

American Airlines

New controls extend the life of an old system

Baggage handling has never been better at Chicago's O'Hare.

Anyone who believes that automated materials handling systems are inflexible has never spoken to Phil Gargula, the facilities maintenance manager for American Airlines' baggage handling operations at Chicago's O'Hare International Airport.

Gargula oversees an operation that handles an average of 20,000 bags a day. The original conveyor and sortation system is still in operation nearly 20 years after it went live.

Thanks to a new controls and software system (Jervis B. Webb Co., 248-553-1200, www.jerviswebb.com), Gargula expects to extend the life of the original equipment another 20 years.

The new controls system is also providing two much needed lifts to American Airlines.

First, the improved data acquisition capabilities provide greater tracking and reporting than was possible in the past. That allows Gargula and his crew to analyze where the bottlenecks are that cause mishandled bags.

Second, the information collected in Chicago can now be shared in real time with American's corporate management system in Dallas. That allows American to track a bag across the airline.

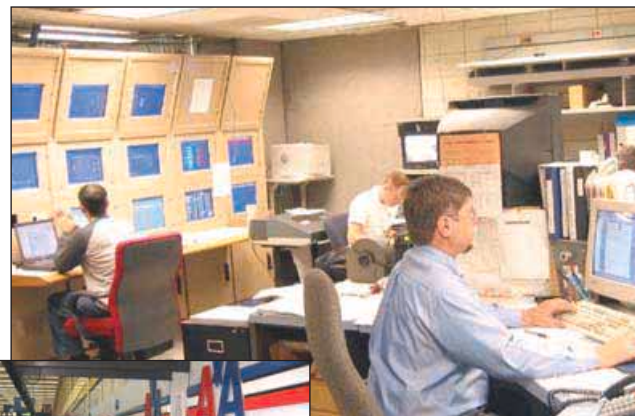
"When a bag arrives at another airport, a baggage handler can enter the bag tag number at a web station and track the bag throughout the system," says Gargula. "Before this, we were strictly a standalone system."

Facing obsolescence

Next to a safe flight, baggage handling is an airline's most important job.

"The Department of Transportation measures every airline by how many bags per thousand are mishandled," says Gargula. "The bar is raised every day."

That was one reason American upgraded the control system at O'Hare. The goal was to implement a sys-



New software and controls give system operators a real-time graphical representation of the baggage handling system.



tem that could track and report back on what happened to a bag from check-in at the ticket counter until it was sorted to a "pier" to be loaded onto a plane. With that information, American could better analyze whether bags were getting held up at the counter because of new security processes; whether there was a problem with the scanning system that directs a bag's destination; or whether there was a mechanical problem causing the bags not to sort fast enough.

Obsolescence was the major impediment to collecting that information. While the original conveyors and sortation devices were still up to the job, the mainframe computer, PLCs and proprietary control system that managed the information side of the system were long past their prime.

"Our biggest concern was that some morning the baggage handling system wouldn't start up because we couldn't get a part for the computer," Gargula explains. Work on a new controls system began in 2000, but was interrupted by the attacks on the World Trade Center.

AMERICAN AIRLINES

MYTH: AUTOMATION IS INFLEXIBLE.

REALITY: UPDATED SOFTWARE AND CONTROLS CAN BREATHE NEW LIFE INTO AN OLD SYSTEM.

VALUE: REAL-TIME, END-TO-END TRACKING OF BAGS ELIMINATES MISS-SORTS WITHOUT THE EXPENSE OF REPLACING AN EXISTING CONVEYOR AND SORTATION SYSTEM.

American Airlines

The system finally went live on July 15, 2003, after the remaining controls were replaced and tested.

The implementation took place at night, after the airport closed. "In effect, we replaced the mind of the system while the mechanics continued to operate," Gargula says.

That was accomplished by installing a parallel operating system at the start of the project. The interim system could communicate with both the existing PLCs and the new PACs that were being installed. That allowed the implementation team to do a piece-by-piece replacement of the outdated controllers with no

ical representation of the system that wasn't possible with the old controllers.

Tracking bags

When a passenger checks in at the ticket counter, American Airline's central host computer in Dallas generates information to create a baggage tag with a 10-digit bar code number. The tag, which is just like the license plate bar code on a pallet, is printed and applied to the bag.

The host computer then sends a BSM, or baggage sortation message, to the baggage handling computer at O'Hare. The BSM contains the flight information associated with the bar code number on the bag tag, including the location of the sortation pier assigned to that outbound flight. That determines the route that bag will take throughout the fulfillment cycle.

From the ticket counter, bags first pass through the baggage screening system operated by the Transportation Security Administration. Then it is placed on American's takeaway conveyor.

Behind the ticket counter, the bag passes through a scanner array equipped with multiple read heads capable of reading a bag from almost any angle.

When the tag is scanned, the system looks up the flight information associated with that bag in the local database and determines how to sort the bag.

