

## Dallas/Fort Worth Int'l Establishes New Model

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Elements of the 1 million-square-foot baggage handling system that began operating in Terminal A at Dallas/Fort Worth International Airport (DFW) last May could start appearing in other airports throughout the nation. In addition to eliciting compliments from passengers and the firms involved with the project, the new system received the ultimate nod: TSA plans to use it as a prototype for how other airports should model their in-line systems.



Phil Hemmer

"They allocated four weeks to test it, and left in three," explains Phil Hemmer, project manager with baggage system consulting company CAGE. "That's very unusual for any in-line systems, for them to do that."

Its inherent design and component improvements notwithstanding, the BHS earned additional favor by requiring fewer TSA personnel.

According to Hemmer, governmental testing agents have said it's one of the best systems they've tested.

DFW is similarly pleased. "We've installed other machines and systems, but this is the premier one out there," says Richard Bee, assistant vice president for airport development and engineering. "It's a very efficient and economical system."



Richard Bee

## factsfigures

**Project:** Baggage Handling System

**Location:** Dallas/Fort Worth Int'l Airport, Terminal A

**Size:** 1 million sq. ft.

**User:** American Airlines

**Design:** CAGE  
General Contractor:  
Phillips/May

**Installation:** Jervis B. Webb Co.

**Explosives Detection System:** 7 CTX 9400s, from Morpho

**Belts:** Amp-Miser, by Forbo Siegling

**Gear Motors:**  
SEW Eurodrive

**Motors:** 553

**Conveyor:** 6,028 ft.

**Power Turns:** 85

**Project Duration:**  
2 1/2 yrs

**Fully Operational:**  
May 2011

The Terminal A system, which exclusively serves American Airlines, was the last of the airport's five terminal systems to be redesigned to comply with TSA's post-9/11, 100% screening requirement. The airport's seven-year Aviation Transportation Security and Compliance (ATSAC) program initiated the restructuring and upgrading of all lobby-based luggage screening systems with in-line explosives detection systems (EDS).

Approximately \$104 million ATSAC dollars were used to revamp the systems in terminals A, B, D and E, with a 75%/25% split between the airport and TSA for the EDS. An FAA Airport Improvement Program grant funded the Terminal C system.

General contractor Phillips/May implemented an overall reconfiguration of the BHS in Terminal A to make room for the seven new in-line EDS. It also relocated and built-out spaces for American Airlines operations and constructed TSA support facilities and workspaces, such as baggage screening rooms and facilities for oversized and curbside-checked bags.

Jervis B. Webb Co. installed the in-line BHS, relocating the previous system from the ticket lobby to the lower level.

### Design

CAGE engineers developed about eight different BHS concepts for Terminal A before agreeing on the final design, recalls Hemmer. The concept that was selected utilized the existing, unused AirTran track, located beneath the terminal - a strategy that needed approval from the airport and ultimately saved millions of dollars, he adds.

"It worked really well because we didn't have to make room within the terminal or relocate as much," Hemmer explains. "It was a huge payoff to use that open space."

After all American Airlines' international flights were transferred to Terminal B, work on Terminal A began at full speed. From concept to completion, the project took about three years.

Hemmer attributes much of the project's success to completing the BHS design before the architectural design was completed. "It allowed us to design the system without any interference," he explains. "That was key."

The system at Terminal A is different than the others, notes Bee. It includes Ethernet capabilities and a Morpho 9400 DSI system - the newest generation in baggage handling, with a 1-meter-wide conveyor, he adds.



"It also is a centralized, single point of screening," Bee explains.

Other terminals at DFW have locations around the perimeter where the bags are fed in, then out. In Terminal A, the bags are forwarded to a central location from the ticketing counters, cleared and then sorted to various flights.

The seven machines in Terminal A were installed with a split configuration of four and three, to help balance the load for TSA staff and equipment, especially to cover peak travel hours.

One of the stars of the system is Amp-Miser belting, from Forbo Siegling. Ron Land, senior project manager for the ATSSAC program, explains that this new type of belt has a Teflon coating on the bottom side, which makes it very quiet and efficient.



Bruce McMickle

Amp-Miser reduces the coefficient of friction up to 40%, explains Bruce McMickle, Forbo's global market segment manager for airports. It consequently requires 40% less energy to drive the drive motors, he adds, because it prevents contaminants from being absorbed by the belting between the slider beds and the pulleys.

"The industry is looking for ways and means to cost-effectively reduce energy consumption," he notes. "It saves large dollars when you install a product like this." McMickle considers CAGE "forward-thinking" for designing a system that reduced DFW's energy requirements.

Hemmer agrees: "It's unbelievable the difference between a standard belting and the Amp-Miser. You can actually stand across the conveyor and talk with one another in a normal tone."

According to McMickle, the belting reduces noise levels by up to 4 decibels. The product's ability to reject contaminants such as dust, dirt, grime and oils typically found in a debris-filled airport is again the cause, he notes.

## In the Details

Overall technology is another standout feature of the completely automated BHS. Web-based reporting and fault monitoring systems allow operation to be observed from remote stations at the airport, terminal and/or American Airlines headquarters. System documentation and reports are electronic.

When designing the electrical system, engineers developed strategies to mitigate and isolate power failures so they would not affect the entire baggage system. Various power sources were one measure used.

The motor control panels include equipment related to one other, and power was distributed with conveyor control and operation in mind, to ensure failures and restrictions to certain systems will allow other items to function independently.

Load balancing was an essential element of the mechanical design. Two feed lines accumulate bags from the counters and feed them into the seven EDS machines. Crossover lines were placed between the two feed lines and upstream of the fault areas for each line. Belt speeds and load balancing techniques were employed to allow bags to merge and clear seamlessly.



SEW Eurodrive provided gear motors with motor-integrated variable frequency inverters. With this gear-motor/vfd configuration, engineers were able to decrease the number of drive combinations by more than 50%, relates Jan Lindholm, industry account manager at SEW.

"This reduces spare unit inventory," Lindholm explains. "All reducers are equipped with our tapered bushing hollow shaft design. It, in conjunction with quick connectors, shortens the installation time considerably."

Planning that illuminated potential problems was key to the project's success, says McMickle, noting that lessons learned from previous BHS projects in the other terminals were applied in Terminal A. "CAGE is a very good consultant and they know the strategic value of how to put a project together," he adds.

## **Response**

Gone are the days of screening baggage in the lobby at DFW - and doing it manually.

"Today, the ticket agent processes the bag, which is much more convenient for the passenger," says Hemmer.

"It's a win/win for everybody," says Bee. Customers no longer have to carry their bags, lobby space has been freed up and baggage screening is not being performed in a public area surrounded by people.

TSA is obviously impressed with the Terminal A system, too. Its plan to use the BHS as a model for installations at other airports says it all.