditioning at the gates was unknown, the study calculated the heat load reduction from the difference in temperature change under equal AC power. Calculations revealed a heat load reduction of 69.5 BTU/h (0.02 kWh).

Considering the number of flights each day and the average turnaround time, the total energy savings for Gate E34 would be about 450 BTUs (0.13.kWh) per day, split between the concourse and the pre-conditioned air unit. Although not all bridges receive the same amount of direct sunlight, the thermal barrier could help lower interior temperatures and provide energy savings.

Potential Next Steps

This study was limited in its scope and time span. The airport needs to investigate further the effectiveness of a thermal barrier in reducing temperatures in the passenger bridges. Before broader implementation, the coating would have to be tested at more gates, in different locations, and over a longer period of time. While further testing is essential, the results of this limited preliminary experiment are intriguing. The airport is open to new ways to save energy and reduce costs. With further testing and optimization, a process like this one could provide one more way to help us reach our sustainability goals by 2020. The potential benefits go beyond energy savings. Charles Marshall, utilities manager-asset management and sustainability at Hartsfield-Jackson, stated, “This thermal coating technology appears to provide consistent lowering of heat gain within the passenger boarding bridges, which adds two benefits: customer comfort while using the passenger boarding bridges, and a decrease in cooling load as gate doors are opened for passenger bridge use.” All of this translates into savings, considering that more than 200 boarding bridges are used each day during peak cooling periods.

Several factors should be considered in any further testing or application of the coating. Thermal ceramic coating is an effective and environmentally friendly way to reduce solar heat gain. However, the application process should not occur when humidity levels are higher than 70 percent, as this drastically increases drying and curing time, as well as dry fall. In addition, leaving the bottom of the bridges uncoated should not have a significant impact on the cooling load due to the shade and height off the ground.

Of course, safety considerations are paramount when considering any change to airport equipment or facilities. Pilots were interviewed to determine whether the coated bridge presented any potential challenges to the cockpit. According to Delta pilot Sandy Brown, “There were no issues with glare at passenger boarding bridge Gate E34. It’s only slightly brighter in color than the rest of them. There’s no problem for us as pilots dealing with it.”

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