Photo eyes and programmable controller logic now track the bag until it reaches the sortation area. There a pusher

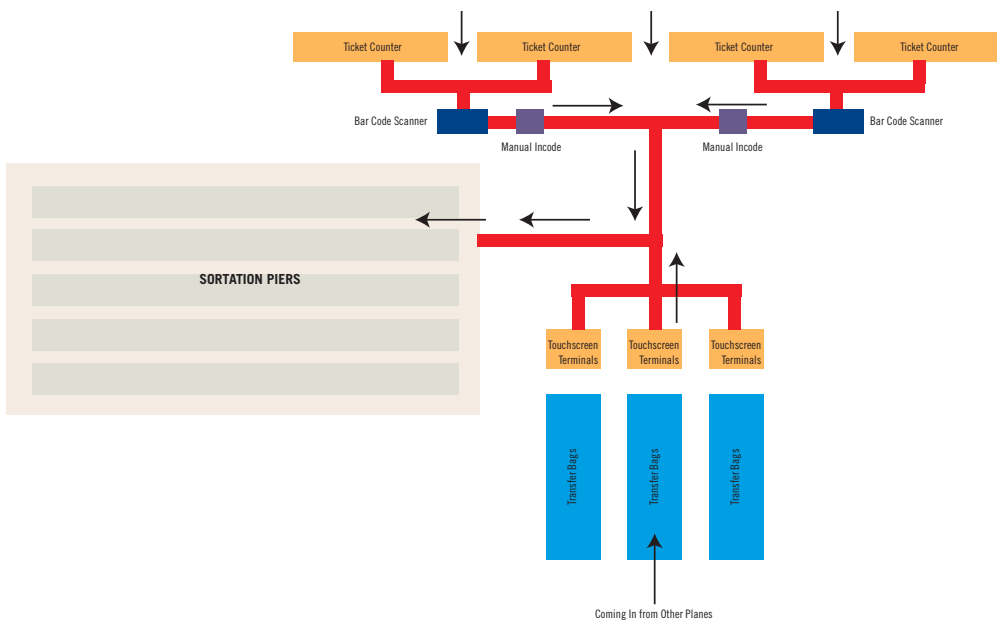
diverter sorts it onto the chute that will deliver it to the right pier. A typical trip takes about 8 minutes from the ticket counter to the sort piers.

From the sortation pier, bags are removed by hand, placed on carts, and delivered to the airplanes.

If a tag can't be read at the scanner array, it is diverted to a re-circulation conveyor. Those bags are scanned by hand, or the information is entered by manual keypad, and placed back on the conveyor. If a bag fails both an array scan and a hand scan, it automatically goes to a default pier where it can be handled manually. Operators look up the flight information and deliver the bag by hand to the right pier.

FROM TICKET COUNTER TO SORT PIER IN 8 MINUTES

Bar code labels with passenger and route information are attached to bags at the ticket counter. Those labels are scanned once the bags are placed on American's conveyor system, which determines how to route the bags. Once a bag reaches the sortation area, a diverter sorts it onto a chute that will deliver it to the right pier. A typical trip takes just 8 minutes.



down time. The implementation team would simply switch back and forth from the old to new system as wiring and controls were replaced.

"It was less expensive and less disruptive than replacing the entire conveyor system," says Gargula. "The only way to do that would be with a completely new building, which would be cost prohibitive."

The result is a combination of old and new: an existing conveyor system that still does the job, but with new baggage tracking, data collection and reporting capabilities thanks to state of the art controls. Those include hot control backup hardware in the event of a shutdown, and a live graph-

Eliminating bottlenecks

One key goal was to reduce the number of bags that go to the re-circulation area.

The system records the time and date when a bag is checked in at the ticket counter into a bag history database. Time and date information is also captured when a bag is scanned at the scanner array and when it is diverted at the sort pier. That allows American to measure how long it took the bag to reach each of those important milestones.

“With better tracking, we can now begin to identify, measure and eliminate baggage processing bottlenecks,” says Gargula.

That information is also used to trace bags globally. As the bags move through the system, those same significant progress steps are relayed in real time to the airline host system through a bag processed message, or BPM.

The airline host computer maintains a database of the steps and progress of all bags for tracking purposes. Likewise, other baggage systems at other airports report to the host to provide a beginning-to-end path report.



American's new system captures time and date information whenever a bag reaches an important milestone, like these sortation piers.

Beyond baggage tracking, the new controls also enable American to monitor the maintenance status of the system. Operators can watch for motor overloads that could shut down a key segment of conveyor, or for photos eyes that might be out of alignment, leading to mishandled bags.

“We’re anticipating a 20% reduction in the number of mishandled bags as a result of the new system, and we’ve already had several days with no bags that were sorted to the wrong pier,” says Gargula. “This has allowed us to expand our system, and extend the life of our system by at least another 20 years.” ♦

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